

Assessment and Screening of Impaired Driving Offenders: An Analysis of Underlying Hypotheses as a Guide for Development of Validation Strategies

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Keywords: intervention, screening, rehabilitation, DUI, assessment

Abstract

Diverse screening and assessment techniques are used to make decisions about the interventions and sanctions that a detected impaired driver will receive. It is possible to discern several distinct underlying hypotheses that are the basis for most screening/assessment procedures, and these hypotheses have distinctly different implications for choice of validation strategies. Two primary hypotheses are *Risk assessment* and *Treatment matching*. Risk assessment hypotheses are shown to posit differences in base rates of risk, whereas *Treatment matching* hypotheses are shown to posit specific interactions that must be tested to establish the validity of the screening/assessment procedure. Most underlying screening rationales can be shown to be versions of one of these hypotheses. Failure to identify the underlying rationale and hypotheses for use of screening/assessment can lead to inappropriate choice of validation procedures. Each hypothesis is defined, and the necessary conditions for establishing validity under each hypothesis and common combinations of these hypotheses are developed.

Introduction

The growing trend toward court referral of impaired driving offenders to remedial programs such as treatment and education has fostered interest in screening and assessment techniques that would resolve practical questions such as which offenders need intervention and what kind of intervention is needed. For example, a major recommendation in recently developed uniform court guidelines (1) in the USA is that all DUI offenders receive assessment. Studies showing

that DUI intervention combined with licensing actions can reduce recidivism and crashes have provided further impetus for the development of screening techniques (2). Policy makers who must decide how to screen DUI offenders must choose from a confusing array of options and frequently seek from researchers guidance to choose the Abest® screening techniques for their purposes. They seek the most valid and reliable techniques available to achieve their goals but do not necessarily know how to evaluate technical information about screening options.

In order to make an appropriate choice, it is first necessary for both researchers and policy-makers to examine a question for which the answer seems obvious. Why screen DUI offenders? The answer may seem obvious because of an almost universal expectation that the use of screening will somehow lead to the reduction of drinking/driving behavior and alcohol crashes. However, the complete answer is more complicated, and failure to examine one's expectations about screening can result in confusion. All of us bring to the situation a set of expectations about the results of screening, and these expectations are keys to understanding how to best make screening decisions. These expectations are usually unstated and, therefore, untested assumptions; however, these expectations can and should be stated as testable hypotheses about the effects of screening. If the expectations are simply assumed to be true, as is often the case, we will never have the appropriate validity information to guide screening choices. Herein lies the dilemma for screening: the validity of the screening devices hinges on the adequacy of these far-reaching unproven expectations. If the expectations are wrong, then the validity (for the intended use) of the screening devices cannot be established. Alternatively, when stated as testable hypotheses, the specific expectations will be shown to determine the appropriate process for deciding whether a screening instrument is useful--that is the hypotheses will guide the validity information that is needed to evaluate screening devices.

What are the major types of expectations about screening DUI offenders? It is proposed that two basic sets of expectations underlie most screening efforts in the DUI population, although these are seldom articulated or tested. These sets of expectations are stated in the following sections as testable hypotheses. Conditions needed for testing each hypothesis are then discussed and are followed by a consideration of problems and obstacles to providing optimal tests. Finally, the practical implications of the hypotheses and tests of the hypotheses are considered.

Major hypotheses for screening are:

The Risk Assessment Hypothesis

- a. Offenders differ in their risk of subsequent drinking/driving incidents.
- b. It is possible to measure drinking/driving risk and to categorize DUI offenders according to risk (risk screening).
- c. At least one effective intervention to reduce risk exists (otherwise why bother to screen?).
- d. It follows that effective intervention will be expected to produce bigger benefits in the high risk group than in the low risk group. The following hypothetical example illustrates the point: Assume that a low risk offender has a 10 in 1000 chance of drinking/driving; a high risk offender has a 500 in 1000 chance of drinking driving; and intervention will result in a 10% reduction in drinking and driving (that is, the effect of the intervention is the same for both risk groups). It would then follow that it is more productive for the high risk offenders

to receive the intervention than for the low risk offenders to receive the intervention. Returning to the example above, the intervention would prevent only one of 1000 low risk offenders from drinking driving but would prevent 50 in 1000 high risk offenders from drinking and driving. Note that it is NOT necessary to posit that intervention has a bigger effect (e.g., a bigger effect size) for higher risk individuals--according to the risk assessment hypothesis, it is simply the fact that the high risk groups are at higher initial risk of drinking and driving, which means that effective intervention will prevent the most incidents in the highest risk group.

