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The Influence of Environmental Factors on Sexual Harm in Geelong Nightlife Venues: An Observational Study

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ABSTRACT

This exploratory study examines how modifiable venue characteristics relate to nightlife sexual harm. Researchers conducted 35 covert observations across 18 nightlife venues in Geelong, Victoria. Observers recorded venue lighting, decibel levels, crowding, and incidents of sexual harm. Sexual harm was observed in 37% of observations. LUX was an ineffective measure of lighting; however, observer-rated lighting showed a strong negative correlation with sexual harm, indicating that darker venues were associated with more incidents. Sexual harm correlated moderately with decibel levels and strongly with crowding. Venue design changes that enhance visibility and reduce crowding may improve patron safety and increase intervention opportunities.



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Sexual harm within Australian nightlife settings is a significant public health concern, associated with serious emotional and behavioral consequences (Button et al. 2025). The term “sexual harm” refers to a broad spectrum of unwanted sexual behaviors that may leave individuals feeling uncomfortable, intimidated, distressed, or frightened (Sardina and Ackerman 2022; Universities Australia 2023). Sexual harm can range from subtle, nonphysical acts (e.g., leering) to overt or severe physical harm (e.g., groping; Australian Human Rights Commission 2004; Button et al. 2024; Peterson et al. 2023). Kelly’s (1987) continuum of sexual violence framework conceptualizes these behaviors as interconnected, rather than treating them as isolated incidents or ranking them by severity. This framework emphasizes how commonplace or normalized acts (e.g., leering) form part of the conditions that enable more overt forms of sexual harm to occur (Kelly 1987).

Within nightlife settings, overt sexual behavior is typically normalized to a much greater extent than in other public settings (Ronen 2010; Tinkler, Becker, and Clayton 2018). Consequently, the risk of sexual harm is heightened, as the distinction between consensual and non-consensual behavior may not be clear to patrons and venue staff, diminishing bystander intervention and increasing opportunities for perpetration (Wrightson-Hester, Allan, and Allan 2022). While a growing body of literature has examined the individual factors associated with nightlife-related sexual harm, including gender, age, and alcohol use (see Quigg et al. 2020), few studies have investigated environmental factors that contribute to sexual harm in these settings. Emerging research suggests that aspects of venue design and management including low lighting level (Powers and Leili 2016), crowding (Sanchez et al. 2019) and sexualized advertising (Gunby, Carline, and Taylor 2017) may facilitate an atmosphere where sexual harm is tolerated or encouraged. In combination with individual risk factors and the normalization of sexual behavior in nightlife (Quigg et al. 2020), such venue characteristics may increase the

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risk of sexual harm in nightlife settings. Further, existing interventions to prevent sexual harm in nightlife settings typically have a strong focus on individual behavior change (Quigg et al. 2020). Creating and implementing interventions that target modifiable environmental factors at the venue level could help reduce opportunity for sexual harm and help create safer nightlife settings (Button et al. 2024). Thus, understanding which environmental factors to target for intervention is essential.

Crowding is a well-documented factor contributing to violence and aggression in nightlife environments (Homel, Tomsen, and Thommeny 1992; Hughes et al. 2011; Macintyre and Homel 1997) and has more recently been associated with sexual harm within these settings (Peterson et al. 2023; Sanchez et al. 2019). Overcrowding can facilitate the perpetration of sexual harm by increasing physical contact, restricting movement, and hindering visibility (Kavanaugh and Anderson 2009; Thompson and Cracco 2008). Additionally, as crowding increases, the capacity of venue security to effectively monitor, recognize, and respond to incidents is likely reduced (Kavanaugh and Anderson 2009). In focus group research, nightlife venue staff have suggested that ensuring there are adequate numbers of security and managers present could reduce the likelihood of sexual harm occurring (Powers and Leili 2016). In Victoria, Australia, the standard security requirement for late-night venues is generally to have two licensed crowd controllers for the first 100 patrons and one additional crowd controller for each subsequent 100 patrons (Government 2023). While these regulations aim to maintain a safe environment within venues, the effectiveness of security measures may not only depend on the number (and expertise) of staff, but also on their visibility, location, and situational awareness.

