



*ambient public safety hazards?*

**Question 2:** *Given an affirmative answer to the first question, how valid is evidence on which this opinion is based?*

To form an opinion on these two questions, I reviewed the materials sent to me by the Effingham County State's Attorney and the empirical studies of crime-related secondary effects cited in this report. I also consulted the relevant authorities on statistics and criminology and other relevant literature, cited in this report. My opinions also rely on my training and background in statistics and criminology, of course, and especially, on my research in the area of crime-related secondary effects. Based on my review of materials, studies, and authorities, at a trial in this case, I would express the following opinions.

**Opinion 1:** *As a class, sexually-oriented businesses pose significant ambient public safety hazards. These hazards involve not only "victimless" crimes (prostitution, e.g.) but, also, the "serious" crimes (robbery, e.g.) and "opportunistic" crimes (vandalism, e.g.) that are associated with vice. The ambient public safety hazard (or crime victimization risk) can be ameliorated by regulation.*

**Opinion 2:** *The criminogenic nature of sexually-oriented businesses is a scientific fact. This opinion is based on two considerations. First, strong, empirically-validated criminological theory predicts that crime victimization risks will be higher around sexually-oriented business sites as a consequence of the normal commercial activities at the site. Second, this theoretically expected secondary effect has been observed in a diverse range of locations, circumstances, and times. Although the magnitude and nature of the observed crime-related secondary effect varies from*

*case to case, every adequately designed study has observed and reported a large, significant effect.*

In other legal proceedings, Experts retained by the sexually-oriented business industry have argued that the consistent empirical finding of the crime-related secondary effects literature is a methodological artifact of the weak quasi-experimental designs used in this literature.<sup>1</sup> I disagree. These same experts have conducted analyses that purport to show that sexually-oriented businesses have no crime-related secondary effects or, in a few instances, *salutary* impacts on ambient crime. Again, I disagree with the industry experts. Before addressing the empirical evidence, however, I will outline the relevant criminological theory.

### **1. Criminological theory of secondary effects.**

Crime-related secondary effects studies consistently find that sexually-oriented businesses generate significant ambient public safety hazards. The cumulative finding of this literature is more convincing because it is predicted by a strong, empirically-validated criminological theory.

Modern criminological theory holds that the victimization risk at a site is determined by three factors: (1) The number of potential victims (or targets) at the site; (2) the “hardness” of the site’s targets; and (3) the number of potential offenders at the site.<sup>2</sup> Holding target-hardness

---

<sup>1</sup>See, *e.g.*, Paul, B., D. Linz and B.J. Shafer, “Government regulation of ‘adult’ businesses through zoning and anti-nudity ordinances: de-bunking the legal myth of negative secondary effects.” *Communication Law and Policy*, 2001, 6:355-391.

<sup>2</sup>The source of this so-called “Routine Activities Theory” is L.E. Cohen and M. Felson "Social change and crime rate trends: A routine activity approach." *American Sociological Review*, 1979, 44:588-608. See also, M. Felson’s *Crime and Everyday Life, Second Edition* (Thousand Oaks, CA: Pine Forge Press, 1998). Ignoring one mathematical technicality, this three-factor theory can be written formally as:

$$\text{CRIME RISK} = [ \text{TARGETS} \times \text{OFFENDERS} ] / \text{HARDNESS}$$

Crime risk rises if the number of targets or offenders rises; crime risk falls as target hardness

constant, sites with greater numbers of offenders or targets have higher ambient risks. Holding the numbers of offenders and targets constant, on the other hand, sites with softer targets have higher ambient risks.

Target-hardening strategies range from devices designed to increase security around the target (lighting, dead-bolt locks, *etc.*) to proactive guardianship (uniformed guards, police patrols, *etc.*). Reducing the density of offenders (by controlling site access, *e.g.*) or targets (by dispersing the targets across sites, *e.g.*) can also reduce ambient risk in principle. But as a practical matter, crime reduction programs operate primarily through target-hardening.<sup>3</sup>

### **1.1 Victims or targets.**

Applied to sexually-oriented businesses, this three-factor criminological theory predicts that adult bookstores, video arcades, peep-shows, nude dancing clubs and the like will generate large, significant crime risks. The risk phenomenon is driven by the victim factor. Sexually-oriented businesses can draw relative large numbers of potential victims to a common site. The density of potential victims attracts predatory criminals to the site. Business practices designed to attract more customers to the site (sales, advertising, *etc.*) aggravate the risk. To the extent that many types of businesses try to attract more customers, this factor is not exclusive to sexually-oriented businesses. Customers attracted to sexually-oriented businesses have characteristics (*i.e.*, the desire for anonymity) that make them attractive targets, however.

### **1.2 Target hardness**

The qualities of sexually-oriented business patrons make them soft targets for predatory

---

rises.

<sup>3</sup>The classic statement on target-hardening is Oscar Newman's *Defensible Space: Crime Prevention Through Urban Design*. (New York: MacMillan, 1973).

criminals. Many travel long distances to the site, for instance, and are often strangers or outsiders to the area.<sup>4</sup> To avoid stigmatization, some patrons use aliases and pay in cash; and worse, when victimized, tend not to complain to or seek assistance from the police.

In addition to characteristics that make sexually-oriented business patrons soft targets, the three-factor theory also points to physical properties of the site. Virtually all sites have structural features – alleyways, adjacent buildings, fences, *etc.* – that hide or obscure actors and activities. These structures, which constitute one important class of site-specific risk factors, aggravate ambient risk through either of two mechanisms.

First, to the extent that a structural feature can be used to obscure criminal activities, the feature will make the site more attractive to predatory criminals. As more potential criminals are drawn to the site, the site’s victimization risk rises. Second, to the extent that a structural feature makes routine police patrolling of the site more difficult, the effectiveness of police crime reduction procedures diminishes. For this reason, zoning regulations often include features (security lighting, removing visual obstructions, *etc.*) that facilitate police patrolling and related crime reduction procedures.

### **1.2.1 Alcohol makes soft targets softer**

In theory, proximity to alcohol aggravates the ambient crime phenomenon through two mechanisms. First, proximity to a bar or tavern makes a sexually-oriented business site more attractive relative to competing sites; opening a tavern near a sexually-oriented business site will increase the concentration of targets at the site. Second, to the extent that alcohol lowers

---

<sup>4</sup>In 1990, as part of an investigation, Garden Grove police officers ran registration checks on motor vehicles parked at sexually-oriented businesses. Virtually all of the vehicles were registered to addresses outside Garden Grove. The 1986 Austin, TX study arrived at the same finding.

personal inhibitions and clouds judgment, proximity to a tavern will make sexually-oriented business patrons more vulnerable to predatory criminals; *i.e.*, it will make soft targets softer.

