

A Sociological and Criminological Framework For Enforcement and Compliance Measures As Applied to Alcohol-Related Problems

Michael Klitzner, Ph.D.
Principal Social Scientist
The CDM Group, Inc.

Corina Sole-Brito
Research Scientist
Pacific Institute for Research and Evaluation

September 2002

Paper prepared for the National Institute on Alcohol Abuse and Alcoholism (NIAAA), National Institutes of Health (NIH), U.S. Department of Health and Human Services (HHS), as part of the Alcohol Policy Information System (APIS) under Contract No. N01AA12009 to The CDM Group, Inc. (primary contractor) and Pacific Institute for Research and Evaluation (subcontractor).

The non-U.S. Government information, opinions, data, and statements contained herein are not necessarily those of the U.S. Government or the National Institute on Alcohol Abuse and Alcoholism (NIAAA), National Institutes of Health (NIH) and should not be interpreted, acted on, or represented as such. Information about data sources for the measurement of enforcement and compliance of alcohol-related policies is provided here as a convenience for researchers. The list of sources is not comprehensive and no inference should be drawn from the inclusion or exclusion of a particular source.

INTRODUCTION

Sociology and its sub-discipline criminology offer two classes of theories related to enforcement and compliance; social control theories and decision-making theories.

Social control theories address the general topic of how groups (e.g., governments) control the behavior of members (e.g., citizens, organizations) and/or how more powerful individuals (e.g., doctors) control less powerful individuals (e.g., patients). The concept of “control” includes purposive and overt control (e.g., laws, sanctions, confinement), norms, values, and culture, and benevolent and self-serving control. Both those in control and those who are controlled may be aware or unaware that behavior is being directed, constrained, or otherwise manipulated.

Decision-making theories, as the name implies, attempt to explicate the mechanisms by which individuals process information inputs to decide among alternatives. These alternatives are primarily courses of action, although certain applications of decision-making theories relate to the formation of attitudes and impressions (e.g., perception of other people, political orientation).

It is important to note that social control theories and decision-making theories are not mutually exclusive. Rather, it is perhaps useful to think of social controls as addressing the conditions which motivate and shape compliance and decision-making theories as addressing the ways in which information about these conditions is (or is not) used by individuals or organizations. Thus, these two classes of theories can be viewed as complementary levers to advance understanding of the measurement of enforcement and compliance.

Both social control and decision-making subsume a number of specific theoretical formulations (there are perhaps half a dozen major variants of decision theory alone in sociology and criminology). We have attempted to provide broad coverage (within the limitations of space) of relevant social control and decision-making theories. To do so has made it difficult to arrange the discussion in a linear sequence of variables, applications, measurement issues, and applicability to APIS. This is because each specific theory or variant discussed under social control theories and decision-making theories modifies or expands the discussions that have preceded it.

SOCIAL CONTROL THEORIES

By far the most common application of social control concepts to enforcement and compliance are to be found in *deterrence theory*, which is of particular interest to APIS since it deals directly with social control within the context of laws and policies. Ross (1984) defines the central postulate of deterrence theory this way:

“Undesirable behavior will be reduced to the extent that the relevant public perceives the threatened sanctions as certain, severe, and promptly imposed.”

Ross observes that, despite its intuitive appeal, the literature on the effectiveness of deterrence is mixed. To clarify these findings, Ross examines the literature related to three components of deterrence; certainty, severity, and celerity. These three components, apparently developed by Ross (he cites no one else as having used them previously), have become part of the standard nomenclature of the deterrence literature.

