



Matrix-Predictive Uniform Law Enforcement Evaluation Selection (M-PULSE™) Inventory

General Information

The Matrix-Predictive Uniform Law Enforcement Selection Evaluation (M-PULSE™) Inventory is an easily administered self-report measure that assesses the future job performance of law enforcement applicants. It was designed to measure a candidate's attitudes, values, beliefs, and behaviors related to law enforcement and its culture. The M-PULSE Inventory assists agencies, risk managers, and psychologists in sorting and/or hiring suitable individuals for law enforcement personnel, thus minimizing the potential of hiring individuals who violate the law, or the standards, ethics, or regulations of law enforcement agencies. By reducing the chance of hiring officers who demonstrate misconduct, agencies may reduce associated monetary and reputational liabilities, and may also maximize performance and efficiency in their public safety mission.

The M-PULSE Inventory is a pre-conditional liability risk assessment instrument that can be used either pre-offer, or post-offer during the hiring process. As a pre-offer tool, law enforcement agencies may use results from the M-PULSE Inventory with other sources of information to achieve a greater understanding of the nature of each candidate, and to provide comparisons to other candidates. Candidates may, therefore, be screened for liability risk potential. Agencies may find the pre-offer screening application of the M-PULSE Inventory to be an especially beneficial and valuable tool when the number of applicants exceeds the positions available.

As a post-offer tool, psychologists who use clinical decision-making methods for selection evaluations can use the M-PULSE Inventory as part of a battery of other instruments to predict more specific and detailed liabilities. Alternatively, the inventory can be used as part of the M-PULSE: Psychological Methodology developed by the authors. The M-PULSE: Psychological Methodology comprises the M-PULSE Inventory, in addition to a variety of other data-gathering tools, to provide a comprehensive post-offer assessment, involving the actuarial prediction of a candidate's exact liability potential across each of the 18 liability areas in law enforcement.

A differentiating feature of the M-PULSE is that its items were written to include terminology relevant to law enforcement culture, as well as the inclusion of scales specifically aligned with the California POST Psychological Screening Dimensions. Items for the POST scales were selected to ensure relevant content coverage and strong psychometric properties. Furthermore, the reading level for the M-PULSE (sixth grade) makes the instrument highly accessible for typical law enforcement applicants. To facilitate interpretation of M-PULSE results, all scores are converted to standardized *T*-scores and interpretation guidelines are provided (Davis & Rostow, 2008).

Another appropriate use for the M-PULSE is for follow-up assessment. In addition to the inventory, standardized follow-up forms are also available to agencies. The M-PULSE Follow-up Form can be used to track the liability-related performance of officers after they are hired, providing local and regional normative development that helps link the inventory to the local candidate population and agency.

More complete details regarding all information provided in this document are available in the M-PULSE Technical Manual (Davis & Rostow, 2008).

Legislative Compliance

The M-PULSE has been reviewed by independent legal counsel to determine appropriateness for use under the Americans with Disabilities Act (ADA), Title VII of the Civil Rights Act of 1964, and Equal Employment Opportunity Commission (EEOC) guidelines. The review states:

“We have reviewed Title VII, the ADEA, Executive Order 11246, as amended, the ADA and all published regulations and guidelines thereunder relating to employment testing, including the Uniform Guidelines on Employee Selection Procedures. Based on our review, it is our opinion that, as of the date hereof, the Inventory is not prohibited by Title VII, or any of the aforesaid EEO laws or published rules, regulations, guidelines and court decisions interpreting these laws where the Inventory is administered and interpreted in accordance with the directions in the Inventory’s User’s Manual.”

M-PULSE Scales

Validity Scales

The M-PULSE Inventory provides two distinct validity indices—Impression Management and Test Attitude. If either validity index score is elevated or unscorable, the M-PULSE Inventory results may be inaccurate and consequently may be considered invalid.

The **Impression Management (IM)** validity subscale consists of 16 items. Sample items include “I never drive faster than the speed limit” and “I have never told a lie.” Respondents who score high on this subscale may be responding in a socially desirable manner, or are trying to present themselves in an overly favorable and unrealistic way. They may be uncomfortable admitting to beliefs or actions that may be interpreted negatively and they may be reluctant to disclose personal information. They may also be trying to present themselves as better than others.

