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## Bad Nights or Bad Bars? Multi-level Analysis of Environmental Predictors of Aggression in Late-Night Large-Capacity Bars and Clubs

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# **Bad Nights or Bad Bars? Multi-level Analysis of Environmental Predictors of Aggression in Late-Night Large-Capacity Bars and Clubs**

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## **Abstract**

**Aims:** To clarify environmental predictors of barroom aggression by differentiating relationships due to nightly variations versus across bar variations, frequency versus severity of aggression and patron versus staff aggression

**Design/Setting/Participants:** Male-female pairs of researcher-observers conducted 1334 observations in 118 large capacity (>300) bars and clubs in Toronto, Canada.

**Measurements:** Observers independently rated aspects of the environment (e.g., crowding) at every visit and wrote detailed narratives of each incident of aggression that occurred. Measures of severity of aggression for the visit were calculated by aggregating ratings for each person in aggressive incidents.

**Findings:** Although bivariate analyses confirmed the significance of most environmental predictors of aggression identified in previous research, multivariate analyses identified the following key *visit-level* predictors (controlling for bar-level relationships): rowdiness/permissive environment and people hanging around after closing predicted both frequency and severity of aggression; sexual activity, contact and competition and persons with two or more drinks at closing predicted frequency but not severity of aggression; lack of staff monitoring predicted more severe patron aggression while having more and better coordinated staff predicted more severe staff aggression. Intoxication of patrons was significantly associated with more frequent and severe patron aggression at the bar level (but not at the visit level) in the multivariate analyses and negatively associated with severity of staff aggression at the visit level.

**Conclusions:** The results clearly demonstrate the importance of the immediate environment (not just the type of bar or characteristics of usual patrons) and the importance of specific environmental factors, including staff behaviour, in predicting both frequency and severity of aggression.

Keywords: alcohol & aggression, licensed premises, environment, bar staff

## **Bad Nights or Bad Bars? Multi-Level Analysis of Environmental Predictors of Aggression in Late-Night Large-Capacity Bars and Clubs**

Alcohol-related aggression is typically an interactional process that involves multiple contributing factors, including the characteristics of the drinker, the effects of alcohol and the characteristics of the environment in which drinking occurs.<sup>1</sup> One of the riskiest drinking contexts in terms of aggression and injury is the public drinking establishment (i.e., bars, taverns, clubs, pubs);<sup>2-6</sup> however, there is considerable variability among bars and clubs in level of aggression.<sup>7-10</sup> The evidence suggests that while some of the risks may be associated with the types of people who frequent public drinking establishments (e.g., a high proportion of patrons are male and heavy drinkers),<sup>9,11,12</sup> the physical and social environment of certain barroom settings may also contribute to risk of aggression and injury,<sup>13</sup> even controlling for the personality of the drinker.<sup>12</sup>

The physical environment (e.g., the neighborhood in which the bar is located, the size and layout of the establishment, type of furnishings and comfortableness of seating, cleanliness and upkeep, noise level, etc.) might be expected to contribute to aggression through factors such as discomfort related to environmental irritants<sup>14</sup> like smokiness and lack of adequate seating<sup>13</sup> and frustration and provocation due to crowding and congestion.<sup>10</sup> The social environment (i.e., attributes that govern social interactions, such as permissive behavioural expectations or standards of decorum, rowdiness, sexual competition and sexual contact/activity),<sup>8,15,16</sup> including activities such as dancing and pool playing<sup>8,12,17</sup> and the nature and quality of entertainment<sup>8,18,19</sup>) is also likely to influence the probability of aggression.

Characteristics of patrons (e.g., age, social background) have also been found to be important, with aggression more likely in bars frequented by young persons,<sup>12</sup> groups of males<sup>18</sup>

and marginalized subpopulations.<sup>8</sup> The increased risk may be due to the characteristics of the patrons, per se, (e.g., young males are generally higher risk for violence than other demographic subgroups) or to the inter-relationship between patron characteristics and the social environment (e.g., younger age of patrons may be positively correlated with an atmosphere of sexual competition). Intoxication level of those within the bar and bar policies associated with becoming intoxicated such as cheap drinks and drink specials<sup>12,18</sup> have also been found to be highly associated with aggression.<sup>8,15,20</sup>

Staff also form an important part of the barroom environment both through their contribution to the social environment (e.g., permissive behavioural expectations) and more directly through their behavior. Low staff/patron ratio has been found to be associated with more frequent aggression<sup>15</sup> possibly due to reduced vigilance and guardianship.<sup>21</sup> Aggression in bars has also been found to be positively associated with staff serving to intoxication<sup>15</sup> and serving a large amount at closing,<sup>12,17</sup> hostile and aggressive staff,<sup>8,15,18,22-24</sup> staff who are poorly trained and poorly coordinated,<sup>18</sup> a high proportion of staff who are male, and the presence of “bouncers”.<sup>12,15</sup> Finally, certain factors within the bar vicinity, such as a lack of availability of public transportation<sup>15,17</sup> and people hanging around outside the bar at closing,<sup>17</sup> may also affect the likelihood of aggression.

