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CRIMINOLOGY

PERCEIVED RISK AND DETERRENCE: METHODOLOGICAL ARTIFACTS IN PERCEPTUAL DETERRENCE RESEARCH

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I. INTRODUCTION

Recent refinements in the deterrence literature have recognized that deterrence involves a perceptual process.¹ This has led deterrence researchers away from aggregate data analysis into survey research.² The latter literature is now voluminous, and has focused on the relationship between *perceptions* of legal sanctions and self-reported illegal behavior.³ As with the earlier, aggregate level research, the perceptual studies indicated that certainty (risk) acted to deter illegal acts although sever-

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¹ Waldo & Chiricos, *Perceived Penal Sanctions and Self-Reported Criminality*, 19 SOC. PROBS. 522 (1972).

² Aggregate level deterrence researchers have used secondary data aggregated at the state level (National Prisoner Statistics, Uniform Crime Reports). These researchers have investigated the deterrent effect of the objective certainty of punishment (usually the average time served by prisoners over a period for particular offenses) on crime rates. For a review see J. GIBBS, *CRIME, PUNISHMENT AND DETERRENCE* (1975).

³ For reviews of the perceptual level deterrence research, see *id.*; Anderson, *The Deterrent Effect of Criminal Sanctions: Reviewing the Evidence*, in *LAW AND POWER: ESSAYS IN THE SOCIOLOGY OF LAW* 120-34 (P. Brantingham & J. Kress eds. 1979).

ity of punishment did not. The findings with regard to the deterrent effect of perceived risk are not entirely consistent, however, in that the strength of the reported deterrent effect varies considerably from one study to another even for equivalent offenses and samples. As with deterrence research on capital punishment and the aggregate level studies, the perceptual research has many methodological problems which preclude definitive conclusions about deterrent effects.⁴

The purpose of this paper is to highlight three possible sources of the ambiguities in the perceptual deterrence literature. These are variations in (1) measurement levels of perceived risk, (2) types of punishment being measured, and (3) techniques of statistical analysis. These methodological problems and the interpretational difficulties they present will be explored using data from a panel study of college students.

II. DIFFERENCES DUE TO MEASUREMENT LEVELS OF PERCEIVED RISK

In a recent article, Jensen et al. have noted four approaches to the measurement of the perception of punishment risk in prior studies.⁵ These four approaches can be summarized as: (1) interval level/other-referenced, (2) ordinal level/other-referenced, (3) interval level/self-referenced, and (4) ordinal level/self-referenced.⁶ When perceived risk is operationalized at the interval level, the responses are scaled along a continuous dimension (e.g., estimated number of people out of 100 who would get caught committing a given illegal act). When perceived risk is measured at the ordinal level, the responses are in ordered categories

⁴ There has been a flurry of critical reactions to the most recent capital punishment research. For the most part, these are methodological criticisms involving estimation, modeling and measurement errors. See Bowers & Pierce, *The Illusion of Deterrence in Isaac Ehrlich's Research On Capital Punishment*, 85 YALE L.J. 187 (1975); Klein, Forst & Filatov, *The Deterrent Effect of Capital Punishment: An Assessment of the Estimates*, in DETERRENCE AND INCAPACITATION: ESTIMATING THE EFFECTS OF CRIMINAL SANCTIONS ON CRIME RATES 336-60 (A. Blumstein, J. Cohen & D. Nagin eds. 1978); Passell, *The Deterrent Effect of the Death Penalty: A Statistical Test*, 28 STAN. L. REV. 61 (1975). In a fashion similar to the controversy surrounding capital punishment research, recent studies have raised doubts about the validity of most of the aggregate data research, again on methodological grounds. See Greenberg, Kessler & Logan, *A Panel Model of Crime Rates and Arrest Rates*, 44 AM. SOC. REV. 843 (1979).

⁵ Jensen, Erickson & Gibbs, *Perceived Risk of Punishment and Self-Reported Delinquency*, 57 SOC. FORCES 57 (1978).

⁶ Jensen et al. use slightly different terminology to refer to these operationalizations of perceived risk. *Id.* They use the terms quantitative/qualitative to refer to the interval/ordinal distinction and aggregate/personal to refer to the other/self-reference object distinction. We find their language confusing, since the statistical measure of association used with most qualitative measures is gamma, which is not traditionally understood to measure a qualitative continuum. Furthermore, the use of the term "aggregate" in referring to the reference object of perceptions is not the accepted sense of the term in deterrence research. The word "aggregate" is usually taken to mean aggregated, state level data. See *supra* note 2.

(e.g., very unlikely to be caught, very likely to be caught). The other- vs. self-referenced dimension reflects the object of the perceptions. Perceptions of the risk of punishment given to a generalized other comprise an other-referenced measure, while one's estimate of one's own risk of punishment makes up a self-referenced measure.⁷ The importance of these measurement differences may be assessed by comparing the findings of studies which have used different operationalizations of perceived risk.

Table 1 presents summary data from the published research on the relationship between perceived risk and self-reported deviant behavior. One feature of the literature seen from the summaries is the inconsistency in the effect of perceived risk. In those cases where perceived risk was operationalized with an other-referenced measure, the support for the deterrence doctrine is equivocal. Using an interval level/other-referenced measure of perceived risk, both Waldo and Chiricos and Teevan found evidence of a deterrent effect for marijuana use but not for petty theft/shoplifting. Jensen et al. and Kraut found no strong effect with similar measures and self-reported shoplifting.⁸ When researchers have used an ordinal level/other-referenced measure, the results have been more supportive of deterrence theory, although again not consistently so. Jensen, Grasmick and Milligan, Grasmick and Appleton, and Jensen et al. all report findings consistent with the deterrence doctrine.⁹ In the Jensen et al. study, however, the observed correlations are all very weak, and a study by Meier and Johnson found no relationship between an ordinal level/other-referenced measure of risk and marijuana use.¹⁰

More compelling evidence for the deterrence doctrine can be found when the perception of risk refers to the respondent's estimate of his own chance for punishment. Kraut (for shoplifting) and Teevan (for marijuana use and shoplifting) both found moderate and consistent relation-

⁷ Examples of other-referenced measures of perceived risk include: "all Canadians," "people who commit crimes," and "people who break the law." See, e.g., Jensen, Erickson & Gibbs, *supra* note 5; Teevan, *Subjective Perception of Deterrence*, 13 J. RESEARCH CRIME & DELINQ. 155 (1976); Waldo & Chiricos, *supra* note 1. Examples of self-referenced measures include: "your chances of getting caught" and "someone like yourself getting caught by the police." See, e.g., Bailey & Lott, *Crime, Punishment and Personality: An Examination of the Deterrence Question*, 67 J. CRIM. L. & C. 99 (1976); Silberman, *Toward a Theory of Criminal Deterrence*, 41 AM. SOC. REV. 442 (1976).

