Opportunities for Video Lottery Terminal Gambling in Montréal

An Environmental Analysis

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ABSTRACT

Background: In the province of Québec, video lottery terminal (VLT) gambling has proliferated under government control since 1993. The aims of this study were to describe the spatial distribution of video lottery terminals (VLTs) in the municipalities of Montréal and Laval and to identify neighbourhood socio-economic conditions associated with their distribution.

Method: Locations of all establishments holding VLT licences in Montréal and Laval (n=834) were geocoded by their street address. Boroughs (n=49) were characterized by socio-economic indicators (unemployment, educational attainment, lone parenthood), a neighbourhood distress index, and measures of VLT prevalence, VLT adoption and VLT density.

Results: VLT prevalence, adoption and density were strongly correlated (p<0.01) with lower borough socio-economic conditions. Although liquor establishments were also more likely to be located in poorer neighbourhoods, the adoption rate of VLT licences by bars in poorer neighbourhoods was systematically higher than in more affluent ones.

Conclusions: The spatial distribution of VLTs in Montréal and Laval closely reflects local geographies of socio-economic disadvantage. Any public health effort to reduce the burden of gambling-related health and social problems must recognize the spatial distortion of gambling opportunities in the urban environment.

MeSH terms: gambling; geographic factors; social environment; geographic information systems

In 1969, the Government of Canada amended the criminal code and legalized gambling; Loto-Québec was created that same year. Video lottery terminals (VLTs) were first introduced in Québec in 1993, and by 2003, the net income from the _Société des loteries vidéo du Québec_ was $706 million – over one half of Loto-Québec's total net income.[1,2] Loto-Québec retains ownership of all VLTs and regulates their distribution through the _Régie des alcohols, des courses, et des jeux (RACJ)._ VLTs are only permitted in establishments with at least one licence to serve alcohol if the owner applies to the RACJ for a VLT licence. The latter allows owners to operate a maximum of five VLT machines per liquor licence.

This paper examines the distribution of VLT licences in Montréal and Laval in an effort to understand the spatial distribution of opportunities for this form of gambling. More specifically, we aim to reveal the spatial patterning of gambling opportunities in relation to neighbourhood socio-economic conditions. While the academic body of literature addressing VLTs in Canada is somewhat limited owing to their relatively recent emergence into community landscapes, there is a growing consensus from both international and Canadian studies that VLTs pose a particularly serious public health threat, especially as an entrée to gambling addiction for youth.[3-6] VLTs are like video arcade games but with higher stakes; machines offer games such as blackjack, poker and video slots, and individual bets that start as low as a nickel. Studies suggest that most VLT "addicts" are under 30 and single, and tend to have below average levels of education and income.[3,7,8] Although in Canada, VLTs are restricted to establishments with liquor licences in order to exclude minors, case studies have shown that 10-20% of underage youth have somewhat regular access.[5] Data from the 2002 Canadian Community Health Survey indicates that the VLT participation rate for respondents 15 years of age and over in the eight provinces with machines (excluding Ontario and British Columbia) was between 7 and 21%; one quarter of those VLT players already had or were at risk for developing a gambling problem.[9]

The literature on VLTs, and gambling in general, tends to focus overwhelmingly on individual explanatory models of

human behaviour while paying comparatively less attention to the social, political and economic contexts in which the behaviour occurs. For example, problem gamblers have been reported to have high rates of suicide ideation and suicide attempts and a number of mental health and behavioural problems, including increased risk-taking, low self-esteem, and greater depressive symptomatology. Problem gamblers also exhibit heightened anxiety and excitability, tend to have difficulty conforming to societal norms, experience difficulties with self-discipline, and are at increased risk for multiple addictions.[3,5,10-12] In addition, problem and pathological gambling among adolescents in particular has been shown to result in increased delinquency and crime, the disruption of familial relationships and poor academic performance.[5,10,13,14]

It could be argued that gambling is becoming so representative of modern culture that to ask individuals to curb their behaviours is to request the abandonment of that culture (this claim has been made about risky behaviours such as lack of exercise and unhealthy diet.[15]) Our research focus on gambling environments comes out of growing acknowledgement that long-term, large-scale behaviour change is best achieved not by focussing on individuals but rather by changing social norms (i.e., established and expected forms of social behaviour), and by altering access to "opportunities" for the behaviour to occur.[16,17] In the case of smoking, for example, the proliferation of individual-level smoking cessation aids did little to reduce smoking in North America. Instead, efforts to create environments that support non-smoking and changing norms and values were critical for making population-wide and longstanding impacts in tobacco reduction.[18]