Venue staff and police officers in the United Kingdom have proposed that maintaining adequate lighting levels within and around venues may also reduce the risk of sexual harm (Bates et al. 2022; Powers and Leili 2016). While research examining the relationship between venue lighting and sexual harm is limited, lighting level and effects (e.g., disco lights) have been shown to influence patron alcohol consumption (Labhart et al. 2021), drug use (Carlini, Andreoni, and Sanchez 2017) and violence (Gregory et al. 2022). One policing study conducted in Queensland found that when the median LUX level reaches 20, the likelihood of a violent offense occurring in the venue reduces to almost zero (Gregory et al. 2022). However, this study examined all violent offenses in aggregate, including physical assaults, sexual assaults, and robbery, and as such the specific association between sexual harm and lighting level is unclear. Similar to venue crowding, low lighting may increase the risk of antisocial behavior and sexual harm occurring by reducing visibility and surveillance within the venue (Gregory et al. 2022). As a result, such behaviors may go unnoticed by other patrons and security, reducing the likelihood of intervention. Furthermore, previous research has linked music genre to nightlife-related sexual harm (Palamar and Griffin 2020; Sanchez et al. 2019). For instance, in Brazil, sexual aggression was most likely to be reported in venues that played pop, funk, and electronic music (Sanchez et al. 2019). This may be influenced by the lyrical content of some songs or genres (e.g., sexual themes) or by the style of dance they encourage (e.g., grinding; Sanchez et al. 2016). However, the impact of music volume on sexual harm within nightlife venues remains underexplored. Elevated noise levels may reduce situational awareness (Korte and Grant 1980) and create discomfort among patrons, potentially increasing the risk of aggression (Macintyre and Homel 1997) and sexual harm.

The current study

There is limited research examining the influence of venue-level characteristics on the occurrence of sexual harm within nightlife venues (Miller et al. 2013, 2017). However, some findings suggest that venue-level factors may have a stronger association with sexual harm than individual-level factors (Sanchez et al. 2019). As factors such as lighting, noise, and crowding level are modifiable, understanding how they facilitate or mitigate sexual harm is important for the development of interventions that do not rely solely on individuals preventing their own victimization. The first aim of the current exploratory study is to qualitatively examine the nature and context of sexual harm in nightlife settings. This includes the types of incidents observed, the characteristics of those involved, and the presence or absence of venue-level prevention measures (e.g., signage, security, surveillance, and

layout). The second aim is to investigate the association between nightlife-related sexual harm and modifiable venue-level factors using both objective and subjective measures. It is hypothesized that:

- (1) Venue lighting level will be negatively correlated with the number of sexual harm incidents witnessed by observers (i.e., brighter lighting will be associated with fewer incidents).
- (2) The average decibel level of a venue will be positively correlated with the number of sexual harm incidents observed (i.e., louder venues will be associated with more incidents).
- (3) Crowding within venues will be positively correlated with the number of sexual harm incidents witnessed by observers (i.e., higher levels of crowding will be associated with more incidents).

Method

Setting

Ethics approval was obtained from Deakin University (2022–112). Observations were undertaken weekly on Saturday nights from January 2023 to April 2023. The observations were conducted in nightlife venues in Geelong, Victoria, Australia between 10pm and 3am. Geelong is Victoria's largest regional city (2021 population: 271057; Australian Bureau of Statistics 2021) and has over 50 licensed venues that operate until midnight or later in the city center (Government 2024).