⁸ Jensen, Erickson & Gibbs, *supra* note 5; Kraut, *Deterrent and Definitional Influences on Shoplifting*, 23 SOC. PROBS. 358 (1976).

⁹ Grasmick & Appleton, *Legal Punishment and Social Stigma: A Comparison of Two Deterrence Models*, 58 SOC. SCI. Q. 15 (1977); Grasmick & Milligan, *Deterrence Theory Approach to Socioeconomic/Demographic Correlates of Crime*, 57 SOC. SCI. Q. 608 (1976); Jensen, *Crime Doesn't Pay: Correlates of A Shared Misunderstanding*, 17 SOC. PROBS. 189 (1969); Jensen, Erickson & Gibbs, *supra* note 5.

¹⁰ Jensen, Erickson & Gibbs, *supra* note 5; Meier & Johnson, *Deterrence As Social Control: The Legal and Extralegal Production of Conformity*, 42 AM. SOC. REV. 292 (1977).

TABLE 1
MEASURES OF PERCEIVED RISK AND REPORTED FINDINGS FROM PUBLISHED PERCEPTUAL DETERRENCE STUDIES: 1969-1980

Level of Measurement/ Reference Type	Measure of Association	Deviance Index	CORRELATION COEFFICIENT BETWEEN PERCEIVED RISK AND:					Other Offense
			Marjuana Use	Shoplifting	Peity Theft			
Ordinal/Self-Referenced								
Waldo and Chiricos (1972)	gamma		-.84		-.31			
Burkett and Jensen (1975)	gamma		-.57					
Silberman (1976)	phi	-.26*	-.06	-.04	-.18			
Jensen et al. (1978)	gamma	-.39 ^b		-.39 ^c				
Tithe (1980) ^e	gamma		-.21		-.14		-.37 ^d	
			-.13		-.17			
Ordinal/Other-Referenced								
Jensen (1969)	gamma	.22						
Grasmick and Milligan (1976)	Pearson's r						-.34 ^f	
Meier and Johnson (1977)	Pearson's r		.17				-.27 ^g	
Grasmick and Appleton (1977)	Pearson's r						-.21	
Jensen et al. (1978)	gamma	-.12		-.12				
Interval/Self-Referenced								
Bailey and Lott (1976) ^h	Pearson's r		-.09	.05	.02			
			.04	.04	-.07			
Kraut (1976)	Pearson's r							
Tevan (1976b)	gamma		-.25	-.24				
Minor (1977) ^h	tau		-.25	-.23				
	Pearson's r		-.17	-.11				
				-.09				
Interval/Other-Referenced								
Waldo and Chiricos (1972)	gamma		-.28	.08	-.14			
Kraut (1976)	Pearson's r			.01				
Tevan (1976b)	gamma		-.26	-.16				
Jensen et al. (1978)	gamma	-.07					-.10	

^a Silberman used a point biserial correlation in reporting the relationship between his general certainty index and general criminal involvement index.
^b For the general delinquency index, Jensen et al. report coefficients for two subsamples (metropolitan, small town) and two time periods (1973-74, 1974-75); the coefficients reported in this column are from the metropolitan sample, 1974-75.
^c For their specific offense analysis Jensen et al. report data separately for 1973-74 and 1974-75; only the 1974-75 coefficients are reported here. In all cases the two sets are not substantially different.
^d The other offense for the Jensen et al. study reported here is vandalism.
^e The first row of coefficients reported is the perceived risk of arrest; the second set is the perceived risk of jail.
^f speeding
^g speeding
^h The first row of coefficients reported is for the perceived risk of arrest; the second row is for the perceived risk of conviction.

ships with an interval level/self-referenced measure of risk.¹¹ Minor found equally strong evidence of a deterrent effect for marijuana use but weaker support for shoplifting.¹² Of those studies which have used an interval level/self-referenced measure of risk, only one study, by Bailey and Lott, found no evidence of a deterrent effect.¹³

The strongest and most consistent support for deterrence theory appears when perceived risk is measured with ordinal level/self-referenced measures. As shown in Table I, four out of five published studies report strong negative relationships between these measures and self-reported deviance, and the coefficients for these measures of risk are the strongest and most consistent found in the literature. The strong support for the self-referenced measure of risk validates an earlier observation by Waldo and Chiricos that "perceptions of the certainty of punishment appear most viable as a deterrent when they involve the potential criminal's estimate of his *own chances* for arrest and harsh penalties."¹⁴

A brief look at the various measures of perceived punishment risk in deterrence research suggests that different operationalizations of the independent variable can produce different substantive conclusions. While the pattern of differences between the ordinal and interval level measures are not consistent, it does appear that the other-referenced vs. self-referenced distinction is substantively crucial. This lack of measurement consistency may contribute to the muddled state of the literature. The issue of which measure of perceived risk has greater salience cannot, however, be addressed within traditional, cross-sectional perceptual deterrence research designs. Generally, perceptual deterrence researchers have collected data at one point in time concerning respondents' *current* perceptions of punishment risk and *prior* involvement in rule breaking.¹⁵ Consequently, the possibility that prior illegal behavior affects one's perceptions of punishment risk cannot be eliminated.¹⁶ Teevan has sug-

¹¹ Kraut, *supra* note 8; Teevan, *supra* note 7.