### **1.3 Expected crimes and criminals**

Criminological theory predicts that the public safety hazard posed by sexually-oriented businesses will be realized in three broad categories of crime: Predatory, “victimless,” and opportunistic crimes. Predatory crimes, like robbery and assault, are perpetrated in the victims’ presence and, for that reason, each is potentially fatal. “Victimless” crimes, including drugs, lewd behavior, and prostitution, are perpetrated with the victims’ active participation. Aside from the fact that these crimes are illegal *per se*, victimless crimes are often linked to predatory crimes through the perpetrator. This link can be a rationale for police vice control activities. Finally, crimes of opportunity, including some acts of vandalism, thefts, and burglaries, are perpetrated outside the victims’ presence, often by predatory criminals drawn to the site by opportunities for other crimes.

The criminal predators who are attracted to the sexually-oriented business site by the quantity and quality of victims can be thought of as “professional” criminals. Most lack legitimate means of livelihood and devote substantial time to illegitimate activities. With few exceptions, predators and victims are not acquainted and this has theoretical implications for the types of crimes expected.

### **1.4 Regulatory amelioration**

Since predatory criminals are attracted to sexually-oriented business sites by the concentration of soft targets, ambient crime risk can be ameliorated by hardening the sites’ targets. To the extent that regulations, including those that govern public nude conduct, focus

public safety attention and police resources on a site, the regulations will ameliorate the public safety hazard. Inspections and routine visible police presence in a neighborhood have the effect of reducing victimization risk through a complex set of pathways.<sup>5</sup> Effective regulations vary across jurisdictions, of course, but to the extent that (apparently) idiosyncratic regulations are designed to facilitate enforcement, to maximize police officer safety, or to otherwise harden a target, they are expected to amplify the regulations' impact on ambient crime. In that sense, these idiosyncracies represent sound public policy.

### **1.5 *Non-sexually-oriented businesses***

Criminological theory predicts that *non-sexually-oriented* businesses, like gas stations, convenience markets, and bread stores, will have trivially small crime-related secondary effects. This is because *non-sexually-oriented* businesses do *not* draw large numbers of soft-target customers from wide catchment areas; customers drawn to the sites of *non-sexually-oriented* businesses spend only minutes on-site and, otherwise, lack the characteristics that make sexually-oriented business customers soft targets. Due to the relatively low density of soft targets in areas around *non-sexually-oriented* businesses, rational predatory criminals are *not* attracted to gas stations, convenience markets, or bread stores.

### **1.6 On-premise vs. off-premise businesses**

In other legal proceedings, experts for the sexually-oriented business industry have argued that the criminological theory does not apply to businesses that rent or sell products *only* for off-

---

<sup>5</sup>The best known statement of this effect is “Broken windows: The police and neighborhood safety.” by J.Q. Wilson and G.L. Kelling, *Atlantic Monthly*, 1982, 249:29-38. Wilson and Kelling argue persuasively that police visibility in a neighborhood has a greater impact on crime and victimization risk than police activities that target crime. Modern police methods are based on this theory.

premise consumption. This argument holds that, even though other sexually-oriented businesses might pose public safety hazards, the sub-class of sexually-oriented businesses that rent or sell only for off-premise consumption *do* not and *cannot* pose the same risk. In fact, however, the theoretical mechanism that generates a public safety hazard in and around an on-premise sexually-oriented business, operates as well for off-premise sexually-oriented businesses. Whether its products are consumed on- or off-premises, the success of a sexually-oriented business depends on its ability to attract large numbers of a certain type of customer from a wide catchment area. The implicit interests of these customers make them attractive targets to prostitutes and predatory criminals.

Off-premise sexually-oriented businesses often must compete with book and video rental stores are not sexually-oriented (*e.g.*, book and video rental stores that have small sexually-oriented sections). To do this, off-premise sexually-oriented businesses might offer products (*e.g.*, legal stimulants, sexual toys, paraphernalia) that their non-sexually-oriented competitors do not. The differences that distinguish the off-premise sexually-oriented business attract customers whose implicit interests make them soft targets for predatory criminals. In theory then, because both on- and off-premise sexually-oriented businesses must attract customers, both pose public safety hazards. The empirical evidence confirms this theory.

## **2. Empirical evidence: government-sponsored studies.**

Crime-related secondary effect studies began to appear in the mid-1970s. The literature accumulated for the next thirty years until, at present, there are at least three-dozen studies. For all practical purposes, this literature can be divided into two halves. The first half, consisting of studies conducted or sponsored by governments, consistently reports that sexually-oriented

businesses have large, significant crime-related secondary effects. The second half, consisting of studies conducted or sponsored by sexually-oriented businesses usually reports no significant crime-related secondary effects. The contradiction between these two halves of the literature is easily reconciled. Before reconciling the contradiction, however, I will describe the results of three type government-sponsored secondary effect studies that were conducted over a period of thirty years.

**2.1 Phoenix, AZ (1979)**

In 1979, the City of Phoenix, AZ conducted a study of crime-related secondary effects. Although the actual work was conducted by City employees, Arizona State University faculty served as advisors and consultants. I was a Professor of Criminal Justice at Arizona State University at that time and met regularly with the City employees who conducted this research.

<b>Table 2.1 - Secondary Effects in Phoenix, AZ</b>			
	<i>Adult Business Areas</i>	<i>Control Areas</i>	<i>Secondary Effect</i>
<i>Property Crime Rate</i>	122.86	87.90	139.8 %
<i>Personal Crime Rate</i>	5.81	5.11	113.7 %
<i>Sexual Crime Rate</i>	9.40	1.62	580.2 %

Source: ADULT BUSINESS STUDY, City of Phoenix Planning Department, May 25, 1979; Table V

To estimate the crime-related secondary effects of adult businesses, the researchers compared crime rates in areas with adult businesses to crime rates in “matched” control areas (*i.e.*, areas that were similar but that had no adult businesses). The comparisons are summarized in Table 1. The property and personal crime rates reported in Table 1 were estimated from

Uniform Crime Report (UCR) data. The percentages reported in the right-hand column, in red, are the secondary effect estimates derived from the crime rates. Compared to crime rates in the control areas, the UCR property crime rate was 39.8 percent higher; the UCR personal crime rate was 13.7 percent higher; and the UCR sex crime rate was 480.2 percent higher in the adult business areas. By any reasonable standard, these are *large, significant* secondary effects.

