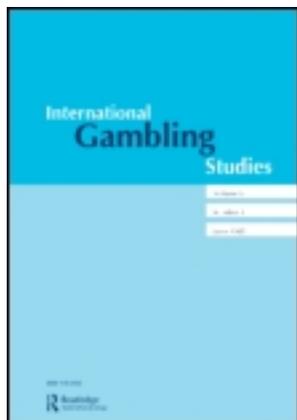


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Preventing lottery ticket sales to minors: factors influencing retailers' compliance behaviour

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Despite legal prohibitions to restrict the availability of lottery products to minors, research shows a high prevalence of lottery playing among adolescents. This study examined factors influencing vendor compliance with minimum-age legislation to better understand how underage youth acquire lottery products. To provide perspective, accessibility to lottery products and alcohol was compared. Six under-age youths (three males, three females; mean 15.8 years) each attempted to purchase a scratch card, a beer, or both products in a sample of convenience stores (494 purchase attempts). Results revealed that only a moderate proportion of vendors (60%) were compliant with existing statutes. The gender of the purchaser and vendor, and the type of store were found to be significant in the prediction of youths' ability to purchase controlled products. Results suggest possible mechanisms involved in the compliance or non-compliance with regulations, and imply considerations for awareness-raising among vendors in terms of controlled products.

Keywords: lotteries; regulation; adolescence; gambling; prevention

Introduction

Early initiation of substance use, such as youth smoking and drinking, is acknowledged to contribute to a variety of physiological, psychological and social problems (Adams, Jason, Pokorny & Hunt, 2009; Komro, Maldonado-Molina, Tobler, Bonds & Muller, 2007; Winters & Lee, 2008). Limiting youth access to these harmful substances is accepted by many as a necessary component of larger comprehensive strategies for reducing adolescents' use of those substances (DiFranza, Savageau & Fletcher, 2009; Forster, Widome & Bernat, 2007; Treno, Ponicki, Remer & Gruenewald, 2008; Wagenaar, Lenk & Toomey, 2005). Although a significant proportion of youths gain access to controlled products through social sources (i.e. parents or other family members, the home, friends, parties), adolescents also report gaining access to alcohol and tobacco from commercial sources (Harrison, Fulkerson & Park, 2000; Hearst, Fulkerson, Maldonado-Molina, Perry & Komro, 2007; Paschall, Grube, Black & Ringwalt, 2007). Consequently, a number of social policies have been instituted internationally to further restrict children and adolescents' access to tobacco and alcohol from commercial sources (Derevensky, Gupta, Messerlian & Gillespie, 2004; Krevor, Capitman, Oblak, Cannon & Ruwe, 2003; Richardson et al., 2009). Social policies targeting youth access to high-risk substances generally include a combination of minimum-age requirements and enforcement via compliance checks (Levy & Friend, 2000; Lubman, Hides, Yücel & Toumbourou, 2007).

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Similar efforts have been made to prevent other forms of adolescent risk behaviour, most notably, gambling participation. Once considered to be an adult activity, it is now well established that a significant proportion of youths gamble (Jacobs, 2004; Stinchfield, 2004). Researchers in North America, Europe and Australia have documented that gambling constitutes a popular pastime for youths, with lottery and scratch card playing ranking high among favourite gambling activities (Druine, 2009; Jackson, Dowling, Thomas, Bond & Patton, 2008; Olason, Sigurdardottir & Smari, 2006; Olason, Skarphedinsson, Jonsdottir, Mikaelsson & Gretarsson, 2006; Poulin & McDonald, 2007; Skokauskas & Satkeviciute, 2007; Stinchfield, 2011; Welte, Barnes, Tidwell & Hoffman, 2009). The appeal for lottery and scratch card play is likely the result of its extensive accessibility, its active promotion and endorsement by both governments and the industry, its public acceptance as an innocuous recreational activity, and its relatively low cost for participation (Barnes, Welte, Tidwell & Hoffman, 2011; Felsher, Derevensky & Gupta, 2003; Wood & Griffiths, 2004). In North America alone, lottery tickets and scratch cards are sold at more than 240,000 locations, most of which are private retailers (North American Association of State & Provincial Lotteries, n.d.). Additionally, a considerable proportion of individuals, especially adolescents and younger adults, do not consider lottery or scratch card playing to be gambling in spite of wagering money in order to win money (Turner, Wiebe, Falkowski-Ham, Kelly & Skinner, 2005; Wood & Griffiths, 2004).