If an individual scores high on the IM subscale, then scores on all the other scales (i.e., Liability and Empirical) may appear more favorable than is appropriate. In general, scores in the high range strongly suggest that the rest of the test is invalid. Scores in the moderate to high range suggest that the rest of the test is suspect, or possibly invalid. It is, however, possible that an individual is overly virtuous and has actually led a life free from undesirable behaviors. If this is the case, scores on the IM scale may be verified by information collected in the background investigation.

The **Test Attitude** validity subscale consists of 4 items, and assesses individuals who are responding in a non-compliant fashion. Sample items include “I have not been paying attention to these statements” and “This test is not important to me and my responses are only guesses.” High scores are generally obtained by individuals who have a negative or unhelpful/uncooperative attitude toward the testing process. They may give little thought to their answers to the inventory, respond randomly, or “make up” answers as they go along. In general, high scores on this subscale indicate an “I don’t care about your test” attitude. As a result, other scores on the M-PULSE Inventory may be affected in unpredictable ways, and should not be relied upon as an indication of test-taker suitability.

Liability Scales

The search for behaviors that represented financial, social, and legal liability in the police environment began with a review of claims, litigation, and judgments against law enforcement officers, agencies, and municipalities. This was followed by conducting interviews with chiefs of police, sheriffs, and police executives to outline what they believed to be problematic behaviors among the rank and file of both sworn and non-sworn officers. These considerations lead to the 18 Liability Scales of the M-PULSE.

Results from the Liability Scales on the M-PULSE Inventory are probably the most pertinent at the pre-offer stage for prediction of future officer liability, because they are most directly linked to serious officer misconduct. These scales were generated by the ongoing follow-up of the post employment work history of law enforcement officers. Data were collected over a multi-year period on hired officers and then linked to responses on the inventory in order to generate the scales through regression analyses. It is extremely important to note that these scales are not intended to be used alone when making decisions about officer candidates. Although they provide useful correlations, these scales need to be combined with other information and form only one component of a comprehensive hiring process.

A high score on any Liability Scale indicates that there is some association between a candidate’s pattern of responses and the later risk of a future on-the-job negative outcome. Generally, a high score serves as a cautionary indicator about the individual. However, candidates whose approach to the testing involves positive impression management may produce uniformly low scores across these dimensions that have also been associated with problematic job performance. A brief description of the 18 liability areas is provided in Table 1.

Empirical Scales

The Empirical Scales were derived statistically by using factor analytic techniques with all items except the validity items. This procedure uncovers sets of items that share common variance and relate to

common themes or a common construct. Four major areas resulted from this analysis: Negative Self-Issues, Negative Perceptions Related to Law Enforcement, Unethical Behavior, and Unpredictability. Examination of the items underlying these factors indicated that they were logical but complex. The items from each area were then subjected to a secondary set of factor analyses that produced three subscales for each of the four main areas. All of the main scales and subscales seemed useful for assessment within policing contexts. The content properties of these scales were investigated by examining the correlations with other scales, as well as through examination of scale reliability. Higher scores are associated with greater concerns for the individual. A brief description of the Empirical Scales is presented in Table 2.