## **2.2 Garden Grove, CA (1991)**

The salient weakness in the Phoenix study is that its “static group comparison” design<sup>6</sup> assumes that the test and control neighborhoods are equivalent on relevant crime risk factors. If this assumption is unwarranted, observed secondary effects cannot be attributed to the sexually-oriented businesses. The surest, simplest way to control this threat to validity is to use a before-after design. In the early 1990s, James W. Meeker and I were able to use a before-after design to study the secondary effects of sexually-oriented businesses in Garden Grove, CA.<sup>7</sup>

In Garden Grove study, Dr. Meeker and I observed neighborhood crime incidents before and after a sexually-oriented business opened in the neighborhood. We found that when a sexually-oriented business *opened* its doors, ambient crime rose. This before-after contrast captures the essence of a crime-related secondary effect. If, as strong criminological theory predicts, sexually-oriented businesses generate public safety hazards, we expect to see crime rise when a sexually-oriented business moves into the neighborhood – otherwise the theory is wrong.

---

<sup>6</sup> The most widely-cited authority on quasi-experimental designs is D.T. Campbell and J.C. Stanley, *Experimental and Quasi-experimental Designs for Research*. Rand-McNally, 1966. Campbell and Stanley call the design used in Phoenix a “static group comparison” design.

<sup>7</sup> *Final Report to the City of Garden Grove: The Relationship between Crime and Adult Business Operations on Garden Grove Boulevard*. October 23, 1991. Richard McCleary, Ph.D. and James W. Meeker, J.D., Ph.D.

The validity of this inference requires that other plausible explanations for the before-after difference be ruled out, of course. Perhaps the difference is a coincidence, for example; or perhaps crime rose throughout the city, not just in the neighborhood where the sexually-oriented business opened. To control these common “threats to internal validity,” Dr. Meeker and I replicated the analyses for all other sexually-oriented businesses in Garden Grove. If a before-after rise in ambient crime were due to some unrelated factor, the effect would also be observed at other sexually-oriented businesses in Garden Grove. If the same effect were not observed at these control sites, on the other hand, the rise in ambient crime could be attributed, with a great degree of confidence, to the newly opened business.

**Table 2.2a - Secondary Effects in Garden Grove, CA: Business Openings  
Total “Serious” Crime, One Year Before/After**

	<i>Test Sites</i>			<i>Control Sites</i>		
	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>	
<b>March, 1982</b>	71	106	<b>1.49</b>	76	78	<b>1.03</b>
<b>March, 1986</b>	31	68	<b>2.19</b>	80	92	<b>1.15</b>
<b>August, 1988</b>	32	50	<b>1.56</b>	41	40	<b>0.98</b>
<b>Total</b>	134	224	<b>1.67</b>	197	210	<b>1.06</b>

*Source: Final Report to the City of Garden Grove, pp. 26-28*

Secondary effects for three business openings are reported in Table 2.2a. When a new sexually-oriented business opened, total “serious” crimes in a 500-foot radius around the site rose, on average, 67 percent. To control for the confounding effects of city-wide crime trends, changes in police activity, and other common threats to internal validity, these before/after differences were compared to the analogous differences for the addresses of existing sexually-oriented businesses. Total “serious” crimes in a 500-foot radius around these “control” sites

rose, on average, only 6 percent. The secondary effect observed when a new sexually-oriented business opens is, thus, substantively large and statistically significant.

Critics could still argue that effects of this magnitude might be observed for the opening of *any* new business. As a *practical* matter, however, if every Garden Grove business had generated a crime-related secondary effect as large as the effects found for sexually-oriented businesses, Garden Grove would have had the highest crime rate in the region; but Garden Grove did not have a particularly high crime rate. As a *theoretical* matter, moreover, the public safety hazard posed by sexually-oriented businesses is a consequence of the normal commercial activity of those businesses; the normal commercial activities of other types of business, including gas stations, convenience markets, bread stores, and Montessori preschools, are qualitatively different.

**Table 2.2b - Secondary Effects in Garden Grove, CA: Alcohol License  
Total “Serious” Crime, One Year Before/After**

	<i>Test Sites</i>			<i>Control Sites</i>		
	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>	
<b>Violent Crimes</b>	1	10	<b>10.0</b>	1	2	<b>2.00</b>
<b>Property Crimes</b>	38	48	<b>1.26</b>	16	21	<b>1.31</b>

Source: *Final Report to the City of Garden Grove*, pp. 26-28

In addition to the findings about sexually-oriented businesses, the Garden Grove study produced a collateral finding that is of some importance. When a tavern opened less than 500 feet from a sexually-oriented business, violent crime in the vicinity of the sexually-oriented business rose significantly. While violent crime in the vicinity of a “control” also rose, the effect

was substantially smaller. Before-after differences in property crime around the test and control sites were not significantly different. The crime-related secondary effect of sexually-oriented businesses is aggravated by proximity to a liquor license then but the effect is limited to serious violent crime. Like the major finding in Garden Grove, this collateral finding is predicted by empirically-validated criminological theory.

### **2.3 Centralia, WA (2003)**

In terms of internal validity, before-after designs (Garden Grove, *e.g.*) are stronger than “static group comparison” designs (Phoenix, *e.g.*). When the methodologically strongest design is not possible, of course. In many cases, for example, well-defined control sites, like those in Garden Grove, are not available. Small cities present an illustrative case. When their sexually-oriented business codes are challenged, small cities often lack the resources required to hire experts; when they are able to hire experts, moreover, local conditions often preclude the use of the optimal design. Since most small cities have at most only one sexually-oriented business, the availability of optimal control sites is always problematic. Nevertheless, in such cases, strong before-after designs may still be feasible.

In first week of December, 2001, a sexually-oriented business opened in an vacant residential structure in Centralia, WA. With population *ca.* 14,000, Centralia is located on Interstate 5 between Portland and Seattle. Total serious crimes before and after the sexually oriented business’ opening are reported in Table 2.3. In the impact area, serious crime rose by nearly 90 percent after the opening. In the rest of Centralia, during the same period, serious crime dropped by nearly four percent. The statistical significance of these before-after contrasts can be tested by forming the odds ratio, as reported in Table 2.3, and comparing its value

(1.9559) to the value of its standard error (.8076).<sup>8</sup> By chance alone, an odds ratio larger than 1.9559 would occur less than eight times in one thousand trials or samples.

	<b>After</b>	<b>Before</b>	<b>Odds</b>
<b>Impacted Area</b>	17	9	1.8889
<b>Other Centralia</b>	3243	3358	0.9658
<b>Odds Ratio</b>			1.9559

Although it is highly unlikely that the secondary effect reported in Table 2.3 occurred by chance, lacking a suitable control site, the effect could conceivably be due to some uncontrolled threat to internal validity. Is it possible, *e.g.*, that crime would have risen in the impact area if another type of business – say, a bread store – had moved into the vacant residential structure? This is highly unlikely and inconsistent with the facts and statistics. Regarding the facts, the bulk of the “crime wave” reported in Table 2.3 occurred during late-night hours when bread stores are closed; the bulk of the increase was realized in crimes that are theoretically inconsistent with a bread store; and so forth and so on.

