

TECHNICAL NOTE**PSYCHIATRY & BEHAVIORAL SCIENCE**

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Workplace Assessment of Targeted Violence Risk: The Development and Reliability of the WAVR-21*

ABSTRACT: This study describes the development of the WAVR-21, a structured professional judgment guide for the assessment of workplace targeted violence, and presents initial interrater reliability results. The 21-item instrument codes both static and dynamic risk factors and change, if any, over time. Five critical items or red flag indicators assess violent motives, ideation, intent, weapons skill, and pre-attack planning. Additional items assess the contribution of mental disorder, negative personality factors, situational factors, and a protective factor. Eleven raters each rated 12 randomly assigned cases from actual files of workplace threat scenarios. Summary interrater reliability correlation coefficients (ICCs) for overall presence of risk factors, risk of violence, and seriousness of the violent act were in the fair to good range, similar to other structured professional judgment instruments. A subgroup of psychologists who were coders produced an ICC of 0.76 for overall presence of risk factors. Some of the individual items had poor reliability for both clinical and statistical reasons. The WAVR-21 appears to improve the structuring and organizing of empirically based risk-relevant data and may enhance communication and decision making.

KEYWORDS: forensic science, workplace violence, threat assessment, violence risk assessment, targeted violence, workplace violence prevention, WAVR-21

Improving the assessment of workplace targeted or intended violence risk is a significant need for employers and assessment professionals alike. Targeted violence, a term originally coined by the behavioral scientists of the U.S. Secret Service, refers to situations in which an individual intentionally commits an act of violence against a preselected target, whether people or places (1). Also referred to as intended violence (2), these acts are potentially foreseeable, as they are the result of an understandable, evolving, and often discernable process of thinking, behavior, and preparation.

Targeted or intended homicidal violence in the workplace, although rare, is a catastrophic event. Perpetrators include disgruntled current or former employees, the rejected intimate partners of employees, or other outsiders such as customers or psychotically driven stalkers. Organizational leaders and their representatives in security, human resources, medical, and legal departments understand the possibility of targeted violence cannot be ignored, as there is no immunity—from either its roots in conflict, or the organizational hiring of the rare individual who would consider violence as a solution to occupational or personal problems. These incidents typically stem from real or

perceived disputes, conflict, and rejections, such as job and other employment losses or accumulated setbacks, domestic or intimate partner rejections, strongly held grudges, and extreme beliefs and attractions rooted in mental illness. The acts usually involve one victim, but on occasion multiple victims in a mass murder scenario (3). In either case, they may end with the perpetrator's suicide. They are commonly motivated by revenge and felt humiliation, but at times mix with other motives such as a quest for notoriety. Regardless of the objective level of risk of any case, the fear of violence and the disruption caused by real or perceived threats of harm are a common phenomenon, and especially frequent in organizations of moderate to large size.

Incidents of workplace-targeted homicide account for approximately 25–30% of the annual number of workplace homicides. Between 1997 and 2009, all workplace homicides in the United States accounted for the deaths of 8654 individuals (4,5). Although work-related homicides have actually decreased 40% since 1997 and represent a comparatively small portion of all workplace fatalities (11% in 2010), the losses are hardly insignificant. Most common, accounting for 70% of the total homicides between 2005 and 2009, is violence associated with the commission of other crimes, usually robbery (4,5). Typically committed by offenders who are strangers to the victims, and motivated by profit, these crimes occur in cash transaction businesses and work settings with high exposure to the public, and also include most fatalities of law enforcement personnel. In 2010, there were approximately 173 victims in the category of workplace-targeted homicide, or 34% of the total. More frequent than homicide are acts of nonfatal violence in the workplace—rape, sexual assault, robbery, and aggravated and simple assault. These may involve different motives and vary as to how

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personal or impersonal the perpetrator's relationship is with the targeted individual or group. In 2009 alone, approximately 572,000 nonfatal violent crimes occurred to individuals while at work or on duty. Those most at risk for nonfatal violence include law enforcement officers, security guards, mental health workers, bar tenders, and sales employees (4,5).

