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Heaviest drinking locations and the most drunk there predict the likelihood of fighting and being assaulted: Results from the 2000 US National Alcohol Survey

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Abstract

Preference for on-premise drinking affects likelihood of aggression but how venue affects victimization by other drinkers is less studied. We investigated influence of heavy consumption in specific venues on fighting and assaults by other drinkers in the 2000 US National Alcohol Surveys, a representative telephone survey of adults (n = 7,612). In the prior year 4.5% current drinkers were assaulted by drinkers, while < 2% reported fighting while drinking. Logistic regression analyses showed that where one drank most, and usual and peak amounts drunk there each influenced risks of fighting and (less) being assaulted. For drinking and fighting, heaviest context, usual amount, and difference between usual and peak were all highly significant but adding age and impulsivity/sensation seeking eliminated effect of venue. Victimization risk curves for maximum were exponential: a peak of 10+ drinks showed odds ratios when at another's home, one's own home, and a bar of 4.5, 5.3 and 10.3, respectively (reference 1-2 home drinks); risk curves were steeper for fighting. Maximum amount consumed dominates the venue in which one drinks the most, once selectivity based on personal characteristics is attended to. We suggest interventions should emphasize ways of addressing overdrinking within a range of settings.

Introduction

Considerable evidence supports a substantial association between acute alcohol use and the occurrence and severity of aggression (Leonard 2008). Experimental evidence indicates aggressive behavior varies with the alcohol intake amount (Taylor and Gammon 1975) and intoxication (Graham et al. 1998), and is often increased with provocation (Bailey and Taylor 1991; Lau, Pihl, and Peterson 1995). Provocation may play a larger role than intoxication for women than for men, for whom intoxication remains the strongest influence (Hoaken and Pihl 2000). Emergency room data (Cherpitel 1994) indicate that 20% to 50% of violent incidents seen in ERs involved alcohol use by either perpetrator or victim. Over 50% of male and female arrestees acknowledge using alcohol prior to committing a violent offense (Reiss and Roth 1993). Finally, alcohol was present in 50% of the violent incidents reported in a community study based on probability sampling; 51% of perpetrators and 30% of victims reported alcohol use in the event (Pernanen 1991).

Scott, Schaefer and Greenfield (1999) argued that population results suggest that selection biases arising from under-sampling incidents not coming to attention of authorities or not

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requiring medical attention do not greatly inflate associations between alcohol and violence in ER and official statistics. However, although official statistics based on large databases can take demographic risk factors into account, unlike surveys, they are unable to measure personality characteristics like impulsivity, risk taking or sensation-seeking that may potentially elevate an individual's risk of violence involvement, and may also relate to choices of where to drink heavily.

Lipsey et al. (1997) conducted a meta-analysis of experimental, individual-level and macro-level studies examining the relationship between alcohol intake and subsequent likelihood of violent behavior. In this meta-analysis they separately examined studies on chronic versus acute consumption and domestic (within home such as family, spousal or child abuse) versus criminal violence (any other potentially chargeable offences like assault, rape, or fighting). They reported weighted mean alcohol-violence correlations of 0.22 for the domestic-chronic use, 0.15 for the criminal-chronic use, and 0.10 in the criminal-acute use groups. However, these reviewers cautioned that the relative lack of studies with adequate methodological or statistical approaches, such as appropriate sampling cross-tabulations or multivariate analyses to control for confounding variables, limited the validity of these summary findings. For example, only 5 of 27 domestic and criminal violence studies included adjusted for at least one variable from each of the following three categories: demographics, other major risk factors for violence and/or alcohol use, and other drug use. Studies controlling such confounders yield smaller alcohol use to violence relationships than those not doing so (Lipsey et al. 1997).

The 1990 National Alcohol Survey (NAS), conducted with face-to-face interviews, was the first US alcohol survey to include criminal behavior and victimization questions (Greenfield and Weisner 1995). Scott, Schafer, and Greenfield (1999) reanalyzed these data, arguing that a general population probability sample avoids selection bias arising in many criminal justice or experimental studies. They controlled for numerous demographic and individual risk factors, using specific outcomes to reduce the measurement error that may be introduced by composite scales combining many types of violence (Roizen 1997). Gender, age and impulsivity and drinking history (ever having drunk 5 or more drinks in a day) were “stable characteristics associated with perpetration at both bivariate and multivariate levels. Impulsivity, drinking history and having been married were related to victimization. Limitations of this study included a focus only on physical assault perpetration and victimization, and reliance on lifetime reports of heavy drinking, given the relatively small sample size (n = 2,058).

In sum, available evidence suggests that alcohol-related aggression involves a complex inter-play between individual characteristics, the context that the aggression occurs in, and the individual's alcohol use patterns. Thus, the coming together of individuals with aggressive tendencies in specific situations where alcohol is highly salient, such as bars, and the individual's heavy alcohol use, appear to be necessary ingredients for alcohol-associated aggression to occur (Pernanen 1993).

The present study has two main “outcomes”: alcohol-related fighting and victimization by assault. We examine these in relation to two main independent variables: drinking context in which you consumed the most and the *number of drinks* involved. We focused on these variables given prior research evidence on acute heavy drinking and frequent intoxication as key predictors of violent behavior (Leonard 2008) and maximum amount consumed or degree of intoxication (Greenfield et al. 2006) as an important predictor of violence and victimization (Greenfield 1998). Preference for drinking more in certain contexts such as bars has also been found to be associated with higher reports of aggression and problems than drinking more at home (Nyaronga, Greenfield, and McDaniel 2009).