The statistics make an even stronger argument, however. The before-after effect reported in Table 2.3 is both substantively and statistically large. If every new business that opened in Centralia generated a secondary effect of this magnitude, Centralia would be the “crime capitol” of the Pacific northwest. But since Centralia is a pleasant, crime-free city, it is highly unlikely

---

<sup>8</sup> Assuming that the secondary effect estimates in Table 2.2 are due to chance, and that the crime data are Poisson-distributed, the standard error of the odds ratio is .8076. Derivations of this standard error are found in most graduate level statistics texts. See, *e.g.*, p. 345 of Steve Selvin’s *Statistical Analysis of Epidemiological Data* (New York: Oxford University Press, 1991).

that the large, significant secondary effect is a simple consequence of a new business moving into a vacant residence.

## **2.4 Summary**

The three government-sponsored secondary effect studies reviewed here are typical of this half of the literature in that each finds a substantively large, statistically significant crime-related secondary effects. The studies also typify the range of methodological rigor found in the secondary effects studies conducted or sponsored by governments. Other commonly cited government-sponsored studies which report large, significant crime-related secondary effects include Los Angeles CA (1977), Whittier, CA (1978), Minneapolis, MN (1980), Indianapolis, IN (1984), Austin, TX (1986), Seattle, WA (1989), Times Square, NY (1994), and Newport News, VA (1996). Individually, each of these studies might be faulted on narrow methodological grounds; that is the nature of non-experimental research. Since no single methodological critique applies to all of the studies, however, taken together, the literature supports the strong inference that sexually-oriented businesses pose serious ambient public safety hazards.

## **3. Empirical evidence: industry-sponsored studies.**

Beginning in 2001, secondary effect studies conducted or sponsored sexually-oriented business began to appear. Unlike the government-sponsored research studies conducted in the preceding 25 years, the industry-sponsored studies were conducted specifically for use in legal proceedings. The most prolific author of industry-sponsored studies is Dr. Daniel Linz.<sup>9</sup> Without exception, Dr. Linz' secondary effect studies find that sexually-oriented businesses pose no *statistically* significant ambient crime risks. Although Dr. Linz' null findings might appear to

---

<sup>9</sup> Dr. Linz is Professor of Communication, University of California, Santa Barbara.

contradict the consensus finding of government-sponsored studies, in fact, Dr. Linz' research is entirely consistent with the consensus view. I will review three of his studies.

### **3.1 Greensboro, NC (2003)**

One of the most interesting industry-sponsored studies was conducted by Dr. Linz in Greensboro, NC.<sup>10</sup> Dr. Linz used a relatively weak "static group comparison design" similar to the one used in the 1979 Phoenix study. With few exceptions, government-sponsored studies tend to use relatively weak quasi-experimental designs. Weaker designs tend to bias a study in favor of the null finding – no secondary effect, *i.e.* – Dr. Linz reported in Greensboro:

The presence of adult cabarets and adult video/bookstores in "neighborhoods" was unrelated to sex crimes in the area. We found that several of an adult video/bookstore were located in high person and property crime incident "neighborhoods." We examined the "neighborhoods" and local areas surrounding the adult video/bookstores (1000 foot radius) further and we found that the adult video/bookstores were not the primary source of crime incidents in these locations ... (T)here is no support for the City of Greensboro's theory that adult businesses produce adverse secondary effects. The results of our study show that adult businesses are not associated with crime events.<sup>11</sup>

Due to the technical nature of the statistical analyses, the City of Greensboro retained me to "translate" Dr. Linz' numerical results into plain words.<sup>12</sup> Even for a statistician, Dr. Linz' report was a difficult read. The numerical results supporting his conclusion were scattered over 18 pages of computer output in an appendix. When the actual numbers are examined, it was clear

