Assessing Pretrial Risk without a Defendant Interview

Marie VanNostrand, Ph.D.
Christopher T. Lowenkamp, Ph.D.

November, 2013

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Background

Judicial officers across the country make release-and-detention decisions for defendants on a daily basis. These decisions carry enormous consequences for both the community and those accused of committing crimes. In some jurisdictions, judicial officers are guided in these decisions by pretrial risk assessments – tools that measure the risk that a defendant, if released pending trial, will fail to appear (FTA) for a court date or will commit new criminal activity (NCA). These assessments have shown promise in identifying those defendants who need to be incarcerated because of the risks they pose, and those who can safely be released, sometimes with conditions or supervision.

Although the use of pretrial risk assessments has increased in recent years, the proportion of jurisdictions employing these instruments remains low, and is estimated to be no more than 10%. This low adoption rate is due in large part to the fact that existing risk assessments require that information be collected through interviews with defendants. Conducting these interviews and verifying the information is a time-consuming and resource-intensive process that many jurisdictions cannot afford.

As of 2012, there were eight multi-jurisdictional pretrial risk-assessment instruments being used in the United States, all of which rely on information from defendant interviews. A meta-analysis of pretrial risk assessments revealed that the strongest predictors of FTA and NCA were static factors such as prior convictions, prior misdemeanors, prior felonies, and prior failures to appear. It also revealed that the more dynamic factors, such as residence and employment, were less predictive or not predictive at all. This fact, combined with the burden imposed by conducting defendant interviews, led to the current research, which explores whether an effective pretrial risk assessment can be developed based only on data that can be gathered without an interview.

Data for this research was drawn from Kentucky, which, at the time, was using the Kentucky Pretrial Risk Assessment (KPRA), an objective

REPORT HIGHLIGHTS:

- Release-and-detention decisions made by judges carry enormous consequences for both the community and those accused of committing crimes.
- Less than 10% of judicial officers across the country use pretrial risk assessment tools to make these decisions, in part because they require costly and time-consuming defendant interviews.
- A new pretrial risk assessment tool (the KPRA-S) has been developed to accurately differentiate low-, moderate-, and high-risk defendants, *without the burden of the costly defendant interview.*

12-point risk assessment that contained interview and non-interview factors. Two samples of data were used to explore three research objectives: 1) Develop a pretrial risk assessment that can be completed without a defendant interview; 2) Determine if the non-interview-based pretrial risk assessment is predictive of FTA and NCA at the pretrial stage; and 3) Validate the non-interview-based pretrial risk assessment on a secondary dataset.

Seven of the 12 KPRA risk factors were used to create a non-interview-based risk assessment: the KPRA-S. Using bivariate and multivariate statistical techniques, the KPRA-S was shown to accurately differentiate low-, moderate-, and high-risk defendants. In addition, it was found to be able to predict both FTA and NCA as accurately as the full KPRA. These results were replicated on a secondary dataset.

BACKGROUND

Introduction

Judicial officers across the country make release-and-detention decisions for defendants on a daily basis. These decisions carry enormous consequences for both the community and those accused of committing crimes. A pretrial risk assessment is a tool intended to assist judicial officers with these decisions by measuring the risk of failure to appear (FTA) and new criminal activity (NCA) if a defendant were to be released pending case disposition (VanNostrand and Keebler, 2007).

The first pretrial risk assessment was used in the early 1960s in New York City to test the hypothesis that defendants could be categorized by the degree of risk they posed to fail to appear in court. The risk assessment, known as the Vera scale, was developed as part of the Vera Institute of Justice's Manhattan Bail Project (Mamalian, 2011). In the 50 years since that groundbreaking study, a substantial amount of pretrial risk-assessment research has been conducted. A review of the literature identified eight multi-jurisdictional pretrial risk-assessment instruments being used in Colorado, Connecticut, Florida, Kentucky, Ohio, Maine, Virginia, and the federal court system. An examination of these assessments, as well as other assessments developed and used in single jurisdictions, revealed that they all require information collected from defendant interviews, and that information must often be verified. In addition, the assessments use common factors to predict pretrial outcome, including:

- Current charge(s)
- Outstanding warrants at time of arrest
- Pending charges at time of arrest
- Active community supervision at time of arrest (e.g., pretrial, probation, parole)
- History of criminal arrest and convictions
- History of failure to appear
- History of violence
- Residence stability
- Employment stability
- Community ties
- History of substance abuse

A meta-analysis revealed that the strongest predictors of FTA and NCA were static factors such as prior convictions, prior misdemeanors, prior felonies, and prior failure to appear. In addition, the more dynamic factors such as residence and employment were less predictive or not predictive at all (Bechtel, Lowenkamp, and Holsinger, 2011).

As evidenced by the eight multi-jurisdictional pretrial risk assessments and the many single jurisdiction assessments, the use of pretrial risk assessments is growing. The exact number of jurisdictions that use pretrial risk assessments is unknown, but it is estimated at only 10%. This low adoption rate is due in large part to the requirement of defendant interviews, which are time consuming and resource intensive to conduct and verify. Even jurisdictions that allocate resources for the task cannot assess every defendant. In Kentucky, for example,

about one-third of all defendants are not assessed because they decline to be interviewed or provide information that cannot be verified.