We also examined individual factors as possible confounds of the relationship between alcohol use and violence. We have previously documented that individuals bring preferences for drinking larger volumes in some settings, which we have called “context preferences”. Specifically, preferentially selecting certain contexts like bars appears to increase risks of some alcohol related problems like aggression (Nyaronga, Greenfield, and McDaniel 2009). This could be because such settings allow these individuals to come into close proximity with each other, possibly precipitating alcohol-related aggression and victimization. For the present study, we hypothesize that certain types of individual (like younger and more impulsive people) are likely to frequent alcohol-rich contexts like bars and parties. Further, we hypothesize that those with higher usual amounts may be at greater cumulative risk by frequency of opportunity or exposure and especially when high maxima are also reported. Thus, in the present study we extend the earlier work by considering risks associated with where you drink your largest amount and the number of drinks in that maximum.

Methods

Data

The 2000 US National Alcohol Survey (N10) was conducted for ARG by Temple University Institute of Survey Research between November 1999 and June 2001. Unlike the 1990 NAS data used by Scott, Schafer, and Greenfield (1999), the 2000 NAS allowed us to focus on violence and drinking behavior during a prior-12-month timeframe and take current context and drinking patterns into account. Roughly comparable though not identical *perpetration* and *victimization* variables are available in the 2000 NAS dataset (alcohol-related fighting and being assaulted by someone else who had been drinking).

The N10 household survey used Computer Assisted Telephone Interviewing (CATI) of adults (18 or older) residing in all 50 US states and Washington DC (n = 7,612) using Random Digit Dialing (RDD) sampling, and household members chosen by the last birthday technique. In addition to the RDD sample, Blacks and Hispanics were oversampled, resulting in 1,341 Black non Hispanic and 869 Hispanic individuals (a Spanish version was available as needed). Additionally13 low-population states were oversampled to yield ≥ 50 cases per state. Interviews lasted 25-50 minutes with an overall cooperation rate of 58%. The sample included a total of 4,142 women and 3,470 men (2,310 women drinkers, 2,320 men drinkers). Analyses are weighted for national representativeness using the 2000 Census and adjusting standard errors for sampling design (Stata Corp. 2001). Consult Greenfield et al. (2006) for further details on N10 methods and summaries of a series of methodological interview-mode studies (Greenfield 2000; Midanik, Greenfield, and Rogers 2001) demonstrating good measurement comparability between the N10 telephone and prior in-person NAS surveys for consumption (Greenfield, Midanik, and Rogers 2000; Midanik et al. 1999) and alcohol-related harms (Kerr et al. 2004; Midanik and Greenfield 2002).

Variables

Alcohol Consumption in Given Settings—The normal way to enquire about drinking context in national surveys has been to ask about frequency of being in the venue, drinking or not in the setting, and usual quantity drunk there, essentially yielding a quantity-frequency (QF) volume per setting, e.g., (Kairouz and Greenfield 2007). Usual quantity and QF volume measures have some well known limitations (Greenfield and Kerr 2008) and it has been suggested that the largest number of drinks or maximum, either overall or in a specific context, may be a better predictor of acute problems (Greenfield 1998; Greenfield et al. 2006). Our approach incorporated both the standard format and a new follow up about the maximum context.

We implemented the standard series on drinking venues as follows. Respondents were asked how often in the past year they went out for an evening meal in a restaurant (not including fast food places and luncheonettes); went to bars, taverns, or cocktail lounges; went to a party in someone else's home; spent a quiet evening at home; had friends drop over and visit in their home; and hung around with friends in a public place such as a park, street, or parking lot. Answer categories were converted to days/year, i.e., "never" (coded zero), "sometimes, but less than once a month" (mid point = 6), "1 or 2 times a month" (18), "3 or 4 times a month" (42) and "once a week or more" (78). Next was a categorized proportion of drinking occasions per context ("never," to "almost all the time", recoded to 0, 0.25, 0.5, 0.7, and 0.9). Last, respondents drinking in each setting were asked how many drinks they typically had. (A "drink" was defined as a 12-oz bottle, can, or glass of beer; a 4-oz glass of wine; or a mixed drink with 1 shot of distilled spirits.) Volume per setting was computed as Frequency × Proportion Drinking Occasions × Number Drinks.

Following this series, an open-ended maximum item asked asking about "the occasion in the last 12 months you had the most to drink. Where were you when you had the most? Was it…" (venues as above but adding outdoors, in a car, at school/work, or somewhere else—specified). A finally question was: "How many drinks did you have at that time?" (defined as above)"; for details see Greenfield et al. (2006). On a weighted basis, 35% reported drinking the most in their home, 23% another's home, 17% bar, 11% restaurant, and about 5% each outdoors, at a wedding/celebration, or somewhere else. About 40% reported a maximum of 1-2 drinks, with diminishing percentages at higher levels; 67% ≤ 4 drinks, 75% ≤ 5 drinks, 92% ≤ 10 drinks, with 8% reporting 11 to 19 or even more drinks. To reduce influence of extremely high maxima and outliers, for the logistic regression analyses, levels > 8 were grouped (9-10, 11-12, 13-18, and 19+ drinks), each category having from 100-150 cases. An alternative categorization for display and sensitivity analyses used five levels (1-2, 3-4, 5-6, 7-9, and 10+ drinks).

Demographic and Individual Characteristics—Age and gender were included, since both affect drinking patterns including drinking in various contexts, and reporting of alcohol-related aggression as perpetrator or victim (Scott, Schafer, and Greenfield 1999). An impulsivity/risk/sensation-seeking composite trait scale was used to identify low cognitive control and risk taking, seen as increasing propensity for violence (Leonard 2008, p 47). Scores were based on 10 items such as the following (impulsivity) "Many of my actions seem to be hasty"; (risk taking) "I get a real kick out of doing things that are a little dangerous"; and (sensation seeking) "I like to try new things just for the excitement". Items have 4-point ordinal scales from "Quite a lot" to "Not at all" with N10 internal consistency high for current drinkers (Cronbach's alpha = .87; no item-removal indicated); see Schafer (1994) for more details.