Eighteen venues were selected for covert observation, with a total of 35 independent observations being conducted for the project. These venues were selected based upon the frequency with which Geelong nightlife patrons reported attending the venues in patron interviews (Button et al. 2025; currently under review). The sample of venues included bars and nightclubs, as previous research has shown that sexual harm is prevalent across both types of venues (e.g., Fileborn 2017; Powers and Leili 2016; Sanchez et al. 2019). In Victoria, there is no specific liquor license that distinguishes a bar from a nightclub, meaning both operate under the same regulatory framework. For the purposes of this study, venues were categorized based on their physical structure and primary function by the lead author. Five bars and 13 nightclubs were observed. Bars were structured around seated areas and typically had food available, whereas nightclubs were centered around late-night entertainment and dancing. Where possible, two separate observations were conducted at each venue. This was not possible for two venues due to them being closed on the night that the second observation was scheduled. To account for timing effects, efforts were made to ensure observations were not conducted at the same time (e.g., for venue 1, the 1st observation was conducted from 11pm–12am, and the second observation was conducted on a different weekend from 12am–1am). Data from three observations were lost due to research assistant error and as such were conducted again at the same time the following year (April 2024).

Procedure

All observations were recorded on iPhones using the Qualtrics offline applications. The methodology utilized in the current study and observation tool was based on prior research (Miller et al. 2013, 2017) and were modified to include further information around venue characteristics. Teams of two trained research assistants conducted 40–60 minute covert venue observations. Observers were equipped with a handheld decibel and LUX meter and were instructed to move throughout the venue to get measures in multiple areas (where possible, specifically near the bar area and on the dancefloor). One observer was tasked with covertly taking the measurements, while the second observer completed the observation checklist. Both observers were to come to an agreement on subjective items (e.g., crowding). Observers were dressed in “going out” clothes in order to remain discreet and not interfere with staff or patrons' usual activities.

Training prior to data collection included reviewing the observation tool, learning to recognize signs of intoxication, and identifying instances of aggressive behavior. Before commencing observations, the team also discussed how sexual harm would be identified, drawing on categories from the patron interview component of this project (i.e., sexual comments, groping, pinching, staring/leering, persistent harassment or coercion, unwanted kissing; Button et al. 2025 [in press]). These discussions, informed by prior research, provided a shared framework for recognizing incidents during fieldwork, with particular attention to behaviors that lacked consent or would reasonably be expected to make a person feel uncomfortable, intimidated, or humiliated. Each observation session was led by either KB or NT to maintain a consistent approach to data collection.

Materials

Crowding

Observers assessed venue crowding through two questions: (1) “In terms of the number of patrons in the venue, what was the percentage capacity during the busiest time you were there?” and (2) “How would you rate the flow of traffic through the venue (were there bottlenecks, queues to move through the crowd, etc)?” Observers responded on a 4-point Likert scale; 1 = Good (no problems moving through), 2 = Fair (clear passage even though crowded), 3 = Poor (difficult to move without bumping others) and 4 = Very Poor (unable to move through).

Objective lighting (LUX)

Using the LUX meter (Five in One Lutron LM-8102), observers noted 2–4 LUX lighting readings per venue. LUX readings were taken near the dancefloor, near the bar, and in additional spaces depending on the venue layout (e.g., 2nd dancefloor, seated area). An average LUX reading was produced for each observation.

Subjective lighting

Following the first 12 observations, it became evident that LUX readings of 0 were frequently recorded. Visual inspection revealed substantial variability in lighting conditions across venues, despite the readings being the same (i.e., 0). To ensure it was not a measurement error, observers utilized a secondary measure of LUX via an application downloaded to their phone (Light meter: Lux-525 Pro). However, the readings were consistent between the LUX meter and the phone application, highlighting a limitation in the ability of LUX measurements to capture meaningful differences in lighting conditions across venues. To address this, we incorporated an observer-rated lighting measure. For each area (i.e., bar, dancefloor), observers noted a lighting rating from 0 (complete darkness/unable to make out features) to 10 (fully lit). An average subjective lighting rating was produced for each observation. Observers returned to earlier venues so that each had at least one subjective lighting rating. As lighting conditions appeared consistent across observations, a single rating per venue was deemed sufficient, particularly given financial constraints on additional data collection.

Decibels

Observers noted 2–4 decibel readings in each venue (in the same locations as the LUX readings, i.e., dancefloor, near bar) using a handheld device (Five in One Lutron LM-8102). An average decibel rating was produced for each observation.