The time-consuming and resource-intensive nature of interview-based pretrial risk assessments makes them prohibitive for many jurisdictions across the country. This fact, combined with the proven predictive nature of criminal history factors, leads to a logical question: can an effective pretrial risk assessment be developed without requiring a defendant interview to be completed?

This study is intended to explore this question. Data from Kentucky was selected due to the comprehensive nature of pretrial risk assessment in the state. Kentucky Pretrial Services was established in 1976. A division of the Administrative Office of the Courts, the program (one of the few state-wide unified systems in the country) operates around the clock in all 120 counties and has interviewed more than 2.7 million defendants since its inception. These interviews, performed within 12 hours of arrest, include extensive criminal history checks as well as collection and verification of ties to the community, and they are essential to the completion of the Kentucky Pretrial Risk Assessment (KPRA). The KPRA is an objective 12-point risk assessment used to assist in recommendations to the court on whether to detain or release a defendant pending trial.

Research Objectives and Questions

The study includes three (3) research objectives and five (5) related research questions as shown below.

1. **Develop a pretrial risk assessment that can be completed without a defendant interview.**

    a. Can a non-interview-based pretrial risk assessment be developed that accurately differentiates low-, moderate-, and high-risk defendants according to the overall Kentucky Pretrial Risk Assessment?

2. **Determine if the non-interview-based pretrial risk assessment is predictive of failure to appear and new criminal activity for defendants awaiting case disposition.**

    a. Does the non-interview-based pretrial risk assessment predict FTA?
    b. Does the non-interview-based pretrial risk assessment predict NCA?

3. **Validate the non-interview-based pretrial risk assessment on a secondary dataset.**

    a. Does the non-interview-based pretrial risk assessment predict FTA for a secondary dataset?
    b. Does the non-interview-based pretrial risk assessment predict NCA for a secondary dataset?

Datasets

The data used to conduct this research was provided by the Commonwealth of Kentucky. The primary sample used for research objectives one and two included all defendants arrested and booked into Kentucky jails between July 1, 2009, and June 30, 2010. This led to a sample size of 153,770 cases, 80,034 of which had a valid risk assessment and defendants who were released prior to case disposition. The dataset does not represent unique individuals, but rather includes all bookings within the study period. (Some individuals were booked multiple times within the timeframe; calculating a unique count of individuals could not be performed reliably,

as unique identifiers were missing in almost 10% of the cases.) All cases associated with the defendants in the sample reached final disposition.

To investigate the third research objective, a second data sample was drawn from cases booked into Kentucky jails between July 1, 2010, and December 31, 2011. This sample yielded a total of 209,306 cases, 109,633 of which had a valid risk assessment and defendants who were released prior to case disposition. Again, this dataset does not represent unique individuals, and all cases in the sample reached final disposition.

PRIMARY SAMPLE DESCRIPTION

Demographics

The vast majority of the working sample was male (74%). The average age of the defendants was 33.5, while the most common age was 21. Thirty percent of all defendants were 25 or younger, 25% were between 26 and 32, 19% were between 33 and 40, 18% were between 41 and 50, and 9% were 51 or older. The sample was 80% White and 18% African American, with other racial categories (Asian, Native American, and other) comprising less than two percent each.

Fifty-seven percent were single, 20% married, 16% divorced, and 7% separated. More than a third of the sample (34%) had less than a high school education, while a total of 43% had either a GED (13%) or a high school diploma (30%). Approximately 23% reported having some college or a college degree (some college = 17%, associate's = 2%, bachelor's = 3%, graduate degree = 1%). A very small portion (3%) of the sample served in the military.

Less than half (39%) of the sample reported being a full-time worker or a full-time student (35% and 4%, respectively), 31% were unemployed, and 30% reported an "other" status (e.g., disabled, retired).

Charge Information

A primary charge (the most serious) was identified for each defendant in the sample. The most common primary charge was drug related (23%), followed by theft/fraud (17%), and DUI (17%). Approximately 13% of defendants had a primary charge related to violence (including non-domestic violence, domestic violence, and sex offenses). Table 1 shows the breakdown of primary charges.

Table 1. Distribution of Primary Charge Category

CHARGE CATEGORY	N	%
Violent (DV)	10,098	7
Violent (Non-DV)	7,096	5
Sex Offense	980	1
Firearm	2,958	2
Drugs	34,502	23
Theft/Fraud	25,713	17
Traffic (DUI)	25,482	17
Traffic (Non-DUI)	17,173	12
Other Felony	5,226	4
Other Misdemeanor	18,288	12
Total	**147,516**	**100**

Pretrial Status

As noted above, the sample includes all cases in which a defendant was arrested and booked into a jail in Kentucky between July 1, 2009, and June 30, 2010. This time frame rendered a total of 153,770 records. Of this sample, 112,215 (73%) were released pretrial while 41,555 (27%) were detained until case disposition. The average length of detention was 7 days for defendants released pending case disposition, and 55 days for defendants detained pending case disposition. Of the 112,215 released pretrial, a total of 80,034 (71%) had a valid risk assessment conducted. Assessments could not be completed on the remaining 29% because the defendant posted a pre-set bond before the interview, declined the interview, provided information that could not be verified, or was homeless.