Although previous studies have shown considerable consistency of findings across time and in different English speaking countries, a major limitation of this research has been the inability to determine whether the associations between aggression and the environment are due to effects of the immediate environment (i.e., characteristics of the environment on any particular occasion) or to the effects associated with the usual features of a bar (i.e., invariant characteristics of the barroom environment such as location as well as characteristics of the usual

bar environment that vary across but not within bars). For example, the association between aggression and permissive social environments could be due to the type of patrons attracted to permissive environments rather than to the specific effects of permissiveness on any particular night. In addition to the confounding of usual and immediate environment, previous studies have not systematically measured severity of aggression (other than differentiating between physical and nonphysical aggression<sup>8,15</sup>) and have not conducted separate analyses to distinguish environmental predictors of staff versus patron aggression.

### **Research Objectives**

The objectives of the present research are:

- 1) to distinguish associations of aggression with the immediate environment reflecting within-bar variance on environmental factors (referred to as “visit-level” predictors in the present study) from associations related to the general characteristics of the bar (referred to as “bar-level” predictors);
- 2) to identify environmental factors associated with *severity* as well as *occurrence and frequency* of aggression;
- 3) to differentiate environmental predictors of severity of aggression *by patrons* versus aggression *by staff*.

### **Methods**

#### **Sample of Bars/Clubs**

The data were collected as part of a randomized control trial of an intervention to reduce aggression in bars and clubs.<sup>25</sup> The original sample of 118 premises included all large capacity (>300) licensed premises in greater Toronto, Canada, that operated primarily as drinking establishments during late evening hours, excluding private or restricted membership clubs, strip

bars and a small proportion of gay clubs where male-female observer pairs would have been conspicuous, and licensed establishments such as restaurants, banquet halls and sports stadiums where the primary function was not as a bar or nightclub. We focused on large-capacity establishments during the two hours prior to closing (midnight to 2am except for one bar visited from 10pm to midnight) on Friday and Saturday nights because these have been identified as particularly high risk locations<sup>15</sup> and time periods<sup>7,26-28</sup> for aggression. Approximately two-thirds of the establishments were dance clubs<sup>29</sup> covering a variety of music genres<sup>30</sup> and attracting patrons diverse in age (although about 75% were under 30), ethnicity and sexual orientation. The remaining establishments included sports and other types of bars, large pubs and concert venues. Because the primary goal of the research was to conduct a randomized control trial of the effectiveness of the *Safer Bars* program,<sup>25</sup> bars and clubs that had little or no aggression were dropped after four or five visits during the pretest because they had little potential to show improvement in terms of the evaluation. Thus, while establishments retained for the evaluation were visited up to 25 nights, a large group of establishments were visited four to five different times (before being dropped from the study) and some were visited less often for other reasons (e.g., closed soon after the study began; changed hours of operation, etc.).

In total, the study included 1334 nights of observation. At least one incident of aggression occurred on 558 of the 1334 observational visits to the bars, and 88 out of 118 bars had at least one incident of aggression (range of number of incidents per bar was 0 to 49). Of those with incidents of aggression, 28.4% had only one incident, 30.7% had 2 to 10 incidents, 20.4% had 11 to 20 incidents and 20.5% had 21 or more incidents.

### **Observation Procedures and Data Collection**

Observers were recruited through advertisements and required to have a Bachelor's degree or equivalent research experience, feel comfortable going to bars and pass a rigorous screening process (see<sup>31</sup> for more details). The training (about 25 hours over two weekends) and the written manual<sup>32</sup> addressed how to observe in bars, procedures for data collection, and ethical, confidentiality and safety issues. The 148 observers hired over the course of the project conducted observations in male-female pairs, with partners and establishments visited varying each week. Observers were instructed to stay together and be as inconspicuous as possible (which included being allowed to order or consume one alcoholic beverage if necessary), to minimize interactions with other patrons or staff, and to move around during the visit in order to observe different parts of the bar, or if moving around would be conspicuous, to sit in a place where they would have a good view of most of the bar. On-call field co-ordinators made spot-checks to ensure that observers were at the assigned location and behaving appropriately.

Immediately after the bar visit or first thing the next morning, the observers independently completed ratings of the physical and social situational characteristics of the bar on machine-readable forms (see the Measures section below). Data were entered each week to allow immediate identification of inconsistent ratings by the two observers or coding errors. Discrepancies were identified according to preset criteria (e.g., a difference of more than 2 points on 10 point scales) and discussed and resolved at the weekly meeting. For responses that were not identified as discrepant, the average score for the two observers was used in the data analyses. Measures of inter-observer agreement were based on the original scores of the observers. Observers also completed detailed descriptions of the aggressive incidents, including data on each participant for up to 8 patrons and 6 staff (sex, age, role in incident, level of intoxication, etc.) as well as a step-by-step description of the incident. A narrative incorporating

details from both observers was prepared by the Field Coordinator and reviewed by the observers at the weekly meeting to address any discrepancies or omissions(see<sup>31</sup>).