Venue-level intoxication

The observation tool also asked, “How would you describe the overall intoxication level of patrons during the ‘peak time?’” Observers responded on a 4-point scale; 1 = No sign of intoxication, 2 = Overall slight levels of intoxication, 3 = Overall medium levels of intoxication, 4 = Overall high levels of intoxication.

Sexual harm

The observation checklist included the question “Did you witness any sexually aggressive or unwanted sexual behavior?” During data collection, observers discussed incidents with each other to verify that the behavior was unwanted and could be classified as sexual harm. If observers responded “yes,” they were subsequently asked, “How many incidents of sexually aggressive or unwanted sexual behavior did you witness?” Observers then wrote notes about the incidents, which included what happened, where the incident occurred, and who was involved. This approach was considered most appropriate, as a structured checklist of predefined behaviors might have led observers to focus only on certain acts and overlook other relevant forms of sexual harm.

Venue characteristics

Observers provided general notes about venue characteristics, including further details on security presence, lighting, signage (e.g., sexual harassment prevention posters), and overall atmosphere of the venue.

Analytical plan

To address the first aim of the study, which was to explore the nature and context of sexual harm in nightlife settings, observer notes were reviewed to identify recurring themes. Independent sample t-tests were used to compare key variables across bars and nightclubs. To address the second aim, Pearson’s and Spearman’s correlations were conducted to determine the strength and direction of the relationship between environmental characteristics and the number of incidents of sexual harm witnessed. In these analyses, subjective lighting ratings ($n = 23$) and LUX readings ($n = 35$) were analyzed separately. The magnitude of Pearson’s and Spearman’s correlations were interpreted in accordance with Cohen (1988).

Results

Incidents of sexual harassment were witnessed in 37% ($n = 13$) of observations, with the number of incidents per observation ranging from 0 to 5 ($M = .94$, $SD = 1.45$). In all but one case, the perpetrator was male presenting and the target was female presenting. The exception involved a female groping a male’s buttocks as she walked past him.

Types of sexual harm witnessed

Groping and grinding were the most commonly observed forms of sexual harm, typically occurring on the dancefloor. For instance:

Two incidents of same man (20s) approaching women on dancefloor from behind and grinding, women indicated they did not want it. [Girls] immediately moved away.

Male (20s) persistently trying to dance/touch a group of girls (that he was not a part of) on dance floor.

A man grabbed the buttocks of a woman who shoved him off.

One 20ish male groped female (18–20) bum and breasts while she was already dancing with a boy (the two boys were friends). Girl that was groped removed herself from first guy and glared at him (they laughed at her).

Leering was also reported in three observations, and was characterized by prolonged, sexually suggestive staring that appeared intimidating and likely to cause discomfort. For example:

Older males on outside of dance floor leering at young females [who were dancing].

Older man (30ish) approached a group of young women (early 20) on crowded dance floor. Didn’t grope but was leering and lingering uncomfortably. Girls walked away.

Sexual harm prevention signage

Observers documented the presence of sexual harm prevention signage in 17% of ($n = 3$) venues. The messages conveyed in these posters varied across venues. One sign stated, “*Sexual assault is never your fault*” and encouraged patrons to report incidents to the police. Another venue’s signage advised patrons to approach venue staff if they felt uncomfortable and needed assistance. These posters were both displayed in the venue’s bathrooms. In the third venue, the sign was tucked away near the end of the bar. The poster encouraged patron bystander intervention and stated, “*If interest is one-sided, then it’s sexual harassment.*”

Security and surveillance

Observers noted varying levels of visibility and distinguishability of security staff across venues:

Good security presence - although could be more visible as [they] were wearing all black clothes.

Small venue, very packed [crowded]. Security were hard to distinguish.

Security were wearing fluoro [fluorescent] vests, one on each floor.

Some venues utilized security cameras and active monitoring by staff to enhance safety:

Signs saying there are security cameras in the venue, some visible security cameras. . . Quite a few bar workers and security walking around.

Lots of security around, visible security cameras in all rooms, good lighting in toilet hall plus visible camera. Manager keeping eye in all areas.

In one venue, security personnel appeared to be strategically placed to monitor key areas:

Security guard placed above large dance floor watching over.