Ross also notes that studies of drunk driving have failed to find an effect for severity. He argues that this disconfirmation of deterrence theory comes “in the context of a negligible likelihood of punishment” and “need be accepted as relevant only in this context.” He uses a subjective expected utility argument (Penalty x Risk of Being Punished; see below) to argue that a very low likelihood of punishment should be expected to vitiate any effect of severity. In contrast, he cites the “classical case” of successful deterrence; parking law enforcement, where the actual likelihood of punishment can be raised to a near certainty (Chambliss, 1966). Here, Ross argues that even small penalties contribute to effective deterrence when the actual likelihood of punishment is very high. Ross concludes that severity of punishment is generally irrelevant in practice (although it may become relevant when detection and punishment is relatively certain), and that certainty and celerity appear to be the important components of effective deterrence. In support of this contention, he cites his own studies of the British Road Safety Act of 1967 (Ross, 1977) as well as studies in New Zealand (Hurst and Wright, 1981) and Australia (Cameron et al., 1980).

The reader will note that Ross’s dismissal of severity relies on his concept of “certainty,” and that his argument conflates “certainty” with “severity.” It has been pointed out that, by conflating certainty and severity, Ross conflates laws and their enforcement.¹ For example, laws may dictate severity (e.g., mandatory revocations or jail time) but may also increase celerity or certainty (e.g., administrative license revocation [ALR]). Similarly, although enforcement efforts are clearly a major contributor to certainty, they may also increase celerity and severity through aggressive prosecution. These observations would pose no theoretical problems for Ross, since his discussions are largely of constructs rather than the specifics of their operationalization. However, blurring the distinction between laws and their enforcement complicates matters in the current search for measures of enforcement and compliance. Specifically, it suggests that measures of enforcement may often be composites of legal provisions and the activities of enforcement agencies, prosecutors, and the courts.

Although the deterrence literature is largely focused on criminal activity, the same concepts apply in a variety of other areas not generally considered criminal, e.g., compliance with health care regulations (Bartum and Bryant, 1997; Walker, 2002).

Deterrence is generally divided into two types. Criminologists distinguish between deterrence aimed at individuals (specific) and groups (general), while sociologists distinguish between deterrence aimed at convicted offenders (secondary or specific deterrence) and the general public (primary or general deterrence). These definitions do

¹ We are indebted to our GPO for pointing out this often overlooked issue.

overlap, and have some similar implications for measurement. For the current purposes, we will adopt the sociological terminology.

It is important to note that incapacitation (supervision, incarceration, a number of hybrids such as electronic monitoring, license revocation, etc.) are widely used forms of specific or secondary deterrence in the United States. Whatever effects incapacitation may have on individuals' propensity to engage in future crime, they are less likely to recidivate while incarcerated or under supervision.

Social control theories go beyond deterrence and suggest other variables that may impact compliance. Ross suggests the possibility of peer group influences and internalized standards of behavior (Grasmick and Green, 1980) and psychological characteristics of potential offenders (Zimring and Hawkins, 1973). To these, we would add norms (see Klitzner et al., 1988) and the opportunities or lack thereof for crime presented by different community environments (Skogan and Annan, 1993; Vingilis, 1990). Vingilis uses the easy availability of alcohol to youth and the prevalence of driving while intoxicated (DWI) offenses among youth as an example of an opportunity associated with the crime. Outside the alcohol field, examples include the increased opportunity for muggings when easy targets are readily available (e.g., the elderly, the chronically inebriated), the opportunities for drug dealing when streets are overgrown and poorly lit, the opportunity to obtain controlled substances which comes with working in a health care setting, and so on.

Vingilis (1990) suggests that "classical" deterrence theory (e.g., Ross) is only applicable to those individuals who are "inadequately" or "abnormally" socialized. She argues that the behavior of most citizens is governed by informal social sanctions. She cites two Scandinavian studies (Norstrom, 1978, 1981) in which agreement with the law and level of alcohol consumption were much stronger predictors of DWI than perceived risk of accident or arrest. Klitzner, et al. (1988) found the same effect using normative judgments instead of agreement with the law (these are essentially the same variable). Vingilis cautions that effective enforcement and deterrence are interactions among individuals and environments and that deterrence is dynamic, with the population who is deterred by a given enforcement activity constantly in flux.