### **Measures of Aggression**

Both physical (e.g., pushing, shoving, pulling, grabbing, holding, unwanted sexual contact; slapping; punching) and nonphysical aggression (e.g., expressing anger, swearing at, insulting or demeaning someone, threatening, challenging, aggressive rule breaking) were recorded (see<sup>31</sup>). Using the narrative descriptions provided by the observers, two members of the research team rated the level of aggression for each patron and staff member in the incident based on level of harm and intent which are considered the defining features of aggression.<sup>33</sup> Harm was coded on an 8-point scale from 0-no harm to 7-severe harm (e.g., punching, kicking) (inter-rater agreement: Spearman rank order correlation=.84, Kappa=.71). Intent was rated as: (0) *no intent* (person made no aggressive act or harm was clearly accidental); (1) *defensive intent* (act involved no more force than necessary to defend oneself or someone else); (2) *probable intent* (acts that clearly caused harm to another person but where the actor's intent was ambiguous due to the actor's intoxication, joking manner or possible belief that the act was defensive); (3) *definite intent* (inter-rater agreement: Spearman rank order correlation=.74, Kappa=.58). An overall aggression score was calculated which combined the harm and intent ratings ranging from a low score of 0 (no aggression) to a high score of 21 (severe physical aggression with definite intent).

For the present analyses, four measures of aggression were calculated from these aggression scores: (1) whether any aggression occurred during the bar visit, (2) number of incidents of aggression during the visit (i.e., frequency of aggression), (3) total score on severity

of aggression for patrons (i.e., summing the overall aggression score for all patrons involved in all incidents occurring during the visit); and (4) total score on severity of aggression for staff.

### **Measures of the Barroom Environment**

As shown in Table 1, scales were constructed by combining highly correlated environmental variables, except for intoxication which was analyzed separately because of its particular importance as a predictor of aggression,<sup>20</sup> despite being highly correlated with rowdiness and permissiveness. Inter-observer agreement was generally adequate to high except for lower than desirable agreement on rowdiness and permissiveness and some of the staff variables (see Table 1). Because rowdiness/permissiveness has been shown to be important in previous research and because of the need to further develop our understanding of staff roles, these variables are maintained in the present analyses but results need to be interpreted with caution. Serving practices are difficult to measure in large-capacity bars and clubs where many patrons stand or mill about; therefore, the dichotomous measure of whether any patrons had two or more full drinks at closing was used as an indicator of poor serving practices.

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Insert Table 1 about here  
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### **Analyses**

The coefficients and significance levels for each of the main predictors (entered individually and in multivariate models) were calculated using 2-level Hierarchical Linear Modeling (HLM)<sup>34</sup> which allows us to take into account the dependence among the multiple visits to each bar. The HLM Bernoulli model for dichotomous outcomes with Laplace approximation was used to predict whether any aggression occurred during the visit. We used the

over-dispersed Poisson version of HLM for frequency and severity of aggression because frequency of aggression is a count variable and the measures of severity of patron and staff aggression were highly skewed. All analyses included random intercepts to allow for unexplained mean bar-level differences. Random coefficients for the visit-level variables were only included if significant, and this occurred only for whether there was a line-up and whether anyone had two or more drinks at closing in the prediction of frequency of aggression. In the multivariate models, the mean was imputed for lack of professional boundaries by security staff in order to include establishments that did not employ security staff.

The models address both within and between bar variation on the environmental variables. The special advantage of this separation is that it makes it possible to assess the visit-level relationship controlling for *all* bar-level variables, whether measured or not. Thus, we can be confident that the relationship between aggression and an environmental variable such as crowding is not due to some other unmeasured characteristic of the sort of bars that are usually crowded, such as the type of staff employed or musical or thematic aspects of the bar. The between bar relationship between the environmental variables and aggression, on the other hand, will reflect any bar-level association *beyond that which was already included in the within-bar relationship*. Though interesting, this relationship is less straightforward to interpret because it does not reflect, for example, the direct relationship between crowding and aggression (which is already included in the visit-level measure). Rather, a significant bar-level relationship between aggression and crowded bars would have a variety of possible interpretations such as altered standards of behavior that evolve in bars that are usually crowded or the types of patrons who are attracted to crowded bars. For most variables, we were primarily interested in the within-bar relationship, that is, the immediate impact of the barroom environment during the visit. A single

visit-level estimate was used for two variables for which it was not possible to separate the two levels (i.e., within-bar variance of less than 20% of the total variance/eta-squared > .80), namely, the presence of pool tables and whether security staff employed.

## **Results**

The following analyses include both visit and bar-level measures, controlling for the following potential confounders and key exposure variables: whether the observations were conducted during the pretest or posttest, visit number (which reflects seasonal variation), total time at the bar in minutes, and number of people in the bar at peak (i.e. the busiest time during the visit).

### **I. The Bivariate Relationship between Individual Environmental Predictors and Aggression**

**Significant predictors of any versus no aggression and frequency of aggression.** In terms of *patron characteristics*, the proportion of patrons aged less than 25 was a significant predictor of frequency of aggression at the bar but not visit-level (see Table 2). Almost all *physical and social environmental* variables were significant visit-level predictors and several were also significant at the bar level. A greater number of staff, the presence of security staff and a lack of professional boundaries by security staff significantly predicted visit level variations in aggression, and the two *closing-time variables* were significant predictors at both the visit and bar level.