Table 1. Brief Descriptions of the M-PULSE Liability Scales

| Liability Scale | Brief Description of High Score |
|---------------------------------|---|
| Interpersonal Difficulties | At risk for problems with personal relationships, either on-duty (fellow officers, supervisors, general public) and/or off-duty (family, spouse, etc.). |
| Chemical Abuse/Dependency | At risk for problems associated with drugs and/or alcohol. |
| Off-Duty Misconduct | At risk for “conduct unbecoming of an officer”, including, for example, fighting, indiscretions, etc. |
| Procedural and Conduct Mistakes | At risk for frequent occurrences of procedural and conduct mistakes, including, for example, job-related administrative requirements regarding departmental policies, reporting, record keeping, etc. |
| Property Damage | At risk for failing to maintain, causing loss, or damaging official property. |
| Misuse of Vehicle | At risk for the inappropriate use of a police vehicle, including engaging in illegal or unauthorized activities with or in the vehicle, inappropriate chases, speeding, or reckless driving. |
| Motor Vehicle Accidents | At risk for being involved in an on-duty or off-duty at-fault motor vehicle accident. |
| Discharge of Weapon | At risk for firing a weapon in the line of duty (whether justified or not). |
| Inappropriate Use of Weapon | At risk for inappropriate use of a weapon, including firearm (excluding discharges), baton, or chemical spray. |
| Unprofessional Conduct | At risk for conduct that is inappropriate for an officer while on duty (e.g., verbal abusiveness, aggressiveness, rudeness, ethical violations). |
| Excessive Force | At risk for use of excessive force or inappropriate aggressive behaviors. |
| Racially Offensive Conduct | At risk for racially inappropriate behavior, e.g., racism or targeting a particular race in law enforcement. |
| Sexually Offensive Conduct | At risk for violation of sexual boundaries. |
| Lawsuit Potential | At risk for having a claim filed against him/her or for being sued. |
| Criminal Conduct | At risk of being arrested, charged, detained, or convicted of criminal activity or corruption. |
| Reprimands/Suspensions | At risk for receiving a formal written reprimand and/or suspension for breaches of acceptable conduct. |
| Potential for Resignation | At risk for resigning prematurely from the job as an officer. |
| Potential for Termination | At risk for being terminated for cause. |

Table 2. Brief Descriptions of the M-PULSE Empirical Scales

| Empirical Scale | Brief Description of High Score |
|--|---|
| Negative Self-Issues | Generally negative attitude towards one's self or policing, and/or an inflated sense of self-importance and disregard for authority. |
| Negative Emotions | Poor frame of mind; feelings of unhappiness; lack of self-confidence. |
| Egocentricism | May be described as arrogant; dislikes rules and authority. |
| Inadequate Views of Police Work | Lack of motivation; distorted view of what is involved in policing. |
| Poor Emotional Controls | Susceptible to temper outbursts; poor self-control; 'moody'. |
| Negative Perceptions of Law Enforcement | Poor attitudes towards law enforcement in general. |
| Inappropriate Attitudes About the Use of Force | Endorses the excessive or inappropriate use of force, coercion, or intimidation within law enforcement. |
| Overly Traditional Officer Traits | Possesses unrealistically or stereotypically masculine traits; views officers as 'combat soldiers'. |
| Suspiciousness | Excessively distrustful, cynical, and suspicious, often towards offenders, the justice system, or bureaucracies in general. |
| Unethical Behavior | Generally endorses morals and ethics that conflict with effective police work. |
| Lack of Personal Integrity | Comfortable with personally engaging in unethical behaviors (e.g., cheating, lying) as a 'means to an end'. |
| Negative Views of Department/Leadership | Is unhappy with or distrusts law enforcement systems; believes in the existence of an "us versus them" rift between lower- and higher-ranking officers. |
| Amorality | Is overly cynical of other officers; believes it is common for them to act unethically. |
| Unpredictability | Generally unpredictable; possibly displays irresponsible, impulsive, or erratic behavior; may be unreliable. |
| Risk Taking | Actions are motivated by thrill-seeking, excitement, and taking risks; potentially reckless. |
| Novelty Seeking | Becomes bored easily; dislikes routines; may have difficulty respecting schedules and appointments. |

Note: Primary Empirical Scales are listed in bold; secondary scales are listed beneath their respective primary scales.

California POST Scales

The M-PULSE Inventory includes 10 scales that are analogous to the Peace Officer Standards and Training (POST) screening dimensions that have been detailed by the California Commission (see Ones, Viswesvaran, & Dilchert, 2004). The results of this seminal work identified 10 dimensions across several psychometric instruments. These dimensions reflect areas of inquiry or understanding in law enforcement selection. The California POST manual requires police psychologists in that state to evaluate candidates with these 10 dimensions prior to making hiring decisions. These dimensions are likely to be a benchmark for pre-employment selection evaluations, and will have broad utility in the police psychology profession.