Despite such lessons learned from population health studies of other risky behaviours, gambling researchers have been slow to realize that models attempting to understand problem gambling behaviour must take into account environmental conditions.[19] Nevertheless, a new geographical understanding of gambling is beginning to emerge. North American studies have repeatedly shown that decreased distance from a casino increases the likelihood of impulsive and problem gambling.[20,21] The
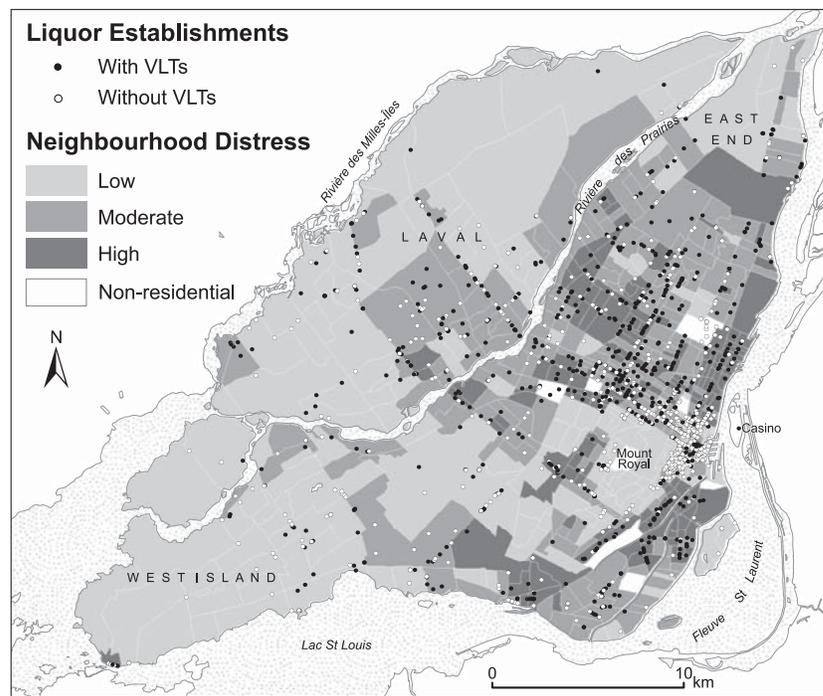

Figure 1.   Liquor establishments, VLT locations and neighbourhood distress
Note that the 7-category distress index was collapsed into 3 categories (low, medium, high) for mapping purposes.
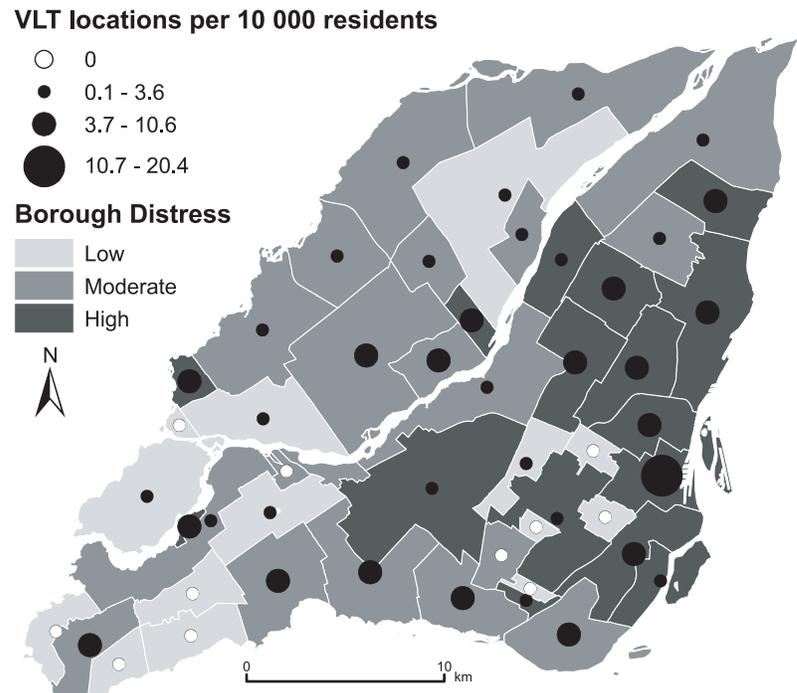
Figure 2.   VLT locations per 10,000 residents and borough-level distress

findings with respect to casinos are straightforward: gambling opportunities lead to gambling problems. Incidence of problem gambling has been compared among provinces and an association

reported with availability of VLTs;[9] however, in the fast-growing academic literature, we know of no North American studies that examine patterns of variation of VLTs among or within towns and cities, or