¹² Minor, *A Deterrence-Control Theory of Crime*, in *THEORY IN CRIMINOLOGY* 117-38 (R. Meier ed. 1977).

¹³ Bailey & Lott, *supra* note 7.

¹⁴ Waldo & Chiricos, *supra* note 1, at 537.

¹⁵ Not all perceptual deterrence researchers have ignored the problem of temporal ordering. Some recent studies have attempted to address the issue of causal ordering by asking respondents about their perceptions *before* they committed the act or what their *future* behavior will be. *See, e.g.*, C. TITTLE, *SANCTIONS AND SOCIAL DEVIANCE* (1980); Teevan, *supra* note 7. The utility of these modifications of essentially cross-sectional designs has yet to be examined; they do, however, require dubious assumptions. In any event, with longitudinal data, causal order is directly managed with less restrictive assumptions.

¹⁶ Cross-sectional analyses require the assumption that perceptions remain stable over long periods. If perceptions of punishment risk before the behavior are not the same as those measured after, then deterrence researchers may not be observing a deterrent effect. A change in perceptions might arise, for example, whenever those who commit illegal acts, and get away with it, lower their subsequent perceptions of the risks involved. This would result

gested that this "contamination" would likely be stronger for self-referenced perceptions of risk than for other-referenced measures, leading to the erroneous conclusion that perceived self-risk is more salient to the deterrence process.¹⁷ To compare adequately self-referenced and other-referenced measures of risk, the effect of this possible contamination must be removed. A longitudinal data collection design is the preferred solution. With it, the effect of perceptions at one point in time on *subsequent* behavior can be unambiguously examined. We employ a longitudinal design in this study, and relate perceptions of self-referenced and other-referenced measures of punishment risk with subsequent behavior.

III. DIFFERENCES DUE TO STATISTICAL ANALYSIS

The manner in which perceptual deterrence data have been analyzed is another extraneous factor which may affect the results of deterrence studies. Table 2 presents selected components of the methodology of nine published perceptual deterrence studies. These studies share some measurement similarity in that they all used a self-referenced measure of perceived risk. They differ in how the data were statistically treated, however, and a clear pattern emerges upon examination of the correspondence between the statistical treatment of the data and the reported results.

The evidence of a deterrent effect is most convincing in studies which report gamma coefficients,¹⁸ and weakest in those studies reporting associations with Pearson's *r*.¹⁹ This is due, of course, to the fact that gamma, because it ignores tied ranks, has a lower standard for correlation than does *r*. As a result of its computation, gamma will be lower than Pearson's *r* for an identical set of data in all but trivial cases. The use of gamma by most of the confirming studies within the perceptual deterrence literature more likely reflects the inflation of gamma due to tied ranks than any substantive differences in the data. Given that the appropriate measure of association for perceptual deterrence is unclear, reporting *both* gamma and Pearson's *r* for the same set of data would

in a negative correlation between perceptions of risk and behavior but would be due to the effect of behavior on perceptions — an "experiential," not a deterrent effect. See L. Anderson, *A Longitudinal Study of the Deterrence Model* (December, 1977) (unpublished Ph.D. dissertation available in Florida State University Library).

¹⁷ Teevan, *Deterrent Effects of Punishment: Subjective Measures Continued*, 18 CAN. J. CRIMINOLOGY & CORRECTIONS 152 (1976).

¹⁸ See, e.g., Burkett & Jensen, *Conventional Ties, Peer Influence, and the Fear of Apprehension: A Study of Adolescent Marijuana Use*, 16 SOC. Q. 522 (1975); Waldo & Chiricos, *supra* note 1.

¹⁹ See, e.g., Bailey & Lott, *supra* note 7; Kraut, *supra* note 8.

TABLE 2
METHODOLOGY AND REPORTED FINDINGS FROM PERCEPTUAL DETERRENCE STUDIES USING PERCEIVED SELF-RISK:
1972-1980

Researcher	Subjects of Study	Perceived Self-Risk of Type of Punishment ^a	Measure of Association	CORRELATION COEFFICIENT BETWEEN PERCEIVED SELF-RISK AND:			
				Marjuana Use	Shoplifting	Petty Theft	
Waldo & Chiricos (1972)	321 college undergraduates	caught by police	gamma	-.84			-.31
Burkett & Jensen (1975)	1056 high school students	caught	gamma	-.56			
Teevan (1976b)	421 high school students	caught	gamma	-.25	-.23		
Silberman (1976)	174 college undergraduates	caught by police	phi	-.06	-.04		-.18
Bailey & Lott (1976)	266 college undergraduates	caught by police caught and convicted in court	Pearson's r Pearson's r	-.09 .04	.02 -.07		.05 .05
Kraut (1976)	606 college undergraduates	caught	Pearson's r		-.24		
Minor (1977)	274 adults	caught by police	tau Pearson's r	-.25 -.17			
Jensen et al. (1978)	4845 high school students	caught	gamma			-.39	
Titlle (1980)	1993 individuals from a probability sample of three states	arrest arrest and jail	gamma gamma	-.21 -.13			-.14 -.17

^aIn each case respondents were asked about their own chances of apprehension or those of "someone like themselves," and all measures of perceived certainty were offense specific.

lead to fewer ambiguities. The research to be discussed herein will report both measures of association.

IV. DIFFERENCES DUE TO TYPES OF PUNISHMENT PERCEIVED

A third extraneous factor which may have contributed to the observed inconsistencies in perceptual deterrence research is the type of punishment measured. The deterrence doctrine states that the perception of some type of punishment, if the risk of that punishment is of sufficient certainty, will deter rule breaking. In empirical tests of this proposition, different researchers have inquired about the certainty of different types of punishment. In the studies summarized in Table 2, the perception of risk was measured with a self-referenced measure, but the types of punishments differ. In these nine studies, five different types of risk were measured: the risk of being (1) caught, (2) caught by the police, (3) arrested, (4) caught and convicted, and (5) arrested and jailed. There is no a priori reason to assume that these five types of punishment are equivalent, for researchers are mixing indicators of certainty with those of severity. When respondents are asked about the probability of being caught, being caught by the police, being arrested, being caught and convicted, or being convicted and jailed, they are also being asked to respond to items whose hypothesized punishment differs in severity.