We refer to acts of workplace-targeted homicide as either "tail risk" or "black swan" (6) events. Both terms find their origins in the financial markets, the former describing very low probability events that are foreseeable, while the latter describe events which are extremely rare, unforeseeable, and may only be imagined by a few. The victims have either been specifically chosen beforehand, are opportunistically present at the time of the crime, or symbolically represent a source of blame or fear of attack for the perpetrator. Fundamentally, such acts are predatory—planned, emotionless, and offensive—rather than affective—reactive, emotional, and defensive (7). Affective and predatory violence have been shown to be biologically distinctive in mammals, including different neuroanatomical and neurochemical activation patterns (8). Workplace assaults are usually affective, but all acts of targeted violence are predatory.

The emergence of workplace mass murder and targeted violence as a broadly recognized social and occupational issue has given rise since the 1980s to the practice of workplace violence prevention or risk mitigation (9,10). Professional efforts in this subspecialty have contributed to the growing profession of threat assessment. The last 20 years have also seen the emergence of structured professional judgment instruments in the domain of violence risk assessment. Such instruments help the assessor organize data on a case, ensure that no relevant risk factors are ignored, and offer a coding criteria for assessing the presence or absence of each evidence-based factor in a particular case. Guidance is sometimes offered for summary judgment of risk. The instruments are intended to improve consistency and communication among responders and transparency of decision making. Ideally, they help assessment professionals provide a comprehensible "anchored narrative" to management or others who need to know about the subject: how, in light of past and present circumstances he or she is likely to respond to possible future events and scenarios (11). Although the instruments typically do not offer specific risk management advice, they ideally point the way toward interventions and actions to manage and reduce an identified subject's risk of being violent (12,13). Studies in clinical settings have shown that structured risk assessments are superior to "unstructured" clinical judgments in both interrater reliability and predictive validity (14). Similarly, studies of structured risk assessments have shown that the reliability and validity of assessments made using structured professional judgment guidelines are equivalent to those using actuarial or statistical instruments (15).

Heretofore, there has been no structured professional judgment instrument focusing upon targeted or intended violence in the workplace. Although risk factors have been identified and various lists of warning signs produced or proposed by practitioners and academics studying cases of completed workplace homicides, the field has lacked an evidence-based and systematic assessment tool. Two instruments were constructed, but not developed further or used widely in practice—the Employee Risk Assessment (ERA-20), which focuses on individual risk factors, and the accompanying Workplace Risk Assessment (WRA-20), focusing on workplace situational risk factors. They represent a good preliminary attempt to develop workplace-structured professional judgment procedures (16).

The primary focus of the WAVR-21 is to assess the risk of workplace-targeted homicide. Its secondary purpose is to capture and assess the risk, frequency, and severity of other forms of nonhomicidal workplace aggression such as stalking, disruptive anger problems, menacing behavior, and bullying. These manifestations of aggression alone are common and problematic in a workplace community and could also figure into the clinical understanding and management of a subject who may pose a risk of targeted homicide. This view is consistent with formulations of targeted violence as continuous, contextual, and dynamic (1).

The intended users of the WAVR-21 are mental health professionals qualified and experienced in the assessment of violence risk, and versed in workplace dynamics, policies, and relevant legal issues. Two supplemental coding tools have also been developed: a 12-item Short Form of risk parameters and a 7-item Protect Form of violence buffers. These forms do not contain clinical terminology, functioning as data organizing and screening instruments for users who are not mental health professionals or trained threat assessors. Such users are typically members of in-house threat management teams who collaborate with expert assessors on cases. Having objective, empirically based screening tools for nonclinical threat management team members addresses their obligation to more accurately identify cases of concern, which may then be subject to further professional assessment.