Venue layout and lighting

Observers noted the impact of lighting and venue design on safety perceptions, with venues containing poorly lit areas that were not monitored well by security staff:

A lot of dark corners and corridors.

Many dark corners not well lit, with not much of a security presence apart from at entry.

Several dark areas outside where it is easy to be hidden. No security and no ID check.

In contrast, venues with open layouts and brighter lighting were perceived as feeling safer:

Lovely vibes, decent security presence. Dancefloor feels safe due to live performers and strong lighting. No dark corners due to open-plan space.

Figure 1 presents a histogram of the distribution of average LUX values across venues. Average LUX values were concentrated between 0 and 5, indicating that the majority of venues had low lighting levels. A small number of outliers with higher LUX values were observed; however, the overall distribution was skewed toward the lower end, with a limited spread of scores.

Figure 2 presents a histogram that displays the distribution of observer-rated subjective lighting scores across venues. The histogram demonstrates a greater spread of observer-rated subjective lighting scores ($Mdn = 5$, $IQR = 4, 7.7$) compared to the objective LUX measurements.

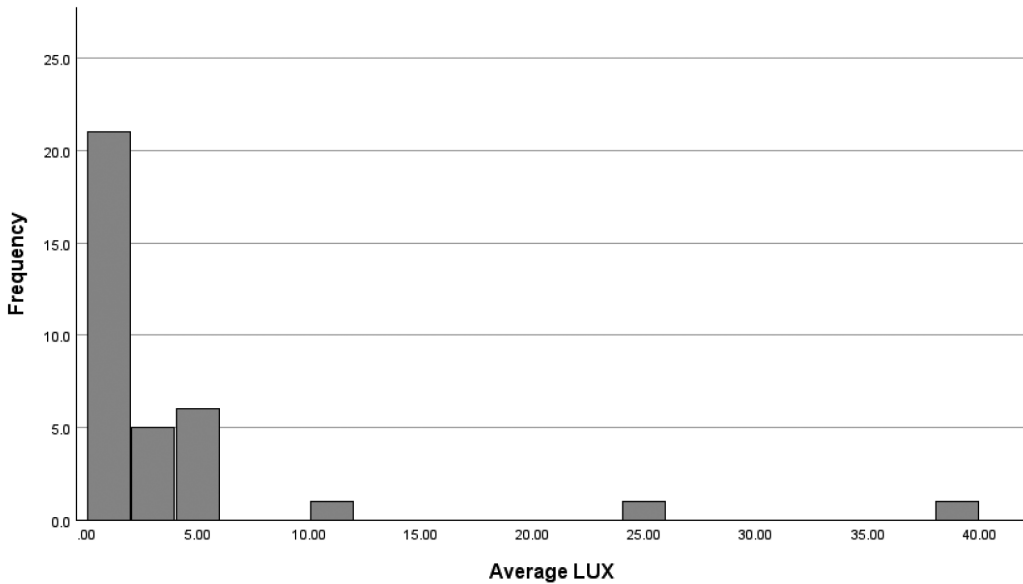


Figure 1. Histogram of average LUX levels across venues measurements.

Differences in bars and nightclubs

Table 1 compares key variables across bars and nightclubs using independent samples t-tests. LUX and subjective lighting ratings were significantly lower (i.e., darker) in nightclubs compared to bars. On average, the decibel level of bars was lower (i.e., quieter) compared to nightclubs. All incidents of sexual harm were observed in nightclubs.

The Pearson's and Spearman's correlations between key variables are presented in Table 2. There was a strong negative correlation between sexual harm and subjective lighting, indicating that as observer ratings of lighting decreased (i.e., got darker), the number of incidents witnessed increased. A moderate positive correlation was observed between decibels and sexual harm; as decibel levels increased (i.e., became louder), the number of incidents witnessed increased. Both flow of traffic within a venue and perceived venue capacity at the busiest time had a strong, positive correlation with sexual harm.

Additionally, subjective venue lighting was significantly correlated with decibel level; as venue lighting decreased, venue decibels increased. Finally, venue-level intoxication showed a strong positive correlation with sexual harm, indicating that venues with higher overall intoxication levels also had more incidents of sexual harm.