If there is an interaction between certainty and severity effects, as some recent research has indicated,²⁰ then different types of punishment in otherwise similar measures of perceived risk might produce different results. This is illustrated in Table 2, where the strength of the relationship between self-referenced measures of perceived risk and both marijuana use and shoplifting vary considerably. In each case where a general measure of certainty of being caught is used, the evidence in support of deterrence is moderately strong and consistent. When the risk is that of being caught by the police, arrested, or convicted, the evidence becomes more equivocal. Unfortunately, any comparisons from the literature on this issue are confounded by other measurement and analysis differences which were discussed above. To lend some clarity to this confusion, we offer a less clouded examination by collecting data from the same subjects for identical offenses but different types of punishment.

²⁰ See, e.g., Anderson, Chiricos & Waldo, *Formal and Informal Sanctions: A Comparison of Deterrent Effects*, 25 SOC. PROBS. 103 (1977); Grasmick & Bryjak, *The Deterrent Effect of Perceived Severity of Punishment*, 59 SOC. FORCES 471 (1980).

V. THE PANEL STUDY

A. METHODS

1. *Sample*

Our research is based on interviews conducted with 300 college students randomly selected from a list of freshmen enrolled at a major state university during the fall quarter of the 1974-75 school year. Originally, 587 full-time freshmen students were selected from a freshman class of 3005. Of the 587 students first selected, 205 had no available address or phone number and therefore could not be located for the interview, twenty-four of those contacted had scheduling differences which precluded an interview, and fifty-eight students were contacted but refused to be interviewed. The final sample of 300 students were ninety percent white and ten percent non-white, fifty-one percent female and forty-nine percent male. These figures closely approximate the race and sex composition of the university population from which the sample was drawn. Respondents were interviewed between January and June of 1975 (Time 1) and again approximately one year later (Time 2). At both measurement points, subjects were questioned about their perceptions of punishment risk and involvement in illegal behavior.

2. *Dependent and Independent Variables*

The dependent variables in this study are stealing or shoplifting something worth less than ten dollars (petty theft/shoplifting), and using marijuana or hashish (marijuana use). These data were collected by way of a self-report inventory which was part of each interview schedule. At both data collection points, respondents were asked about their involvement in these two acts "ever in the past" and "during the past year."

Five different measures of perceived risk were employed as independent variables. There are two measures of the perceived risk of arrest: an ordinal level/self-referenced measure, and a comparable ordinal level/other-referenced measure.²¹ There were three other ordinal level/other-referenced measures of perceived risk which varied the type of punishment. One of these measured the general risk of getting caught, the second measured the risk of getting caught by the police,

²¹ The ordinal level/self-referenced measure was based on respondents' perception of likelihood of arrest if they committed each of the two offenses. The response options ranged on a five point continuum of: "very unlikely," "unlikely," "50/50," "likely," and "very likely." The interval level/other-referenced measure was based on the respondents' estimation of how many of the next 100 people in their city who commit each of the two offenses would be arrested.

and the third measured the risk of getting convicted.²² Thus, the five measures of perceived risk used in this research are:

- (1) an ordinal level/self-referenced measure of the risk of arrest;
- (2) an ordinal level/other-referenced measure of the risk of arrest;
- (3) an ordinal level/other-referenced measure of getting caught;
- (4) an ordinal level/other-referenced measure of getting caught by the police; and
- (5) an ordinal level/other-referenced measure of getting convicted.

3. Data Analysis

In the analysis, the ordinal categories were treated intervally for the calculation of r and then collapsed into ordered categories for gamma. When the data were collapsed, the dependent variable was dichotomized (used marijuana/never used marijuana; stole under ten dollars/never stole under ten dollars) and the five independent variables were collapsed into three approximately equal sized ordered groups (high, medium, and low perceived certainty). It must also be remembered that since we have longitudinal data, our deterrent effect will be represented as the relationship between perceptions measured at one point in time (Time 1) and *subsequent* behavior (behavior occurring during the one year interval between Time 1 and Time 2).

B. FINDINGS

Our earlier discussion of the literature noted several different operationalizations of perceived risk used by deterrence researchers. Earlier researchers have suggested that perceptions of self-risk are more strongly related to one's involvement in illegal activities than are perceptions of risk for a generalized other.²³ Tables 3A and 3B present a comparison of deterrent effects for petty theft and marijuana use between a self-referenced measure of perceived risk and an other-referenced measure. As expected from the deterrence doctrine, there is a consistent negative relationship between perceived risk of arrest and both petty theft and marijuana use. More specifically, however, somewhat stronger support for the deterrence doctrine is found when the perception of risk involves the potential rule violator's estimate of his own chance of arrest rather than the risk to a generalized other. For petty theft, the gamma value for the certainty of one's own arrest is stronger than that for the cer-

²² All three of these interval level/other-referenced measures of perceived risk were based on respondents' replies to equivalent questions. They were asked to estimate how many of the next 100 people in their city who commit each of the two offenses would be caught, caught by the police, or convicted.

²³ See, e.g., Silberman, *supra* note 7; Waldo & Chiricos, *supra* note 1.

