Research Note

Explaining San Diego's Decline in Illegal Street-Racing Casualties

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Illegal street racing has become a pressing problem for cities and counties throughout the United States. In response to the problem, San Diego was the first city to pass a spectator ordinance, making attendance at an illegal street race an arrestable offense. Shortly after the spectator ordinance went into effect, a forfeiture ordinance was passed. This provides for forfeiture of vehicles used in illegal speed contests. A recent drop in illegal street-racing casualties has been attributed to both ordinances, but other explanations are plausible, including an increase in media attention to the problem, a highly publicized prosecution for murder stemming from two illegal street racing fatalities, an increase in the number of sanctioned racing events, and enforcement of certain provisions in California's Vehicle Code. Even in the face of these possible alternative explanations, several regression analyses revealed that the forfeiture ordinance had the most pronounced effect on street-racing casualties.

Keywords San Diego; illegal street racing; forfeiture ordinance; spectator ordinance; casualties

Introduction

Illegal street racing has become a pressing social problem (Peak & Glensor, 2004). Between 1998 and 2001, the National Highway Traffic Safety Administration

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reported that 315 fatal crashes resulted from illegal street racing (Knight, Cook, & Olson, 2004). The California Office of Traffic Safety reported that in excess of 800 citations were issued for illegal street racing in 2001 (NHRA, 2004). In San Diego, the city at focus in this paper, illegal street racing has been described as "epidemic" (City Council of the City of San Diego, 2002). Sixteen deaths and 31 injuries were related to street racing in 2001 (NHRA, 2004). The city attorney's office prosecuted 147 illegal street-racing cases in 1999, 161 in 2000, and 290 in 2001 (Peter, 2004).

In response to illegal street racing, San Diego was the first to pass a "spectator ordinance," making it an arrestable offense to attend an illegal street-racing event (San Diego Municipal Code, Chapter 5, Article 2, Division 52).[1] The ordinance went into effect on October 21, 2002 and has since survived a challenge in the California Court of Appeal. Maria Velasquez, the San Diego City Attorney's Press Secretary, described the rationale behind the ordinance in this way: "The aim of the ordinance [is] to target the hundreds of spectators that, by their mere presence, [fuel] the illegal races and exhibitions of speed. As a nuisance abatement measure, the spectator ordinance [attempts] to reduce other criminal activity that accompanies the illegal races and exhibitions of speed" (San Diego City Attorney's Office, 2004).

Not long after the spectator ordinance went into effect, on April 4, 2003, San Diego enacted a *forfeiture* ordinance, which permits the forfeiture of vehicles used in illegal street races and other exhibitions of speed.[2] The ordinance effectively declares street-racing vehicles public nuisances, which paves the way for forfeiture. The text of the ordinance describes the purpose of its enactment:

> Streets and highways within the City of San Diego have been the site of continuing and escalating illegal street-racing over the past several years. Such street-racing threatens the health and safety of the public, interferes with pedestrian and vehicular traffic, creates a public nuisance, and interferes with the right of private business owners to enjoy the use of their property within the City of San Diego. (San Diego Municipal Code, Chapter 5, Article 2, Division 52.5301)

1. The spectator ordinance provides that "Any individual who is knowingly present as a *spectator*, either on a public street or highway, or on private property open to the general public without the consent of the owner, operator, or agent thereof, at an *illegal motor vehicle speed contest* or *exhibition of speed* is guilty of a misdemeanor subject to a maximum of six months in jail and a fine of $1,000" (San Diego Municipal Code, *0-19118 N.S.*). It also applies to people involved in the *preparation* of illegal speed contests and those who are present, though not necessarily observing, such events.

2. The forfeiture ordinance first provides that "a motor vehicle shall be declared a nuisance and forfeited subject to this division if … [i]t is used in violation of California Vehicle Code sections 23109(a) or (c); and … it is being driven by the registered owner of the vehicle, the registered owner is a passenger, the registered owner's immediate family members is driving or riding in the car, or the driver or passenger lives at the same address as the registered owner." Additionally, the offender who triggers the ordinance must have had one or more previous convictions under specific provisions of the Vehicle Code. Thus, some type of previous conviction is necessary for forfeiture to occur. Several other procedural protections are extended to those whose vehicles are targeted for forfeiture.