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Insert Table 2 about here

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**Predictors of severity of aggression by patrons (including only bars and visits where aggression occurred).** Proportion of patrons aged less than 25 was significant only at the bar level. The pattern of relationships between severity of aggression by patrons and the *physical environment and social environment and activities* was similar to that for any aggression and frequency of aggression only generally weaker, with significant effects at the visit level for whether there was a lineup; sexual activity, contact and competition; intoxication (also significant at the bar level); and rowdiness and permissiveness. Lack of monitoring by staff and number of people hanging around after closing were also significant predictors at both the visit and the bar level, although the bar-level relationship for lack of monitoring by staff was negative. Extent that premises were unclean and messy was significant only at the bar level.

**Predictors of severity of aggression by staff (including only bars and visits where aggression occurred).** Proportion of patrons aged less than 25 was a significant bar-level predictor, while significant visit-level predictors included: rowdiness and permissiveness, number of people hanging around after closing (both also significant for bar level), the presence of a lineup, number of staff and lack of professional boundaries by security staff. Smokiness and poor ventilation, intoxication and anyone with two or more drinks at closing were also significant predictors at the bar level.

## **II. Multivariate Analyses of Predictors of Aggression at the Bar and Visit Level**

In the multivariate models predicting frequency and severity of aggression, we first assessed impact of the physical environment variables with only the control variables, bar location and patron characteristics. We then added the remaining social, staff and closing time variables. Only results meeting the significance criterion of  $p < .05$  are discussed although those

reaching borderline significance ( $p < .10$ ) are also identified in Table 3 in order to highlight suggestive findings for future research.

**Frequency of aggression.** As shown in Table 3, there was a significant *negative* visit-level relationship between aggression and proportion of patrons aged under age 25 in both the partial and full models. Movement, crowding and noise level, and extent premises were unclean and messy were significant predictors of frequency of aggression in the first model but became nonsignificant when other variables were added. In the full model, the most important visit-level predictors were sexual activity, contact and competition; rowdiness and permissiveness; and the two closing-time variables. Intoxication was a significant bar-level but not visit-level predictor.

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Insert Table 3 about here  
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**Severity of patron aggression.** Suburban location was a significant bar-level predictor in the multivariate analysis for both models. Significant visit-level predictors included rowdiness and permissiveness, a lack of monitoring by staff and number of people hanging around after closing. Intoxication was a significant predictor at the bar-level but not the visit-level. No physical environment predictors were significant in either model.

**Severity of staff aggression.** Visits with line-ups tended to have more severe staff aggression ( $p < .01$  in the first model and  $p < .10$  in the full model). When all variables were in the model, rowdiness and permissiveness was significantly and positively associated with more severe staff aggression at the visit level, but intoxication was *negatively* associated with severity of staff aggression. Having a larger number of staff and better staff coordination during a visit were significantly associated with *more severe* staff aggression.

## Discussion

### Bivariate Relationships

The bivariate analyses allow us to compare findings to previous research. Overall, despite the reduced variability due to the inclusion of only large capacity bars and despite observations being limited to the period between midnight and 2am on Friday and Saturday nights, most physical and social environmental variables identified in previous research<sup>8,12,15</sup> were found to be significantly related to any aggression and frequency of aggression, essentially replicating previous findings. The two-level analyses clarified previous research by demonstrating that most variables were significant at the visit level *when bar-level variations were controlled for*. The present analyses unambiguously identify the importance of environmental variations *within bars*. While this type of study cannot assess causality, these analyses support the interpretation that the immediate barroom environment has an important impact on aggression. The significant bar-level predictors indicate that some stable characteristics of the bars are also associated with aggression over and above the effects of nightly variations.

Inclusion of measures of both frequency and severity of aggression provided further insight. The results pertaining to frequency of aggression are the most consistent in replicating previous research which is not surprising given this outcome is most similar to those used in previous studies. In terms of severity of aggression, predictors were similar but weaker effects were obtained, possibly reflecting reduced variability due to selecting only those visits where aggression occurred, but perhaps also suggesting that the overall environment may be less important for predicting severity than for predicting frequency of aggression.

Poor monitoring by staff predicted more severe patron aggression at the visit-level, possibly suggesting that if staff are vigilant about intervening early in patron conflicts, they can

prevent escalation to more severe aggression. Poor monitoring was associated with less severe aggression at the bar level possibly because bars that typically have more severe aggression implement a higher level of staff monitoring. It should be noted, however, that ratings of lack of monitoring by staff showed low inter-observer agreement; so these results should be interpreted with caution. Also, some unpredicted findings could simply be a function of Type I error (given the large number of tests being conducted).

## **Multivariate Analyses**

### ***Key Predictors of Both Frequency and Severity of Aggression***

The multivariate analyses suggested that the social environment and closing-time variables were the strongest predictors of patron aggression; however, this does not rule out an indirect or mediated effect of the physical environment. For example, a physical environment that is unclean or messy may contribute to the general ambiance of permissiveness which in turn may influence aggression. Therefore, the best interpretation of the results, especially for frequency of aggression, is that aggression is more likely to occur on nights when bars/clubs are crowded, noisy, smoky and unclean, and have line-ups, lots of movement, dancing, a lot of sexual activity and competition, highly intoxicated patrons, a highly permissive environment with a great deal of rowdy behavior, a large number of staff, the presence of security staff some of whom demonstrate a lack of professional boundaries, patrons who have been served several drinks at closing and a large number of patrons hanging around after the bar has closed. Within this context, however, several key variables can be identified from the multivariate analyses.

