

Predictive Analytics and Risk Assessment: A Logical Response to Intimate Partner Homicide

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Introduction:

Predictive analytics has been around for a long time, oftentimes used interchangeably with descriptive analytics and data mining. It is commonly used in the realms of marketing, retail, education, health care, and law enforcement, among others. Conceptually, predictive analytics refers to a set of technologies that uncovers relationships and patterns within large volumes of data used to predict behavior and events. Specifically, it involves the use of data, statistical algorithms, and machine learning techniques to identify the likelihood of future outcomes based on historical data (Wiley, 2013). In the realm of criminal justice and its response to intimate partner homicide (IPH), predictive analytics can lead to the construction of risk-assessments (a.k.a. lethality assessments). In its simplest form, predictive analytics is forward-looking, using past events to anticipate future behaviors.

Before looking forward, however, we need to look backwards. Nearly three decades ago, one of the earliest findings concerning IPH suggested that the most dangerous time in a relationship, where the risk of intimate partner homicide was highest, was when a victim of domestic abuse tried to leave the relationship (Bernard, Vera, Vera, & Neuman, 1982). Some have labeled this a 'retaliation effect, oftentimes triggered by an intervention—such as a restraining order, arrest, or shelter protection—that angers or threatens the abuser without effectively reducing contact with the victim (Dungan, Nagin, & Rosenfeld, 2003). Today, IPH remains one of the leading causes of death to women in the United States. It is estimated that one-third of female murder victims aged 12 or older are killed by an intimate partner compared to roughly three percent of male victims (Fox & Zawitz, 2007). In effect, women are killed by intimate partners—husbands, lovers, ex-husbands, or ex-lovers—more often than by any other category of killer. These numbers alone are enough to compel researchers and practitioners to proactively identify victims who stand an increased risk for assault, re-victimization, and homicide. Clearly, determining one's

risk for lethality carries important implications in terms of developing safety plans, criminal justice interventions, and treatment options for victims of domestic violence. This requires practitioners to embrace the value of data and become proficient in using risk assessments that result from predictive analytics. Overall, these might assist victims in realizing the danger and gravity of their situations while enabling practitioners to validate potential factors that could reliably predict and warn of lethal outcomes.

Despite the wisdom and apparent utility of risk assessment instruments, however, little is known about their reliability in predicting dangerous outcomes or the extent to which criminal justice practitioners rely on these when making decisions that potentially impact the lives of many victims. For example, researchers have identified key risk factors such as attempted strangulation, stalking, and threats with weapons as correlates and potential predictors of increased violence, including homicide (Campbell, 1986; Echeburúa, et al., 2009). Recognizing when these factors are present, justice practitioners can conduct a risk assessment in either injunction proceedings, the time of arrests, prior to bail decisions, or when developing safety plans for victims fleeing abusive relationships. Similar measures are already taken in the monitoring and surveillance of sex offenders.

Risk Assessments:

Conventionally, there are three methods (or approaches) used when assessing one's risk for violent victimization (i.e., danger): unstructured clinical assessments, actuarial assessments, and structured professional assessments. Unstructured clinical predictions are based on the professional's training, experience, and observations of a specific client. A clear advantage of this method is that it allows for individualized tailoring of safety planning and prevention strategies in a victim-context situation (Hilton, et al., 2008; Kropp, et al. 1999). A disadvantage, however, is that the method lacks rigor and raises questions concerning its reliability,

validity, and accountability.

The actuarial method, in contrast, involves predicting someone's behavior based upon how others have acted in similar situations (actuarial). According to Kropp (2007) this method is used to predict relative violence by comparing an individual to a norm based reference group. It also predicts absolute violence by providing a precise, probabilistic estimate of the likelihood of future violence. A major limitation of this method, however, is its failure to consider unique, unusual, and context-specific variables that might require intervention (Hart, 1998).

In response to limitations associated with unstructured clinical assessments and actuarial methods, there is middle ground in the form of 'structured professional judgment.' The term 'professional' is used for the non-clinical practitioners who are frequently required to conduct an assessment (Kropp and Hart (2000) These would include judges, police officers, victim advocates, and probation officers, among others. This approach does not impose any restrictions for the inclusion, weighting, or combining of risk factors. Rather, the primary goal is to identify risk and eliminate the prospect of harm.