Both ordinances have been touted as successful. According to the City Attorney, "the spectator ordinance has had a huge impact on public health and safety which is saving lives" (San Diego City Attorney's Office, 2004). RaceLegal, the organization that sponsors sanctioned racing events in the San Diego area, also feels the ordinances have had a positive impact:

> The results are impressive. Year 2003 data show a 99% reduction in organized illegal street racing activity in San Diego and a 79% improvement in illegal street racing involved crash mortality/morbidity…Turnaround of this magnitude in the appropriate direction is impressive and a direct result of a community joining shoulder-to-shoulder and simply saying 'enough is enough.' The 'Closing the Loop' approach to intervention quickly made San Diego a poor choice for illegal street racing activity.

But whether the spectator and forfeiture ordinances themselves have actually improved matters has remained unclear. RaceLegal's observation even suggests that other factors could have explained the decline in casualties; at the same time, the city passed ordinances combating illegal street racing, it has also supposedly stepped up law-enforcement activity, particularly through the use of the San Diego Police Department's anti-street-racing team (Hughes, 2003). Also, the number of sanctioned racing events increased during the same time the forfeiture and spectator ordinances have been in effect. Finally, a spring 2003 murder prosecution stemming from street racing may have influenced the number of casualties (Jones, 2003).

Given the number of possible explanations for San Diego's decline in illegal street-racing casualties, the analysis reported in this paper sought to determine which was most likely. We begin, however, by giving some attention to the theory behind San Diego's approach to illegal street racing. We also begin by exploring in more detail several potential explanations for the decline in San Diego street-racing casualties.

Theorizing Policy Responses to Illegal Street Racing

Most policy responses to the illegal street-racing phenomenon proceed from the classical economic assumption that people can be deterred from committing crimes (e.g., Ehrlich, 1972; for a review of recent research, see Piquero & Tibbetts, 2002). The spectator and forfeiture ordinances were clearly based on this assumption; make it costly for people to attend or participate in illegal street-racing events, and they will presumably be less inclined to do so. Additional law-enforcement activity, through the issuance of citations and the prosecution of street racers, has also been intended to deter offenders. Moreover, the increased media attention, including that related to racing-related murder prosecutions, discussed below also were clearly intended to send a message that illegal racing is very hazardous and not condoned in the city of San Diego.

Whereas the passage of ordinances and stepped-up law enforcement rely on deterrence thinking, this is not the case for the sanctioned racing events. The details of the sanctioned races are discussed in some detail below, but for now, a theoretical explanation for them is not readily apparent. Rare are the occasions throughout history where authorities have responded to a criminal problem by effectively legalizing it—and continuing to criminalize it on public streets. This combined deterrence and sanctioning approach to illegal street racing is, with the possible exception of drug policies legalizing certain substances for medicinal purposes, quite unprecedented. Furthermore, the spectator ordinance represents an innovative approach in that the intervention places a focus on the demand side of the economic equation, namely the spectators of street racing, as opposed to simply targeting the supply (i.e., the actual street racers).

There is not much evidence supportive of deterrence-oriented law enforcement, especially when little else is done besides throw money at some problem. For example, there is no agreement in the literature over whether adding more police reduces crime (see, e.g., Marvell & Moody, 1996, for a review). At the same time, though, directed patrol and certain proactive arrest strategies appear successful (e.g., Sherman, 1990; Sherman, Gartin, & Buerger, 1989; Sherman & Rogan, 1995). Most such studies have been concerned with policing of gun violence and drug hot spots, however. Yet, research is also supportive of certain aggressive strategies for vehicle-related crime problems, such as drunk driving. For example, Kinkade and Leone (1992) found that aggressive enforcement of drunk-driving laws in California reduced the problem. Thus, it is reasonable to expect that a tough-on-street-racing stance could lead to reductions in casualties attributable to the problem (see also Benson, Mast, & Rasmussen, 2000).

Other Possible Explanations for the Reduction in Casualties

There are at least three other explanations (besides the ordinances) for San Diego's decline in street-racing casualties. First, there has been an increase in the number of sanctioned racing events in the city. Second, the San Diego County District Attorney filed murder charges against two street racers in 2002, which could also have been responsible for the decline. Third, the San Diego Police Department's undercover street-racing enforcement team, "DragNet", allegedly stepped up its enforcement of a provision in California's Vehicle Code that makes it illegal to drive recklessly and participate in exhibitions of speed.