Dependent Variables—Alcohol-related aggression perpetrated by the respondent was assessed by the question: "Has this ever happened to you…I have gotten into a fight while drinking". Those affirming were asked (as reported here): "did this happen during the last 12 months?" Victimization was assessed in an externalities series (Greenfield et al. 2009): "The next few questions concern your experiences with other people's drinking problems." After several items about family/marriage, and risks form drunk drivers, we asked "Have you ever … been pushed, hit or assaulted by someone who had been drinking?" Those affirming were asked: "was that during the last 12 months?" referred to here as "assault by another drinker".

Analyses

In a series of multivariate logistic regressions we examined the effects of the heaviest-drinking venue, and the usual and heaviest drinking amounts, on the likelihood of either

alcohol-related fighting or of being assaulted by someone else who was drinking. A sequence of models aimed to see how these associations may be altered after controlling for key demographic and personal risk factors. Examining *interactions* of usual and maximum quantity consumed, and demographic variables, though important, is beyond the scope of this analysis, but we intend to explore this in the future.

Results

Over twice as many (4.5%) reported assault by another drinker as acknowledged fighting while drinking (under 1.8%) with similar results in the group limited by complete data. The low numbers of perpetrators and victims of assaults precluded disaggregation by gender. As seen in Table 1, a base logistic regression model predicted fighting when drinking controlling only for gender (male OR = 1.9) and location where the largest amount was reported. In this model a strong relationship with highest drinking venue was seen. Compared to having the most at home, drinking most at another's home, drinking at bars and drinking outdoors each elevated the odds ratios (2.0, 2.8, 2.9, respectively). This implies that the likelihood of fighting was 2 to 3 times more likely in these venues where the most was drunk than when the most was in one's own home. Drinking most at restaurants, and celebrations/weddings reduced alcohol-related fighting likelihood (ORs .059, .064, respectively); all venues showed significant contrasts with “own home” (excepting “other places”) and ranged from $p < .001$ to $p < .05$. For drinking and fighting, the base model including only gender and heaviest context had a pseudo R^2 of 6.1%. Including in this model usual amount drunk in the given setting added 11.4%, and further adding the difference between usual and peak drinking (i.e., maximum minus usual quantity in a particular setting) added a further 4.0% (all incremental ps < .0001) for a full model R^2 of 21.4%; finally adding age and impulsivity/risk taking/sensation seeking yielded a full model R^2 of 33.9% but the inclusion of all predictors eliminated effects of venue. (Note: The Pseudo R^2 reported here from Stata analyses is the McFadden R^2.) In the base model for assaults by another drinker, with only gender and venue of drinking the most, only bars elevated (OR = 2.2, $p < .001$) and restaurants reduced (OR = .26, $p = .015$) risks. In the subsequent models Assaults showed the same pattern but with full models accounting for less total variance (16.2%).

Model 1 in Table 1 provides a summary with gender, age, and the composite impulsivity/risk taking/sensation seeking score as controls and the venue in which the most is drunk. Of demographic and individual difference predictors, only age and impulsivity/risk taking/sensation seeking but not gender remained significant, and for the highest-drinking venue drinking the most at celebrations or a wedding (referenced to own home) is protective ($p < .01$) but other most-venue contrasts are no longer important. Model 2 adds usual number of drinks in the highest-drinking venue and the difference usual to peak amount. This model, which divides the maximum measure into the usual amount (in the given setting) and the additional amount to peak drinking, shows that both are independently significant (they are only modestly inter-correlated around 0.2). Model 3 substitutes for the two drinking components simply the maximum number of drinks measure, which is found to be highly significant (OR 1.3). To illustrate the effects of the maximum, in the 5-level categorization, Figure 1 displays the odds ratios considering only the three most prevalent settings where the most is drunk (own home, others' home, and bar). We chose these three heaviest-drinking venues for illustrative purposes and because in these venues there are adequate numbers available for meaningful estimation throughout the maximum range. These simplified models take account of gender, the three settings, and the categorized maximum and thus resemble the Base model, omitting age and the cognitive variable. The strongest predictor in each of the heaviest-drinking venues is the maximum number of drinks. The form of the risk curve for alcohol-related fighting is such that while risk is increased with

increasing maximum, it is greatly increased at 10 or more drinks, where the ORs increase dramatically (drinking at most 1-2 drinks on one's own home is the reference group, which has large *n*s but very low levels of fighting). At the highest 10+ drinks maximum level, drinking the most at another's home is slightly more likely to be associated with fighting than when the most is in bars, suggestive of greater risks in this less controlled, informal setting.

Table 2 gives the same logistic regressions model summaries for assaults by another drinker. Victimization, compared to fighting models show lower overall predictive precision (Model Pseudo R^2 = 16% compared to 33% for fighting when drinking). Most results are similar to those for fighting, although no venue comparisons are important with alcohol consumption included (a $p < .1$ trend implies possible risk reduction when the highest amount is consumed in restaurants). In Model 2 the difference from usual to peak amount is not quite significant ($p = .06$) once usual quantity in setting, which is highly significant, is accounted for. However in Model 3, Maximum is significant although the OR is only 1.08 ($p < .01$). Figure 2 demonstrates that the odds-ratio-based risk curve in this case shows the dramatic increase in risk of being assaulted by another drinker only when the individual has the most to drink in bars, although there are generally rising risks with drinking the most at one's own home or at others' parties as well. Again, the odds ratio results are references to drinking at most 1 to 2 drinks in one's own home, in which case there is minimal attendant risk of either alcohol-attributed fighting or being assaulted.