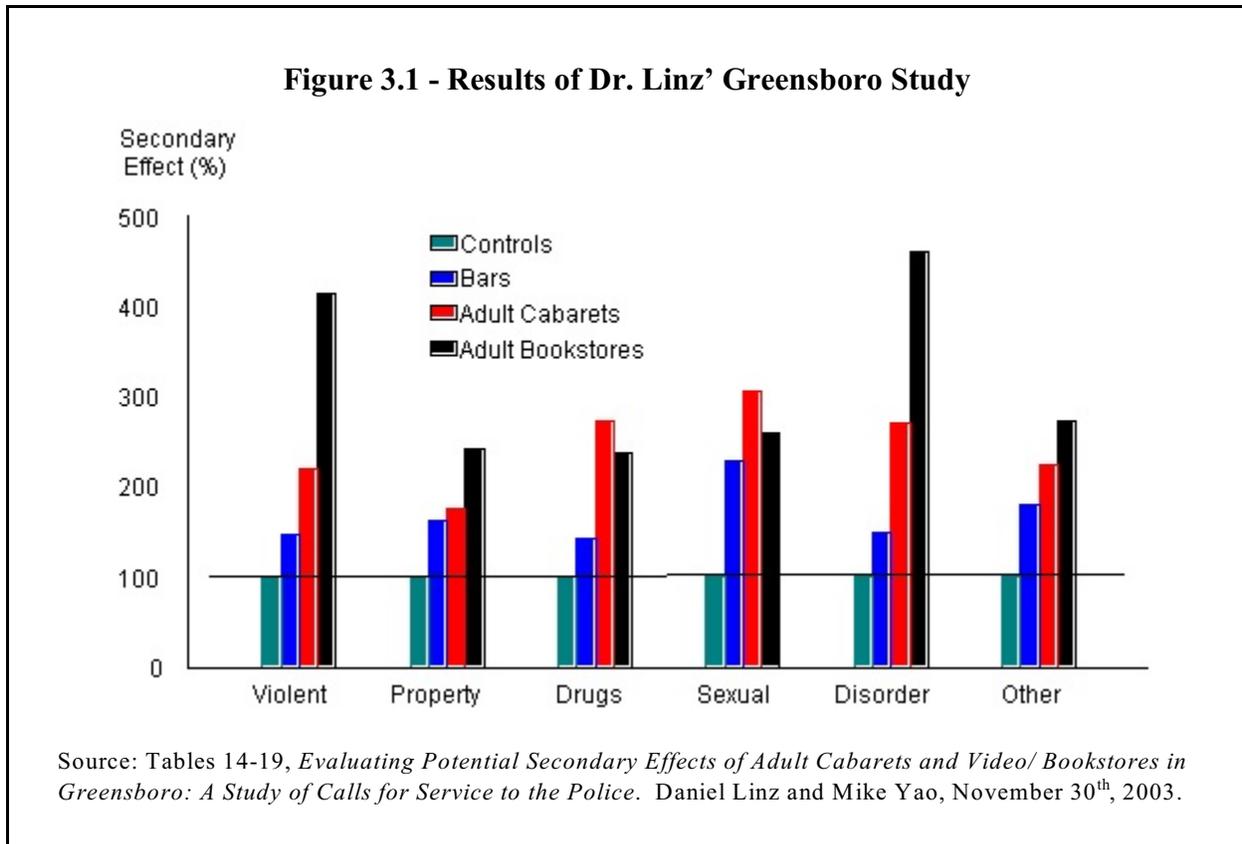
---

<sup>10</sup> *Evaluating Potential Secondary Effects of Adult Cabarets and Video/Bookstores in Greensboro: A Study of Calls for Service to the Police* by Daniel Linz, Ph.D. and Mike Yao, November 30<sup>th</sup>, 2003. Submitted by the plaintiffs in *Giovani Carandola Ltd., et al v. City of Greensboro*, U.S. District Court for the Middle District of North Carolina, Greensboro Division (1:03 CV 722)

<sup>11</sup> p. 3 (counting the title sheet as p. 1) of the Linz-Yao Greensboro *Study*.

<sup>12</sup> R. McCleary. *A Methodical Critique of the Linz-Yao Report: Report to the Greensboro City Attorney*. December 15, 2003.

that Dr. Linz had overstated the basis of his strongly-worded conclusion. Put simply, Dr. Linz' numbers contradicted his words.



The results of Dr. Linz' analyses are plotted in Figure 3.1. Dr. Linz analyzed six types of police data (relating to violent crimes, property crimes, drug crimes, sexual crimes, disorder crimes, and all other crimes). Controlling the effects of demographic and economic variables presumed to cause crime, Dr. Linz estimated crime risks four model neighborhood types. To facilitate interpretation, the green bars in Figure 3.1, representing control neighborhoods, are fixed at 100 percent. Dr. Linz found that neighborhoods with taverns, represented as blue bars in Figure 3.1, had more crime than the controls. That result was expected. What Dr. Linz did not expect, however, was that neighborhoods with adult cabarets would have more crime than the neighborhoods with taverns; and that neighborhoods with adult bookstores or video arcades

would have more crime than any other type of neighborhood.

The pattern of results in Figure 3.1 are credible for three reasons. First, the results are exactly what strong criminological theory predicts. Second, the study was sponsored by the sexually-oriented business industry. Third, Dr. Linz used a study design that biased the analyses in favor of a null finding. The fact that a large, significant secondary effect survived the weak design testifies to size and nature of the secondary effects in Greensboro.

### **3.2 Toledo, OH (2004)**

The 2003 Greensboro study was not an isolated case. One year later, Dr. Linz replicated the Greensboro study in Toledo.<sup>13</sup> In Toledo, Dr. Linz reported:

... that after controlling for variables used by criminologists and found to be related to criminal activity, the presence of adult cabarets, video/bookstores or other adult businesses in the neighborhood was unrelated to crime incidents when the control variables were considered, no matter what type of crime event we studied.<sup>14</sup>

Professor James W. Meeker and I were retained by the City of Toledo to re-analyze Dr. Linz' data. Although we were able to replicate the Dr. Linz' analysis, arriving at the same results, we noticed several suspicious idiosyncracies in Dr. Linz' statistical model. With three simple "tweaks," Dr. Linz' statistical model produced the large, significant secondary effect estimates plotted in Figure 3.2.<sup>15</sup>

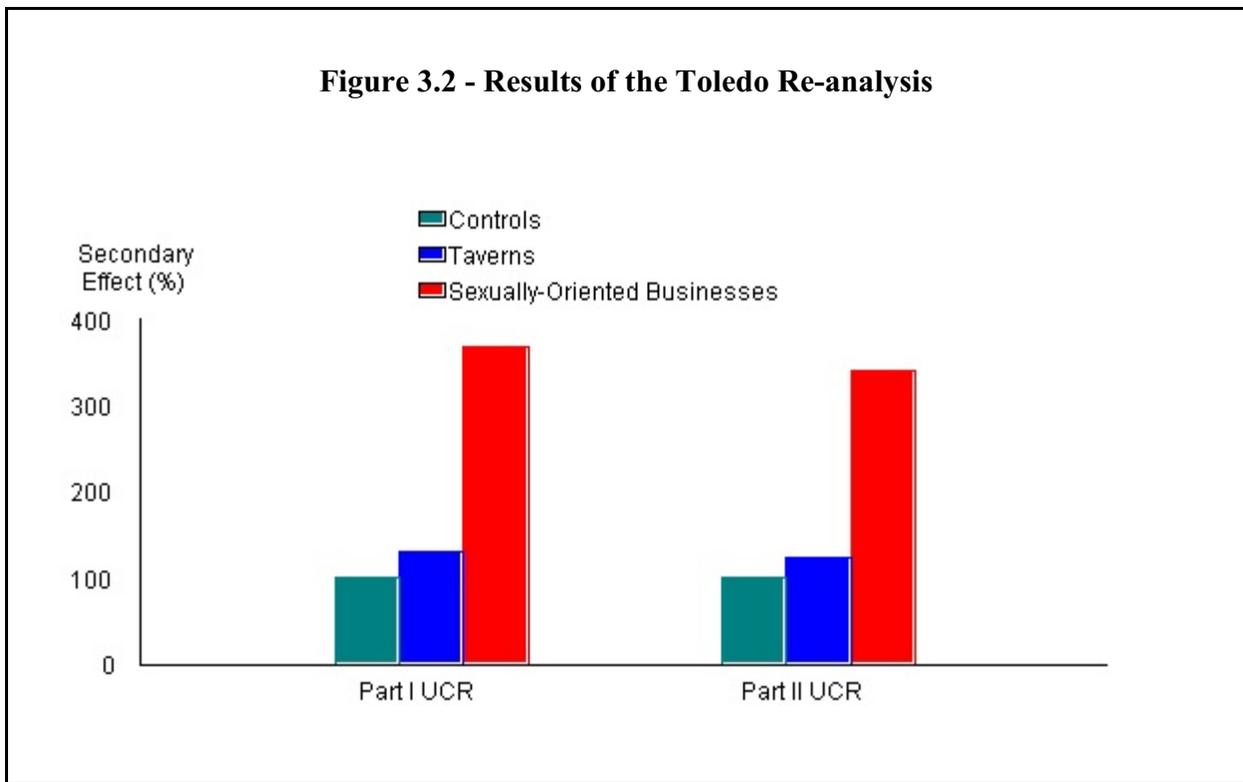
---

<sup>13</sup> *Evaluating Potential Secondary Effects of Adult Cabarets and Video/Bookstores in Toledo, Ohio: A Study of Calls for Service to the Police*. Daniel Linz and Mike Yao, February 15, 2004. Submitted in *Deja Vu-Toledo, Inc., et al., v. City of Toledo*, U.S. District Court for the Northern District of Ohio, Western Division (Case No. 3:03CV7245).