While many adolescents participate in gambling activities in a responsible manner (including lottery and scratch card playing), there remains an identifiable proportion of youths who gamble excessively and experience gambling-related problems. Despite a lack of consensus as to the actual prevalence of severe gambling problems, estimates from numerous international prevalence studies suggest that approximately 0.3–10% of adolescents meet diagnostic criteria for pathological gambling, and another 8–14% are at risk of developing severe gambling problems (Delfabbro, Lahn & Grabosky, 2005; Derevensky & Gupta, 2007; Moodie & Finnigan, 2006; Splevins, Mireskandari, Clayton & Blaszczyński, 2010; Welte, Barnes, Tidwell & Hoffman, 2008; Volberg, Gupta, Griffiths, Olason & Delfabbro, 2010). A sizeable proportion of these youths started gambling at an early age, between 10 and 14 years old (Shead, Derevensky & Gupta, 2010; Spritzer et al., 2011; Vitaro, Wanner, Ladouceur, Brendgen & Tremblay, 2004; Volberg et al., 2010). There is also evidence to suggest that youths who gamble may start with state or provincially regulated lottery products (Felsher, Derevensky & Gupta, 2004b).

The findings of these studies have prompted suggestions that lottery playing may act as a 'gateway' to other gambling venues, because it is through lottery play that youths learn about the exciting properties of gambling (Felsher, Derevensky & Gupta, 2004a; LaPlante, Gray, Bosworth & Shaffer, 2010). As well, scratch cards may in themselves be potentially addictive given they contain characteristics that have been reported to induce excessive gambling behaviour, such as short payout intervals (i.e. brief time lapse between the initial gamble and the payment of winnings), rapid event frequencies (i.e. opportunities to gamble limited only by how fast a person can scratch the card to unveil winning or losing symbols), and near miss designs (i.e. the illusion of coming close to winning a substantial prize) (Griffiths, 2002). In an early study of instant lottery playing, Hendricks, Meerkerk, Van Oers and Garretsen (1997) found that from their sample of 4497 adolescent and adult Dutch scratch card players, 4.1% could be considered at-risk for some gambling problems, with an additional 0.7% classified as problem gamblers. Additionally, Griffiths (2000) found that 12% of male youth gamblers who had purchased scratch cards themselves met the DSM-IV criteria for pathological gambling. Further, from their sample of elementary

and secondary school students, Felsher et al. (2003) observed that juvenile probable pathological gamblers reported greater regular scratch card (17.9%) and lottery (14.8%) play compared with social gamblers (2.9% and 1.4%, respectively). Moreover, a 2006 survey of 8017 adolescents in the UK revealed that 1% of underage problem gamblers (aged 12–15 years old) gambled exclusively on scratch cards (MORI Social Research Institute/International Gaming Research Unit, 2006). Regardless of the manner in which youths develop gambling problems, the fact that these problems frequently result in multiple, long-lasting, negative outcomes draws attention to the importance of prevention initiatives (Derevensky, Gupta, Dickson & Deguire, 2004).

Restricting minor's access to lottery products through minimum-age legislation and other regulatory policies is a fundamental component of youth gambling prevention initiatives (Derevensky, Gupta, Messerlian et al., 2004; Messerlian, Derevensky & Gupta, 2005). For example, the Québec legislature amended the Act Respecting the *Société des Loteries du Québec* (1999), also known as Bill 84, to prohibit the sale of lottery products to minors under the age of 18 years. Subsequently, Loto-Québec, the provincial crown corporation mandated to operate and regulate gambling, implemented several policies and administrative measures to support the application of the law. One such measure is the *Here, we card/Ici, on carte* program (Loto-Québec, 2005). The program consists of supervised compliance checks at various retail outlets. The principle objective of these checks is to ascertain whether or not vendors are abiding by the corporation's policies for requesting age identification from consumers appearing 25 years of age and younger. Any retailer found to be in contravention of youth access laws and/or Loto-Québec's policies is subject to an appropriate penalty (e.g. warning, fine, license suspension). Supplementary administrative measures instituted by Loto-Québec include the transmission of information via print material and on point-of-sale terminals reminding vendors that the sale of lottery products to minors is prohibited by law, and the printing of the '18+' logo on ticket display stands and on all lottery products. Numerous other North American jurisdictions have enacted similar legislation prohibiting the sale of lottery products to minors, including British Columbia, Ontario, California, Illinois and Texas (California State Lottery Act, 2010; Gaming Control Act, 2002; Illinois Lottery Law, 2010; Ontario Lottery and Gaming Corporation Act, 1999; State Lottery Act, 2010). Recently, in 2010 and 2007, respectively, France and Israel implemented comparable minimum-age regulations (Française des Jeux, 2010; Gavriel-Fried & Derevensky, 2009). In addition to legislation against the sale of lottery tickets to minors, regulations against underage participation in lottery play have been ratified in the USA and Europe (California State Lottery Act, 2010; Demetrovics, 2009; Goudriaan, de Bruin & Koeter, 2009; Illinois Lottery Law, 2010; Skokauskas, 2009).