Measurement From a Social Control Perspective

The effect of primary deterrence on compliance is generally measured by arrests among the general public. Such data suffer a number of limitations. In general, raw arrest rates provide neither a measure nor enforcement, but rather represent some amalgam of both (Gruenewald et al., 1997). However, a simple model can be built on the premise that arrests reflect both rates of violations and "enforcement pressure" (i.e., the effort expended by enforcement personnel in apprehending specific types of offenders or, more usually, all offenders). As noted by Gruenewald et al. (1997), a measure of full-time law enforcement officers provides a measure of the effect of enforcement pressure on measured arrest rates. This measure, while crude, offers increased precision in measuring enforcement (or crime) and is generally readily available. Wagenaar and Wolfson (1994) provide one example. Their enforcement models take two or more variables (e.g., arrests

and rate of officers per 100,000 population) and combine them into a single measure (a simple ratio in the example just given).

Secondary deterrence is measured as recidivism among adjudicated offenders (i.e., repeat offenses), including violations of probation and parole (e.g., Cohen, 1995). Here again, arrest data are commonly used. Convictions may also be used to index recidivism. The problems discussed for arrest data apply to convictions. An alternative strategy for measuring recidivism is surveys of ex-offenders, which has the advantage of addressing recidivism that is not detected by enforcement agencies.

For either primary or secondary deterrence, measurement may focus on undetected or unsanctioned violations (i.e., law- or rule-breaking that does not result in arrest, citation, censure, and so on). In general, such measures will require primary data collection such as surveys and observation because undetected violations do not, by definition, appear in official records. So-called unobtrusive measures (Webb et al., 1966) offer the possibility of the creative use of records data in the current context. For example, shoplifting may be indexed by a comparison of inventory and receipts. Examples of conventional and unobtrusive measures will be provided in a revision of this paper.

Ross (1984) discusses evidence supporting the importance of publicity ensuring that increased enforcement leads to increased perception of the certainty of apprehension. In these studies, the enforcement interventions intended to increase certainty of arrest were indexed descriptively. Hingson et al. (1987, 1996) indexed the awareness component of certainty through surveys aimed at assessing citizens' perceptions of enforcement and obtained results similar to those reported by Ross. More detail on these measures will be provided in a revision of this paper.

It has been suggested that agreement with the law, norms, and opportunities for crimes or other aspects of non-compliance may be important in understanding the effectiveness of social policies. Norms have been indexed through a variety of surveys (e.g., Gruenewald et al., 1997; Johnston et al., 2001; Klitzner et al., 1988). Indexing opportunities for crime generally requires on-the-ground study of neighborhoods or communities, as described by Greene and McLaughlin (1993), Skogan and Annan (1993), and Sadd and Grinc (1993). More detail will follow.

In summary, deterrence theory leads to a number of ideas for measuring enforcement and compliance, and also illuminates a number of conceptual problems that must be addressed if measurement is to lead to sound conclusions and an increment in understanding.

DECISION-MAKING THEORIES

Within sociology, decision theories fall within the general realm of social psychology. As such, these theories tend heavily toward explanation at the level of individuals, with contextual factors treated as exogenous variables to be controlled. Thus, decision-making theories may provide significant leverage in understanding the potential offender's

decision to offend, the police officer's exercise of arrest discretion, the decisions of prosecutors, and the judgments handed down by judges and juries. These theories may be less potent in predicting the behaviors of populations in natural environments. On the other hand, these theories offer the significant advantage of reducing complex phenomena to a set of measurable variables. The complex interactions among—and integration of—relevant factors take place in the mind of individuals who can then output numbers on a survey instrument in response to an interview question. This contrasts dramatically with the analytic work needed to develop indices from community indicators (see Gruenewald et al., 1997). In addition, the science of measurement is well developed in the realm of intrapsychic variables, and the properties of measures thus derived are well understood.