**Rowdiness and permissiveness and number of people hanging around after closing.** The relationship between aggression and rowdiness and permissiveness is consistent with findings from a number of other studies<sup>8,15,16</sup> but adds to knowledge of this relationship by

demonstrating that *nightly variations* in rowdiness and permissiveness predict aggression (i.e., it is not solely a function of rowdy/permissive bars) and that a permissive atmosphere is positively associated not only with frequency of aggression *but also severity of aggression* and applies to severity of *both* staff and patron aggression. Therefore, setting and maintaining higher standards of behavior, including reducing rowdy behavior, may be an effective strategy not only for reducing the incidence but also the severity of aggression.

The increased risk of aggression including more severe aggression related to people hanging around after closing confirms previous qualitative research<sup>17</sup> suggesting that the dynamics of people hanging around at closing and how these contribute to frequency and severity of aggression deserve further exploration. For example, this variable may reflect poor management on the part of the bar/club, especially if aggression is due to problems that start inside the establishment spilling out onto the street after closing. The availability of food stands and lack of transportation may also be factors in keeping bar patrons in the area. Interestingly, the association between aggression and patrons hanging around on the street after closing might account for some of the relationship found between bar density and violent crime.<sup>35-38</sup>

**Intoxication of patrons.** Intoxication of patrons, while strongly correlated with aggression in the bivariate analyses (consistent with previous research<sup>8,15,16,18</sup>), became nonsignificant as a visit-level predictor of patron aggression in the multivariate analysis (and negative for staff aggression). It may be that the visit-level relationship was masked due to the high correlation of intoxication with rowdiness and permissiveness. Thus, an important direction for future research would be to explore the inter-relationship between permissiveness, intoxication and rowdiness. Intoxication was, however, positively related to aggression at the bar level, possibly indicating that bars that routinely serve patrons to intoxication are at increased

risk over and above any risk due to intoxication, rowdiness and permissiveness on any particular night. This confirms our previous analyses of these data<sup>20</sup> emphasizing the importance of targeting prevention interventions and enforcement efforts toward bars that regularly serve patrons to intoxication.

### ***Key Predictors of Frequency but Not Severity of Aggression***

**Sexual activity, contact and competition.** Sexual competition was a major factor in many of the nightclubs included in the present study<sup>30</sup> and has been found to be a significant predictor of aggression in Australian bars and clubs.<sup>15</sup> An atmosphere of sexual competition may increase risk of aggression due to aggression arising out of sexual overtures, especially when patrons are intoxicated.<sup>39-41</sup> The lack of relationship between this variable and severity aggression may have been due to the nature of most observed sexual aggression which typically involved a male making an unwanted overture (which was usually mild such as touching someone who did not want to be touched) and a female target who responded with no aggression (e.g., avoidance) or with mild aggression such as an angry look.

**Anyone with two or more drinks at closing.** Although the importance of this variable is consistent with previous evidence linking aggression with poor serving practices,<sup>15</sup> it is particularly noteworthy that this variable remained significant in the multivariate model, suggesting a contribution to aggression beyond simply reflecting intoxication level of patrons. One explanation for this effect is that patrons are likely to become aggressive if they are being urged to leave soon after purchasing drinks, even if they are not intoxicated! Aggression at closing time has been the focus of concern in many jurisdictions, most recently in the UK.<sup>42</sup> The present research has confirmed two factors that contribute to this problem, over-serving at

closing time and patrons not leaving the area. These issues would be appropriate targets for future policy and prevention.

### ***Key Predictors of Severity but Not Frequency of Aggression***

**Bar location.** In the multivariate model, aggression was more severe at suburban than at entertainment district clubs/bars. This suggests that the broader social context of the bar location may be a factor in aggression; however, given that this effect only emerges in the multivariate model, its relationship seems to be secondary to more immediate aspects of the barroom environment.

**Lack of monitoring by staff.** The significant relationship of *severity of patron aggression* with a lack of monitoring by staff suggests that more severe aggression may escalate from lower level rowdiness in permissive environments when combined with poor control of minor incidents by staff. This finding highlights the important role of staff in controlling aggression and preventing escalation to more severe and injurious forms of aggression.

**Number of staff and lack of staff coordination.** Although a higher staff-patron ratio and better coordinated staff was expected to be associated with less aggression,<sup>15</sup> these were found to be *positively* related to more *severe aggression by staff*. Although it is possible that past experience with aggression leads to increased numbers of staff being employed by the bar, a more likely explanation (given the importance of this variable as a *visit-level* predictor) is that having more staff increases aggression because some staff actually cause aggression.<sup>24</sup> Similarly, there are at least two possible explanations for the finding that lack of coordination by staff was associated with *less severe* aggression. The first is that greater staff coordination was needed on nights where staff had to use more severe aggression to deal with problem patrons; however, the lack of a significant relationship with severity of patron aggression does not support this

explanation. The second explanation is that the coordination was done in an officious way that increased tension and required more severe aggression on the part of staff in order to manage problem patrons. Thus, while in theory, staff coordination should serve to decrease risk of aggression, coordination will not have the expected positive impact if the staff are creating a confrontational rather than friendly and cooperative environment.<sup>43</sup> Because bar staff can inflict serious injury at times,<sup>44</sup> factors such as how staff enforce the rules, preserve order and deal with aggression deserve further attention in developing prevention programming and policies in the area of bar violence.