Sanctioned Races

At the same time San Diego responded to a surge in street racing with extra law enforcement (but prior to the passage of the spectator and forfeiture ordinances),

it also provided a legal venue in which racers could compete. With funding from the California Office of Traffic Safety, both RaceLegal and the San Diego Police Department's "DragNet" unit (see below) were formed. One of RaceLegal's goals is to provide a minimum of 40 sanctioned track alternatives to illegal street racing per year. The races are held most Friday nights at San Diego's Qualcomm Stadium on a one-eighth mile track.

It is rarely the case that authorities respond to a crime problem with additional enforcement *and* by creating a legitimate outlet for activities that would otherwise be considered criminal. Few, if any, theories are available to explain such a phenomenon as well, but according to some, especially RaceLegal's organizers, the sanctioned events have contributed to the decline in street-racing casualties in the San Diego area. This possibility is appealing because the number of sanctioned racing events increased during the study period reported in this paper. In other words, it is critical to examine the effect of sanctioned races on the number of street-racing injuries and fatalities.

Media Attention

A considerable amount of attention was given to street racing in San Diego during the time of this study, particularly at the time that the relevant ordinances were implemented. It is likely that this attention may have had an educational or moralizing effect on potential street racers and/or spectators. Moreover, such an effect could have been independent from any deterrent effect associated with the spectator and forfeiture ordinances.

Research has shown moralizing effects from media attention. For example, Grasmick, Bursik, and Kinsey (1991) concluded that an anti-littering media campaign in Oklahoma City produced significantly stronger anticipated feelings of shame and embarrassment if respondents were to litter compared to before the campaign. The observed decrease in respondents' intentions to litter was compelling because during the same period, their intentions to commit other illegal activities did not diminish. This type of moralizing effect may have occurred with respect to street racing in San Diego given the attention to the passage of the ordinances and the generally negative press coverage of the problem. One event in particular may have had an effect on racers' decision-making processes. This involved the charging of a driver in a street race with murder under the conditions established by the new ordinances.

On October 6, 2002, the driver of a souped-up 1968 Plymouth Barracuda was racing his friend in another vehicle at nearly 80 miles-per-hour in the city of Lemon Grove, close to San Diego. The Barracuda lost control and broadsided a Geo Storm, killing a young couple. The District Attorney's Office sought second-degree murder convictions against both men engaged in the impromptu race. This represented a significant departure from previous prosecutions against street racers; previously, prosecutors sought, at most, vehicular manslaughter convictions, but the murder charges were much more significant. The murder

charges carried the potential for a 30-year prison terms, but manslaughter convictions could have resulted in sanctions as minor as probation.

The murder charges received a fair degree of press in the San Diego area (e.g., Jones, 2003) and even came to the attention of the national press (Bean, 2003). Court TV followed the progress of the case, as well. After its deliberations, the jury elected to convict both men of gross vehicular manslaughter, sparing them a lengthy prison term that would have resulted from murder convictions. Even so, the attention the case received, and the seriousness of the initial charges, could have had an impact on the incidence of illegal street racing in the San Diego area. It is impossible to know for sure whether "word got around," but the potential influence of such negative publicity needs to be taken into account.

Law-Enforcement Activity

The identities of the officers in "DragNet" and, indeed, the number of officers are not publicized. They work undercover, infiltrating the illegal street-racing scene. When the team learns of a race, undercover officers tape the contests and videotape the drivers and license plates of the cars involved. They then present the evidence to the District Attorney's Office, after which the police arrest the offenders in their homes and impound their vehicles. This strategy keeps the unit intact and the identities of the officers involved protected. Officers in the DragNet unit, as well as those on regular patrol, have also participated in a number of "busts" at street-racing events and other such enforcement efforts where large numbers of citations are issued against racers and race attendees.

While ordinances, sanctioned racing events, and aggressive prosecutions may have deterred illegal street racers, law-enforcement activity may have had an effect as well. Again, it is not possible to know with certainty whether all street racers are aware of DragNet's presence, or of the police department's stance on racing, but it is a safe bet that most do. Those who participate in sanctioned racing events at Qualcomm certainly are aware of DragNet because both RaceLegal and DragNet are funded by the same grant, and RaceLegal routinely pitches attendance at sanctioned races because of the Police Department's enforcement efforts. It seems important, therefore, to explore the relationship between policing activity (in DragNet and the police department at large) and the number of street-racing casualties.