Discussion

This observational study aimed to investigate the correlations between nightlife-related sexual harm and modifiable environmental factors. Sexual harm was witnessed in over a third of observations and typically involved a male perpetrator and a female target. All observed sexual harm incidents occurred within nightclubs and included groping, unwanted grinding, and leering. Most incidents occurred on or around the dancefloor. While LUX levels were not significantly correlated with sexual harm, observer lighting ratings indicated that as venue lighting became darker, the number of incidents witnessed significantly increased. Thus, hypothesis one was partially supported. The current study also found that as venue decibel levels increased (i.e., became louder), the number of sexual harm incidents witnessed also increased, supporting hypothesis two. Similarly, hypothesis three was supported, as

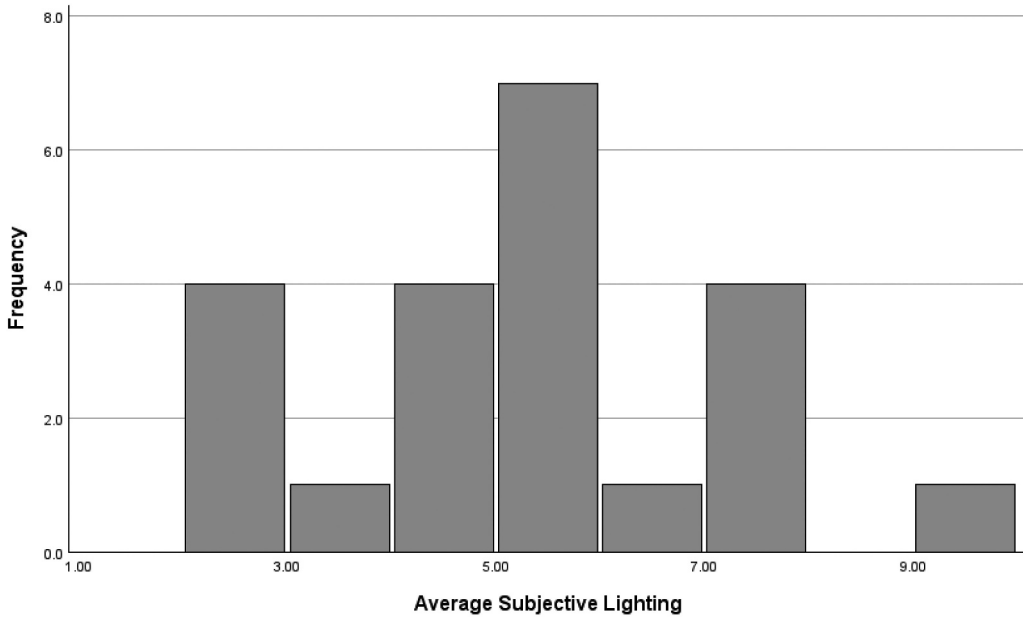


Figure 2. Histogram of average observer-rated lighting across venue measurements. Note: Observer ratings ranged from 0 (complete darkness/unable to make out features) to 10 (fully lit).

Table 1. Independent samples t-tests comparing key variables across bars and clubs.

	Bars			Nightclubs			<i>t</i>	<i>p</i>
	Range	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>		
SH incidents	0	0	0	0–5	1.22	1.55	–2.20	<.001
LUX	0.00–38	10.27	13.99	0.00–5.67	1.50	2.05	3.25	.001
Subjective Lighting	4.5–10	7.24	2.31	2–7.75	4.76	1.76	2.74	.006
Decibels	63.25–91.5	82.03	8.75	77.05–103.95	93.01	6.11	–4.09	<.001
Perceived venue capacity (Crowding)	5–100	37.5	36.65	10–90	54.44	24.93	–1.51	.07

Note: $n = 8$ bar observations, $n = 27$ nightclub observations, except for subjective lighting where $n = 6$ bar observations, $n = 17$ nightclub observations. SH: Sexual harassment

Table 2. Correlation matrix between observed environmental features.