The M-PULSE Inventory POST scales are the same as the POST dimensions, only reversed (e.g., Social Competence on the POST becomes Social Incompetence on the M-PULSE Inventory). This reversal is done so that poor results are associated with high scores, and so that all the scales on the M-PULSE Inventory are consistent with each other. Brief descriptions of the M-PULSE POST Scales are provided in Table 3.

Supplementary Scale

The M-PULSE includes a supplementary scale that serves as an indicator for potential substance abuse issues. For this Substance Abuse Scale, high scores may indicate a proneness to behavior that is inappropriate or self-damaging (e.g., alcohol abuse, drug abuse, or gambling).

Table 3. Brief Descriptions of M-PULSE California POST Scales

| POST Scale | Brief Description of High Score |
|--|---|
| Social Incompetence | May have problems communicating with others in a tactful and respectful way. |
| Lack of Teamwork | May have problems working effectively with others to achieve goals. |
| Unreliability | May have problems maintaining diligent, reliable, conscientious work patterns. |
| Reckless-Impulsivity | May be predisposed to impulsive or risky behavior. |
| Rigidity | May handle change poorly, showing inflexibility or difficulty managing change or complex situations. |
| Lack of Integrity/Ethics | Opinions regarding morality and ethical situations seem questionable. |
| Emotional Instability-Stress Intolerance | May have trouble staying calm and composed in difficult situations. Coping skills for handling stress may be poor. |
| Poor Decision-Making and Judgment | May use impractical approaches to solving problems. May have difficulty sizing up situations and taking the proper action. |
| Passivity-Submissiveness | May be too submissive and yielding in situations and taking the proper action. |
| Poor Service Orientation | Does not show an active interest in helping others; does not go out of the way to help others, and generally doesn't show respect or compassion for others. |

Development of the M-PULSE

The development of the M-PULSE Inventory was driven by the need to develop a model that predicts specific law enforcement liabilities that can be embarrassing and costly to law enforcement agencies. It also took into account changes in employment law brought about by the Americans with Disabilities Act (1990) and other pertinent statutes. These changes required a shift from clinical judgment paradigms (which focused on mental illness and required highly trained medical specialists to employ) to predictive, statistical models of misconduct (which can be administered by human resources personnel) that predict liability potential with far greater accuracy and without discriminating against possibly disabled applicants who do not pose a liability risk.

The search for behaviors that represented financial, social, and legal liability in the police environment began with a review of claims, litigation, and judgments against law enforcement officers, agencies, and municipalities. This was followed by conducting interviews with chiefs of police, sheriffs, and police executives to outline what they believed to be problematic behaviors among the rank and file of both sworn and non-sworn officers. These considerations lead to the 18 liability categories used in the M-PULSE.

New items were created for the M-PULSE based on the authors' experience with, and in, law enforcement, in addition to sociological literature about police officers. The original item pool for the M-PULSE Inventory consisted of 1,100 items including statements that reflect police culture as well as more general behavioral and attitudinal statements. This pool was pared down to a final set of 455 items after removed items due to inconsistency with legal standards in some states for pre-offer usage (ADA, EEOC, and Title VII) as well as item redundancies.

Normative Sample

The normative sample consisted of 2,000 officer candidates who were administered the M-PULSE from 2003 to 2007. The average age of these officers was 29.1 (SD = 7.7, age range = 18 to 73 years), and about 70% were between 21 and 33 years of age. In terms of gender, 83.0% of the sample was male. In terms of ethnic background, 53.5% (n = 1,070) of the sample were White/Caucasian, 9.3% (n = 185) were Hispanic, 9.3% (n = 185) were Black/African-American, 16.5% (n = 329) were Asian, 4.1% (n = 82) were multi-racial, and 7.5% (n = 149) were other ethnicities or the ethnicity was not indicated. Data came from multiple sites across the U.S. with all of the major regions represented. In order to ensure that the representation was consistent with U.S. census figures some weighting of cases was used, resulting in a normative sample that matched the U.S. census within 0.02 percentage points for each geographic region. An additional 3,348 cases were collected and used for both assessing officers and for research and development of the M-PULSE Inventory, particularly the Liability Scales.