TABLE 3A
CORRELATIONS BETWEEN PERCEIVED RISK OF ARREST FOR GENERALIZED OTHER, PERCEIVED SELF-RISK, AND
PETTY THEFT/SHOPLIFTING

Perceived Likelihood of:	% Not Having Stolen or Shoplifted	% Having Stolen or Shoplifted	Total	(N)	Gamma	Pearson's r
Generalized Other Being Arrested	High	90.3	100.0	(93)	-.22	.07
	Medium	81.6	100.0	(103)		
	Low	81.4	100.0	(102)		
One's Own Arrest	High	86.7	100.0	(60)	-.30 ^a	-.04
	Medium	91.6	100.0	(95)		
	Low	78.6	100.0	(145)		

TABLE 3B
CORRELATIONS BETWEEN PERCEIVED RISK OF ARREST FOR GENERALIZED OTHER, PERCEIVED SELF-RISK, AND
MARIJUANA USE

Perceived Likelihood of:	% Not Having Used Marijuana	% Having Used Marijuana	Total	(N)	Gamma	Pearson's r
Generalized Other Being Arrested	High	61.4	100.0	(83)	-.25 ^a	-.07
	Medium	50.4	100.0	(113)		
	Low	41.6	100.0	(101)		
One's Own Arrest	High	66.7	100.0	(24)	-.33 ^a	-.11 ^a
	Medium	63.3	100.0	(30)		
	Low	47.1	100.0	(244)		

^ap < .05

tainty of generalized others' arrest ($-.30$ vs. $-.22$). Utilizing the Pearsonian correlation coefficients, the observed correlation between perceived risk and petty theft is weak in both cases. For self-risk the sign for r is in the expected direction while for the risk to generalized others r is positive. The same pattern emerges regarding marijuana use, where both gamma and r provide somewhat stronger support for deterrence with a self-referenced measure (gamma = $-.33$, $r = -.11$) than with an other-referenced measure (gamma = $-.25$, $r = -.07$).²⁴

This difference in the magnitude of the deterrent effect for the self- and other-referenced measures of perceived risk is not as large as the difference presented in the literature. The more substantial difference found in the literature may reflect the "contamination" in the cross-sectional correlations, where prior behaviors may affect current perceptions. This contamination may affect self-referenced perceptions of risk more than other-referenced measures. Since we report longitudinal data, our comparison is not confounded by such contamination. That we observed consistent but slight differences between our self- and other-referenced measures may indicate that the different operationalizations may not be as important as has been suggested.

We examined the possible differential effect of prior behavior upon self- and other-referenced measures of perceived risk by treating our panel design as two cross-sectionals.²⁵ This was accomplished by correlating behavior in the year prior to Time 1 with perceptions of risk at Time 1, and then correlating behavior occurring in the interval between

²⁴ The data presented here also demonstrate no evidence of a differential deterrent effect by offense type. It has been suggested that offenses, such as theft, which arouse considerable moral opprobrium (*mala in se*) would be less affected by punishment threats than would *mala prohibita* offenses, such as marijuana use, with weaker support in the mores. See, e.g., F. ZIMRING & G. HAWKINS, *DETERRENCE* (1973). It has also been suggested that expressive acts (e.g., marijuana use) would be less affected by legal threats than instrumental acts. See, e.g., Chambliss, *Types of Deviance and the Effectiveness of Legal Sanctions*, 1967 WIS. L. REV. 703. Our findings are consistent with others in finding no support for this distinction. See, e.g., Teevan, *supra* note 7. The gamma values for the certainty of arrest risk for others are virtually identical for petty theft and marijuana use (gammas = $-.22$, $-.25$, respectively). A similar equivalency is found for the risk of one's own arrest (gammas = $-.30$ for petty theft, $-.33$ for marijuana use). There is inconclusive evidence for greater deterrence of marijuana use when Pearson's r is the measure of association. For the risk of arrest of both others and self, the correlations for marijuana use are somewhat larger than those for petty theft, although the differences are slight.

²⁵ The nature of the behavior variable allows for two cross-sections out of this panel design. Although behavior and perceptions were measured together at the same point in time (during the Time 1 questionnaire administration in 1974 and again during the Time 2 administration in 1975), the behavioral items refer to behavior occurring in the year interval before the measurement. The behavior actually occurred, then, in the years 1973-74 for Time 1 and 1974-75 for Time 2. This allows us to examine both the effect of the 1973-74 behaviors on the 1974, Time 1 perceptions (one cross-section) and the effect of the 1974-75 behaviors on the 1975, Time 2 perceptions (the second cross-section).

Time 1 and Time 2 with perceptions measured at Time 2. These two cross-sections are deliberately "contaminated" and give two assessments of the effect of prior behavior on current perceptions of self- and other-referenced risk. We have called the effect of behavior on perceptions the "experiential" effect. The data are reported in Tables 4A and 4B.

The data give some support to the contamination hypothesis. As would be expected if there were contamination, the self-referenced measures of perceived risk tend to be larger in the cross-sectional (experiential) than in the longitudinal (deterrent) analysis. For petty theft, both cross-sectional correlations for the self-referenced measures of perceived risk are significant, and generally larger than those for the other-referenced measure. Marijuana use follows the same pattern for the first experiential effect. In this instance, as was true for petty theft/shoptlifting for the second cross-section, the sensitivity of a self-referenced measure of perceived risk to past behavior is clearly seen.²⁶ It is important to remember that cross-sectional analyses correlate prior behavior with perceptions, and do not indicate a deterrent effect. By comparing the experiential effect data with the deterrent effect data, we see that the self- vs. other-referenced dimension of perceived risk is less consequential for the deterrent effect than for the experiential effect. Since prior deterrence researchers have in fact reported experiential effects,

²⁶ In discerning this from the data in Tables 4A and 4B, it may be legitimately asked why there was a difference in the magnitude of the experiential effect for a self- vs. other-referenced measure of perceived risk in only one of the two cases for both marijuana use (the first experiential effect) and petty theft (the second experiential effect). Here it is important to keep in mind that the experiential effect reflects the effect of prior behavior on measured perceptions. In our other analyses with this data, we have found that a critical factor in this experiential effect is the *novelty* of the behavior, rather than the frequency. See Saltzman, Paternoster, Waldo & Chiricos, *Deterrent and Experiential Effects: The Problem of Causal Order in Perceptual Deterrence Research* (forthcoming in J. RESEARCH CRIME & DELINQ.). Thus, large experiential effects are found in instances where respondents first commit the offense and discover that they can do so without getting caught. The fact that the self/other-referenced difference was found only for the second experiential effect for petty theft (Time 1 - Time 2 behaviors on Time 2 perceptions) may be due to the fact that there were more new petty thieves between Time 1 and Time 2 than in the year before Time 1. In the year before Time 1, for example, only seven percent of those stealing were stealing for the first time that year. Of those who reported stealing during the year interval between Time 1 and Time 2, however, 17% were stealing for the first time. The "contamination" is greatest for the second experiential effect, then, because there were more people engaging in the act for the first time and getting away with it. A similar process can explain why the contamination is greater for the first experiential effect in the case of marijuana use. An analysis of the pattern of movement into marijuana use shows that there were slightly more new marijuana users (20% of those using marijuana) in the year prior to the administration of the Time 1 questionnaire than in the year interval between Time 1 and Time 2 (17% of those reporting marijuana use).