Methods

Several regression models were estimated in order to determine which of the aforementioned factors were associated with street-racing casualties. The data used in the analysis came from several sources. Street-racing injury and fatality

data were provided by the San Diego Police Department's DragNet team. Counts of sanctioned racing events were gathered from "Race Legal," the organization that orchestrates the races. Press coverage data were collected from Lexis-Nexis. Finally, enforcement data (citations and charges filed) were provided by the San Diego Police Department and City Attorney's Office.

The units of analysis in the analyses were city-weeks. That is, each observation in the data set consisted of a weekly total. There were 104 observations in the data set (52 weeks each in 2002 and 2003). Weeks were not counted as Sundays through Saturdays but rather 7-day increments starting at the beginning of 2002. January 1, 2002 was a Tuesday, so week 1 in the analysis covered a Tuesday through a Monday. Since there are not exactly 52 seven-day weeks in a single 365-day year, the last week of 2002 and 2003 consisted of 8 days.

Variables

The dependent variable was a count of injuries and fatalities (combined into a single variable).[3] The Spectator Ordinance was coded as a dummy variable with values of zero prior to the first full week the ordinance took effect and one thereafter (variations on this coding scheme were also used when we explored gradual and temporary effects—see below). The same coding scheme was used for the forfeiture ordinance.[4] Interestingly, the forfeiture ordinance was not actually used during the time covered by our data, and the spectator ordinance was used rarely (13 arrests were made on March 23, 2003). Thus, to the extent either ordinance reduced street-racing casualties, they probably did so via a deterrent effect.

Press coverage was coded as a count of the number of newspaper articles in Lexis Nexis mentioning "San Diego" and "street racing" in the body of the article. The number of sanctioned events, also a count, was coded as the number of races occurring in any given week. Law-enforcement and prosecution activities were also treated as counts. Three law-enforcement variables were included in the analysis. They were misdemeanor citations, traffic citations, and guilty

3. These data were provided to us by the DragNet team in the San Diego Police Department. The data were an improvement over ordinary traffic injury/fatality data because each casualty was validated by a DragNet team member. If, for example, a California Highway Patrol officer suspected that a crash on a San Diego freeway was caused by street racing, or even that street racing was involved, they would contact DragNet, and a representative would be sent to the crash site to determine whether the crash was in fact street-racing-related.
4. We explored other coding schemes, such as gradual, permanent effects, but the forfeiture and spectator coefficients did not achieve significance. Also, recall that the spectator and forfeiture ordinances went into effect on October 21, 2002 and April 21, 2003, respectively. Because our observations were weeks, and because the ordinances were not necessarily enacted at the start of one of those weeks, the first week containing a code of "one" for the ordinances was the week with the most days on which the ordinance was in effect. For example, the spectator ordinance variable was coded with a 1 starting on the week beginning on October 22, 2002. We did not feel comfortable coding the preceding week with a 1 because the ordinance was in effect for only one day during that week.

dispositions, namely convictions under Vehicle Code Section 23019(A). Convictions were by jury verdicts or guilty pleas and were coded based on disposition dates. This means that some arrests that took place between 2002 and 2003 but were not "disposed of" by guilty verdicts until after 2003 were not included in the analysis.

Estimation Techniques

There were two choices for estimation in the proposed study. One was a time-series count model that took into account the weekly increments in the data (an autoregressive Poisson time series model). The other was a model for dealing with excess zero counts (a zero-inflated negative binomial regression model) because street-racing casualties are fairly rare occurrences. Both techniques were used because no available statistical modeling strategy takes into account *both* the time dimension and the excess zeros inherent in data sets such as that used in the analysis reported here. In an effort to keep this study brief, we only report the results from the zero-inflated negative binomial regression models.[5]

Zero-inflated negative binomial regression models.   Unfortunately, most count models, autoregressive Poisson models included, do not address the problem of excess zeros in the data. In light of the relatively low number of street-racing injuries and fatalities, we felt it was appropriate to estimate zero-inflated negative binomial (ZINB) regression models (Long, 1997, p. 242), as well. But the problem with ZINB models is that they are not necessarily meant to be estimated with time-series data. As indicated in note 5 (and discussed further below), though, autocorrelation functions were not conclusive when applied to our data, which led us to conclude that ZINB models may have yielded ideal estimates. We avoided trying to resolve the debate over whether ZINB models were better than autoregressive Poisson models and instead opted to report results from both modeling strategies. As the following section attests, the results were fairly consistent, regardless of which technique was used.