As far back as the 18th century, decision theorists abandoned the notion of a strict concordance between mathematical calculations of optimality and the decisions people actually make. Thus, at least at the level of individual behavior, mathematical decision rules are generally points of departure (and sometimes simply metaphors) for understanding the complex and sometimes irrational processes that humans conduct each day.² It should be noted that the same concepts can be applied in organizational decision-making, reflecting the view articulated by Weick (1979) in which organizations are “bodies of thought” with specific types of thinking practices. In such applications, the organization is treated as an individual.

Some of the earliest applications of decision-making theory focused on gambling of one sort or another (see Von Neumann and Morgenstern, 1947). As early as the 18th century, the need for a subjective assessment of the value of outcomes was recognized, with the concept formally introduced into the social science literature as subjective expected utility by Ramsey (1931). Thus, in a simple example, the prospect of the “big win” in the lottery can increase the subjective value of the prize to the extent where the vanishingly small probability of winning becomes irrelevant to the bettor's decision to buy a ticket.³ Gambling is an attractive paradigm for the decision theorist because a mathematically optimal strategy can be specified. Even here, however, it is clear that less tangible variables may be of importance. Thus, for example, the need to view oneself as a “shark,” a responsible family man (who cannot afford to lose much), or a rake (who can drop a bundle at the baccarat table) all enter into decisions about when and how much to bet. Similarly, as is well known to the gaming industry, certain environmental factors (e.g., the ready availability of alcohol) can affect the level of risk players are willing to take.

When one enters the realm of compliance and enforcement, the number of variables that are strictly tangible will be limited. For some crimes there is a clear monetary incentive, but even in these cases extra-economic factors (e.g., seeking peer group approval, “proving oneself,” playing the game well) may be more important to the perpetrator than actual financial gain. In other instances, the incentive may be totally extra-economic, but

² Sometimes mathematical optimality is a point of reference to which human behavior is compared. Bernoulli (1954) sought to fit a power function to the relationship between objective value and subjective utility.

³ One can also hypothesize that many lottery players are simply ignorant of the laws of probability or believe in such myths as “odds pressure.”

can be indexed along some reasonable metric (e.g., the relaxation or sociability that may attend underage drinking, the “thrill” of risky driving). In some instances (e.g., vandalism), the incentives to the perpetrator may be highly idiosyncratic and resistant to indexing at any level other than that of the individual offender.

One decision-theoretic variable that can and has been measured is perceived risk of arrest or detection (e.g., Hingson et al. 1996; Holder, 1998). Perceived risk of arrest is, more or less, a direct analog of expectancy in traditional decision models. This variable has a number of interesting properties that deserve mention. First, it has been found to be related to compliance (see Holder, 1998), and thus provides a useful measure for studies of policy effects. Second, although the processes and inputs by which individuals determine risk can be idiosyncratic and highly variable, the output (perceived) risk is on a common metric and can be aggregated at the population level. Third, from an enforcement perspective, perceived risk serves as a measure of the effectiveness of enforcement efforts. Finally, perceived risk may be manipulated by non-enforcement activities such as media campaigns (it may also be easier and cheaper to manipulate than actual enforcement practices).

Arrest and detection are by no means the only outcomes amenable to perceived risk analysis. For example, Grasmick et al. (1993) studied the effects of perceived risk of shame and embarrassment on self-reported drunk driving behavior. In health care, Kamerow (1997) has noted that practitioners are motivated to adopt practice guidelines because they want to be considered members of the “good doctor club.”

All of the subjective perception measures discussed are amenable to measurement through surveys and interviews. Other decision theoretic variables (beliefs about conviction rates, probable sanctions, the reactions of intimates, etc.) can be expected to operate in ways analogous to risk of detection or arrest and could be similarly measured. Again, the methods for measuring these intrapsychic variables are highly developed and well-tested. (For the canonical discussion of these issues, see Anastasi, 1996.)