Pretrial Outcomes

Pretrial outcome is the success or failure of a defendant released pending case disposition. "Failure" includes failure to appear (FTA), arrest for new criminal activity (NCA), or bail revocation. "Success" means avoiding these pretrial outcomes.

Of all defendants with a valid risk assessment who were released pending case disposition, 90% appeared for all scheduled court appearances (10% FTA). Eighty-nine percent were not arrested for new criminal activity (11% NCA). Approximately 1% had their bail revoked for reasons other than FTA or NCA. Table 2 contains these outcomes.

Overall, 81% of all defendants in the sample were successful. Some defendants failed to appear and had an arrest for new criminal activity, which explains why the failure rate of 19% is lower than the sum of the three failure subcategories.

Table 2. Outcomes of Defendants Released Pretrial with a Valid Pretrial Risk Assessment

OUTCOME	N	%
Failure (any FTA, NCA, Revocation)	15,312	19
FTA	8,262	10
NCA	8,752	11
Revocation	677	1
Successful (No FTA, NCA or Revocation)	64,688	81

Risk Assessment

There are 12 risk factors on the current Kentucky Pretrial Risk Assessment (KPRA). Table 3 contains each risk factor, the response which indicates if it is the presence or absence of the factor that is considered a risk, the weight (points) assigned to the risk factor, and the percentage of defendants in the sample who had the risk factor present.

Table 3. Defendants with a Valid KPRA

RISK FACTOR	RESPONSE	WEIGHT	% PRESENT
Does the defendant have a verified local address, and has the defendant lived in the area for the past twelve months?	No	2	12
Does the defendant have verified sufficient means of support?	No	1	44
Is the defendant's current charge a Class A, B, or C felony?	Yes	1	13
Does the defendant have a pending case?	Yes	7	23
Does the defendant have an active warrant(s) for FTA? If no, does the defendant have a prior FTA on a misdemeanor or felony charge?	Yes	2	18
Does the defendant have a prior FTA on a criminal or traffic violation?	Yes	1	17
Does the defendant have prior misdemeanor convictions?	Yes	2	70
Does the defendant have prior felony convictions?	Yes	1	28
Does the defendant have prior violent crime convictions?	Yes	1	23
Does the defendant have a history of drug or alcohol abuse?	Yes	2	14
Does the defendant have a prior conviction for felony escape?	Yes	3	2
Is the defendant currently on probation/parole from a felony conviction?	Yes	1	9

The points for each risk factor are summed for a total risk score. The defendants were categorized as low risk (0 to 5 points), moderate risk (6 to 13), or high risk (14-24).

For the current sample, 68% were low risk, 29% moderate, and 3% high (see Figure 1). Figure 2 presents the failure rates for each risk category: 14% for low risk, 27% for moderate risk, and 38% for high risk.

Figure 1. Risk Category Distribution

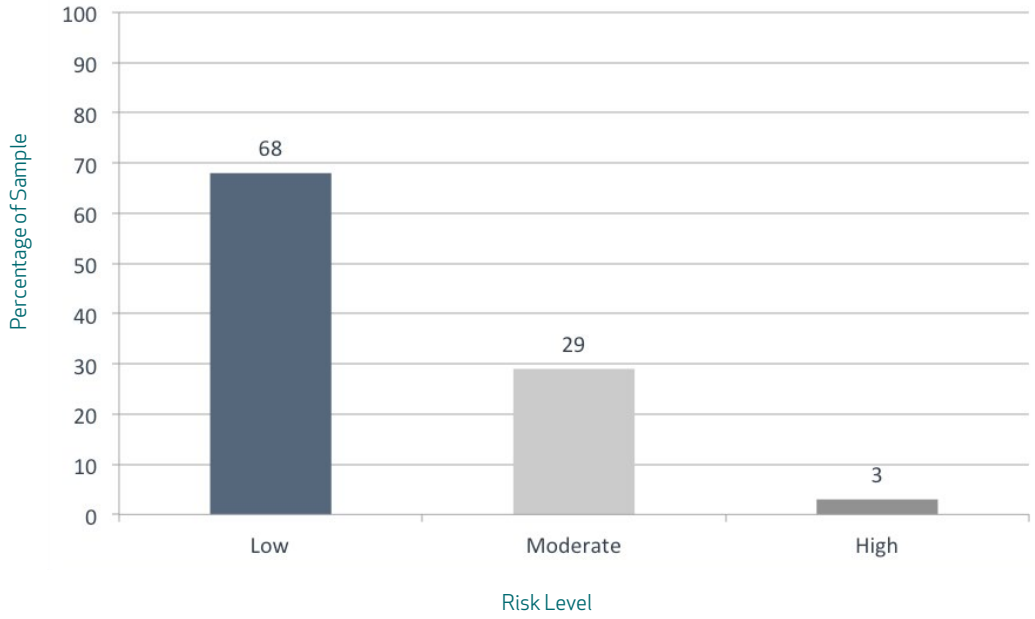
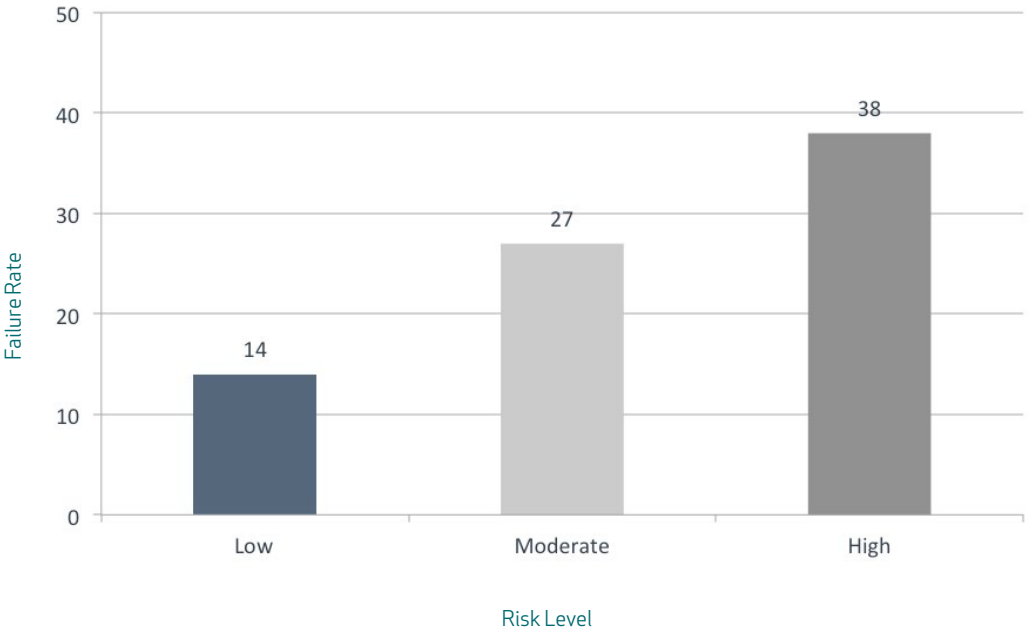