Results

Table 1 contains descriptive statistics. The average number of street-racing injuries/fatalities was .25 during any given week throughout 2002 and 2003.

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5. The main reason we did this was that autocorrelation functions did not clearly demonstrate whether autocorrelation was present. To err on the side of caution, though, we nevertheless assumed that it could have been and thus estimated several autoregressive Poisson regression models using Stata's user-written -arpois- command. Such models have been both developed and used extensively in the field of epidemiology (e.g., Katsouyanni et al., 1996; Schwartz et al., 1996). We discuss these analyses in the Results section.

Table 1   Summary statistics

Variable	Obs.	*M*	*SD*	Min.	Max.
Dependent					
Injuries/Fatalities	104	.25	.89	0	5
Independent					
Spectator Ordinance	104	.60	.49	0	1
Forfeiture Ordinance	104	.35	.48	0	1
Sanctioned Races	104	.30	.48	0	2
Media Coverage	104	.50	.82	0	4
Misdemeanor Citations	104	2.24	1.95	0	9
Traffic Citations	104	1.26	1.22	0	7
Guilty Dispositions	104	1.49	1.38	0	6

This relatively low average, coupled with some of the other low averages, clearly points to the need for a modeling strategy that deals with excess zeros. Before getting to the ZINB models, however, we first discuss the descriptive and bivariate analyses we conducted.

Descriptive and bivariate analyses

There were 11 casualties before the spectator ordinance went into effect and 15 after. In contrast, there were 24 casualties before the forfeiture ordinance went into effect and only two after. This suggests, at a glance, that the specta-tor ordinance had a much less pronounced effect than the forfeiture ordinance. But was the drop significant? To begin answering this, we conducted two sets of *t* tests in an effort to detect whether there was a significant drop in casualties before and after either of the ordinances went into effect.[6] The mean number of weekly street-racing casualties was .26 before the spectator ordinance went into effect, compared to .33 after. The *t* statistic was –.33 and was not signifi-cant. With respect to the forfeiture ordinance, the mean number of casualties before it went into effect was .56 compared to .06 afterward, a significant difference (*t* = 2.11).

Multivariate Analyses

Table 2 reports the results of negative binomial (NB) and zero-inflated negative binomial (ZINB) regression models. We began with a negative binomial model for two reasons. First, it provides a point of departure and serves as a base of

6. The *t* tests were set up such that there were equal numbers of observations before and after the ordinances went into effect (84 observations for the spectator ordinance and 72 for the forfeiture ordinance). This approach restricted the number of observations in each test but was necessary to make the *t* tests valid.

Table 2 Negative binomial and zero-inflated negative binomial models (abrupt, permanent effect)

Variable	Negative binomial	Zero-inflated negative binomial
Forfeiture Ordinance	−2.43	−4.30**
	(1.35)	(1.51)
Spectator Ordinance	.32	.35
	(1.05)	(.79)
Sanctioned Races	1.39	1.58
	(.98)	(.83)
Media Coverage	.49	.34
	(.70)	(.92)
Misdemeanor Citations	.1	.17
	(.24)	(.31)
Traffic Citations	−.07	.10
	(.41)	(.31)
Guilty Dispositions	.01	−.07
	(.24)	(.22)
LR chi-square	7.62	14.85
Probability > chi-square	.37	.04
LR $\alpha = 0$	.35.82**	−

Note. Coefficients are reported with standard errors in parentheses; LR $\alpha = 0$ tests for overdispersion (significant chibar statistic justifies negative binomial model in lieu of Poisson).
*$p < .05$; **$p < .01$.

comparison for the ZINB model. Also, Stata provides the results of a test for overdispersion as part of its negative binomial regression model routine. The results of the test appear at the bottom of the first column of coefficients in Table 3 and clearly indicate overdispersion in the data. This prompted us to opt for NB and ZINB models in lieu of Poisson and zero-inflated Poisson models.