As Figures 1 and 2 show, the odds ratios for higher maximum levels of consumption in these settings are very large. However, given the adjustment for the other factors in the models, it is difficult to translate these results into a prevalence for either outcome. Therefore, we present simple prevalence results in Figure 3 for fighting when drinking and Figure 4 for being assaulted by another drinker. These descriptive (unadjusted) prevalence results demonstrate the same characteristics of the odds ratio risk curves (in Figures 1 and 2). In the three settings where the most is consumed, risk of fighting is more than doubled at a maximum of 10 or more drinks compared to 7-9 drinks. In each figure the combined (3-venue total) prevalence is modeled with a polynomial curve which makes the accelerating form of the curve clearer. In regard to assaults by another drinker, only for bars is there the clear acceleration at the peak level of 10 or more drinks, with risks at progressively higher maxima in one's own and others' homes being much more linear.

Discussion

In this study the first aim was to empirically determine the value, for predicting alcohol-related assaults and victimization, of the novel information gathered by asking about where one drank the largest amount, not only, as more typical, the average intake by context. Our analyses aimed at learning more about the occasion or setting in which you drank the most, and the maximum number of drinks consumed there, and how these related to drinking-related fights and assaults perceived as due to another's drinking (always reported more often than fighting due to one's own drinking). We examined the incremental effect of maximum over and above the usual amount in that same setting (which might on average also be larger than in the other settings). Our findings show that maximum is important and that it adds something significantly over and above usual quantity (in a particular setting) in the case of predicting alcohol-related fighting (Table 1, Model 2), but a bit less strongly so for being assaulted by another perceived to have been drinking (Table 2, Model 2). Other individual characteristics including younger age and seeking exciting and potentially dangerous experiences in settings where you can act on impulse are, not surprisingly, also predictive. Also probably not surprising, being at celebrations like weddings seems to dampen the fighting spirit, as somewhat may drinking most at restaurants (both compared to

drinking most at one's home). We should keep in mind that those who say they drink the most in a restaurant or special celebration are also *not* drinking their greatest amount in a bar or typical party, and may in fact have lower maxima on average. This is likely why, in Models 2 and 3 with maximum added, much of the effect of venue disappears or is considerably diminished (compared to the base model). The place you report drinking the most represents a proclivity and to some extent is a personal preference (Nyaronga, Greenfield, and McDaniel 2009) for places to drink that was shown to affect drinking related aggression. But maximum is seen to play a considerable role and so the effect of venue *where* that largest amount is consumed is reduced when the maximum amount itself is in the model.

Much has been written about the role of *setting* (and sometimes *set* as well) in violent behavior, an older example being Fagan (1993) and other contributions in the NIAAA Monograph (Martin 1993). Many newer contributions on context emphasize risks in bar venues (Graham et al. 2008; Wells et al. 2005). There is perennial discourse also about the relative influence, on the one hand, of features of the setting in which violence (or acute alcohol problems more generally) occurs and, on the other, on what the parties involved bring to them, i.e., socio-demographics and individual differences (Kairouz and Greenfield 2007; Roizen 1993). Most recognize that both are important, given the selectivity involved in the particular types of individuals who tend to gather and so be found in certain drinking environments (Greenfield 1994). There has been note of numerous other causal process and contingent factors needed to be present for aggression to be expressed (Pernanen 1993), including normative structural explanations of comportment in the place and time of drinking (MacAndrew and Edgerton 1969) and recently, non-linear dynamic modeling of relative residence times spent in low- and high-risk environments (Mubayi et al. 2010). We view the current approach and findings as fairly limited because they do not model the selectivity factors distinctly from the situational variables. Nevertheless, while not based on sophisticated modeling, this work introduces several new results related to the role of the *place one drinks the most* and the *maximum in a given setting*. We know maximum in any day to be important in an overall assessment of drinking pattern (Greenfield 1998; Greenfield et al. 2006) but this is the first look at the role of maximum in particular drinking contexts as regards risks of perpetrating or being victimized by alcohol-fueled aggression.

What do these findings suggest? As observed in an earlier longitudinal study of university students self-selecting into high drinking living groups like Greek Houses, i.e., fraternities and sororities, dormitories or off-campus housing (Greenfield 1994; Greenfield and Duncan 1985), the results appear *consistent* with a self-selected choice of the venue in which one drinks the most. This is because in predicting fighting and assaults the coefficients on the most-venue (context where one drinks the largest amount) diminish to non-significance once the characteristics affecting settings and amounts drunk (e.g., gender, age and impulsivity/risk taking/sensation seeking) are added to the models (Tables 1 and 2). Conversely (and in a sense descriptively), venue remains very significant in models with *only* gender included (shown in Figures 1 and 2). Thus an observer in or around a particular venue sees behavior they may attribute to the venue but has a lot to do with who gathers there. Odds ratios for the maximum consumed also are diminished by the addition of personal predictors (maximum also being associated with the other individual factors) but, importantly, remain significant in the full models. While showing equivalent risk curves for the three most common venues at levels up to 7 to 9 drinks, the figures appear to indicate some interaction between heaviest-drinking venue and maximum amount such that at the highest level (10 or more drinks) there is most fighting for those drinking their largest amount in others' homes, next when drinking most in bars, and lowest but still elevated in one's own home, all compared to maximum of 1 to 2 drinks at one's home (Figures 1 and 3). For assaults by another drinker, it is clearly those whose greatest amount is 10 or more drinks in bars who have the greatest

risk of victimization, both other venues carrying much lower risks even at this maximum (Figure 2 and 4). The greatly raised likelihood of alcohol-related fighting especially in bars at this 10+ drink maximum suggests that observable drunken comportment placing patrons at risk could potentially be detected by bar staff, and if properly trained, appropriate interventions might follow. Not surprisingly, the drinking fighters are younger, 'ready for action and letting loose', and tend to be very heavy drinking individuals (both in terms of usual or maximum amount); the heaviest drinkers among them appear more prone to violence when they drink more beyond their own homes. Those assaulted by other drinkers also tend to have drunk a lot, are often the same types of individuals, and are especially at risk when drinking 10 or more drinks when they say their most was at a bar. Thus, if detected, preventive interventions could in principle avert harms of assault to such at-risk individuals also. Although some context effects are seen in both outcomes, the heaviest venue differences tend to be slight compared with the maximum amount itself.