The most costly mistake employers or assessment professionals working on their behalf can make when addressing threat scenarios is to assess that an individual does not pose a risk of homicide or serious violence when in fact he does, as demonstrated by the subject subsequently committing such an act (a false negative). Assessment instruments and the assessment process are most desired to the extent they identify individuals within the moderate to high range of violence risk. Improving the accuracy of workplace violence risk assessments is also important due to the high false-positive rate of workplace threat cases—a threat is made but is not posed (17)—and the negative and costly implications of intervention decisions when employers overreact to the considerable volume of no risk or low-risk scenarios. In the workplace context, communicated threats *per se*, although they should always be taken seriously, are not very accurate predictors of violent outcomes. Threats may indicate actual *intent*—a crucial risk factor—but statistically they more commonly have other purposes or meanings; for example, to ventilate frustration ("I could just kill my boss!"), to manipulate others ("You'll be sorry if I'm ever demoted"), or to get attention ("I would never do it, but I can understand a guy coming in and shooting up his workplace"). The most frequent outcome in workplace threat assessment and case management, at least in large organizations where incidents of concern are fairly common and routinely screened or assessed, is the determination that the subject does not, after all, have homicidal intent, even though he or she may otherwise reveal fairly significant psychopathology, misconduct, or interpersonal issues. Finally, a workplace threat assessment instrument must incorporate the contextual and dynamic or changing nature of workplace threat cases: it captures both the possibility for escalation—an individual moves forward on what is widely recognized as a "pathway" (1) to targeted or intended violence; as well as de-escalation—an individual contemplates and perhaps prepares for violence but ultimately decides against it (2). All these considerations were taken into account in the formulation and construction of the WAVR-21.

Development of the WAVR-21

In light of the lack of a systematic and practical assessment scheme for assessment professionals assisting organizations, construction of the WAVR-21 was begun in 2004. It was to be a structured professional judgment instrument rather than an actuarial instrument for three reasons: first, the lack of large sets of statistical data on known risk factors for workplace-targeted violence; second, the projected use of the instrument as a risk management tool for targeted violence rather than a predictor of general violence risk; and third, the dynamic nature of threat assessment and violence risk. The latter aspect is often ignored in actuarial instruments, which usually assume that the probability of generic violence is static in nature. The method utilized was to study the existing literature on violence risk and threat assessment and cull from that large database risk factors that were either empirically or clinically related to violence, especially targeted violence. Included in our search were instances of workplace-targeted violence, and violence risk and threat assessment studies which could be applied to the workplace setting.

Modifications of some of these eventual evidence-based risk factors were made to heighten their application to the workplace. For example, a known risk factor related to violence, employment instability (18), was divided into two: Current Job Problems and Extreme Job Attachment, the latter risk factor assessing the degree to which the individual was unrealistically invested in his or her employment. Furthermore, violent thoughts, another known risk factor related to violence (19), were divided into three factors—Motives for Violence; Homicidal Ideas, Violent Fantasies or Preoccupation; and Violent Intentions and Expressed Threats—to highlight important differences in these internal characteristics of the subject of concern.

Two risk factors describe areas for assessment which are often disregarded: Situational and Organizational Contributors to Violence, and Stabilizers and Buffers Against Violence. These variables counter two important biases in violence risk and threat assessment: the overprediction of violence risk (20), and the tendency to attribute to others (not the self) the primacy of personality rather than environment causing behavior (21). A final variable, Organizational Impact of Real or Perceived Threats, is not a risk factor *per se*, but an indicator of the impact of any threat scenario on the employees in a workplace—an important issue in case management.

Certain characteristics of various personality disorders related to violence were also emphasized: important aspects of narcissistic psychopathology (22) were included in the risk factor, Entitlement and Other Negative Traits, and important aspects of antisocial pathology, or in extreme cases, psychopathy (23), were included in the risk factor, Lack of Conscience and Irresponsibility.

An important external source of workplace-targeted violence is that posed by a disgruntled or rejected partner of an employee who comes to her workplace and acts out violently. This is addressed with the item Domestic/Intimate Partner Violence. Assessment professionals may turn to additional guides, such as the Spousal Assault Risk Assessment Guide (SARA), for further assessment of a subject’s risk to his partner, but the WAVR-21 also attempts to assess his risk to her or others in her workplace.