TABLE 4A
GAMMA AND PEARSONIAN CORRELATION COEFFICIENTS BETWEEN PERCEPTIONS OF ARREST RISK FOR SELF AND GENERALIZED OTHERS AND PETTY THEFT/SHOPLIFTING

Perceived Arrest Risk for:	OBSERVED CORRELATION BETWEEN:				
	Prior Behavior and Current Perceptions (Experiential Effect) ^a	(r)	Prior Behavior and Current Perceptions (Experiential Effect) ^b	(r)	Current Perceptions and Subsequent Behavior (Deterrent Effect) ^c
	gamma		gamma		gamma
Generalized Others	-.33 ^d	(-.08)	-.23	(.10) ^d	-.22 (.07)
Self	-.33 ^d	(-.16) ^e	-.46 ^e	(-.10) ^d	-.30 ^d (-.04)

TABLE 4B
GAMMA AND PEARSONIAN CORRELATION COEFFICIENTS BETWEEN PERCEPTIONS OF ARREST RISK FOR SELF AND GENERALIZED OTHERS AND MARIJUANA USE

Perceived Arrest Risk for:	OBSERVED CORRELATION BETWEEN:				
	Prior Behavior and Current Perceptions (Experiential Effect) ^a	(r)	Prior Behavior and Current Perceptions (Experiential Effect) ^b	(r)	Current Perceptions and Subsequent Behavior (Deterrent Effect) ^c
	gamma		gamma		gamma
Generalized Others	-.33 ^f	(-.11) ^d	-.24 ^f	(-.04)	-.25 ^d (-.07)
Self	-.67 ^f	(-.16) ^e	-.23	(-.10) ^d	-.33 ^d (-.11) ^d

^aReflects the correlation between behavior occurring in the year prior to Time 1 and measured perceptions of risk at Time 1

^bReflects the correlation between behavior occurring in the year between Time 1 and Time 2 and measured perceptions of risk at Time 2

^cReflects the correlation between perceptions measured at Time 1 and behavior occurring in the year between Time 1 and Time 2

^dp < .05

^ep < .01

^fp < .001

our finding suggests that the contamination of personal indices of risk may have led them to exaggerate the importance of self-referenced measures.

In addition to exposing the differences resulting from the two levels at which perceived risk was measured (self-vs. other-referenced), an examination of Tables 4A and 4B reveals some large differences in the deterrent effect depending upon whether gamma or r is the applied measure of association. If the data are collapsed and treated as ordered categories, the evidence of a deterrent effect for perceived risk is consistent and moderate in strength. All the gamma values are in the expected direction. Three of the four are significant. If the data are retained as continuous and treated as interval level data, however, one is led to a different conclusion. All of the r values are weak, and only one is statistically significant. Furthermore, the other-referenced measure for petty theft/shoplifting shows a positive r value. For our data the difference between gamma and r is partly a function of the fact that gamma ignores tied ranks and becomes inflated relative to r . The fact that the data are collapsed for the calculation of gamma may also contribute to the difference, since one effect of collapsing is to increase the number of ties. Consequently, our results should not be startling. Of importance is that in reporting the presence or absence of a deterrent effect for perceived risk, deterrence researchers have reported only one measure of association. Our analysis suggests that two contrary substantive conclusions about the deterrence doctrine may be drawn from the same underlying numbers, depending upon whether the data are collapsed before analysis.

Tables 5A and 5B present data on the relationship between the perceived risk of different types of punishment and shoplifting/petty theft and marijuana use. It was suggested above that some of the ambiguity in the perceptual deterrence literature might arise because even though deterrence researchers were measuring some form of the perceived certainty of punishment, the character of the punishments differed. Different punishments might conceivably produce different deterrent effects due to the mixing of the certainty and severity properties of punishment. Although this appears to be a reasonable conjecture, most perceptual deterrence researchers have instead assumed that the risk of any punishment is equally effective (or ineffective).

The data in Tables 5A and 5B allow a direct test of the validity of the two assumptions by comparing four different types of punishment

TABLE 5A
CORRELATIONS BETWEEN FOUR MEASURES OF THE PERCEIVED RISK OF PUNISHMENT AND SHOPLIFTING/PETTY THEFT

Perceived Likelihood of:	% Not Having Stolen or Shoplifted	% Having Stolen or Shoplifted	Total	(N)	Gamma	Pearson's r
Generalized Others	86.7	13.3	100.0	(89)	-.14	.01
Being Caught	85.6	14.4	100.0	(97)		
	81.5	18.5	100.0	(119)		
Generalized Others	89.4	10.6	100.0	(94)	-.27	.04
Being Caught By Police	88.8	11.2	100.0	(89)		
	79.8	20.2	100.0	(99)		
Generalized Others	90.3	9.7	100.0	(99)	-.22	.07
Being Arrested	81.6	18.4	100.0	(103)		
	81.4	18.6	100.0	(102)		
Generalized Others	88.6	11.4	100.0	(105)	-.09	.12*
Being Convicted	78.4	21.6	100.0	(97)		
	85.4	14.6	100.0	(96)		