As already noted, decision-making is a key aspect of enforcement activities. We have located one application of decision-making theory to the behavior of enforcement personnel. Mastrofski et al. (1994) conducted a secondary analysis to examine the productivity of enforcement efforts targeted at driving under the influence (DUI) violations. The model included effort-performance expectancy (officers’ perception that they have the ability/skill and opportunity to perform), instrumentality of performance (the belief that performance will lead to desired outcomes), performance-reward expectancy, and reward-cost balance (whether officers perceive the outcome as worth the effort and other costs). After controlling for organizational variables, this analysis found that worker capability and opportunity were the strongest predictors of productivity, a finding which seems to contradict decision-making theory to some degree.

In summary, decision-making theories provide a set of intrapsychic variables, some of which have been empirically related to enforcement and compliance. The major measurement-related strength of this approach is its grounding in a long and well-

developed tradition of psychological measurement and analysis. Its primary drawback for our current purposes is the requirement of primary data collection to index all the variables we have discussed.

A NOTE ON PROBLEM-ORIENTED POLICING

The above discussion has generally been predicated on a traditional understanding of the mechanisms by which enforcement and compliance are implemented in the real world; that is, some agency or group of agencies is charged with the task of detecting non-compliance and sanctioning violators. This traditional model is currently being challenged nationally and internationally by proponents of problem-oriented policing (POP) (Goldstein, 1990). This approach seeks to prevent violations in addition to making arrests.⁴ Crime prevention (e.g., increased lighting in areas used as drug markets, citizen contacts, foot patrols) interacts with more traditional activities aimed at primary and secondary deterrence to reduce offenses. Accordingly, some measures of enforcement discussed above (e.g., an index based on arrests and police person power, perceived risk of arrest) may misrepresent the actual levels of enforcement in a given jurisdiction. These measures would need to take into account, for example, the extent to which opportunities for crime may have decreased or that citizen cooperation has led to early detection of and intervention in potential crimes as they develop. Actual measures used by departments implementing POP and its variants include monthly reports of gunshots in a given area, monthly assessments of graffiti, number of citizen contacts, and so on (Eck, 2002). Future work will be needed to assess the extent to which these and other measures can be used to develop indices of enforcement that are meaningful when innovative policing strategies are implemented.

CONCLUSION

Deviance and its control have long been central concerns of sociologists. Enforcement and compliance are, by definition, a major focus of criminology. Thus, it is not surprising that a number of specific approaches to measuring enforcement and compliance have been identified.

Most Promising/Reliable/Valid Measures

Deterrence theory is a form of social control theory that offers specific and direct measures of enforcement; certainty of detection, severity of punishment, and celerity. All three of these variables are also used as determinants of compliance, although the prediction of compliance is not a focus of our current concerns. Other social control theories posit individual-level variables that may vary as a function of—or mediate the effects of—enforcement programs.

Certainty of detection and apprehension have been indexed descriptively. Such descriptive data can be used quantitatively in time series designs or as simple categories

⁴ One chief interviewed in a large community study by an author of this paper wryly, but proudly, referred to his community policing program as the “medicalization of policing.”

(e.g., high and low probability) in quasi-experiments and correlational analyses (see Gruenewald, 1997).

Compared to severity and certainty, celerity has received little attention in the literature (Vingilis, 1991). At least for adults, measures can be calculated from court records as the time from arrest to disposition.

Incapacitation of various kinds (incarceration, supervision, vehicle impoundment, license revocation) is a form of enforcement directed at adjudicated offenders. Compliance among adjudicated offenders can be measured through recidivism. Both incapacitation and recidivism can be measured from public records, although these records will be subject to all the limitations that attend public records data (see Gruenewald et al., 1997). Non-detected recidivism can also be measured through surveys of ex-offenders.