We are inherently limited by the cross-sectional survey rather than event-based or longitudinal data. So we cannot link in any causal or direct sense the amount consumed to the aggression reports. We take the drinking variables as general indicators of patterns or styles that distally rather than proximally affect likelihoods engaging in fights or (as more of them experience it) coming the way of harm from another's drinking. Still, it seems clear that earlier findings about maximum as a promising indicator of risks of violence and/or victimization (Greenfield 1998) and more recently (Greenfield et al. 2006) are fairly well confirmed by these results. The notion that *where* one chooses to drink a lot, either by volume (Nyaronga, Greenfield, and McDaniel 2009) or by the place you drank the most (here) affects likelihood of giving or receiving alcohol connected aggression. The venue effect is sustained in a descriptive sense but is secondary to the maximum itself as a predictor, other characteristics controlled. Risk is elevated by individual factors such as one's gender (males more prone), age (younger more prone) and being an impulsive, risk taking and/or sensation seeking, more or less regardless of where you do your heavy drinking. Even the influence of the extent of your heaviest intake is reduced when these propensities are included in the model. Descriptively, it remains true that the amount of peak intake is a very good marker of risk, with an accelerating risk curve that "takes off" when the amount is 10 or more drinks, especially for alcohol-involved fighting and being assaulted. We hope in the future to be able to examine alcohol-related arguments as well as fights and assaults, as a possible indication of the role of verbal provocation both for perpetrators of aggression and victims of it, also examining those victimized only, fighting only, and both, and what characterizes these separate and joint processes.

Finally, what are the main implications for prevention and policy strategies? Clearly the heaviest drinkers have a disproportionate likelihood of being involved in fights either as a perpetrator or as a victim. Many but not all of these incidents occur in bars (and generally much less in restaurants). Therefore, strengthening programs and enforcement of policies reinforcing establishment rules restraining admittance or service to inebriated patrons remain important priorities. Because many individuals pre-drink (Wells, Graham, and Purcell 2009), and there is selective gathering of heavier drinkers into alcohol-rich environments, whether at parties (which lack the controls of on-premise settings) or bars and taverns, overall evidence-based policies to limit intake through pricing and access policies are still indicated (Babor et al. 2003; Giesbrecht and Greenfield 2003). From a policy development perspective we know this will not be an easy task (Giesbrecht et al. 2004; Greenfield, Johnson, and Giesbrecht 2004). Efforts to influence public opinion to be more supportive of enacting strong evidence-based policies will not be easy either, particularly because these measures are often attacked by alcohol producers, though much needed (Greenfield, Ye, and Giesbrecht 2007b). It may be that another steady increase in young people's heavy drinking in the US (Kerr et al. 2009) and the externalities associated with it

(Greenfield et al. 2009) will have to occur before the public and politicians turn again seriously to pricing and regulatory approaches, but at least there are some positive signs in the states in the economic downturn that alcohol taxation may be back on the agenda (Greenfield, Ye, and Giesbrecht 2007a).

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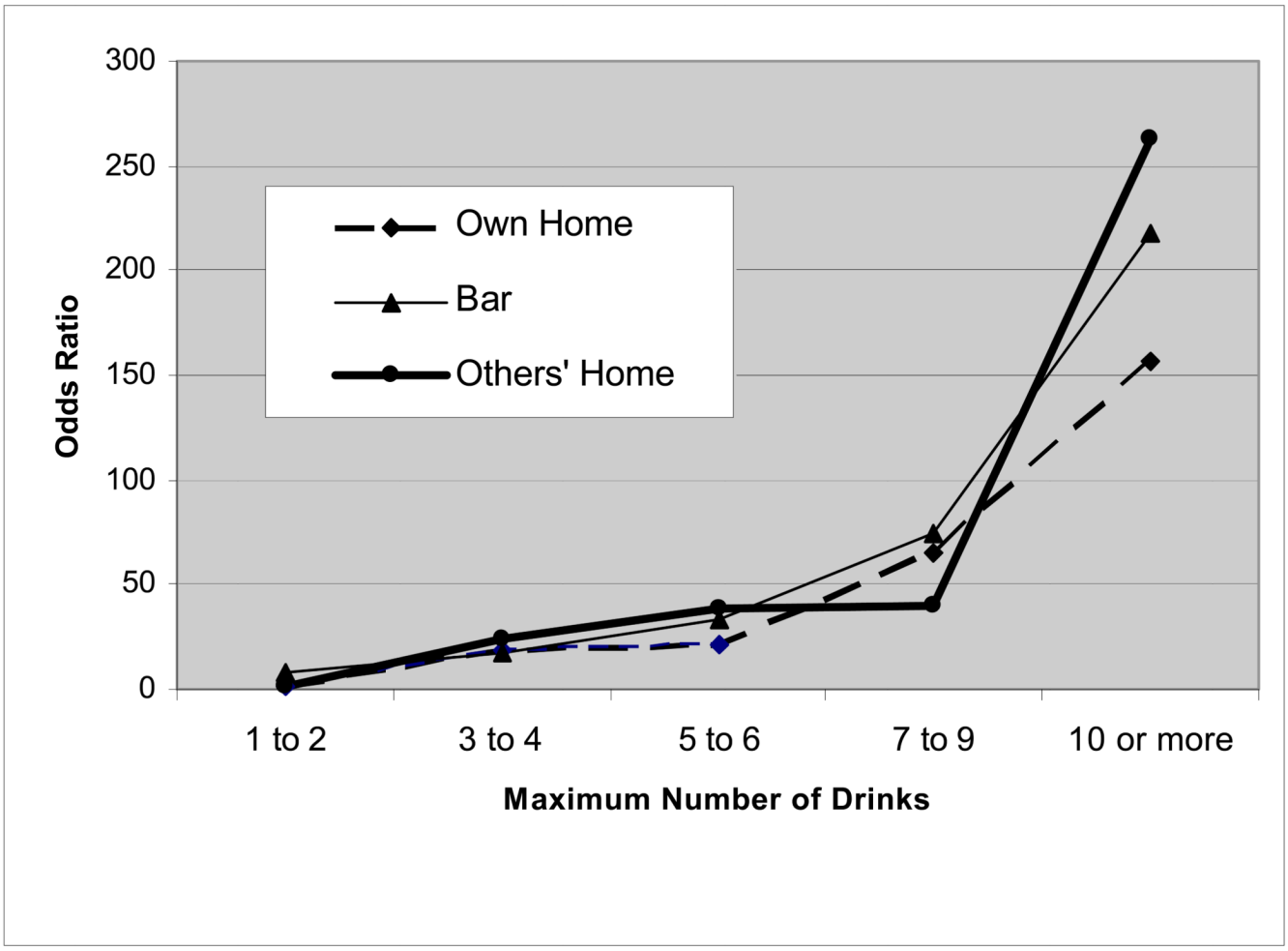