Figure 2. Failure Rate by Risk Category



RESEARCH OBJECTIVE ONE:

Develop a pretrial risk assessment that can be completed without a defendant interview.

Research Question

Can a non-interview-based pretrial risk assessment be developed that accurately differentiates low-, moderate-, and high-risk defendants according to the overall Kentucky Pretrial Risk Assessment?

Methods and Analysis Results

The first research objective required analyses of the non-interview-dependent factors contained on the KPRA. Of the 12 factors on the risk assessment, nine were related to criminal history and therefore available without a defendant interview. Table 4 contains the nine factors identified for testing.

Bivariate analyses were conducted to test the relationship between each of the criminal history factors and pretrial failure. Eight of the nine had statistically significant relationships with failure. Only seven of the eight statistically significant factors were selected for further testing and use because one factor (prior conviction for felony escape) was present in less than 2% of the cases and did not add to the overall predictive validity of the instrument. Table 5 includes the seven risk factors used to develop a non-interview-based risk assessment, hereafter referred to as the KPRA-S. The original weighting contained in the full KPRA is maintained in the KPRA-S.

Table 4. Potential Factors for KPRA-S

RISK FACTOR	RESPONSE
Is the defendant's current charge a Class A, B, or C felony?	Yes
Does the defendant have a pending case?	Yes
Does the defendant have an active warrant(s) for FTA? If no, does the defendant have a prior FTA on a misdemeanor or felony charge?	Yes
Does the defendant have a prior FTA on a criminal or traffic violation?	Yes
Does the defendant have prior misdemeanor convictions?	Yes
Does the defendant have prior felony convictions?	Yes
Does the defendant have prior violent crime convictions?	Yes
Does the defendant have a prior conviction for felony escape?	Yes
Is the defendant currently on probation/parole from a felony conviction?	Yes

Table 5. Non-Interview Dependent Factors Selected for KPRA-S

RISK FACTOR	RESPONSE	WEIGHT
Does the defendant have a pending case?	Yes	7
Does the defendant have an active warrant(s) for FTA? If no, does the defendant have a prior FTA on a misdemeanor or felony charge?	Yes	2
Does the defendant have a prior FTA on a criminal or traffic violation?	Yes	1
Does the defendant have prior misdemeanor convictions?	Yes	2
Does the defendant have prior felony convictions?	Yes	1
Does the defendant have prior violent crime convictions?	Yes	1
Is the defendant currently on probation/parole from a felony conviction?	Yes	1

Once these seven items were identified for inclusion on the KPRA-S, five risk categories were created from the new point scale, which ranged between 0 and 15 points. The categories (low, low-moderate, moderate, moderate-high, and high) were based on the overall distribution of scores as well as the interview-based risk categorization and overall outcomes. Low risk defendants scored 0 points, low-moderate 1-3 points, moderate 4-9 points, moderate-high 10-11 points, and high 12 or more points.

Once the KPRA-S score and categories were developed, analyses were conducted to determine if the KPRA-S placed the defendant in a similar risk category to the full KPRA.

Table 6 shows how the KPRA-S categories aligned with the categories on the full KPRA. All of the defendants in the low-risk category of the KPRA-S were also low-risk according to the full KPRA. Ninety-three percent of defendants in the low-moderate category of the KPRA-S were in the low category for the full KPRA, while 7% were in the moderate category. Twenty-nine percent of defendants in the moderate risk category of the KPRA-S were in the low category of the full KPRA, while 71% were in the moderate category and less than 1% were high risk. Eighty-seven percent of defendants in the moderate-high category of the KPRA-S were moderate on the full KPRA, while 13% were high risk on the full KPRA.