Social control theories also direct attention to the measurement of opportunities for crime. This measure seems particularly relevant to prevention-oriented policing strategies, which seeks (among other objectives) to reduce these opportunities. Norms and measures of socialization measured through surveys (Vingilis, 1991) provide additional leverage on the factors that mediate the relationship between enforcement and policy effectiveness.

Decision-making theoretic models are most often psychological and rely on perceptions of factors rather than the “real world” measures. The reliance on perceptions has both advantages (complex processing of inputs is done by the respondent, measurement methods are well tested) and drawbacks (measures such as surveys and interviews are required). Decision-making theories address the variables discussed from social control theory (as components of subjective utility) and also suggest some additional measures.

Citizens’ perception of risk has been fruitfully applied to measuring certainty of detection, which in turn is a determinant of utility. This approach has several attractive features. First, as suggested, perception of risk is the output of the complex and idiosyncratic processes by which individuals evaluate and combine information concerning the risks associated with crime. As such, measurement bypasses the need to model the processes by which these judgments are reached and focuses instead on the outputs themselves. Second, this index appears to be sensitive to extra-police activities such as media campaigns, which have been shown to have an impact on compliance. Decision-making theoretic models also suggest the need to consider social sanctions such as embarrassment and withdrawal of peer or professional group approval.

Decision-making theories also direct attention to the perceived value of crime and other deviance, measured both monetarily and non-monetarily (e.g., group approval, self-esteem, etc.). These variables would appear to be predictors or mediators of compliance rather than direct measures, and may thus be of limited utility to APIS.

In summary, both the sociological and criminological literature point to certainty of detection as a primary enforcement variable and a primary determinant of compliance.

Measures of celerity and severity may also hold promise, although the former is not fully developed in the literature and the latter appears to apply in limited circumstances. Measures of incapacitation are direct measures of secondary deterrence, and recidivism offers a measure of compliance among offenders. Decision-making theories offer a variety of measures that may predict or mediate compliance.

Potential Utility to APIS

We assume three desiderata for an enforcement/compliance component for APIS: (1) measurement of enforcement and compliance should be applicable to a wide variety of policies, (2) available data should be used whenever possible, and (3) the enforcement/compliance component of APIS should conform to the high scientific standards applied elsewhere in the project.

Certainty of detection (measured directly or as perceptions of risk) seems to have broad applicability as measures of enforcement across policy areas. Direct measurement and perceptions of risk have more or less opposite strengths and weaknesses. Direct measurement of certainty has most often taken the form of descriptive analysis of interventions (generally stepped-up enforcement). Useful descriptive analyses often require primary data collection, although in the case of well-specified interventions (e.g., roadblocks), the strength of a given policy might be inferred by examining relevant descriptive research in the literature. This approach, however, runs the risk that poor implementation of a strong enforcement strategy will go undetected. Certainty can also be indexed as arrests if necessary precautions (as discussed above) are taken, or by comparing arrest rates to actual violations (see Wagenaar and Wolfson, 1994). The latter approach requires access to self-report data on violations that match the geographic area for which arrests are indexed. The number of enforcement-related situations in which this condition is met may be limited.

Perception of risk has the distinct advantage that it is a measurable output of a complex and idiosyncratic psychological process which may, itself, be very difficult to model. The assumption that these outputs can be aggregated across individuals (despite the idiosyncratic nature of the mental processes underlying it) seems supportable. Perceptions are measurable using standard and well-tested psychometric techniques and will yield interval or ratio data amenable to a wide variety of analyses. The main drawback of this approach for APIS is the lack of a body of relevant data that could be made available. Rather, indexing perception of risk (at least for the moment) would appear to require new data collection tailored to specific policies and locations.

Celerity is amenable to direct measurement through court records. We are not aware of any national source of data that could be used to index celerity, although such a source may exist. As noted by Vingilis (1991), the measurement of celerity is underdeveloped (and appears to have remained so a decade after Vingilis' paper).