TABLE I

Correlation Matrix: Distress Indicators and Measures of VLT Concentration at the Borough Level*

	Unemployment	Low Education	Lone Parenthood	VLT Prevalence†	VLT Adoption	VLT Density
Unemployment	1	–	–	–	–	–
Educational attainment	0.77	1	–	–	–	–
Lone parenthood	0.80	0.71	1	–	–	–
VLT prevalence†	0.47	0.48	0.49	1	–	–
VLT adoption	0.56	0.70	0.52	0.61	1	–
VLT density	0.68	0.42	0.65	0.58	0.41	1

* All correlations are significant for non-zero slope at the p<0.01 level.
† Excludes the downtown borough of Ville-Marie.
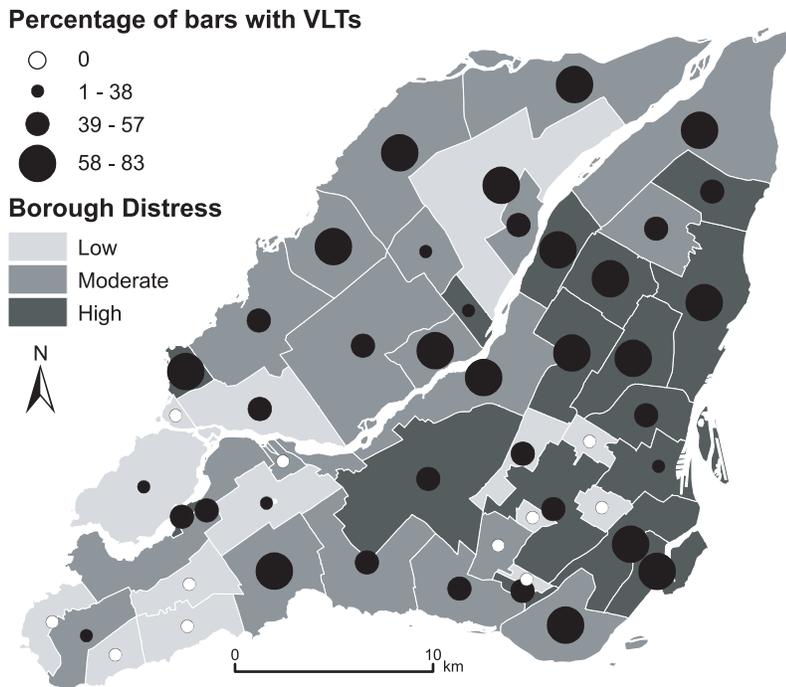

Figure 3. VLT adoption and borough-level distress

their use at the neighbourhood level. For groundbreaking research in the geography of gambling one must look to Australia, where electronic gambling machines (EGMs) have also proliferated only since the early 1990s, but the number of machines per capita is at least two times greater than in any Canadian province.[22] Recent studies of gambling in metropolitan areas of Australia have all shown that EGMs are heavily concentrated in the most disadvantaged areas.[22,23] Australian studies have also revealed that areas with high per capita expenditure on EGMs tend to be heavily disadvantaged, with a high proportion of the population being unemployed and poorly educated.[24,25] The primary hypothesis tested in this paper is that VLT gambling opportunities in Montréal and Laval are heavily concentrated in dis-advantaged neighbourhoods with low socio-economic status.

METHODS

Addresses of all liquor establishments with VLTs and the corresponding number of licences in the individual establishments in 2002 were obtained from the RACJ. These addresses were then geocoded and entered into a geographic information system (using GeoPinPoint [DMTI Spatial] and ArcGIS [ESRI] software). Census tracts (n=564) and boroughs were characterized by a composite neighbourhood distress index using data from the 1996 Canada Census. The three indicators making up the index – unemployment, low educational attainment and lone parenthood – were derived from the 1996 Census at the census tract level. The z-values (based upon unweighted [by census tract population] mean and standard deviation of the indicators) of each neighbourhood were calculated, and assigned a value of -1 if the z-score was -1 or less, 1 if the z-score was 1 or more, and 0 otherwise. The assigned value of each neighbourhood for the three indicators was summed to obtain their index score, which ranged from -3 to +3. This index differed from previous distress indices in two fundamental respects: 1) two indicators from Ley and Smith's index[26] were removed due to their redundancy (unemployment, government transfer payments and low income status were all highly correlated, so only the unemployment rate was retained); and 2) the measure does more than distinguish a small number of "underclass" neighbourhoods: it identifies neighbourhoods that are distressed across multiple measures. It, furthermore, has the enviable properties of a large median class and two intermediate classes between the mean and each extreme and it retains a large amount of variation between neighbourhoods. More specifically, a distress level of 3 indicates that a census tract is among the 16% most distressed tracts on all three different indicators.