TABLE 5B
CORRELATIONS BETWEEN FOUR MEASURES OF THE PERCEIVED RISK OF PUNISHMENT AND MARIJUANA USE

Perceived Likelihood of:	% Not Having Used Marijuana	% Having Used Marijuana	Total	(N)	Gamma	Pearson's r
Generalized Others	61.4	38.6	100.0	(89)	-.28	-.09*
Being Caught	52.4	47.6	100.0	(124)		
	39.3	60.7	100.0	(89)		
Generalized Others	58.9	41.1	100.0	(95)	-.24*	-.07
Being Caught By Police	50.0	50.0	100.0	(86)		
	41.4	58.6	100.0	(111)		
Generalized Others	61.4	38.6	100.0	(89)	-.23*	-.07
Being Arrested	50.4	49.6	100.0	(113)		
	41.6	58.4	100.0	(101)		
Generalized Others	57.4	42.6	100.0	(94)	-.18	-.06
Being Convicted	50.0	50.0	100.0	(128)		
	42.7	57.3	100.0	(75)		

*p < .05

risk.²⁷ They suggest that the magnitude of the deterrent effect is sensitive to the type of punishment risk being perceived. In the case of petty theft/shoplifting (Table 5A), the gamma values range in magnitude from $-.09$ (generalized others being convicted) to $-.27$ (generalized others being caught by the police). In two cases, being caught by the police and being arrested, the gamma values are moderately strong and supportive of a deterrent effect. There is little or no deterrent effect for the perceived risk of either being caught or being convicted. The Pearsonian correlations do not follow such a clear pattern; all r values are positive, contrary to the deterrence doctrine, and the risk of being convicted is statistically significant.

The importance of considering different types of punishment in measuring perceived risk is also conveyed in the case of marijuana use (Table 5B), although to a lesser extent than was true for petty theft/shoplifting. For both gamma and Pearsonian r coefficients, evidence of a deterrent effect is strongest when the perception is for the risk of being caught (gamma = $-.28$, $r = -.09$; $p < .05$), and weakest for the risk of being convicted (gamma = $-.18$, $r = -.06$; N.S.). Unlike the data for petty theft, the magnitudes of gamma and r do not vary appreciably among the different punishment types. Gammas range from $-.28$ to $-.18$ and the magnitudes for r range only from $-.04$ to $-.09$. Nevertheless, putting aside conviction risk, the data consistently show a deterrent effect. It must be emphasized that had we used conviction risk as our only measure of perceived risk, we would have reported no evidence of a deterrent effect.

There are two interesting parallels between the results for petty theft and marijuana use. As a corroboration of our earlier results, from the same underlying data set there is evidence of a deterrent effect for perceived risk when the data are first collapsed and the strength of the association is reported with gamma. There is no such evidence from the Pearsonian coefficients. For all eight values of gamma in Tables 5A and 5B the coefficient r is negative, and it is significant for three measures. Four of the eight r coefficients are in the wrong direction and only one of the negative r 's is significant. Secondly, in both instances the evidence of a deterrent effect for perceived risk is weakest when measured as the risk of being convicted (gamma = $-.09$, $r = .12$ for petty theft/shoplifting; gamma = $-.18$, $r = -.06$ for marijuana use). The finding of no deterrent effect is striking when compared with the other measures of perceived risk, which show generally consistent evidence of a deterrent effect. In this regard it is particularly interesting that for both petty

²⁷ This comparison is not confounded by variations in the level at which risk is measured since all four are interval level/other-referenced measures.

theft/shoplifting and marijuana use the risk of arrest shows the second strongest deterrent effect though the subsequent procedural penalty, conviction, shows very little effect.

VI. SUMMARY AND DISCUSSION

This paper has pointed out three methodological problems plaguing perceptual deterrence research, and has explored the significance of these issues through a panel analysis of a sample of university students. In reviewing the research on perceived risk, it was discovered that some studies report rather strong and consistent deterrent effects while other researchers find virtually no evidence of a deterrent effect.

Deterrence theory does appear to receive the most support when perceptions of risk are operationalized with self-referenced rather than other-referenced measures. Relationships between perceived risk and both marijuana use and petty theft/shoplifting were stronger and more consistent when risk was estimated with a self-referenced measure. We also found the self-referenced measure of risk to be more salient for the experiential effect (behavior → perceptions) than for the deterrent effect (perceptions → behavior). This suggests that the larger differences in the self- vs. other-referenced measures of risk found in the literature are probably due to the greater contamination of the self-referenced measures in cross-sectional designs.

In addition to the manner in which perceived risk is measured, the measure of association used in reporting the data also appears to affect the substantive interpretation of the results. Indeed, we have found that one may be induced to make entirely different conclusions from the same data, depending upon the measure of association used. Had we reported our results solely with Pearsonian correlation coefficients we would have concluded, along with Bailey and Lott, that perceived risk has little or no deterrent effect.²⁸ Had we only collapsed our data, however, and calculated the value of gamma, we would have concluded, along with Burkett and Jensen and Jensen et al., that perceived risk is an important deterrent.²⁹

The failure to find a strong and more consistent deterrent effect with Pearson's *r* may reflect the lack of variation in the independent and dependent variables in perceptual deterrence research. Statisticians have noted that the magnitude of Pearson's *r* will be restricted if the range of values of the variables being correlated is limited.³⁰ The problem of insufficient variation is particularly acute for the dependent vari-

²⁸ Bailey & Lott, *supra* note 7.

²⁹ Burkett & Jensen, *supra* note 18; Jensen, Erickson & Gibbs, *supra* note 5.