Thus screening is justified by identifying a high risk group that will receive maximum benefit from intervention. This rationale would justify devoting more resources to the high risk group (e.g., putting high risk offenders into treatment and giving minimal or no intervention to low risk offenders), especially when resources are limited.

Similar hypotheses also underlie many programs that attempt to change drinking/driving by giving feedback about risk in that it is assumed that an offender at high risk of drinking/driving, when informed of the risk, will be more likely to act to reduce the risk. That is, the implied assumption is that offenders will be more likely to change their behaviors if they believe that their behavior has a relatively high probability of resulting in a drinking/driving incident or crash,

The Matching Hypothesis

- a. Different types of interventions will be maximally effective for individuals (in this case, DUI offenders) with different characteristics (3).
- b. Critical offender characteristics can be reliably measured, and based on these characteristics, different types of offenders can be identified.
- c. Interventions that are effective for the various offender types are available.

The main point of this hypothesis is that the effect of a particular intervention varies across offender types and the maximally effective intervention will differ for different types. Regarding intervention resources, priority should be given to identifying the critical characteristics of offenders, classifying them into treatment-specific types, and directing offenders to the most effective treatment, based on type. Specifications for and variations of the matching hypothesis have been reviewed for both the alcohol treatment literature and the literature on DUI remediation (3).

Hybrids

In reality, hypotheses that underlie many existing screening and intervention studies appear to be combinations of the risk assessment and the treatment matching hypothesis. This combination occurs when risk is treated as a matching variable. Assertions of this risk matching combination are:

- a. Offenders differ in terms of their risk of subsequent drinking/driving incidents
- b. It is possible to measure risk and to categorize individuals by risk level (risk assessment).
- c. Offenders at different risk levels require different types of interventions for maximal effect

(matching).

d. Interventions that are effective for different risk levels are available.

That is, it might be hypothesized that low risk offenders, but not high risk offenders, would benefit from DUI education, and that high risk, but not low risk offenders, will benefit from intensive alcohol treatment; therefore, the effect size for education and for intensive alcohol treatment will be different for low versus high risk groups.

Conditions for testing each hypothesis:

Risk Assessment

The key to testing the risk assessment hypothesis is the demonstration that within the population of DUI offenders it is possible to predict risk. Drinking/driving risk is usually measured by a drinking/driving indicator such as arrest recidivism or alcohol related crashes. Standards for validating risk screening instruments are needed. Statistics that permit comparisons across varying marginal distributions of criterion variables and across cut-points should be used for cross-study comparisons when a measure of subsequent risk, such as recidivism, is the criterion. Furthermore it must be demonstrated that DUI offenders can be meaningfully categorized into risk groups--that is, either that distinct risk groups exist or that there are logically meaningful ways to identify cut points to distinguish low from high risk groups. Although it is necessary to show that intervention is generally effective for DUI offenders (2), the risk assessment hypothesis does NOT entail a demonstration that an intervention has different effects for different levels of risk. That is, in regard to predicting outcomes such as recidivism the risk assessment hypothesis is a main effects hypothesis and not an interaction hypothesis.

Matching

From a technical perspective, the matching hypothesis has been shown to be an interaction hypothesis in contrast to the risk assessment hypothesis which is not necessarily an interaction hypothesis. However, the matching hypothesis has in common with the risk assessment hypothesis, at least for court referred DUI offenders, that the usual definition of intervention effectiveness is the reduction of drinking driving incidents.

So as not to repeat material available elsewhere an exhaustive discussion of all of the technical requirements for an adequate test of the matching hypothesis will not be repeated (3), requirements will only be summarized. It is necessary to prove both that (a) the critical types of offenders can be reliably distinguished and (b) at least one specific intervention has different effects for the different offender types--the effect size for the intervention must differ significantly across offender types. Although interaction effects are more difficult to test than simple main effects hypotheses, the validity of any screening instrument that is predicated on the matching hypothesis is ultimately dependent on a complete test of the specific matching hypothesis itself. Few examples of actual tests of the matching hypothesis exist in the DUI literature, and most existing examples focus on the use of demographic variables as matching variables (3).