The results reported in Table 2[7] suggest that San Diego's forfeiture ordinance appears to have led to a reduction in the number of street-racing casualties. The forfeiture coefficient was negative in each model, but it was only significant in the ZINB model (arguably the more appropriate model). This finding suggests that a get-tough stance on illegal street racing may have led to a significant reduction casualties.

We also estimated several autoregressive Poisson models, with two effect coding schemes (an abrupt, permanent effect and gradual, permanent effects allowing for 4-, 10-, and 20-week start-ups). Additionally, we modeled second-,

7. ZINB models assume there are two latent groups-one in the always-zero group and another in the not-always-zero group. In the present context, this would mean weeks that will always have no street-racing casualties and weeks that will always have a positive probability of having a street-racing casualty. We report the ZINB results that assume there is a positive probability that there will be a street-racing casualty in any given week. The reason is that these results are most comparable with the NBRM results in the first column of Table 2.

third-, fifth-, and eighth-order autoregressive processes because autocorrelation functions did not provide clear evidence of autocorrelation. The forfeiture ordinance was not significant in the gradual, permanent effect models, but it was significant in the abrupt, permanent models. Also, the forfeiture ordinance variable was significant in models specifying a second-, third-, and eighth-order autoregressive process. The results of these models are not presented here, but they are available from the authors on request.

We experimented with several combinations of covariates, mainly to explore their effects. For example, we were concerned with whether the forfeiture ordinance or the forfeiture *and* spectator ordinances together reduced casualties. As we did this, we observed that as more variables were added to the equation, the stronger the relationship between the forfeiture ordinance and street racing casualties became. To illustrate this, we prepared Table 3. Note that the third model presented in Table 3 shows the results from models with both the forfeiture and spectator ordinances included. Note further that the coefficient is larger than in the model with the forfeiture ordinance alone. We feel that this may be due to the combined effect of both ordinances and the message they have sent.

It would not appear, though, that additional law-enforcement activities made a difference. The same can be said of media coverage, but the model with only the ordinances, sanctioned races, and media coverage yielded some interesting results. Specifically, the sanctioned races variable became significant and positive. We are not convinced that sanctioned races lead to more casual-

Table 3 Alternative specifications

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Forfeiture Ordinance	−3.72**	–	−4.01**	−3.80**	−4.01**
	(.78)	–	(.78)	(.82)	(.77)
Spectator Ordinance	–	.35	.55	.07	.58
	–	(.78)	(.51)	(.52)	(.53)
Sanctioned Races	–	–	–	1.20**	–
	–	–	–	(.44)	–
Media Coverage	–	–	–	.74	–
	–	–	–	(.45)	–
Misdemeanor Citations	–	–	–	–	−.07
	–	–	–	–	(.14)
Traffic Citations	–	–	–	–	.17
	–	–	–	–	(.35)
Guilty Dispositions	–	–	–	–	.11
	–	–	–	–	(.15)
LR chi-square	4.16	.09	5.3	14.52	6.56
Probability > chi-square	.04	.77	.07	.01	.26

Note. Coefficients are reported with standard errors in parentheses; both Spectator and Forfeiture Ordinance variables coded for abrupt, permanent effect.
*$p < .05$; **$p < .01$.

ties, for two reasons. First, this variable was not significant in our main model reported in Table 2. Second, safety is paramount at sanctioned races, and to date there is no news of any casualties at sanctioned street races (those held in the legal San Diego racing venue pointed out earlier).

Robustness Checks

We were unable to gather data from another city, so there was no "control group" in our analyses. We were thus forced to consider alternative outcome measures in order to mitigate against the possibility that our findings were a statistical artifact. We also wanted to ensure that our findings were robust to checks besides model re-specifications such as those reported in Table 3. The outcome we chose was arrests for violations of any of three California Vehicle Code provisions, namely 23109(A), prohibiting illegal speed contests; 23019(B), prohibiting illegal exhibitions of speed; and 23019(C), prohibiting road blockages for speed contests. We felt that arrests was an ideal outcome insofar as arrest statistics are usually highly correlated with the outcomes of interest to researchers who examine the effectiveness of anti-crime policies.