Finally, 47% of defendants in the high-risk category on the KPRA-S fell in the moderate risk category on the full KPRA, while 53% were high risk.

These results were not unexpected because the full KPRA assessment is largely driven by the same factors as the KPRA-S (i.e., criminal history and factors related to court appearance). Nonetheless, these results indicate that the seven items used to create the KPRA-S categorize defendants in a manner that is consistent with the full KPRA.

Table 6. Full KPRA and KPRA-S Comparison

	CURRENT KPRA CATEGORY		
KPRA-S	Low	Moderate	High
Low	100%	0%	0%
Low-moderate	93%	7%	0%
Moderate	29%	71%	<1%
Moderate-high	0%	87%	13%
High	0%	47%	53%

SUMMARY OF FINDINGS

Based on the analysis, it appears that a non-interview-based pretrial risk assessment can be developed that accurately differentiates low-, moderate-, and high-risk defendants. The consistency between the KPRA-S and KPRA was high, with a correlation between the scores on these two instruments of 0.96.

RESEARCH OBJECTIVE TWO

- Determine if the non-interview-based pretrial risk assessment is predictive of failure to appear and new criminal activity while awaiting case disposition.

Research Questions

Does the non-interview pretrial risk assessment predict FTA while awaiting case disposition? Does the non-interview pretrial risk assessment predict NCA while awaiting case disposition?

Methods and Analysis Results

For research objective two, the distribution of the sample, per the KPRA-S five-category model, was calculated. Figure 3 displays the percentages: 26% of the sample was low risk, 37% low-moderate, 25% moderate, 7% moderate-high, and 5% high.

The next analyses calculated the percentage of defendants who failed to appear for a court appearance, per their KPRA-S risk category (see Figure 4). "Stair-step" increasing failure rates are observed with each risk category. Specifically, 6% of low-risk defendants failed to appear, 9% of low-moderate, 13% of moderate, 15% of moderate-high, and 20% of high. The likelihood of FTA increases with each KPRA-S risk category.

Figure 3. Risk Category Distribution for KPRA-S

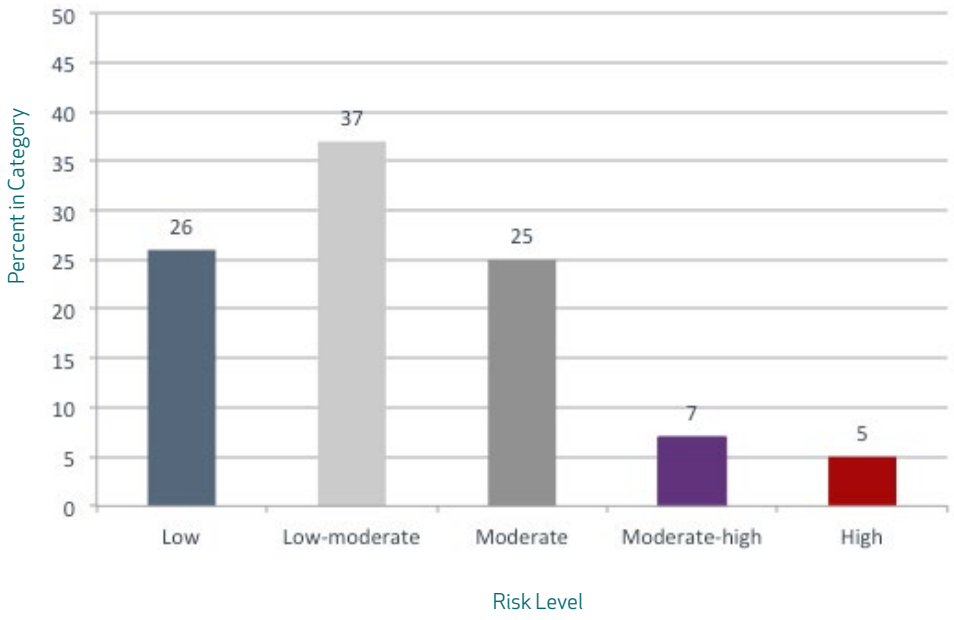
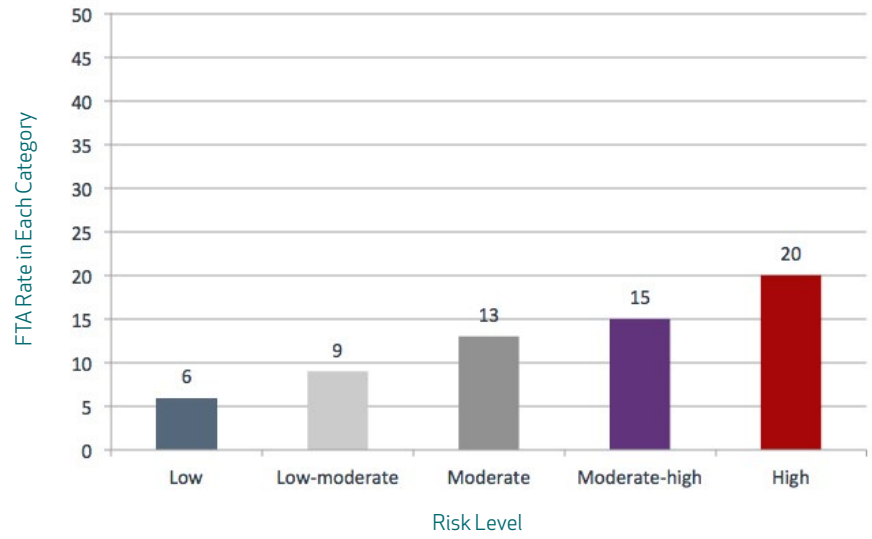