### **Limitations**

A number of variables had lower than desirable levels of inter-observer agreement including some that were key predictors such as rowdiness and permissiveness, lack of monitoring and lack of coordination by staff. The lower rate of agreement may have been due to the restricted range on these variables or to insufficient training of observers, especially in recognizing staff behaviors indicative of better monitoring and coordination. Improved measurement of these apparently highly influential aspects of the barroom environment is needed.

It is possible that some variables predicting staff aggression did not emerge as significant because the lower rate and less severe aggression by staff (compared with rates for patrons) resulted in low statistical power. Examination of the findings indicated, however, that nonsignificant findings for staff aggression reflected lower coefficients and not a lack of power when compared with analyses of severity of patron aggression, except for two bar-level relationships (unclean/messy premises in the bivariate analyses, location in the multivariate

analyses) and one visit-level relationship (people hanging around at closing in the multivariate analyses).

Finally, as was noted in the methods section, this study focused mostly on a higher-risk sample of bars and clubs. Thus, the within-bar findings would be especially reflective of higher risk bars/clubs and may be less representative of other kinds of drinking establishments. However, as noted above, despite this restrictive sample, the results were very similar to findings from previous research involving a broader range of bars.

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Table 1. Environmental variables included in the analyses

Variable	Categories or scale anchors	Inter-observer reliability <sup>1</sup>
<b><i>Bar location and patron characteristics</i></b>		
Bar location	Entertainment district; downtown but not in entertainment district; suburb (the three areas were defined on a map of Toronto, and the location of bars coded accordingly)	---
Proportion of patrons who were female		r = .71
Proportion of patrons aged less than 25		r = .68
<b><i>Physical environment</i></b>		
Whether there was a line-up	A line-up was defined as persons having to wait more than a few seconds to enter the bar/club	---
Movement, crowding and noise scale (Cronbach's alpha = .81)	Average score on amount of movement, crowding and noise level	r = .84; 74%
- <i>Amount of movement</i>	<i>0-little movement other than staff to 9-a great deal of movement, crowd in constant motion</i>	r = .56; 64%
- <i>Crowding (on the dance floor, if applicable)</i>	<i>0-extremely easy to move, lots of space to 9-extremely difficult to move</i>	r = .70; 73%
- <i>Crowding (off the dance floor)</i>	<i>0-extremely easy to move, lots of space to 9-extremely difficult to move</i>	r = .80; 71%
- <i>Noise level</i>	<i>0-very quiet, easy to talk to 9-extremely noisy, noise hurts ears, impossible to talk</i>	r = .65; 74%
Smokiness and poor ventilation scale (Cronbach's alpha = .89)	Average score on smokiness and ventilation	r = .60; 67%
- <i>Smokiness</i>	<i>0-not visible or detectable to 9-extremely smoky, hard to breathe</i>	r = .60; 74%
- <i>Ventilation</i>	<i>0-extremely fresh to 9-extremely stuffy or stale, rank</i>	r = .51; 69%
Extent premises were unclean and messy (Cronbach's alpha = .80)	Average score on tables and premises kept clean	r = .63; 64%
- <i>Tables not kept clear</i>	<i>0 – empties always cleared immediately to 9 –tables sticky and full of empties</i>	r = .57; 64%
- <i>Premises not kept clean</i>	<i>0-very clean 9-broken glass, spilled drinks, wet floor, filthy</i>	r = .58; 67%
<b><i>Social environment and activities</i></b>		
Sexual activity, contact and competition (Cronbach's alpha = .82)	Average score on sexual activity, contact and competition	r = .73; 65%
- <i>Sexual activity in bar</i>	<i>0-not at all to 9-explicit sexual contact</i>	r = .56, 64%
- <i>Sexual contact in dancing</i>	<i>0-not at all to 9- explicitly sexual “dirty dancing”</i>	r = .50, 59%
- <i>Sexual competition</i>	<i>0-not the focus for anyone to 9-scoping is the focus for 76-100%</i>	r = .71, 66%
Intoxication of patrons	<i>0-no signs of intoxication to 9-more than a few drunk, stumbling</i>	r = .59; 69%
Rowdiness and permissiveness	Average score on rowdiness and permissive behavioral expectations	r = .47; 64%
- <i>Rowdiness</i>	<i>0-none or very rare to 9-rough horseplay, patrons out of control</i>	r = .40; 67%
- <i>Overall decorum/behavioural expectations</i>	<i>0-no swearing or loudness to 9-anything goes –from open sex to</i>	r = .39; 64%