Three outcome measures were derived. The first, *VLT prevalence*, is a population-based measure that represents the proportion of VLT licences per 10,000 people within a given area (census tract or borough). The second, *VLT adoption*, represents the percentage of liquor establishments within a given area that have acquired VLT licences. The third, *VLT density* is an area-based measure that represents the number of VLT licences per square km within a given area.

RESULTS

The distribution of VLT locations across Montréal and Laval shows a striking correspondence with neighbourhood socioeconomic characteristics (Figure 1). VLT locations are virtually absent in the most affluent West Island and downtown neighbourhoods while their concentrations are elevated in the more distressed neighbourhoods in the east end and along transportation corridors northward into Laval. When we change the scale of our focus from the census tract to the borough to alleviate

some variability in the outcome measures caused by excessive boundaries, the pattern remains fairly consistent with heightened borough distress being associated with higher prevalence of VLT locations (Figure 2).

When we decompose the distress index into its constituent measures, we can see that VLT prevalence, adoption and density are significantly positively correlated ($p<0.01$) with unemployment rates, the proportion of individuals without a high school diploma and the proportion of families headed by a lone parent (Table I). These correlations are perhaps not unexpected given the tendency for lower income areas of the city to have more zoning for commercial activities, including liquor establishments. The distribution of liquor establishments (Figure 1) also appears to reflect levels of socio-economic disadvantage. What is perhaps more surprising is the "gradient" in the rate of adoption of VLTs by borough distress (Figure 3). With the exception of the top 5% most distressed boroughs, there is a steady increase in the adoption rate of VLT licences by liquor establishments with increasing borough distress. Indeed, bivariate regression analysis (weighted by borough population) indicates that low borough education levels alone can account for 50% of the variation in the rate of adoption of VLTs (Figure 4).

DISCUSSION

Over the last decade or so, VLTs have proliferated throughout North America. In the city of Montréal, for example, there are now almost 900 places to gamble with VLTs and over 4,000 machines. Intense public opposition recently prompted the Province of Québec to cap the proliferation, and to consider concentration in a smaller number of more "manageable" sites. Some critics have claimed that VLTs are "targeted" to vulnerable populations (i.e., youth, poor), but as of yet, none has systematically examined the evidence. The evidence portrayed here suggests that there is a non-ignorable relationship between neighbourhood characteristics, reflecting a spatial distortion in the prevalence, adoption and density of VLT opportunity.

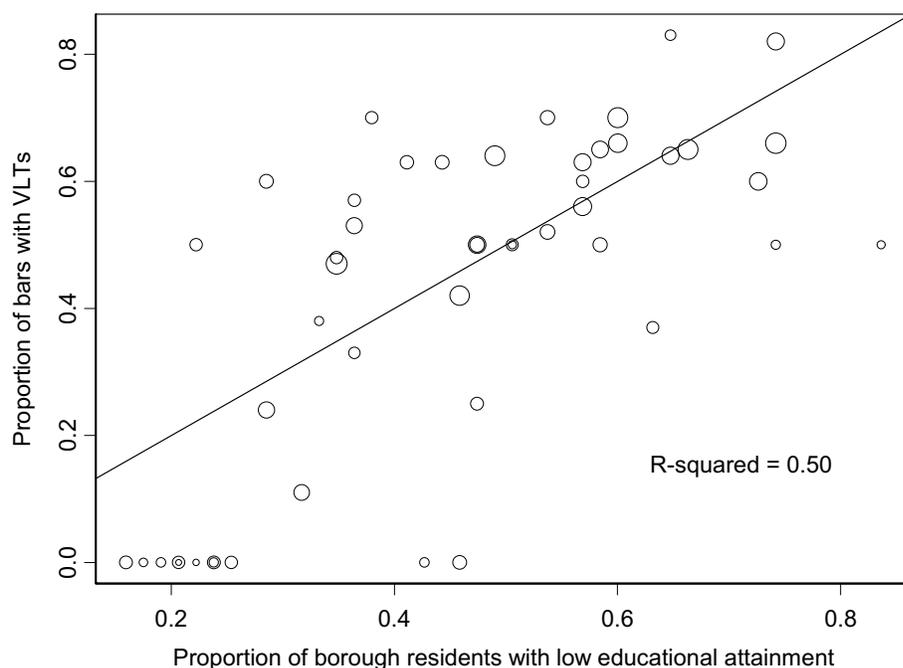Besides neighbourhood SES, other factors might be implicated as influencing the