Figure 1.
Odds Ratios[a] for Fighting when Drinking For Maximum Levels in Each of Three Common Heaviest-Drinking Venues
[a] Logistic regression controls for gender. Reference group is most at Own Home with 1 to 2 drinks maximum.

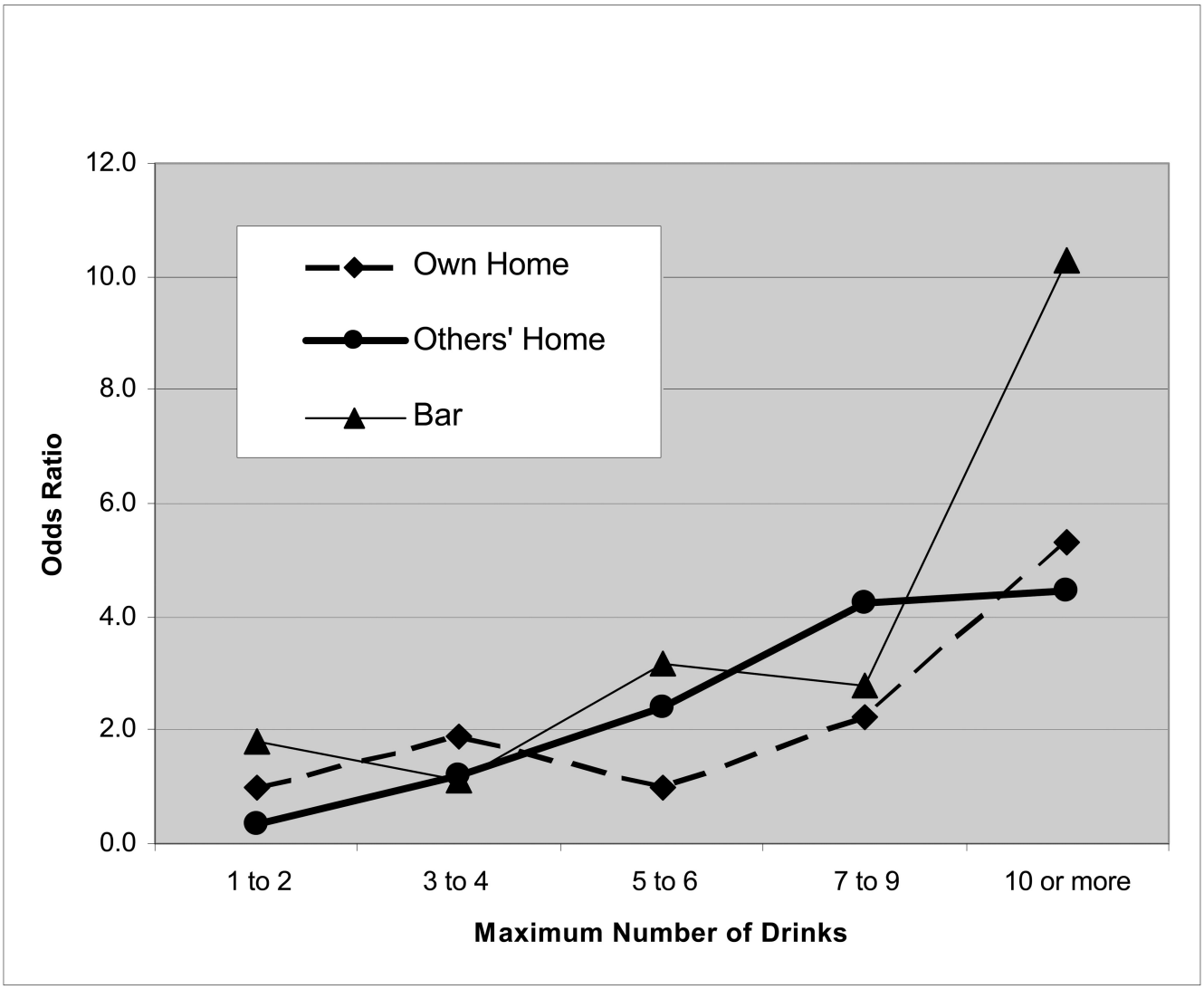

Figure 2.
Odds Ratios[a] for being Assaulted by Another Drinker for Maximum Levels in Each of Three Common Heaviest-Drinking Venues
[a] Logistic regression controls for gender. Reference group is most at Own Home with 1 to 2 drinks maximum.