Severity information for some policies may be directly available in APIS through examination of relevant statutes. Although the evidence for an effect of severity is mixed,

a better understanding of the conditions under which it is or is not important may increase its value as a measure.

The social control and decision-making theory literature suggest a number of additional variables that may mediate enforcement or compliance. These include factors related to enforcement personnel activities and decision-making (discretion) in the course of their work. They also include motivations and social sanctions, which may affect compliance. These latter variables would appear to be largely of interest as part of research study designs that include more direct measures of enforcement and compliance. On the other hand, instances exist where enforcement practices specifically attempt to manipulate motivations (e.g., asset forfeiture laws reduce the expected value of crime) and social sanctions (e.g., ads in local newspapers that name alcohol or tobacco retailers who sell to minors). These approaches might be viewed as a component of severity and measured using similar strategies.

References

- Anastasi, A. *Psychological Testing, 7th Edition*. Englewood Cliffs, New Jersey: Prentice Hall, 1996.
- Bartrum, T. and Bryant, L. The brave new world of health care compliance programs. *Annals of Health Law* 51(6), 1997.
- Bernoulli, D. Specimen theoriae novae de mensura sortis. St. Petersburg 1738. Translated in *Econometrica* 22:23–36, 1954.
- Cameron, M, Strang, P, and Vulcan, A. Evaluation of random breath testing in Victoria Australia. Paper prepared for the Eighth International Conference on Alcohol, Drugs, & Traffic Safety. Stockholm, June 1980.
- Chambliss, W. The influence of punishment as a deterrent. *Crime and Delinquency* 12:70–75, 1966.
- Cohen, R. *Probation and Parole Violators in State Prison*, 1991. Washington, DC: U.S. Department of Justice, Office of Justice Programs. NCJ 149076, 1995.
- Eck, J. *Assessing Responses to Problems: An Introductory Guide for Police Problem-Solvers*. Washington, DC: U.S. Department of Justice, Office of Community Oriented Policing Services, 2002.
http://www.usdoj.gov/cops/pdf/cp_resources/guidebooks/e04021502.pdf
- Grasmick, H., and Green, D. Legal punishment, social disapproval, and internalization as inhibitors of illegal behavior. *Journal of Criminal Law and Criminology* 71:825–835, 1980.
- Goldstein, H. *Problem-Oriented Policing*. New York: McGraw Hill, 1990.
- Grasmick, H.G.; Bursik, R.J., Jr.; Arneklev, B.J. Reduction in drunk driving as a response to increased threats of shame, embarrassment, and legal sanctions. *Criminology* 31(1):41-67, 1993.
- Greene, J., and McLaughlin, E. Facilitating communities through police work: Drug problem solving and neighborhood involvement in Philadelphia. In: Davis, R., Lurigio, A., and Rosenbaum, D., eds., *Drugs and Community*. Springfield, IL: Charles C. Thomas Publishing, 1993.
- Gruenewald, P.J. Analysis approaches to community evaluation. *Evaluation Review* 21:209–230, 1997.
- Gruenewald, P., Treno, A., Taff, G., and Klitzner, M. *Measuring Community Indicators: A Systems Approach to Drug and Alcohol Problems*. Thousand Oaks, CA: Sage Publications, 1997.
- Hingson, R., Heeren, T., Kovenock, D., Mangione, T., Lederman, R., and Scotch, N. Effects of Maine's 1981 and Massachusetts' 1982 driving under the influence legislation. *American Journal of Public Health* 77:593–597, 1987.
- Hingson, R., McGovern, T., Howland, J., Heeren, T., Winter, M., and Zakocs, R. Reducing alcohol-impaired driving in Massachusetts: The Saving Lives Program. *AJPH* 86(6):791– 797, 1996.