	1	2	3	4	5	6	7
1. Number of sexual harm incidents witnessed	—						
2. LUX	–.29	—					
3. Subjective lighting	–.59**	.71**	—				
4. Decibels	.41*	–.37*	–.49*	—			
5. Flow of traffic in venue	.51**	–.40*	–.51*	.42*	—		
6. Perceived venue capacity	.50**	–.47**	–.48*	.36*	.66**	—	
7. Venue-level intoxication	.59***	–.47**	–.50*	.52**	.48**	.43**	—

Note: Pearson's correlations are reported when examining associations between two continuous variables, and Spearman's correlations are used when analyses involve an ordinal variable (i.e., flow of traffic in the venue and venue intoxication level). * represents $p < .05$ ** represents $p < .01$; *** represents $p < .001$.

poorer foot traffic flow and higher venue capacity during the busiest times were associated with an increase in sexual harm incidents.

An objective measure of lighting (i.e., LUX) was utilized in this study to address the limitation around the subjective nature of patron ratings reported in prior research (Button et al. 2025; currently under review). However, the objective measure failed to adequately capture lighting conditions in

nightlife venues. LUX readings frequently registered as zero, despite observers noting considerable variability in lighting across venues, suggesting a potential floor effect. For context, a LUX level of 1 is equivalent to the illumination provided by moonlight, whereas a LUX level of 10 corresponds to the brightness of a full moon on a clear night (Lee Hing 2025). Consistent with venue staff (Powers and Leili 2016) and experienced police officer (Bates et al. 2022) reports, the current study found that fewer incidents of sexual harm were witnessed as observer lighting ratings increased (i.e., venues became brighter). Darker venues could reduce the likelihood of perpetrators being identified by victims or bystanders, increasing opportunities for predatory behavior. Additionally, low lighting may also grant perpetrators a sense of anonymity (Zhong, Bohns, and Gino 2010), thereby lowering their perceived risk of being caught and experiencing repercussions.

Furthermore, the findings of the current study indicated that darker venues also tend to be louder and more crowded, suggesting a potential interplay between these characteristics. Crowded venues likely compound the effects of low lighting by further hindering effective surveillance (Kavanaugh and Anderson 2009). Further, elevated music and chatter within venues likely reduce patrons' and staffs' situational awareness (Korte and Grant 1980). Reduced situational awareness may impair individuals' ability to detect predatory behavior or identify signs of distress among other patrons (Kavanaugh and Anderson 2009). The interaction between low lighting, crowding, and elevated noise may create an environment where patrons are more vulnerable to sexual harm by reducing individuals' ability to detect and respond to such incidents. Simultaneously, these conditions facilitate opportunities for perpetrators to engage in unwanted sexual behavior, with a reduced likelihood of intervention.

In accordance with prior nightlife literature (e.g., Graham et al. 2014), venues with higher levels of general intoxication tended to have more incidents of sexual harm. At the individual level, intoxicated patrons may be deliberately targeted, as impaired judgment, reduced ability to resist, and heightened vulnerability create opportunistic conditions for perpetrators (Bogren et al. 2024; Gómez, Romo-Avilés, and Pavón-Benítez 2022). At the venue level, higher levels of intoxication may indicate a lack of effective management practices, such as monitoring intoxication, refusing service, or intervening in problematic behavior. This inaction could create a permissive environment where sexual harm is also more likely to occur.

The findings of the current study have a number of research-based and practical implications. The results underscore the potential for applying principles of Crime Prevention Through Environmental Design (CPTED; NSW Police Force 2024; Jeffery 1971) to mitigate the risk of sexual harm within nightlife settings. Specifically, this involves maximizing risk to perpetrators, maximizing the effort required to commit sexual harm, and minimizing the actual and perceived benefits of the harm. Venue characteristics such as lighting, crowding, and noise level could be leveraged to develop targeted interventions and policies aimed at reducing the occurrence of sexual harm (Button et al. 2024). For example, more stringent venue capacity policies and a minimum standard of lighting could be implemented for nightclubs to increase surveillance, thereby maximizing the risk to perpetrators. Addressing these factors could also enhance the effectiveness of existing interventions, particularly bystander intervention programs. In these programs, patrons and venue staff are encouraged to call for help or step in during incidents of sexual harm to prevent escalation (Quigg et al. 2021, 2024). While bystander programs are a promising intervention, their success may be hindered in venues where visibility is low, the music is loud, and there are large crowds of patrons. These characteristics may create an unsafe environment for intervention, particularly for patrons, as they can hinder the ability to accurately assess the situation, potentially increasing the risk of escalation. Addressing these environmental factors could improve the impact of venue and staff bystander interventions.