Table 4 resembles Table 3 but contains arrests as the outcome. Also, it does not include the specification with ordinances, citations, and guilty dispositions (we excluded this model from Table 4 because of the endogeneity problems it would have likely introduced) as the covariates. Interestingly, instead of the forfeiture ordinance retaining significance across several specifications (as in Table 3), the spectator ordinance appeared most significant. It appears, in other words, that the spectator ordinance was associated with a reduction in Vehicle Code arrests. Importantly, these arrests are not the same as spectator arrests, the latter of which may well have increased following the passage of the spectator ordinance.[8] The processes by which the forfeiture ordinance was associated with reductions in street-racing casualties and the spectator ordinance was associated with reductions in arrests are not well understood, but it appears nevertheless that both ordinances have yielded reductions in two indicators that are indicative of the illegal street-racing phenomenon.

Discussion and Conclusion

We identified several possible explanations of San Diego's decline in illegal street-racing casualties. These included the passage of spectator and forfeiture

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8. In some early analyses, we included arrests in models of street-racing casualties. Arrests was never significant, so we excluded it. It was also excluded in such models because the standard errors were very high, even though arrests was not highly correlated with other covariates.

Table 4 Arrest outcome

Variable	Model 1	Model 2	Model 3	Model 4
Forfeiture Ordinance	−1.93*	-	−1.45	−1.09
	(.94)	-	(1.54)	(.94)
Spectator Ordinance	-	−2.86**	−.99	−2.44**
	-	(.83)	(.87)	(.93)
Sanctioned Races	-	-	-	−.06
	-	-	-	(.90)
Media Coverage	-	-	-	.24
	-	-	-	(.36)
Misdemeanor Citations	-	-	-	-
	-	-	-	-
Traffic Citations	-	-	-	-
	-	-	-	-
Guilty Dispositions	-	-	-	-
	-	-	-	-
LR chi-square	1.87	7.53	3.13	10.05
Probability > chi-square	.17	.001	.21	.04

Note. Coefficients are reported with standard errors in parentheses; both Spectator and Forfeiture Ordinance variables coded for abrupt, permanent effect.
*$p < .05$; **$p < .01$.

ordinances, an increase in the number of sanctioned races, press coverage of a murder prosecution stemming from an illegal race, and enhanced law-enforcement activity aimed at curbing the problem. Of these explanations, the only one that achieved statistical significance—and retained significance across several specifications—was the forfeiture ordinance. We should reiterate that the ordinance was not actually used during the period covered by our analysis. This suggests it had a deterrent effect.[9] The problem, of course, is how that deterrent effect was communicated when neither the press coverage nor law-enforcement variables were significant. We submit that it was through word of mouth.

Another interesting finding that resulted from our analysis was that as we added more variables to our model, the forfeiture ordinance appeared to have a more pronounced effect on street-racing casualties. This was especially true when the spectator ordinance (though not significant by itself) was added. This, we feel, offers some evidence of a possible suppression effect (e.g., Babbie, 2004, p. 435), namely that the relationship between the forfeiture ordinance

9. The convention in the literature is to argue that crime-control interventions can have deterrent and incapacitative effects (Kessler & Levitt, 1999). However, since forfeiture targets property and does not require a criminal prosecution or conviction, or even confinement, the forfeiture ordinance could not have had an incapacitative effect. Had the ordinance been used during the period covered by our analysis, it could have had a "forfeiture effect." But since it was not used, we are left to conclude that the ordinance had a deterrent effect.

and street-racing casualties becomes more pronounced after controlling for the spectator ordinance. We also checked the robustness of our findings using street-racing arrests as the outcome (as opposed to spectator ordinance arrests). We found that in such models, the spectator ordinance, not the forfeiture ordinance, achieved significance. This is not what we expected, but it suggests that perhaps both ordinances have yielded desired effects, depending on the outcomes of interest.

Our analysis is not without limitations. It would be ideal, for example, if a statistical technique was available to handle the type of data used in our analysis. Also, we did not have a comparison group for our analysis, so it is important to view the findings with a measure of caution (we invite additional research). Despite these limitations, we feel that two important messages have emerged. One is that tough-on-crime approaches to the illegal street-racing problem may be deterring offenders. The other is that it is quite possible that other unmeasured and/or unobserved forces were at work. This brings us full circle to an observation we made at the beginning of the paper: Street racing is a pressing social problem that needs more attention.

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