Figure 4. Likelihood of FTA for KPRA-S



The percentage of defendants arrested for NCA was also calculated per the KPRA-S five-category model. NCA rates for each risk category were similar to those observed for FTA. Figure 5 displays the percentages: 5% of low-risk defendants were arrested pretrial, 9% of low-moderate, 15% of moderate, 20% of moderate-high, and 23% of high. NCA, like FTA, increases with each KPRA-S risk category. These results begin to establish the predictive validity (albeit retrospectively) of the KPRA-S.

FTA and NCA were combined into a composite measure of failure, and similar "stair-step" results were observed as the risk categories increased. Figure 6 shows the percentages: 10% of low-risk defendants failed (FTA or NCA), 16% of low-moderate, 25% of moderate, 31% of moderate-high, and 37% of high. On all counts, as risk category increases, so does the likelihood of failure.

Figure 5. Likelihood of NCA for KPRA-S

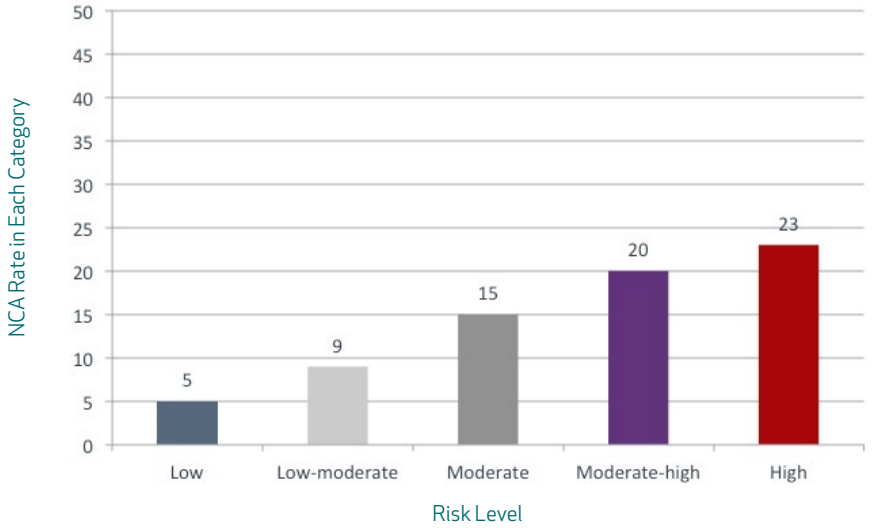
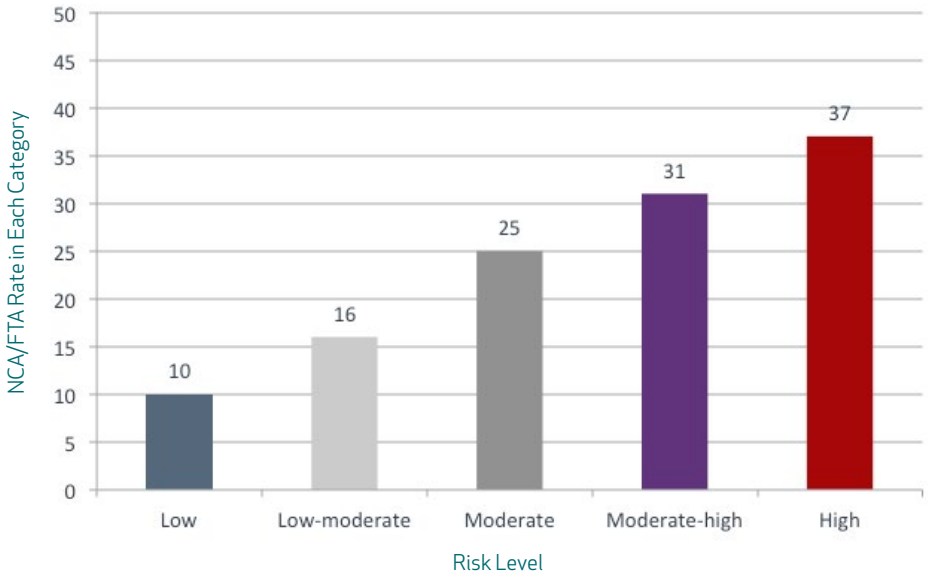


Figure 6. Likelihood of NCA or FTA for KPRA-S



The full KPRA and the KPRA-S were also tested by calculating a summary statistic – area under the curve for the Receiver Operator Characteristics (AUC-ROC).[1] These analyses further test the predictive validity of each assessment, beyond the percentages displayed above. The AUC-ROC value between the full KPRA risk score and failure (FTA or NCA) was .6474, while the AUC-ROC value between the KPRA-S risk score and failure (FTA or NCA) was .6381. The AUC-ROC values are in the acceptable range, although neither met the commonly accepted target for risk assessment research of .7000. It is also important to note that the two values did not differ to a statistically significant degree. In short, the scales performed equally well.