Additionally, the current study found that security presence varied greatly across venues. The absence of security personnel, or situations where patrons are unable to locate them, may allow sexual harm to go unaddressed and create challenges in reporting such behavior as the victim or a bystander. Enhancing the visibility of security through identifiable clothing, such as fluorescent vests (as seen in one venue), could deter perpetrators and allow victims and bystanders to quickly and easily report sexual harm when it does occur. Additionally, venues designed with open layouts that reduce crowding and eliminate dark or

secluded areas could improve surveillance and discourage inappropriate behavior (Manton, Robin Room, and Thorn 2014). These environmental adjustments could enhance security measures and contribute to safer nightlife settings. From a research perspective, the findings of the current study emphasize the limitations of using LUX as an objective measure of lighting within nightlife venues. While LUX readings failed to capture the variability of venue lighting, alternative approaches such as observer ratings and pixel-based tools (i.e., using computer algorithms to analyze video footage by calculating the average intensity of each pixel across frames within nightlife space) have shown greater sensitivity and should be utilized (Labhart et al. 2021).

Strengths and Limitations

Due to resource constraints, only a limited number of observations could be conducted within one nightlife precinct in Victoria, Australia. In order to substantiate the findings, the study should be replicated on a larger scale with a greater number of observations across multiple nightlife precincts. This would increase the generalizability of the findings and enable more sophisticated analyses. The limited number of observations also meant that multivariate analyses could not be conducted. Future research should aim to explore the relationships between sexual harassment and environmental factors such as lighting, noise, and crowding, while controlling for each variable to better understand their independent and combined effects. A further limitation is that different forms of sexual harm were combined into a single category, which may limit understanding of how environmental conditions influence particular behaviors. For example, factors that contribute to groping may differ from those that enable leering. Future studies should therefore examine each type separately in relation to venue characteristics. Further, some incidents may have gone unobserved due to factors such as poor lighting, venue layout, or size.

Nonetheless, lead researchers (either KB or NT) were present at all observations. This approach, along with the structured observation tool, contributed to consistency in interpretation and judgment during data collection. Additionally, a notable strength of the study was the use of observational methods, which enabled researchers to capture behaviors and environmental characteristics in real time within the naturalistic setting. This approach provides contextual insights that are not attainable through patron self-report measures.

Conclusion

Within nightclubs, features such as low lighting, crowding, and loud music may facilitate an environment that enables individuals to perpetrate sexual harm while simultaneously discouraging intervention from other patrons and security personnel. Modifying these aspects of venue management and design could increase the likelihood of intervention by making it easier for others to notice and respond to sexual harm. Additionally, improving these conditions within venues could serve as a preventative measure by reducing potential perpetrators' sense of anonymity and limiting their opportunity to engage in harmful sexual behavior.

Author contributions

CRedit: **Kira Button:** Conceptualization, Formal analysis, Investigation, Methodology, Project administration, Writing – original draft, Writing – review & editing; **Kerri Coomber:** Conceptualization, Methodology, Supervision, Writing – review & editing; **Nicholas Taylor:** Conceptualization, Investigation, Methodology, Project administration, Supervision, Writing – review & editing; **Dominique de Andrade:** Conceptualization, Supervision, Writing – review & editing; **Zara Quigg:** Supervision, Writing – review & editing; **Peter Miller:** Conceptualization, Investigation, Methodology, Resources, Supervision, Writing – review & editing.

Disclosure statement

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Notes on contributors

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