Gender and Ethnic Differences

Using the normative sample, all of the M-PULSE scales were tested for gender or ethnic bias. These analyses demonstrated that none of the scales met the Uniform Guidelines for adverse impact (the "four-fifths" or "80%" rule) between males and females or across ethnic groups (White, African-

American, Latino, and Asian). Relatively minor ethnic differences were found in the mean scores of two Empirical Scales, with White candidates producing higher mean scores than African-American and Asian candidates on the Negative Perceptions Related to Law Enforcement scale and White candidates producing higher mean scores than African-American candidates on the Overly Traditional Officer Traits scale.

Psychometric Properties

Reliability

Cronbach's alpha provides a metric for assessing the extent to which items from the same scale are consistently measuring the same construct. Desirable values of Cronbach's alpha vary depending on the number of items on the scale, the construct being measured, and the context that the measure is being used in. Generally speaking, Cronbach's alpha values above .80 indicate excellent reliability, values between .70 to .80 are very good, and values between .60 to .70 are satisfactory/good. The values shown in Tables 5.22 to 5.24 are based on the full sample ($N = 5,348$)¹ and indicate strong reliability for the Validity Scales, the Empirical Scales, and the POST scales. For the Validity Scales, the alpha value for Impression Management is .75, and the alpha value for the Test Attitude scale is .66. Both of these values indicate adequate reliability. For the Empirical Scales, the alpha values range from .67 to .97, indicating strong reliability. Finally, for the POST scales, the alpha values range from .74 to .93, also indicating strong reliability². Note that it is not appropriate to compute Cronbach's alpha for the Liability Scales since these metrics include actual scales and are not just item based. Complete results are provided in the M-PULSE Technical Manual (Davis & Rostow, 2008).

Factorial Validity: Empirical Scales

The Empirical Scales were determined through the use of factor analysis on the full data sample. Maximum likelihood factor analysis was used with Varimax orthogonal rotation. The number of factors for the factor solution was determined by examining the scree plot, eigenvalues greater than one, and factor interpretability. All 455 items were initially included in the procedure. However, items that did not load at .30 or higher on any of the factors were dropped and the analysis was rerun. This procedure was repeated until all items loaded at .30 or higher. Based on these criteria, a five-factor solution was determined to be the most suitable, but a four-factor solution was the end result. These four factors are the four primary Empirical Scales listed in Table 2³. Subsequent confirmatory factor analysis results supported this four-factor structure in an independent sample (Williams, 2013).

¹ Results for the normative sample were nearly identical to that of the full sample.

² The Supplementary Scale for Substance Abuse had an alpha value of .64.

³ The fifth factor consisted of Impression Management items and the Poor Emotional Controls secondary factor, the latter of which was moved to the Negative Self-Issues scale for conceptual reasons.

Predictive Validity: Liability Scales

A two-step approach was used in developing the Liability Scales. Step 1 involved determining which of the 455 items on the M-PULSE Inventory best predicted other liability risk metrics (from a detailed methodology used by the authors [Davis & Rostow, 2002]) across the 18 liability areas. Using this risk metric ensured that a continuous metric was available for this stage of the analysis. Forward stepwise regression analysis was used; in 18 different analyses, the 455 items were the possible independent variables, and each predicted risk metric was used as dependent variables. Items were allowed to enter into the equation as long as they added significantly to the prediction of the risk metric (dependent variable). This analysis produced M-PULSE Inventory item sets that best predicted each risk metric (from this alternate methodology). For each risk area, the model was highly significant and accounted for a sizable portion of the variance in methodology risk factor scores.

The item models created in the first step were then used in a second series of analyses (step 2). Each of these 18-item models were then used as a predictor in addition to the M-PULSE items to create final models for actual outcomes—the most important aspect of this tool. Eighteen different forward stepwise discriminant function analyses were run. For each analysis, the predictor from step 1 was forced into the model; also allowed into the model were items that added significantly to the correct classification of cases for the outcomes. The result was 18 final models that predicted each outcome with a very high level of prediction accuracy. The predictive accuracy of the Liability Scales has been subsequently replicated in an independent sample, and shown to be a more accurate predictor than various MMPI-2 scores (Williams, Davis, & Rostow, 2011).

References

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