Summary of Findings

Based on the analysis, the non-interview-based pretrial risk assessment was able to predict both FTA and NCA. The rate of FTA and NCA increased with each increase in KPRA-S risk category. When the measures of "failure" were combined (FTA and NCA), similar results were observed.

1 AUC-ROC is a summary measure that captures the association between two measures and is unaffected by the base rate of the outcome being predicted.

RESEARCH OBJECTIVE THREE

Validate the non-interview-based pretrial risk assessment on a secondary dataset.

Research Questions

Does the non-interview-based pretrial risk assessment predict FTA for a secondary dataset? Does the non-interview-based pretrial risk assessment predict NCA for a secondary dataset?

Research Methods and Analysis Results

A validation of the KPRA-S was completed using a second sample of data that included cases booked into Kentucky jails between July 1, 2010, and December 31, 2011. This sample yielded a total of 209,306 cases, 109,633 of which had a valid risk assessment and defendants who were released prior to case disposition. Again, the dataset did not represent unique individuals, but rather all bookings within the study period.

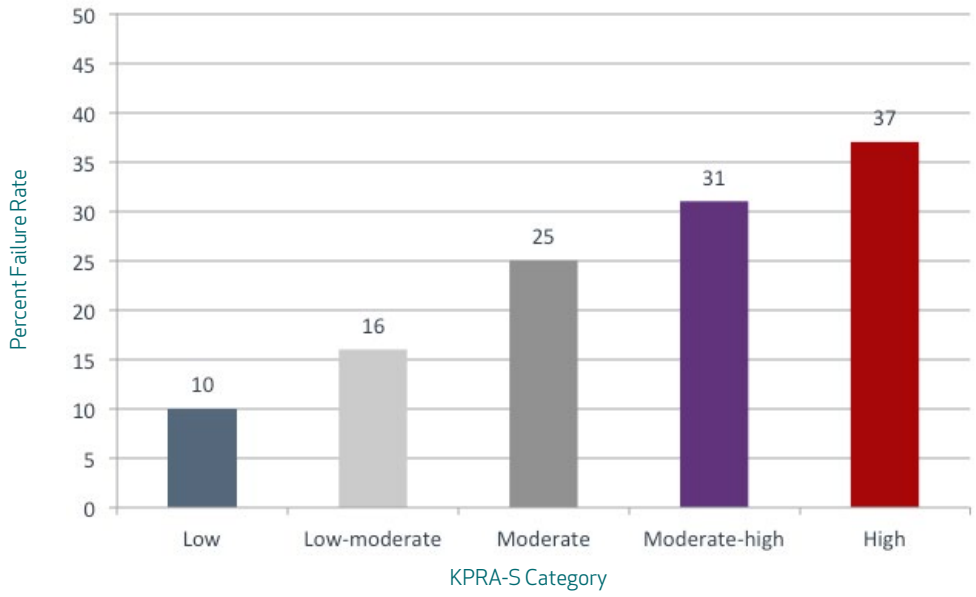
The KPRA-S was calculated for each of the 109,633 cases in the second working sample. The risk category was then used to predict failure (FTA and/or NCA) pending case disposition. The results from the primary and secondary sample were then compared. Table 7 presents the failure rates for each risk category as defined by the KPRA-S. The failure rates are again strictly increasing when moving from the low-risk to high-risk category.

Figure 7 presents a graphic display of the data found in Table 7. Regardless of outcome measure, an increase in failure rate is again noted when moving from one category to the next. This observation is a baseline test of whether the proposed classification instrument has predictive validity.

Table 7. Failure Rates by KPRA-S Category

	FAILURE RATE		
Risk Category	FTA	NCA	FTA OR NCA
Low (n = 26,536)	6%	5%	10%
Low-moderate (n = 36,491)	8%	9%	15%
Moderate (n = 30,418)	14%	14%	24%
Moderate-high (n = 8,724)	16%	17%	29%
High (n = 7,672)	22%	20%	35%
Total (n = 109,841)	11%	11%	19%
ROC-AUC Values	.64	.63	.62

Figure 7. Graphic Display of Failure Rates by KPRA-S Category



Figures 8 and 9 compare the primary and secondary datasets. The failure rates are strictly increasing with the risk categories for both datasets, and the failure rates are remarkably similar.