Variable	Categories or scale anchors	Inter-observer reliability <sup>1</sup>
	<i>abusive swearing and behavior</i>	
Whether there were pool tables in use		---
Whether there was dancing taking place		---
<b>Staff variables</b>		
Number of staff		r = .87
Whether security staff (“bouncers”) were present		---
Lack of staff coordination	0-not at all coordinated, each quite isolated to 9-constant radio or eye contact, obviously trained to work together (reverse scored for analyses)	r = .44; 52%
Lack of monitoring by staff	0-not enough staff and many areas unmonitored to 9-complete coverage of the bar (reverse scored for analyses)	r = .38; 57%
Lack of professional boundaries by servers/bartenders	0 – all completely professional, clear boundaries to 9 – all socialized with patrons in familiar way, e.g., sexual contact with patrons, playing pool or dancing while on duty	r = .43; 66%
Lack of professional boundaries by security staff	As above	r = .45; 68%
<b>Closing-time variables</b>		
Anyone with two or more drinks at closing	Yes, no	73%
Number of people hanging around after closing		r = .76
<b>Control variables</b>		
Number of people in bar at peak		r = .94

<sup>1</sup>Pearson’s r and % agreement within 1 category (if applicable).

Table 2: Bivariate analyses of individual environmental predictors with whether any aggression occurred, frequency of aggression and severity of patron and staff aggression controlling for potentially confounding variables (time of observation, time at bar, number of people at bar) and nesting of visits within bars

Variable	Any aggression <sup>1</sup>		Frequency of aggression <sup>1</sup>		Severity of patron aggression <sup>2</sup>		Severity of staff aggression <sup>3</sup>	
	Visit-level coefficient (df=1326)	Bar-level coefficient (df=115)	Visit-level coefficient (df=1326)	Bar-level coefficient (df=115)	Visit-level coefficient (df=550)	Bar-level coefficient (df=84)	Visit-level coefficient (df=550)	Bar-level coefficient (df=84)
<i>Bar location and patron characteristics</i>								
Downtown location (vs. entertainment district)		-.064		-.059		.091		-.388
Suburban location (vs. entertainment district)		.222		.018		.249		.107
Proportion female patrons	.000	.007	.002	.005	.006	-.001	-.013	.008
Proportion patrons aged less than 25	.002	.008	-.004	.014**	-.001	.011*	.000	.018*
<i>Physical environment</i>								
Whether there was a line-up	.512**	.180	.304*	.252	.273*	-.258	.664**	-.546
Movement, crowding and noise level	.382***	-.055	.290***	-.042	.109 <sup>+</sup>	.007	.037	.242
Smokiness, and poor ventilation	.089	.396**	.117**	.199*	.033	.096	.036	.429*
Extent premises were unclean and messy	.294***	.277 <sup>+</sup>	.169***	.236**	.077 <sup>+</sup>	.190*	.034	.293 <sup>+</sup>
<i>Social environment and activities</i>								
Sexual activity, contact and competition	.364***	-.024	.301***	-.060	.115*	-.017	.094	.131
Intoxication of patrons	.432***	.179 <sup>+</sup>	.253***	.213**	.087*	.205**	-.051	.479**
Rowdiness/permissiveness	.479***	.422**	.379***	.251**	.252***	.162	.288***	.436*
Whether there were pool tables in use	.508*	--	.163	--	.088	--	.362	--
Whether there was dancing taking place	.459	.572	.508*	.352	.393	.070	-.262	1.263
<i>Staff variables</i>								
Number of staff	.036*	.011	.029**	.010	-.003	.015	.040*	.041
Whether security staff present	.478 <sup>+</sup>	--	.422*	--	.148	--	.740 <sup>+</sup>	--
Lack of staff coordination	-.079 <sup>+</sup>	.044	-.055 <sup>+</sup>	-.026	-.007	-.059	-.071	-.013
Lack of monitoring by staff	.032	-.033	.051 <sup>+</sup>	-.108	.123**	-.200*	.013	-.058
Lack of professional boundaries by servers/bartenders	.027	.187	.014	.131	-.051	.162 <sup>+</sup>	.003	.211
Lack of professional boundaries by security staff	.100*	.290 <sup>+</sup>	.077**	.148	-.025	.149	.143**	.205

Variable	Any aggression <sup>1</sup>		Frequency of aggression <sup>1</sup>		Severity of patron aggression <sup>2</sup>		Severity of staff aggression <sup>3</sup>	
	Visit-level coefficient (df=1326)	Bar-level coefficient (df=115)	Visit-level coefficient (df=1326)	Bar-level coefficient (df=115)	Visit-level coefficient (df=550)	Bar-level coefficient (df=84)	Visit-level coefficient (df=550)	Bar-level coefficient (df=84)
<i>Closing-time variables</i>								
Anyone with two or more drinks at closing	.314*	2.016**	.261**	1.413***	.160	.546	-.215	2.097**
Number of people hanging around after closing	.021**	.067*	.011***	.056***	.007*	.033**	.009*	.081**
<i>Variables controlled in the analyses<sup>4</sup></i>								
Intercept		-.565***		-.521***		3.861***		2.288***
Pre vs Post-test	1.765**		.830**		.563 <sup>+</sup>		1.665**	
Total time in line-up and bar	-.000		.003*		.001		.003	
Visit number	-.003 <sup>+</sup>		-.001		-.001		-.004**	
Number of people in bar at peak	.001***	.000	.001**	.000	.000	.000	.001 <sup>+</sup>	-.001

\*\*\*p <.001, \*\* p <.01, \*p<.05, + p<.10.