Hybrids

From a technical perspective, the hybrid or combination hypothesis predicts both a main effect (i.e., that base rates of subsequent drinking/driving will differ across different risk levels) and an interaction effect (i.e., that effect sizes for different treatments will differ across risk levels). It is necessary to show that risk levels and interventions interact. Effect sizes for one or more interventions must differ reliably across the identified risk levels. Even more complex combinations of the risk assessment and the matching hypothesis could underlie screening. For example it is often argued that the costs of interventions differ and that assertions could be made about benefit to cost ratios. These assertions would also need to be treated as testable hypotheses. To extend the above example, in addition to assuming that effect sizes and base rates (for subsequent drinking/driving) differ between risk groups, it could be posited that the high risk group requires expensive intervention options, such as alcohol treatment, for maximum effect while the low risk group would neither respond to nor require expensive interventions such as alcohol treatment. Low risk groups might, however, be hypothesized to respond to inexpensive options such as education.

Relative cost arguments coupled with different expected benefits of treatment across risk groups is often the unstated reason for sending high risk offenders to expensive alcohol treatment and low risk offenders to inexpensive educational programs or excluding low and moderate risk offenders from any intervention. It might be argued that even though intensive treatment is much more expensive than education, devoting resources to intensively treating high risk offenders in alcohol programs is more productive than educating low risk offenders because the benefits are greater (and outweigh the costs to a greater degree) within the high risk group. This argument would be based on a predicted higher base rate as well as a relatively larger effect size for the high risk as compared to a low risk group. For example, it might be hypothesized that either education or intensive treatment has a 10% effect for low risk offenders who have only a 10 in 1000 chance of recidivating (using numbers from an earlier example) without intervention, thus it could be expected that 1 low risk offender in 1000 would be prevented from recidivating if education were provided. On the other hand, in this hypothetical example, it is predicted that education would be ineffective but that intensive treatment would have a 30% effect size for high risk offenders who have a 500 in 1000 chance of recidivating without treatment ; thus 150 in 1000 high risk offenders would be prevented from recidivating if optimal (but expensive) treatment were provided. If the cost of treatment were less than 150 times the cost of education (say for this example the cost of treatment was 20 times higher than the cost of education), it could be argued that treating high risk offenders is more beneficial than either educating or treating low risk offenders. However, if this assertion about relative cost effectiveness is made, it must be tested too. It is likely that the hypothetical underpinnings of many well-known intervention studies, such as many of the ASAP/STR studies that are included in most reviews of the DUI intervention literature (2, 4), are similar to this example that posits different intervention effects for different risk groups as well as cost/ benefit ratios suggesting higher benefits for intervening with high risk groups. In fact, the hypotheses were treated as untested assumptions in many studies of DUI intervention effectiveness (4). Thus, designs for these studies did not permit tests of either the risk assessment hypotheses or the matching hypotheses or the cost/benefit assertions that were implied by the research. In a meta-analysis of DUI intervention

effects (2), when effects from existing studies were examined within risk groups across studies, the overall average effect of intervention appeared to be smaller in groups of low risk offenders (generally groups of first offenders or groups screened as low risk based on multiple criteria), but largest in designated moderate/high risk groups (typically defined as second or undifferentiated multiple offenders, or first offenders screened as higher risk on other criteria). However, upon closer inspection it was apparent that those in the moderate/high risk category were more frequently assigned to interventions that combined several modalities including education, psychotherapy, and some follow-up than were designated low risk offenders who were more likely to receive education only. The combination interventions were shown to be most effective regardless of risk group. That is, when low risk offenders did receive such combination interventions the size of the effect was equal to that for combination interventions in higher risk groups, thus risk designation and type of intervention received were shown to be confounded. This confounding of risk category and intervention assignment illustrates the problem that differential assignment to interventions on the assumption that some treatments are more appropriate for some risk categories not only precludes tests of the matching hypotheses but may have resulted in underestimates in general of the potential effects of intervention for so-called low risk offenders.

Discussion

Assessment information may be used in other ways such as in clinical judgements and interpretations during treatment. Although some of the above assumptions may underlie clinical judgements, such issues are beyond the scope of this paper. However, regardless of the use of screening and assessment information, it is clearly important for both researchers and practitioners to analyze their expectations about screening and assessment. In doing so they can determine what empirical information they need to verify those expectations and select screening/assessment criteria as well as develop appropriate intervention alternatives.

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