<sup>14</sup> p. 2, the Linz-Yao Toledo Report

<sup>15</sup> Dr. Linz' model broke crime down into five categories (personal, property, sex, drugs, and other); broke down sexually-oriented businesses into three categories (cabarets, bookstores, and other); and defined the secondary effect in terms crime *totals* (rather than *per capita* crime

To facilitate interpretation of Figure 3.2, the secondary effect estimates for control neighborhoods, which have no sexually-oriented businesses or taverns, are fixed at 100 percent and are represented as green bars. Compared to control neighborhoods, *per capita* UCR Part I (“serious”) and Part II (“victimless”) crime rates in neighborhoods with taverns, represented by blue bars in Figure 3.2, were 30 and 23 percent higher respectively. In neighborhoods with sexually-oriented businesses, however, the *per capita* UCR Part I (“serious”) and Part II (“victimless”) crime rates were 268 and 241 percent higher respectively.



The secondary effect estimates plotted in Figure 3.2 are unambiguous. Even compared to

---

rates). Our model broke crime down into two categories (UCR Part I or “serious” and Part II or “victimless” crimes); made no distinctions among the types of sexually-oriented businesses; and defined the secondary effect in terms of *per capita* crime rates (rather than crime totals). Other than these three differences, the two models are identical. Both use multiple regressions on the same explanatory variables and are estimated with the same software (SPSS).

neighborhoods with taverns, the crime-related secondary effects of Toledo’s sexually-oriented businesses are large and statistically significant.

Non-technical readers may wonder how three simple model “tweaks” could transform a small, insignificant secondary effect into a large, significant secondary effect? Minor changes in the structure of a statistical model cannot reverse a secondary effect estimate (from small and insignificant to large and significant) unless the model is mis-specified; Dr. Linz’ model was clearly mis-specified so as to create a bias in favor of a null finding.

### **3.3 San Diego, CA (2002)**

Using the same weak quasi-experimental design, Dr. Linz reported a similar effect in San Diego.<sup>16</sup> Comparing police calls-for-service in peep-show and control neighborhoods, Dr. Linz reported that there were no statistically significant differences. Professor James W. Meeker and I were retained by the City of San Diego to re-analyze Dr. Linz’ data.<sup>17</sup> We discovered that Dr. Linz’ summary of the San Diego findings omitted an important point. What Dr. Linz actually found was that peep-show neighborhoods had 15.7 percent more calls-for-service than the control neighborhoods. Although a 15.7 percent increase in the crime rate is large by *any* standard, Dr. Linz argued that because the effect was *statistically insignificant*, the “real” secondary effect was zero:

... statistically nonsignificant result and must be interpreted, as meaning that there is no significant difference between these two averages – an indication that the

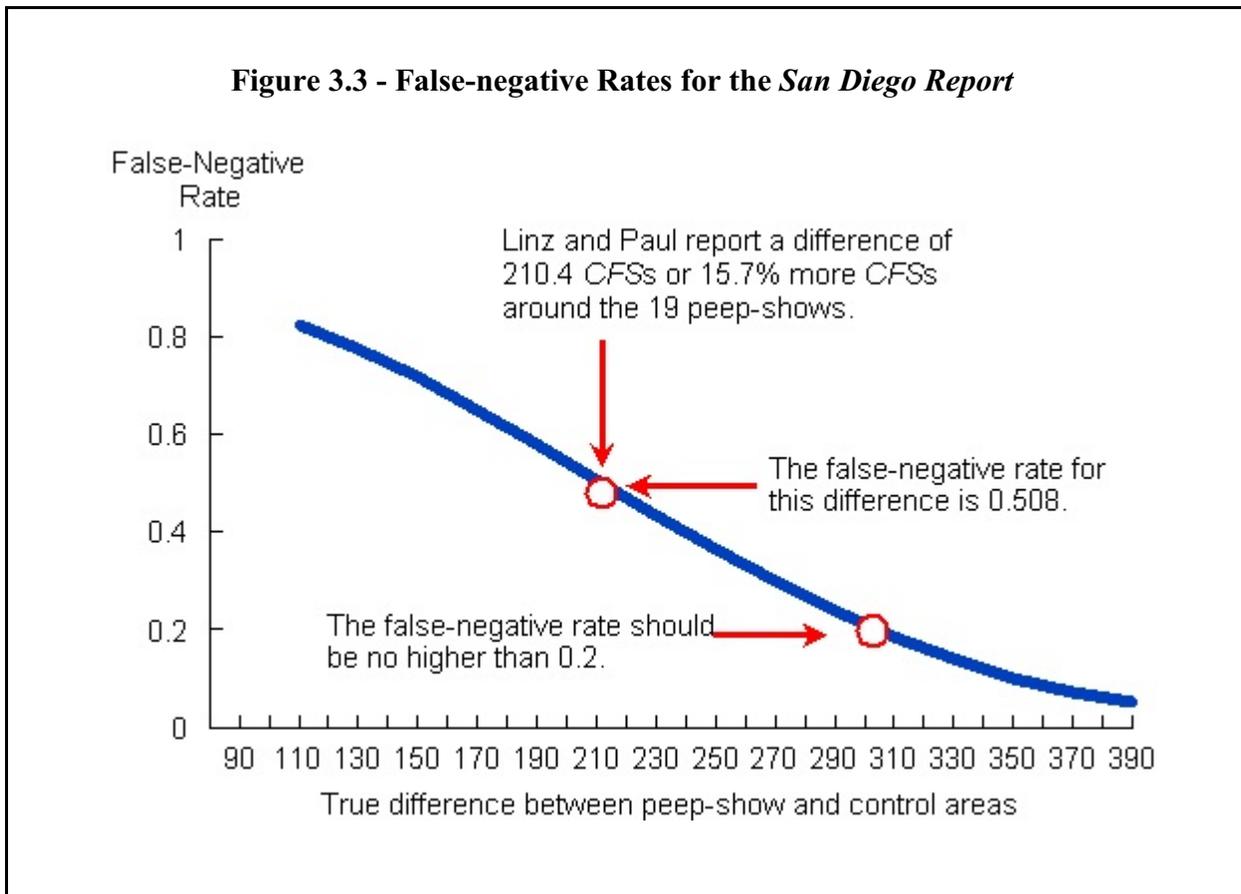
---

<sup>16</sup> *A Secondary Effects Study Relating to Hours of Operation of Peep Show Establishments in San Diego, California*. September 1, 2002. Daniel Linz and Bryant Paul. Submitted in Mercury Books v. City of San Diego. U.S. District Court, Southern District of California (00-CV2461).