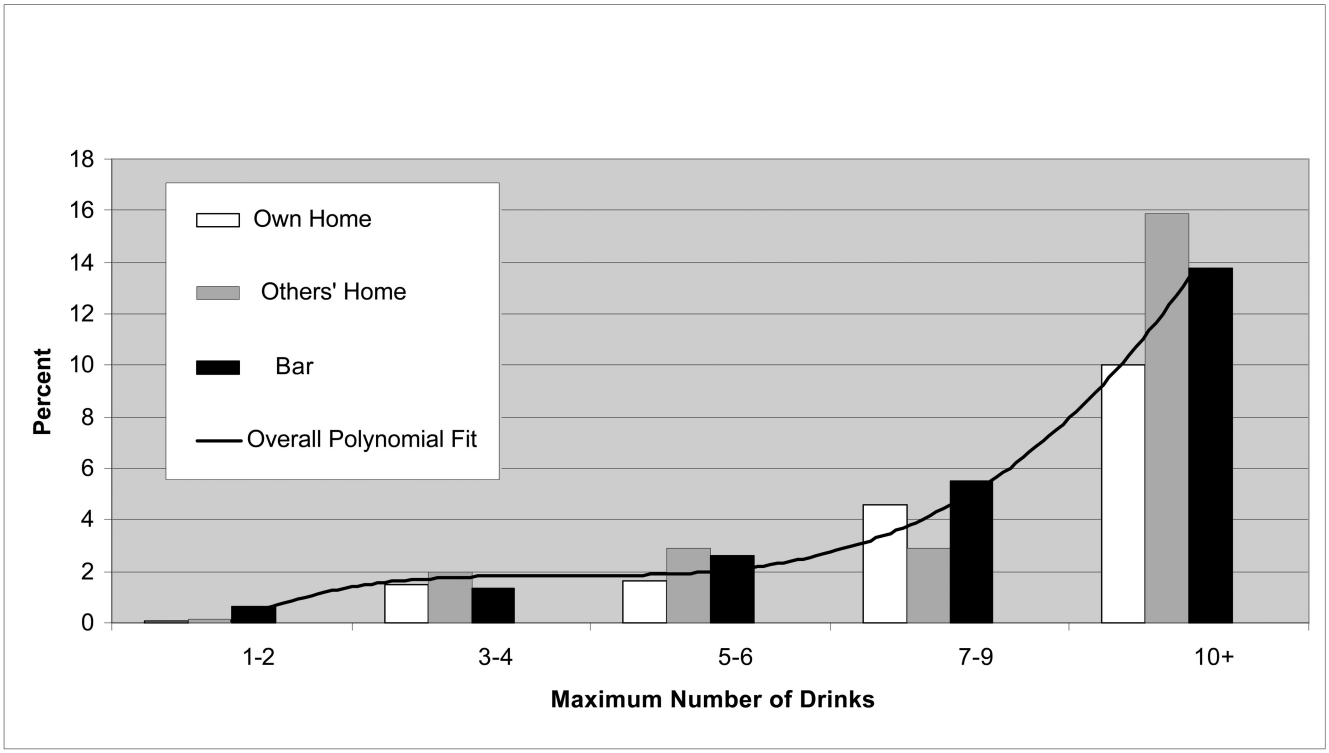

Figure 3.
Descriptive Results[a]: Fighting Prevalence by Maximum Level in each of 3 Common Heaviest-Drinking Venues
[a] Weighted crosstabulation, drinkers only, no covariates; polynomial fit for 3 common venues where the most is drunk.