<sup>1</sup>Includes all bars and visits.

<sup>2</sup>Sum of patron scores on aggression severity scale including only visits where aggression occurred.

<sup>3</sup>Sum of staff scores on aggression severity scale including only visits where aggression occurred.

<sup>4</sup>Coefficients for the control variables reflect values in the base model with only control variables

Table 3: Variable coefficients for stepwise entry of groups of variables predicting frequency of aggression, severity of patron aggression and severity of staff aggression in two-level analyses (visit, bar)

Variable	<u>Frequency of aggression</u>				<u>Severity of patron aggression</u>				<u>Severity of staff aggression</u>			
	Bar location, patron characteristics and physical environment		All variables		Bar location, patron characteristics and physical environment		All variables		Bar location, patron characteristics and physical environment		All variables	
	Visit-level (df=1312)	Bar-level (df=108)	Visit-level (df=1286)	Bar-level (df=96)	Visit-level (df=536)	Bar-level (df=77)	Visit-level (df=514)	Bar-level (df=66)	Visit-level (df=536)	Bar-level (df=77)	Visit-level (df=514)	Bar-level (df=66)
<b><i>Bar location and patron characteristics</i></b>												
Downtown location (vs. entertainment district)		.015		.105		.176		.194		-.367		.000
Suburban location (vs. entertainment district)		.265		.250		.441*		.577**		.311		.535
Proportion female patrons	-.000	-.002	.003	-.000	.005	-.007	.005	.003	-.011	-.012	-.005	-.035
Proportion patrons aged less than 25	-.007**	.005	-.005*	.006	-.003	.007	-.003	.012 <sup>+</sup>	-.002	.010	-.002	-.002
<b><i>Physical environment</i></b>												
Whether there was a line-up	.147	.546	.117	.196	.211	.055	.189	-.166	.649**	-.834	.445 <sup>+</sup>	-.174
Movement, crowding and noise level	.226***	-.192 <sup>+</sup>	.031	-.050	.039	.021	-.064	.090	-.037	.243	-.244 <sup>+</sup>	.425
Smokiness and poor ventilation	.015	.154	-.041	.141	-.001	.044	-.035	.052	.053	.293	.065	.252
Extent premises were unclean and messy	.101**	.263**	.035	-.034	.062	.147	.037	.051	.002	.194	.104	-.220
<b><i>Social environment and activities</i></b>												
Sexual activity, contact and competition			.148**	-.106			.036	-.091			.096	-.329
Intoxication of patrons			.058	.339**			-.048	.441**			-.253**	.251
Rowdiness/permissiveness			.257***	-.170			.250***	-.434 <sup>+</sup>			.367**	.171
Whether there were pool tables in use			-.167	--			-.094	--			.320	--
Whether there was dancing taking place			.121	.098			.082	.289			-.158	.869
<b><i>Staff variables</i></b>												
Number of staff			.013	.019			-.004	.019			.037*	.037

Variable	<u>Frequency of aggression</u>				<u>Severity of patron aggression</u>				<u>Severity of staff aggression</u>			
	Bar location, patron characteristics and physical environment		All variables		Bar location, patron characteristics and physical environment		All variables		Bar location, patron characteristics and physical environment		All variables	
	Visit-level (df=1312)	Bar-level (df=108)	Visit-level (df=1286)	Bar-level (df=96)	Visit-level (df=536)	Bar-level (df=77)	Visit-level (df=514)	Bar-level (df=66)	Visit-level (df=536)	Bar-level (df=77)	Visit-level (df=514)	Bar-level (df=66)
Whether security staff present			.084	--			-.080	--			.593	--
Lack of staff coordination			-.056 <sup>+</sup>	.114			-.065	.057			-.157*	.318
Lack of monitoring by staff			.048	-.040			.124**	-.182			.066	-.133
Lack of professional boundaries by servers/bartenders			-.056 <sup>+</sup>	.016			-.053	.152			-.113	-.033
Lack of professional boundaries by security staff			.034	.099			-.044	.025			.135 <sup>+</sup>	-.010
<i>Closing-time variables</i>												
Anyone with two or more drinks at closing			.175*	-.106			.125	-.558			-.163	-.067
Number of people hanging around after closing			.009**	-.000			.008*	.006			.008 <sup>+</sup>	.052
<i>Control variables</i>												
Intercept												
Pre vs Post-test	.507 <sup>+</sup>		.177		.658 <sup>+</sup>		.560 <sup>+</sup>		1.726**		1.424*	
Total time in line-up and bar	.005**		.002		.004 <sup>+</sup>		.002		.004		-.000	
Visit number	-.001		-.000		-.002 <sup>+</sup>		-.001		-.004**		-.003*	
Number of people in bar at peak	-.000	-.000	-.000	-.001	-.000	-.000	-.000	-.001	.001	-.001	.000	-.003

\*\*\*p <.001, \*\* p <.01, \*p<.05, <sup>+</sup> p<.10.