<sup>17</sup> R. McCleary and J.W. Meeker, *A Methodical Critique of the Linz-Paul Report: A Report to the San Diego City Attorney’s Office*. March 12, 2003.

level of criminal activity for [peep-show areas] is equal to the level of criminal activity for [control areas].<sup>18</sup>

The substantively large 15.7 percent increase is not “real,” in other words. Finding no *statistically significant* secondary effect, Dr. Linz then concludes that no secondary effect exists. This is a fallacy. Not finding a significant effect *might* imply that no secondary effect exists, as Dr. Linz claims, but it might also imply that the search for an effect was weak or defective.<sup>19</sup> It was.



<sup>18</sup>p.15, *A Secondary Effects Study Relating to Hours of Operation of Peep Show Establishments in San Diego, California*. September 1, 2002. Daniel Linz and Bryant Paul.

<sup>19</sup>Not finding something cannot prove that the thing does not exist. Newton made this point with his aphorism “*Negativa non Probanda*.” “Finding nothing proves nothing.”

Under the circumstances, Dr. Linz should have asked whether his failure to find a significant secondary effect was an artifact of the weak design used in the San Diego study. Although Dr. Linz did not address this question, his report included enough statistical detail to permit others to calculate relevant probabilities. The probabilities plotted in Figure 3.3 were calculated by Professor Meeker and me from statistics reported by Dr. Linz. As shown, the 15.7 percent secondary effect estimate found by Dr. Linz has a false-negative probability of .508. What this means, simply, is that Dr. Linz' null finding is more likely (51 percent) to be *incorrect* than it is to be correct (49 percent).

### **3.3 Summary**

The three industry-sponsored secondary effect studies reviewed here are typical of this half of the literature in that each uses a relatively weak quasi-experimental design and each reports no statistically significant crime-related secondary effect. In some instances, however, as in the case of the (2003) Greensboro study and the (2004) Toledo study, re-analyses of the data have found large, statistically significant crime-related secondary effects that the authors ignored and/or obfuscated. In other instances, as in the case of the (2002) San Diego study, re-analyses have found that the statistical power of the reported null finding falls far below the conventional level; and in those cases, what the authors had mis-characterized as a *null* finding – no secondary effect – is an *inconclusive* finding. I will explain this point further in my conclusion.

### **4. Conclusion**

Table 4 lists sixteen of the most widely-cited crime-related secondary effects studies. The three columns of Table 4 correspond to three findings: an *adverse effect* finding, an *inconclusive* finding, and a *null* finding. Thirteen of the sixteen studies – including the two industry-

sponsored studies reviewed in this report – had *adverse effect* findings. Three of the studies, all industry-sponsored, had inconclusive findings. None of the sixteen had a *null* finding (*i.e.*, a finding of no adverse secondary effect).<sup>20</sup>

<b>Table 4 - Secondary Effects Studies by Type of Finding</b>		
<b>Adverse Effect</b>	<b>Inconclusive</b>	<b>Null Effect</b>
<i>Confidence</i> ≥ 95%	<i>Confidence</i> < 95%	<i>Confidence</i> < 95%
<i>Power</i> ≥ 80%	<i>Power</i> < 80%	<i>Power</i> ≥ 80%
Amarillo, 1977	Charlotte, 2001	
Los Angeles, 1977	Ft. Wayne, 2001	
St. Paul, 1977	San Diego, 2003	
Whittier, 1978		
Phoenix, 1979		
Minneapolis, 1980		
Indianapolis, 1984		
Austin, 1986		
Garden Grove, 1991		
Times Square, 1994		
Newport News, 1996		
Greensboro, 2003		
Toledo, 2004		

Before stating the obvious inference to be drawn from Table 4, I will explain, as best

---

<sup>20</sup> This set of sixteen studies is not arbitrary. It was drawn from a list of studies submitted to the court by the plaintiff in this case. In addition to thirteen crime-related secondary effect studies, the plaintiff submitted a secondary effect study of real estate values (Oklahoma City, 1986) and two studies consisting of public hearings (Houston, 1983; Seattle, 1989). Because my is limited to *crime-related* secondary effects, I will express no opinion in this report on the 1986 Oklahoma City study. Because my area of expertise lies in the *numerical analysis* of crime data, moreover, I will express no opinion in this report on the anecdotal evidence reported in the 1983 Houston and 1989 Seattle studies. My reluctance to express opinions on anecdotal evidence should not imply that scientific methods are the only means of demonstrating a secondary effect. Crime-related secondary effects can be demonstrated by methods that, while empirical, do not rely on formal scientific design structures (before-after contrasts, cross-sectional control comparisons, *etc.*). On the contrary, anecdotal or other “nonscientific” data can be used to demonstrate secondary effects and legislatures can rely on these nonscientific data. *See, e.g., Center for Fair Public Policy v. Maricopa County*, 336 F.3d 1153, 1168 (9<sup>th</sup> Cir. 2003).

possible, the criteria used to decide whether a finding is *adverse*, an *inconclusive*, or *null*. The criteria are so widely accepted in the scientific community that no research can be accepted as *scientific* unless it adheres to the conventions of statistical “confidence” and “power.”<sup>21</sup>

The idea behind the confidence and power criteria is that any statistical hypothesis test can be wrong. Recognizing this point, scientists who conduct hypothesis tests calculate error rate. In any hypothesis test, there are *two* types of error rates. The “false-positive” error rate comes into play when an adverse effect finding emerges from the research; the “false-negative” error rate comes into play when the research produces a null finding.