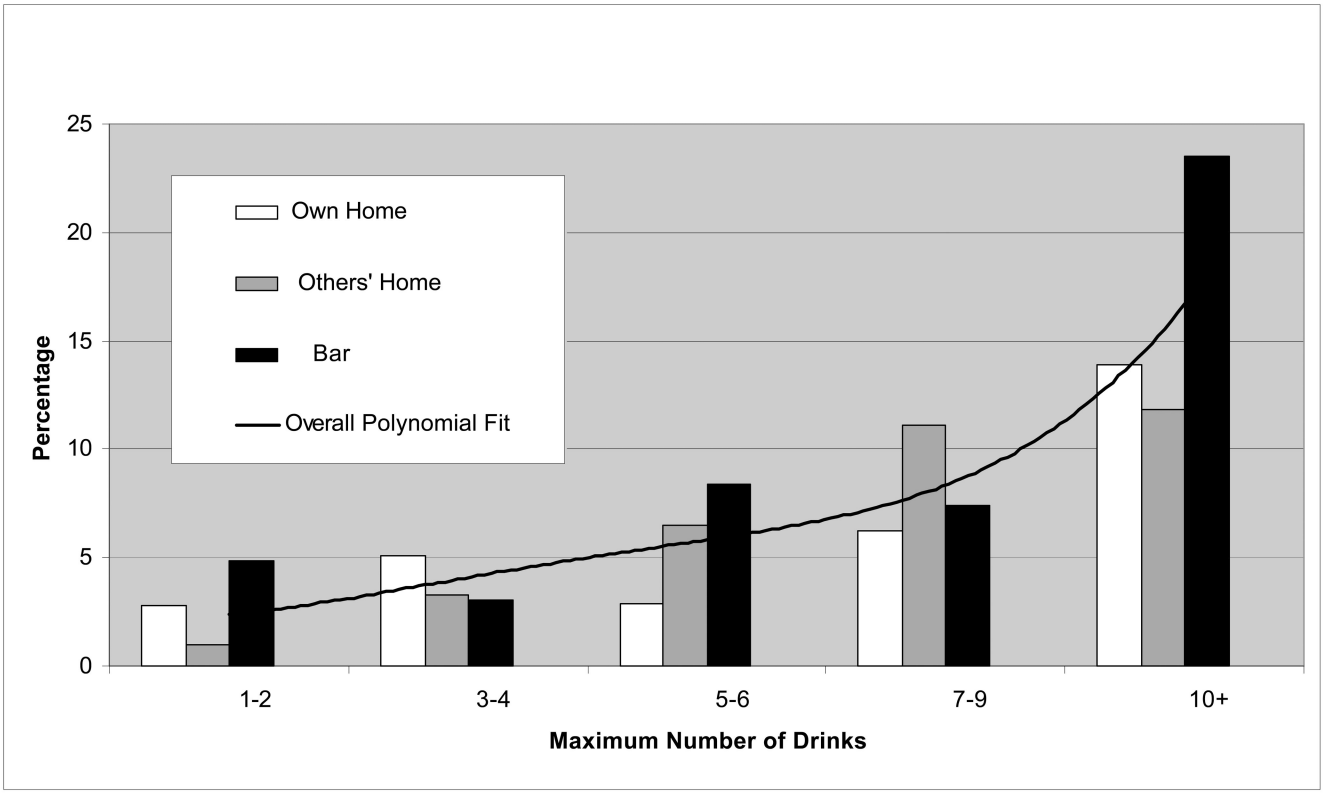

Figure 4.
Descriptive Results[a]: Rate of Being Assaulted by Maximum Level in each of Three Common Heaviest-Drinking Venues
[a] Weighted crosstabulation, drinkers only, no covariates; polynomial fit for 3 common venues where the most is drunk.

Table 1

Summary of Logistic regression Predicting Reporting Alcohol-Related Fights (N = 4,279)

	Base Model		Model 1: controlling for age and impulsivity/risk taking		Model 2: Usual Quantity and Maximum		Model 3: Maximum	
Predictor	**Odds Ratio**	**95% CI**	**Odds Ratio**	**95% CI**	**Odds Ratio**	**95% CI**	**Odds Ratio**	**95% CI**
Male Gender	1.881	(1.180, 2.997)**	1.281	(0.778, 2.110)	0.912	(0.521, 1.600)	0.816	(0.456, 1.462)
Age			0.876	(0.843, 0.911)***	0.884	(0.848, 0.921)***	0.884	(0.846, 0.924)***
Impulsivity/Risk/Sensation Seeking			1.108	(1.069, 1.150)***	1.069	(1.027, 1.113)**	1.066	(1.026, 1.108)**
Setting where Drank the Most: [a]								
Others' Home	2.039	(1.165, 3.571)*	0.952	(0.523, 1.731)	0.941	(0.474, 1.867)	0.896	(0.474, 1.692)
Bar	2.821	(1.603, 4.965)***	1.249	(0.690, 2.261)	1.026	(0.514, 2.047)	0.917	(0.477, 1.763)
Restaurant	0.059	(0.008, 0.441)**	0.112	(0.015, 0.848)*	0.180	(0.023, 1.396)	0.186	(0.024, 1.440)
Outdoors	2.868	(1.167, 7.050)*	1.725	(0.664, 4.482)	1.538	(0.600, 3.942)	1.468	(0.570, 3.779)
Celebration/Wedding	0.065	(0.009, 0.483)**	0.046	(0.006, 0.348)**	0.051	(0.007, 0.406)**	0.040	(0.005, 0.311)**
Other Setting	1.192	(0.440, 3.228)	0.949	(0.336, 2.680)	0.695	(0.229, 2.104)	0.745	(0.262, 2.119)
Model 2:								
Usual Quantity					1.278	(1.188, 1.375)***		
Maximum - Usual Difference					1.085	(1.016, 1.160)*		
Model 3: Maximum							1.275	(1.174, 1.386)***
Pseudo R^2		0.061		0.282		0.339		0.332

[a] Reference is Own Home

* $p<0.05$,

** $p<0.01$,

*** $p<0.001$

Table 2

Summary of Logistic regression Predicting Reporting Assault by Another Drinker (N = 4,272)

	Base Model		Model 1: controlling for age and impulsivity/risk taking		Model 2: Usual Quantity and Maximum		Model 3: Maximum	
Predictor	**Odds Ratio**	**95% CI**	**Odds Ratio**	**95% CI**	**Odds Ratio**	**95% CI**	**Odds Ratio**	**95% CI**
Male Gender	1.759	(1.285, 2.407)***	1.409	(1.016, 1.954)*	1.203	(0.847, 1.710)	1.227	(0.865, 1.741)
Age			0.936	(0.920, 0.952)***	0.942	(0.925, 0.958)***	0.941	(0.924, 0.958)***
Impulsivity/Risk/Sensation Seeking			1.070	(1.046, 1.095)***	1.056	(1.030, 1.082)***	1.059	(1.034, 1.086)***
Setting where Drank the Most: [a]								
Others' Home	1.228	(0.817, 1.846)	0.743	(0.484, 1.142)	0.674	(0.428, 1.062)	0.658	(0.422, 1.026)
Bar	2.232	(1.508, 3.304)***	1.195	(0.798, 1.790)	1.049	(0.689, 1.596)	1.039	(0.687, 1.569)
Restaurant	0.262	(0.089, 0.770)*	0.359	(0.121, 1.062)	0.356	(0.108, 1.172)	0.391	(0.131, 1.167)
Outdoors	1.809	(0.969, 3.376)	1.169	(0.611, 2.236)	1.141	(0.577, 2.258)	1.104	(0.564, 2.163)
Celebration/Wedding	1.029	(0.485, 2.184)	0.816	(0.364, 1.829)	0.711	(0.303, 1.667)	0.665	(0.287, 1.545)
Other Setting	1.117	(0.549, 2.272)	1.041	(0.487, 2.222)	1.008	(0.451, 2.250)	1.012	(0.463, 2.214)
Model 2:								
Usual Quantity					1.109	(1.045, 1.177)**		
Maximum - Usual Difference					1.047	(0.997, 1.098)		
Model 3: Maximum							1.084	1.027 1.144)**
Pseudo R^2		0.036		0.154		0.162		0.159

[a] Reference is Own Home

* $p<0.05$,

** $p<0.01$,

*** $p<0.001$