Figure 8. KPRA-S Likelihood of FTA

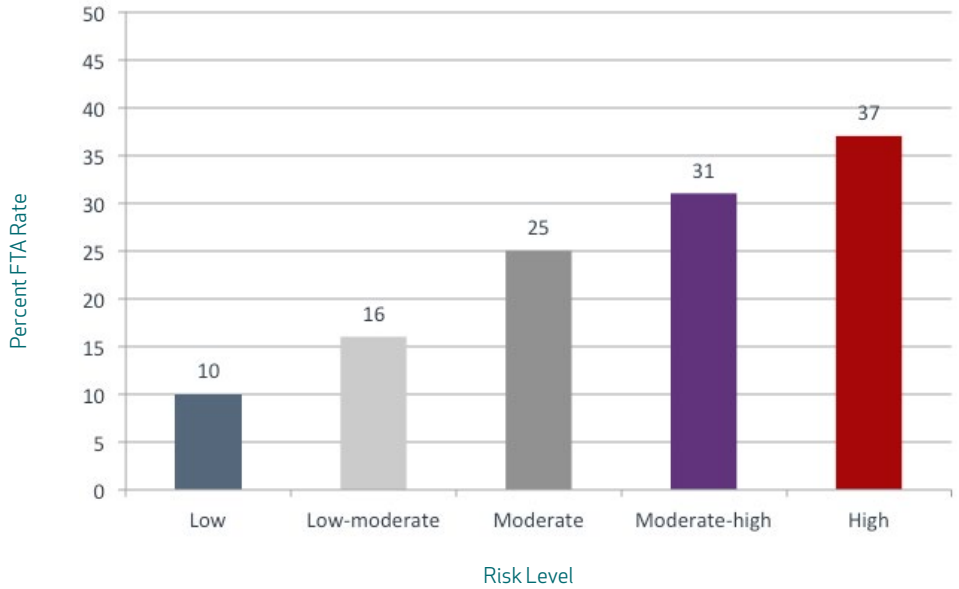
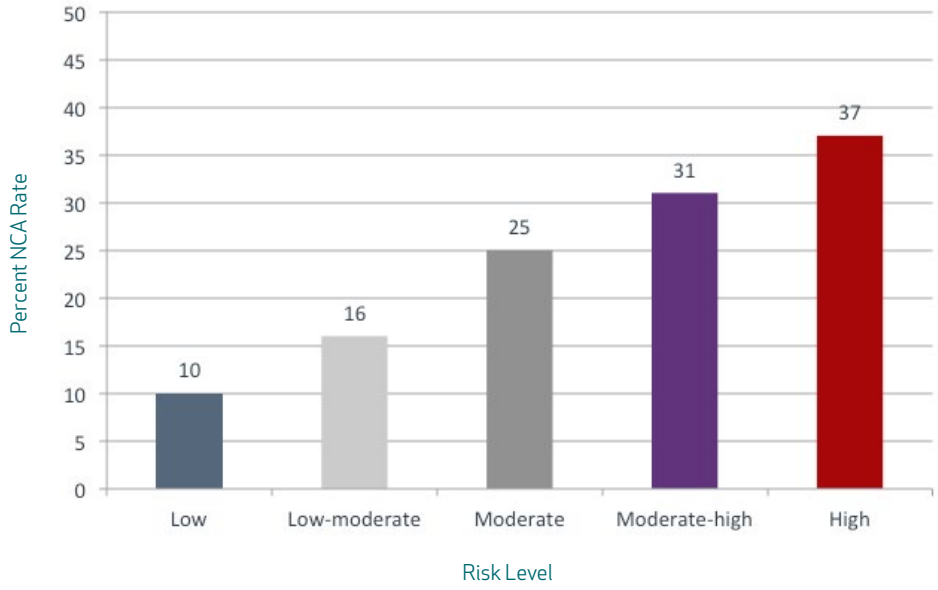


Figure 9. KPRA-S Likelihood of NCA



Comparisons of the AUC-ROC values were also made between the two samples of data. The AUC-ROC values when using NCA as the outcome measure did not differ significantly. The AUC-ROC values for FTA, NCA and FTA/NCA indicated significant differences, with higher AUC-ROC values for the secondary dataset. While the values were larger by a statistically significant margin, there was no practical difference in AUC-ROC values. In other words, the KPRA-S was as predictive with the secondary data sample as it was with the primary sample.

It is also valuable to assess how the KPRA-S compared to the full KPRA for the secondary data sample. AUC-ROC values for the secondary sample of data using the full KPRA were statistically larger than those generated by the KPRA-S, but the differences were less than .02, meaning the practical significance of the differences is questionable. To provide a quick assessment of the discriminatory power of the classification instruments and their associated categories, the prognostic separation index - PSEP (a simple measure of separation) was calculated. The PSEP measures the difference in failure rates between the best-performing and the worst-performing groups in a categorization scheme. For the full KPRA, the PSEP between the low- and high-risk defendants is .21. For the KPRA-S, the PSEP value is .25. The slightly higher PSEP for the KPRA-S indicates a greater separation in failure rates from the lowest to highest categories and thereby more practically useful classification outcomes.

Summary of Findings

The non-interview-based pretrial risk assessment predicted FTA and NCA for the secondary dataset. The rates of FTA and NCA increased with each successive risk category developed using the KPRA-S. Similar results were observed in the second dataset when the measures of failure were combined to include both FTA and NCA.The results demonstrate that the KPRA-S maintained its predictive power with the second data sample. In addition, the KPRA-S was shown to be as predictive as the full KPRA.

APPENDIX G – REFERENCES

Bechtel, K., Lowenkamp, C.T. & Holsinger, A.M. (2011). Identifying the Predictors of Pretrial Failure: A Meta-Analysis. *Federal Probation 75(2): 78-87.*

Mamalian, C.A. (2011). State *of the Science of Pretrial Risk Assessment*. Washington, DC: PJI.

VanNostrand, M. & Keebler, G. (2007). Our Journey Toward Pretrial Justice. *Federal Probation*, 71 (2).