The construction of the instrument resulted in 21 risk factors, some of which are static (unchangeable) and others of which are dynamic (changeable over time and/or intervention). Such risk factors have also been referred to as status and state variables, respectively (24). The first five risk factors for the instrument

are considered “red flag indicators” or critical items due to their proximal, if not causal relationship to targeted violence: (i) Motives for Violence, (ii) Homicidal Ideas, Violent Fantasies or Preoccupations, (iii) Violent Intentions and Expressed Threats, (iv) Weapons Skill and Access, and (v) Pre-attack Planning and Preparation. The WAVR-21 items, referred to as the WAVR-21 Grid, are listed in Table 1.

Each risk factor was elaborated upon in the WAVR-21 manual with a key assessment question, behavioral risk indicators, and an extensive narrative with references for further research by the user (25). The risk factors were coded at three levels: absent, present, or prominent, each with specific definitions. Initial coding was specified as absent/mild in 2007, but was changed in the second edition of the WAVR-21 published in 2010 to facilitate simpler and more reliable ratings. A fourth coding was introduced, recent change, to account for the dynamic nature of threat assessment and the need to continuously monitor change over time in a subject of concern.

In practice, each of the risk factors is examined by the evaluator in relation to the evidence for the other factors, relying on clinical judgment as well to reach an opinion of the current nature and severity of violence risk. For instance, does a jealous subject fixated on his wife at her workplace (captured by the item Domestic/Intimate Partner Violence) have access to firearms, or is he also paranoid, captured by other items on the WAVR-21? As with other structured professional judgment guides, the evaluator must integrate and weigh the evidence present for all of the WAVR-21 factors in formulating an opinion.

Interrater Reliability Study

Methods

A sample of 16 raters invited from the United States and Canada completed a 1-day training course in the use of the WAVR-21. The raters consisted of six police officers, six mental health professionals or doctoral students in forensic psychology, and four human resource professionals or police analysts. Experience ranged from 2 to 20 years.

Twelve cases were drawn from the files of the authors and other professionals not involved in the study, and stripped of all identifying information. Cases were deliberately chosen to vary in the nature and severity of risk posed. No outcome data were provided on any cases. Materials included such items as personnel records,

TABLE 1—WAVR-21 coding grid.

1. Motives for violence	12. Anger problems
2. Homicidal ideas, violent fantasies, or preoccupation	13. Depression and suicidality
3. Violent intentions and expressed threats	14. Paranoia and other psychotic symptoms
4. Weapons skill and access	15. Substance abuse
5. Pre-attack planning and preparation	16. Isolation
6. Stalking or menacing behavior	17. History of violence, criminality, and conflict
7. Current job problems	18. Domestic/intimate partner violence
8. Extreme job attachment	19. Situational and organizational contributors to violence
9. Loss, personal stressors, and negative coping	20. Stabilizers and buffers against violence
10. Entitlement and other negative traits	21. Organizational impact of real or perceived threats
11. Lack of conscience and irresponsibility	

personal interviews with perpetrators and victims, police reports, and mental health reports. All opinions regarding risk of workplace violence or recommendations for risk management were also removed. The amount of material varied considerably, from a few pages to several dozen pages. Cases were organized as e-files and provided to the participants in their professional settings within days of the training.

Each rater was randomly assigned 12 cases. Raters made WAVR-21 ratings independently, based solely on case materials and according to the instructions in the manual (25). Each of the items was coded on a 3-point scale: 1 = absent, 2 = present, 3 = prominent, but dichotomized to simplify the statistical analyses into 0 = absent and 1 = present or prominent. A summary index of presence ratings, formed by adding the dichotomized presence ratings together (theoretical range 0–21), was also determined.

Finally, two summary ratings of structured professional judgment were calculated for risk of workplace violence and risk of serious physical harm on a 4-point ordinal scale: 1 = low risk; 2 = moderate risk; 3 = high risk; 4 = imminent risk as defined in the manual, but simplified for statistical analysis into 3-point ordinal ratings: 1 = low risk; 2 = moderate risk; 3 = high or imminent risk.

Eleven raters eventually each completed all 12 cases, for a total of $N = 131$ sets of ratings. Interrater reliability was indexed using intraclass correlation coefficients for single ratings, ICC1, calculated using a mixed effects (absolute agreement) model. For ordered categories, ICC1 is mathematically equivalent to weighted kappa. We interpreted ICC1 values as follows: <0.39 = poor; 0.40 – 0.75 = fair to good; and >0.75 excellent interrater reliability.