³⁰ H. BLALOCK, SOCIAL STATISTICS (1972).

able in perceptual deterrence, involvement in illegal behavior. For the most part perceptual deterrence research has been conducted on a rather homogenous (and unrepresentative) population — young, predominately white university students. It must be recognized that university students are a rather select subsample of the U.S. population. Moreover, as a group university students consistently report infrequent involvement in illegal activities. For example, in our study eighty-four percent of the respondents had not committed petty theft and fifty-one percent had not used marijuana during the year between Time 1 and Time 2. In Silberman's study with a college undergraduate sample, sixty-six percent of the students reported no shoplifting incidents and eighty-nine percent reported no involvement in petty theft.³¹ In an earlier study by Waldo and Chiricos, sixty-seven percent of their college sample had never used marijuana and forty-three percent had never committed petty theft.³² In order to give their variables sufficient variation so that any relationships may be revealed, perceptual deterrence workers should employ samples other than conveniently available university students.³³

Finally, we found that the conclusions permitted by the data also depended upon the type of punishment perceived. For petty theft/shoplifting, evidence of a deterrent effect for perceived certainty was found when the punishment being assayed was the risk of being caught by the police and the risk of being arrested. Only weak evidence of deterrence was observed for the risk of being caught and the risk of being convicted. To complicate the issue further, somewhat different results were found for marijuana use, where there was greater stability in the correlation coefficients across different measures of perceived risk. For both offenses, however, some of the strongest evidence of a deterrent effect was found for the risk of arrest while the weakest was found for the risk of conviction.

In understanding why potential arrest looms so significantly as a deterrent to our respondents but conviction does not, it is helpful to re-

³¹ Silberman, *supra* note 7.

³² Waldo & Chiricos, *supra* note 1.

³³ The problem of a skewed distribution on the dependent variable has plagued perceptual deterrence research with other samples. In his earlier study of the "shared misunderstanding" of belief in punishment, 56% of Jensen's high school respondents had committed no delinquent acts during the year prior to the questionnaire administration, and an additional 25% had committed only one act. See Jensen, *supra* note 9. In Burkett & Jensen's study of marijuana use, 42% of their high school students had never tried the drug. See Burkett & Jensen, *supra* note 18. Similar distributions were found by Teevan where 71% of his high school respondents reported smoking marijuana two times or less, and 64% had never used marijuana. See Teevan, *supra* note 17. In their study of several thousand adolescents, Jensen et al. found that approximately 64% had committed less than three delinquent acts. See Jensen, Erickson & Gibbs, *supra* note 5.

member that the sample consists of college students. It may be that, for these generally "respectable" and predominately middle-class respondents, an arrest would be just as costly in social and personal terms as any additional procedural penalty. Such was the conclusion drawn by Cameron in her study of middle-class shoplifters. She notes that after apprehension and arrest, even without further legal action, "pilferers stop pilfering. . . . The reward of shoplifting, whatever it is, is not worth the cost of reputation and self-esteem."³⁴

As to why the risk of conviction consistently showed even *less* of a deterrent effect for our respondents than did arrest, we can only conjecture that, for these college students, being arrested for an illegal act may initiate "highly positive, supportive, and socially integrative" social reactions which would facilitate the actor's movement back in the direction of conforming behavior.³⁵ Not all social reactions, either real or perceived, need result in expulsion from the group. Roman and Trice have identified inclusive social reactions as a part of the normalization of deviance. They suggest that such normalization processes—responses on the part of a social audience which tend to integrate rather than expel the rule breaker—are likely to occur where the deviant is "privately recognized as deviant but publicly acknowledged as normal."³⁶ An arrest can more easily be kept private than a more public degradation ceremony such as conviction and would therefore be less likely to lead to social stigma and exclusion (or the perception of stigmatization). In addition, an arrest might more easily be discounted by self and significant others as not indicative of essential identity, making more likely an inclusive social reaction. To support this, Orcutt has shown with small group research that, under conditions where group members generally perceive deviation as not being a "symptomatic expression" of the deviant's basic character, the deviant is perceived as an ordinary group member, and social reaction takes the form of inclusive responses whereby attempts are made to bring the deviator back into the fold.³⁷

The fact of criminal conviction, by contrast, may initiate more powerful and consequential labeling processes, those which Orcutt refers to as exclusive reactions.³⁸ These reactions (or, again, the actor's perception of these reactions as a possible outcome) are the traditionally-conceived labeling processes of social exclusion. A conviction is a more

³⁴ M. CAMERON, *THE BOOSTER AND THE SNITCH* 151 (1964).

³⁵ Thorsell & Klemke, *The Labeling Process: Reinforcement and Deterrent?*, 13 *LAW & SOC. REV.* 155 (1972), at 400.

³⁶ P. Roman & H. Trice, *Normalization: A Neglected Complement to Labeling Theory* (paper presented at the annual meetings of the American Sociological Association, 1971).

³⁷ Orcutt, *Societal Reaction and the Response to Deviation in Small Groups*, 52 *SOC. FORCES* 259, 264 (1973).

³⁸ *Id.* at 260.

public event than arrest and is less easily hidden from public knowledge. It may also be less easy to rationalize a conviction since a criminal trial is a degradation ceremony which often is an assault on the actor's entire character.³⁹ The culmination of such a ceremony may be that the deviation is taken to be indicative of essential identity, evidence of the kind of person the deviant really is. For these reasons, a conviction may be perceived to be less likely to initiate inclusive and supportive responses from others and more likely to lead to a wide range of exclusive reactions. Consequently, the actor, in ruminating over the potential response of others to a criminal conviction, may imagine sufficient negative reactions to be partially convinced of the disutility of conformity.

The findings of this study do suggest that the contradictions and inconsistencies found in the perceptual deterrence literature may be, at least in part, methodological artifacts. Nevertheless, we report our findings with caution, and as tentative observations. Additional research should expand the preliminary work reported here. Perhaps the most important issue on the research agenda should be the broadening of the sample scope of perceptual deterrence research. For the most part, this research (our's included) has been conducted on university students. Although such samples are acceptable in the exploratory stages of any social science research endeavor, the findings from such a select sample, however consistent, can only offer a modest contribution. The advancement of our understanding of the deterrence process will therefore require that deterrence research be undertaken on groups other than university students. An additional incentive for broadening the sampling scope is that deterrence researchers may thereby solve the problem of the lack of sufficient variation in behavioral variables. It may be desirable for deterrence researchers to select either a representative adult sample or a younger, behaviorally active sample for their research. The benefits accruing to the deterrence doctrine of such work will be theoretical as well as methodological.

³⁹ Garfinkel, *Conditions of Successful Degradation Ceremonies*, 61 AM. J. SOC. 420 (1956).