There are several existing risk assessment scales, all of which have similar content and some of which have established psychometric reliability. One of the best-known tools is the Danger Assessment developed by Jacquelyn Campbell in 1985 (and revised in 2009) for use by health personnel in consultation with women to 'enhance women's self-care agency.' The goal of this and most danger assessments is to prevent violence by any means necessary. Other scales include the Domestic Violence Screening Inventory (DVSI) which contains 12 social and behavioral factors found to be statistically related to recidivism by domestic violence perpetrators on probation (Williams & Houghton, 2004). Added to this list are the Spousal Ontario Domestic Assault Risk Assessment (ODARA) (Hilton, et al. 2004) and the Spousal Assault Risk Assessment (SARA), one of the most widely used structured judgment tool for spousal risk evaluations (Kropp et al., 1995). It contains twenty items covering criminal history, psychological functioning, and current social adjustment.

A Case for Predictive Analytics:

To make the case for predictive analytics that inform risk assessments, my colleague and I conducted a secondary data analysis of domestic violence related homicides reported in Duval County, Florida. We applied Campbell's 20-item Danger Assessment Scale to examine four consecutive years (2008-2011) of domestic violence fatalities that were compiled by the Duval County Domestic Violence Fatality Review Teams. Our results suggest that there are many factors positively correlated with IPH—but five factors were far more salient and predictive. The first factor included actual or threatened use of a weapon (present in 92% of the cases). The second factor was an increase in the severity of violence over time (present in 64% of cases). The third factor was the use of a firearm (present in 60% of the cases). The fourth factor was the perpetrators' avoidance of arrest (present in 52% of cases). And finally, the fifth factor was when perpetrators either committed, tried to commit, or to threatened commit suicide (present in 40% of the cases), (see Ross & Kane, 2014). When applying this danger assessment to these 25 cases, we found that many cases (56%) rated the victim

at an increased risk for danger. Moreover, we discovered that 20% were rated at variable danger; 16% at severe danger, and 8% at extreme danger. In summary, eighty percent of these cases would have been rated at either an increased, severe, or extreme level of danger. Our findings reflect a history of violence that increases over time, encouraged by evading arrest by someone who has access to a gun, and who has threatened to use it on either the victim or himself. These results are also consistent with prior research concerning correlates of IPH. Sadly, based on these results, it is reasonable to conclude that had a danger assessment been used, it would have correctly predicted a lethal outcome in most of these cases. Typically, when such dangerous levels are present, victims are advised and asked to take proactive measures. These actions include anything from calling the police—or other criminal justice professionals, including prosecutors who can also recommend the highest bail, highest sentencing, and highest level of probationary supervision following an arrest.

In the case of IPH, we could hypothesize that the five factors are statistically correlated with an eventual re-victimization (i.e., IPH). Linear regression analysis would evaluate the magnitude of these correlations and find the right combination of variables and the best model. Theoretically, each variable (or factor) in combination with all relevant variables would explain a certain percentage (or degree) of variation in intimate partner homicide. Using that regression equation, the analyst can then use the regression coefficients—the degree to which each variable affects the IPH—to create a score predicting the likelihood of a fatal outcome. Essentially, the same factors that result from a regression model can be used in the construction of risk assessments for IPH. When done properly, law enforcement, criminal justice practitioners, and other victim service providers can utilize these results in hope of saving lives. This would paint a picture of predictive analytics in its finest hour, where its potential is most illuminated.

Despite the promise of proactive interventions and increased agency adoption of actuarial tools, research indicates that officers fail to connect the risk and criminogenic needs to keep offenders under constant surveillance. (Bonta, Ruge, Sedo & Coles, 2004; Lowenkamp, Latessa & Holsinger, 2006). This is very problematic as it might reflect a refusal of justice practitioners to acknowledge and incorporate standardized and well-established instruments in its daily practices. We all value experienced practitioners who interact daily with victims of domestic violence. We trust their judgment and we value their opinion and expertise. However, when scores die each year as the result of IPH, the resulting mounds of data lend itself to the benefits of predictive analytics, which can be used to positively identify potentially lethal outcomes. Moreover, predictive analytics is beneficial toward predicting recidivism, homicide, increased victimization, violation of restraining order, failure to appear, and the odds of following through on a court appearance. But none of this is possible without good data and agency leaders that appreciate and value statistical analyses, such as multiple linear regression the primary tool used for predictive analytics. Fortunately, some local law enforcement agencies already rely on state agencies to analyze criminal justice data and prepares statistical reports for policy makers, planners, and program developers. Many more need to do so.

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