- Holder, H. *Alcohol and the Community: A Systems Approach to Prevention*. Cambridge: Cambridge University Press, 1998.
- Hurst, P.M. and Wright, P.G. Deterrence at last: The Ministry of Transport's Alcohol Blitzes. In Goldberg, L., ed., *Alcohol, Drugs and Traffic Safety, VOL III*, pp. 1283-1297. Stockholm: Almqvist & Wiksell International, 1981.
- Johnston, L.D., O'Malley, P.M., and Bachman, J.G. *The Monitoring the Future National Survey Results on Adolescent Drug Use: Overview of Key Findings, 2000* (NIH Publication No. 01-4923). Bethesda, MD: National Institute on Drug Abuse, 2001.
- Kamerow, D.B. Before and after guidelines. *Journal of Family Practice* 44(4):344–346, 1997.
- Klitzner, M.D., Vegega, M., and Gruenewald, P. An empirical examination of the assumptions underlying youth drinking/driving prevention programs. *Evaluation and Program Planning* 11(3):219–235, 1988.
- Lewin, K. Frontiers in group dynamics: Concept, method, and reality in social science. *Human Relations* 1:5–41, 1947.
- Mastrofski, S.D., Ritti, R.R., and Snipes, J.B. Expectancy theory and police productivity in DUI enforcement. *Law & Society Review* 28(1):113–148. 1994.
- Norstrom, T. Drunken driving: A tentative causal model. *Scandinavian Studies in Criminology* 6:69–78, 1978.
- Norstrom, T. *Studies in the Causation and Prevention of Traffic Crime*. Stockholm: Almqvist and Wiksell, 1981.
- Ramsey, F. *The Foundations of Mathematics and other Logical Essays*. London: Kegan Paul, 1931.
- Ross, H.L. Social control through deterrence: Drinking-and-driving laws. *Annual Review of Sociology* 17:21–35, 1984.
- Ross, H.L. Deterrence regained: The Cheshire constabulary's "breathalyzer blitz." *Journal of Legal Studies* 6:241-249, 1977.
- Sadd, S., and Grinc, R. The effects of drug abuse and sales on three urban communities. In, Davis, R., Lurigio, A., and Rosenbaum, D., eds., *Drugs and Community*. Springfield, IL: Charles C. Thomas Publishing, 1993.
- Skogan, W., and Annan, S. Drug enforcement in public housing. In, Davis, R., Lurigio, A., and Rosenbaum, D., eds., *Drugs and Community*. Springfield, IL: Charles C. Thomas Publishing, 1993.
- Vingilis, E. A new look at deterrence models. In Wilson, R.J. and Mann, R., eds., *Drinking and Driving Advances in Research and Countermeasures*. New York: Guilford Publishers, 1990.
- Vingilis, E. Problems in detecting DWIs. *Alcohol, Drugs and Driving* 7(3-4):197–203, 1991.
- Von Neumann, J. and Morgenstern, O. *Theory of Games and Economic Behavior*. Princeton, NJ: Princeton University Press, 1947.
- Wagenaar, A.C., and Wolfson, M. Deterring sales and provision of alcohol to minors: A study of enforcement in 295 counties in four states. *Public Health Reports* 100(4): 419–427, 1994.

- Walker, R. A HIPAA strategy for dental schools. *Journal of Dental Education* 66(5):624–633, 2002.
- Webb, E., Campbell, D., Schwartz, R., and Sechrest, L. *Unobtrusive measures: Nonreactive Research in the Social Sciences*. Chicago: Rand McNally, 1966.
- Weick, K. Cognitive processes in organizations. In: Staw, B. ed., *Research in Organizational Behavior, Vol I*. Greenwich, CT: JAI Press, 1979.
- Ziller, R. Four techniques of group decision-making under uncertainty. *Journal of Applied Psychology* 41:384–388, 1957.
- Zimring, F., and Hawkins, G. *Deterrence: The Legal Threat in Crime Control*. Chicago: University of Chicago Press, 1973.