Results

The distribution of presence ratings for individual risk factors, averaged across the 131 sets of ratings, is presented in Table 2. Only one risk factor had an extreme endorsement frequency, that is, rated absent or present in <10 or $>90\%$ of cases on average. ICC1 is also presented in Table 2. Interrater reliability was “excellent” for two risk factors; “fair to good” for 11 risk factors; and “poor” for the remaining eight risk factors. As the 8 risk factors with “poor” reliability also had low variability (all $SD <0.28$), it appears that the cases were not sufficiently diverse to permit meaningful statistical evaluation of interrater reliability for these items.

The distribution of overall presence ratings was sufficient to permit meaningful estimation of interrater reliability. As Table 2 indicates, the overall presence rating, which is the sum of the individual risk factor ratings, had “good” interrater reliability, $ICC1 = 0.67$.

The distribution of structured professional judgment for both risk of workplace violence and serious physical harm was also sufficient for meaningful estimation of interrater reliability. ICC1 for workplace violence risk was 0.58, and ICC1 for serious physical harm was 0.57, both in the “fair to good” range.

Post Hoc Analysis of Mental Health Professionals’ Reliability

An analysis of the five coders who were psychologists improved the reliability of the WAVR-21 as expected. Although the total number of cases was reduced to 60 (five ratings of 12 cases), the overall presence rating agreement was excellent ($ICC1 = 0.76$). Summary ratings for agreement of risk of

TABLE 2—Distribution and interrater reliability (ICC1) of WAVR-21 ratings: 11 sets of ratings for 12 cases ($N = 131$).

	<i>M</i> (SD)	ICC1 [95%CI]
Presence ratings		
Item 1	0.76 (0.34)	0.57 [0.37, 0.81]
Item 2	0.43 (0.38)	0.53 [0.33, 0.78]
Item 3	0.63 (0.40)	0.61 [0.41, 0.83]
Item 4	0.36 (0.40)	0.61 [0.42, 0.83]
Item 5	0.31 (0.38)	0.61 [0.41, 0.83]
Item 6	0.73 (0.24)	0.22 [0.08, 0.49]
Item 7	0.66 (0.34)	0.45 [0.26, 0.72]
Item 8	0.36 (0.37)	0.53 [0.33, 0.78]
Item 9	0.77 (0.21)	0.17 [0.05, 0.43]
Item 10	0.73 (0.27)	0.29 [0.13, 0.57]
Item 11	0.67 (0.33)	0.42 [0.23, 0.70]
Item 12	0.73 (0.35)	0.56 [0.36, 0.80]
Item 13	0.12 (0.21)	0.33 [0.16, 0.62]
Item 14	0.51 (0.44)	0.71 [0.53, 0.88]
Item 15	0.53 (0.47)	0.81 [0.67, 0.93]
Item 16	0.45 (0.23)	0.15 [0.04, 0.40]
Item 17	0.73 (0.38)	0.65 [0.45, 0.85]
Item 18	0.33 (0.47)	0.91 [0.83, 0.97]
Item 19	0.35 (0.27)	0.24 [0.10, 0.53]
Item 20	0.51 (0.28)	0.23 [0.09, 0.51]
Item 21	0.83 (0.20)	0.19 [0.06, 0.46]
Total	11.48 (3.35)	0.67 [0.47, 0.86]
Ratings		
Workplace violence	2.04 (0.65)	0.58 [0.38, 0.81]
Serious physical harm	2.02 (0.66)	0.57 [0.36, 0.81]

workplace harm and serious violence were good ($ICC1 = 0.65$ – 0.66). Reliability was excellent for two individual variables, and fair to good for 13 variables. Reliability remained poor for six variables: Loss, Personal Stressors, and Negative Coping; Depression and Suicidality; Isolation; Situational and Organizational Contributors to Violence; Stabilizers and Buffers Against Violence; and Organizational Impact. Reliability among the psychologists for the five red flag indicators had a greater range, $ICC1 = 0.41$ – 0.74 , than the reliability range for all the coders.