Figure 4. Relationship between low educational attainment and VLT adoption, Montréal boroughs (with weighted [by population size] linear fit)

distribution of VLTs, such as land use zoning and liquor licensing. Before the recent "mega city" merger, the Island of Montréal contained 29 separate municipalities, each responsible for its own land use by-laws. Some municipalities originally imposed tougher restrictions on alcohol (e.g., Westmount), and as a consequence, these boroughs have no gambling outlets today. It is perhaps not surprising that these boroughs without VLTs also have the lowest levels of socio-economic distress today, as our findings point to borough distress level as a primary factor in determining the prevalence and density of VLTs, as well as the rate of uptake of VLTs by liquor establishments. Current zoning regulations appear to have only a marginal effect on exposure to VLTs, as commercial zoning penetrates all boroughs. It could be argued that further constraining VLT licences, perhaps in terms of minimum distance to incompatible land uses (e.g., schools), or stricter policies on sites, hours and concentrations, would reduce ease of access and, ultimately, the likelihood of impulsive gambling.

Although the present study has clearly shown that VLTs are disproportionately concentrated in disadvantaged neighbourhoods, and previous research has shown that VLT players are more likely to come

from disadvantaged backgrounds,[7] our data do not allow us to confirm causality between VLT accessibility and play at this time (ongoing research is focussed on this issue[27]). Nevertheless, as noted earlier, several casino studies *have* made the link between accessibility and the probability of participation and development of gambling problems.[20,21] Unlike casinos, VLTs are a convenience good (like cigarettes and beer) which are found in close proximity to residential areas, and are therefore even more likely to service a highly local clientele. Given our current knowledge, opportunity to VLTs *must* be recognized as a leading factor contributing to higher levels of gambling and gambling-related problems.

Problem gambling has emerged as a critical public health issue in several countries, including Canada. The findings of this study have significant implications for public policy on government-sponsored gambling in existing and future markets. Any public health effort to reduce the burden of gambling-related health and social problems must recognize the spatial distortion of gambling opportunities. By strategically reducing the widespread visibility and access to VLTs, it is perhaps possible to prevent vulnerable members of society from developing gambling problems and

to limit the temptations of others who have already stopped playing.

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RÉSUMÉ

Contexte : Au Québec, les appareils de loterie vidéo (ALV) prolifèrent sous le contrôle de l'État depuis 1993. Notre étude décrit la répartition spatiale de ces appareils dans les municipalités de Montréal et de Laval et les conditions socio-économiques dans les quartiers où trouve les ALV.

Méthode : Les emplacements de tous les établissements titulaires de licences d'ALV à Montréal et à Laval (n = 834) ont été codés selon leur adresse de voirie. Les bourgs (n = 49) ont été caractérisés selon des indicateurs socio-économiques (chômage, niveau d'instruction, monoparentalité), l'indice de détresse du quartier et des mesures de la prévalence, de l'adoption et de la densité des ALV.

Résultats : La prévalence, l'adoption et la densité des ALV présentaient une forte corrélation (p<0,01) avec les bourgs où les conditions socio-économiques étaient inférieures. Les débits de boissons étaient aussi plus susceptibles de se trouver dans les quartiers pauvres, mais néanmoins, le taux d'adoption des licences d'ALV dans les bars des quartiers pauvres était systématiquement plus élevé que dans les quartiers mieux nantis.

Conclusions : La répartition spatiale des ALV à Montréal et à Laval correspond étroitement à la géographie locale des milieux socio-économiques défavorisés. Tout effort déployé par les autorités de santé publique pour réduire le fardeau des problèmes sanitaires et sociaux liés au jeu devrait donc tenir compte de la distorsion spatiale des possibilités de jeu en milieu urbain.