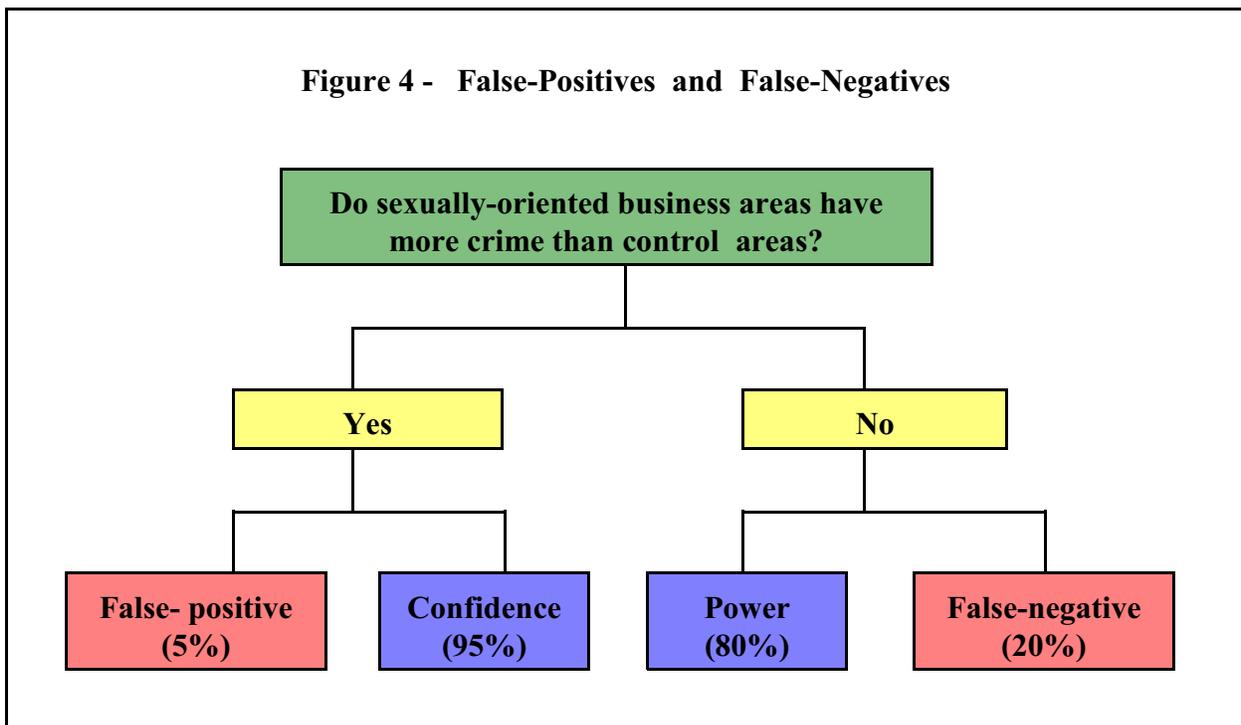


Figure 4 illustrates the relationship between the two complementary error rates.<sup>22</sup> The

---

<sup>21</sup> Since general acceptance in the scientific community is one of four criteria noted in *Daubert v Merrell Dow Pharmaceuticals* 509 US 579 (1993), this would also affect admissibility in U.S. District Court trials.

<sup>22</sup> In statistical hypothesis testing, a false positive is called a “Type I” or “alpha-type” error. A false negative is called a “Type II” or “beta-type” error. The terms “false positive” and

research question “Do sexually-oriented business areas have more crime than control areas?” has two possible answers, “Yes” or “No.” Since data vary from sample to sample, any study can arrive at an incorrect answer. Incorrect “Yes” answers are false-positives. Incorrect “No” answers are false-negatives. Conventional false-positive and false-negative rates are 5 and 20 percent.<sup>23</sup> Complements of the false-positive and false-negative rates, “confidence” and “power,” are 95 and 80 percent respectively. These conventional levels imply that “Yes” decisions are correct 95 percent of the time, “No” decisions are correct 80 percent of the time respectively.

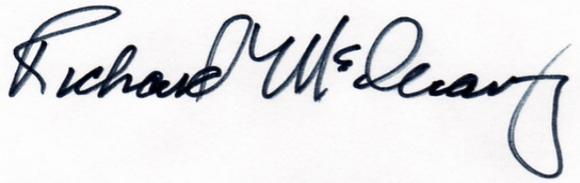
Returning now to Table 4, *adverse effect* findings are required to have 95 percent confidence (*i.e.*, false positive rates less than 5 percent). The thirteen studies listed in the first column of Table 4 satisfy this criterion. Lacking 95 percent confidence, one can conclude that the finding is a *null effect* if – and only if – the finding has 80 percent power (*i.e.*, false negative rates less than 20 percent). Findings that have neither 95 percent confidence nor 80 percent power are *inconclusive* and must be done over. Three industry-sponsored studies listed in Table 4 fall into this category.

---

“false negative,” which come from the field of public health screening, are widely used in popular discourse. I use the terms “false positive” and “false negative” for descriptive simplicity.

<sup>23</sup> The most comprehensive authority on this issue is Chapter 22 of *The Advanced Theory of Statistics, Vol. 2, 4<sup>th</sup> Ed.* by M. Kendall and A. Stuart (Charles Griffin, 1979). This authority requires a strong background in mathematics, however. J. Cohen’s *Statistical Power Analysis for the Behavioral Sciences, 2nd Ed.* (L.E. Erlbaum Associates, 1988) and M. Lipsey’s *Design Sensitivity: Statistical Power for Experimental Research.* (Sage Publications, 1990). Both Cohen (pp. 3-4) and Lipsey (pp. 38-40) set the conventional false-positive and false-negative rates at .05 and .2, respectively. These rates can be set lower, of course. The convention also sets the ratio of false-positives to false-negatives at 4:1, implying that false-positives are “four times worse than” false-negatives. The 4:1 convention dates back at least to 1928 (J. Neyman and E. Pearson, “On the use and interpretation of certain test criteria for purposes of statistical inference.” *Biometrika*, 1928, 20A:175-240). It reflects a view that science should be conservative. In this instance, for example, the 4:1 convention works in favor of the sexually-oriented businesses. When actual decision error costs are known, the actual ratio is used.

The issue of low statistical power, depicted in Figure 3.3 for the San Diego study, has become one of the most serious methodological issues in the secondary effects literature. The “dirty little secret” of social science research is that anyone with a modest research background can design a study so weak as to guarantee statistically insignificant results.

A handwritten signature in black ink that reads "Richard McCleary". The signature is written in a cursive style with a large, looping 'y' at the end.

Richard McCleary, Ph.D.

## **Appendix**

In the last five years, I have been deposed or testified as an expert witness in six cases:

Alaska Inter-Tribal Council v. State. Alaska Superior Court, Dillingham Branch.

Artistic Entertainment v. City of Warner Robins. U.S. District Court, Middle District of Georgia (Case No. 97-00195-CV-4-HL-5); U.S. Court of Appeals, Eleventh Circuit (Case No. 02-10216).

Scamp's v. California Alcoholic Beverage Commission and City of Westminster, CA. Alcoholic Beverage Control Board Administrative Hearing.

Washington Retailtainment, Inc. v. City of Centralia, WA. U.S. District Court, Western District of Washington at Tacoma (Case No. C03-5137FDB).

Giovani Carandola Ltd. et al. v. Ann Scott Fulton et al. U.S. District Court for the Middle District of North Carolina, Greensboro Division (Case No. 1:01 CV 115)

Fantasyland Video, Inc. v. County of San Diego, U.S. District Court for the Southern District of California (Case Nos. 02-CV-1909 LAB (RBB) and 02-CV-2023 LAB (RBB)).

My curriculum vitae is appended.