Discussion

The first five “critical items” of the WAVR-21 had consistently “fair to good” reliability ($ICC 0.53$ – 0.61) across all the coders. These “red flag indicators” are particularly important, because together they signal a high to imminent risk case that requires immediate case management. They are proximal and dynamic risk factors and are closely associated with other accelerating and dynamic warning behaviors in targeted violence (26).

Eight Additional Risk Factors Had “Fair to Good” to “Excellent” Reliability

Other risk factors, however, had poor reliability, and half of these required clinical judgment: Loss, Personal Stressors and Negative Coping, Entitlement and other Negative Traits, Depression and Suicidality, and Isolation. Besides the insufficient diversity of coding on these items, scrutiny of the cases utilized after determination of the reliability ICCs indicated that there was a paucity of clinical data in the case reports, and within the WAVR-21 manual (25), the authors required that a licensed mental health professional who is also a threat assessor be the one who completes the WAVR Grid—all of the 21 items—in consultation with other members of the threat assessment team. Only a minority of

our raters were mental health professionals, and the majority were nonmental health professionals whom we instructed to complete the WAVR Grid. When we analyzed a subgroup of raters who were psychologists, reliability improved, but remained poor for three clinical variables: Loss, Personal Stressors, and Negative Coping; Depression and Suicidality; and Isolation. The other three variables with poor reliability were social constructs—Situational and Organizational Contributors to Violence, Stabilizers and Buffers Against Violence, and Organizational Impact of Real or Perceived Threats. Such constructs are novel, but given these reliability data, they should be coded with caution and may require further refinement. Such refinement did occur in the case of the item stabilizers and buffers against violence, in the form of an adjunctive short form “Protect,” which was developed following the completion of this study.

Despite these risk factor shortcomings in some cases, the overall presence rating had good reliability—excellent reliability with only the psychologists—and the judgment ratings for workplace violence risk and serious physical harm also had fair to good reliability. These summary judgments are the ones upon which threat assessment teams will rely to plan and implement intervention strategies; therefore, general agreement is crucial. The imminence of the case is judged by the first five risk factors; likewise, general agreement is critical for reasonable risk mitigation if some of these five risk factors are present.

This is likely a lower-bound estimate of the interrater reliability of ratings made using the WAVR-21 for three reasons: first, the raters had limited to no training and experience in the use of the instrument and were actually training with the cases. Second, the case materials were necessarily limited in quantity and quality—attenuated by necessity given the nature of the task. And third, the majority of the raters were not mental health clinicians.

These summary findings are similar to those obtained using other structured professional judgment guidelines for assessment of risk of general violence (HCR-20, SAVRY), intimate partner violence (SARA), and risk of sexual violence (SVR-20, RSVP) (27–31). They indicate that the WAVR-21 can be used by a wide range of professionals, with a wide range of experience, to make ratings, especially for “red flag indicators,” summary judgments of risk, and overall risk presence with good to excellent interrater reliability.

Conclusions

Structured professional judgment is a method to improve assessment and decision making for workplace threats of targeted or intended violence, given its dynamic nature, inherently incomplete database, and the need to bring evidence-based guidelines to this context. Moreover, clinical judgment remains a crucial element of threat assessment (14) given the importance of the psychology of the subject of concern and the need to individualize each assessment, something not accounted for by actuarial instruments.

Cognitive errors are endemic in human beings, and threat assessment professionals and the threat management teams they assist are no exception (32). Structured professional judgment instruments such as the WAVR-21 may attenuate such errors by anchoring decision making to evidence-based and meaningful behavioral and motivational risk factors. Such instruments also provide a template for organizing training and education about violence risk and threat assessment among decision makers from various professional backgrounds, often including security,

mental health, legal, human resources, and corporate management personnel.

Further research, moreover, is indicated. The WAVR-21 shows promise, but needs further testing among mental health professionals involved in occupational and higher educational settings to determine the reliability of the clinical risk factors. The usefulness of the instrument will also need to be tested through the investigation of its construct, criterion, and predictive validity beyond the testimonials of individual users of the instrument. Such research designs are difficult, but not impossible, given the interplay of threat assessment and threat management in the real world of the workplace and employment.

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