The recognized merit of this approach in preventing underage gambling participation notwithstanding, empirical evidence suggests that its effectiveness in reducing youth access to lottery products is limited (Derevensky, Gupta, Dickson et al., 2004). A number of years following formal ratification of Bill 84 and implementation of administrative policies, close to one-third of Québec's adolescents still reported having gambled on provincially-regulated lottery products (i.e. lottery draws, scratch cards and sports lottery tickets) (Martin, Gupta & Derevensky, 2009). This high prevalence of participation in and relative ease of access to lottery or scratch card playing among adolescents is not a condition exclusive to Québec. Studies in other jurisdictions report similar results (e.g. Felsher et al., 2004a; Stinchfield, 2011; Turner, Macdonald, Bartoshuk & Zangeneh, 2008; Wood & Griffiths, 2004). Consistent with self-report data, results from the only published empirical study to measure the rate of access to lottery tickets showed that 98% of vendors tested sold

a lottery ticket to a 16-year-old minor (Radecki, 1994). These results, however, should be interpreted with caution. The minor in the study was also co-purchasing cigarettes, and the influence of this condition on the sales rate was not addressed. Although minimal profit is yielded from the sale of a single lottery ticket, the sample of vendors tested may have been more inclined to sell the ticket given that the large majority of them (94%) had already agreed to sell cigarettes, a product that generates higher profit margins for retailers. Despite this unknown, it remains clear that legislation and administrative policies adopted to prevent sales to minors are not being adhered to by a significant proportion of retailers. It is therefore of great importance to identify those factors which contribute to the sustained commercial accessibility of lottery products to minors.

The aim of this study is to examine the factors influencing the rate of vendor compliance with minimum-age legislation and age identification policies restricting youth access to prohibited products. More specifically, this study seeks to ascertain if vendors are equally likely to request age identification from and refuse the sale to young-looking customers attempting to purchase scratch cards as when purchasing alcohol products or both products simultaneously. In addition to providing new information about rates of retailer compliance, this study seeks to investigate the relationship between individual- and store-level factors and vendors' decision to request age identification and to refuse the sale of age-restricted products. Individual-level factors refer to the characteristics of the minor attempting to purchase restricted products as well characteristics of the vendor selling restricted products, in this case, the purchaser's gender, the vendor's gender, the vendor's age, and the vendor's ethnicity. Store-level factors concern the store itself, such as the store operation type (chains and franchises vs independently owned stores). Their selection was based on empirical evidence of variables that mediate sales of controlled products to minors. The results presented are part of a larger study identifying the role of sociodemographic factors in retailer compliance.

Method

Participants

Three male and three female underage purchasers were selected to perform compliance checks. The six purchasers ranged in age from 15 to 17 years old ($M = 15.83$ years, $SD = 0.75$). Five of the six purchasers (2 male, 3 female) indicated 'Caucasian' as their ethnicity; the remaining male purchaser designated 'Hispanic or Latino' as his ethnicity. Attempts to include a larger number of non-Caucasian minors were unsuccessful for reasons that remain unclear. Given the limited number of non-Caucasian purchasers in this study, the contribution of the purchaser's ethnicity in vendor compliance behaviour was not evaluated.

A panel of six males and seven females (mean age = 32.38 years, range = 20–57 years), blind to the aims of the study, were used to estimate the age of the purchasers. The overall mean age rating of the six purchasers was 16.86 years ($SD = 2.02$, range = 14–24 years), and none of the purchasers had a mean estimated age that exceeded 18.54 years. Age estimations for female purchasers ($M = 17.15$ years, $SD = 2.32$) were slightly older than male purchasers ($M = 16.56$ years, $SD = 1.65$). However, the small sample size and the magnitude of this discrepancy undermine the probability that this finding is statistically significant. Agreement between the raters' mean age estimates was evaluated using a two-way mixed-effects model of average intraclass correlation (ICC). The results indicated moderate inter-rater agreement for mean age ratings [$ICC(3, 13) = 0.67$, 95% CI (0.26, 0.94)].

Selected purchasers were required to participate in a training program covering the study's principle objectives and the possible risks of participation. Specifically, purchasers were informed that: (a) the findings from the study would provide information on weaknesses in existing regulatory policies that is potentially useful in the development of new strategies to limit youth commercial access to lottery and alcohol products; (b) the risks of participation are minimal, although in the event that a clerk appear suspicious or upset with the buyer's activities, they are instructed to refrain from making any comments or arguing and leave the store immediately; and (c) they are responsible for maintaining the confidentiality of the identity of the stores involved in the study. The training program also instructed purchasers on the study's protocol and its rules of conduct. These rules of conduct included abstaining from coaxing or persuading the vendor into selling the product, as well as using courteous and respectful language with all store personnel. Further, it was impressed on purchasers that use of the study's protocol for buying controlled products outside the framework of the project was prohibited, and that the project did not approve of or condone underage drinking and lottery play. Finally, the training program provided purchasers with strategies for estimating a target person's age and ethnicity.

Sampling

A list of 1180 retail outlets in the metropolitan Montreal, Canada area was obtained through an independent web search. A purposive stratified sample based on municipality was drawn from this list. The majority of the sample ($N = 280$) was selected using this sampling design. An additional 33 stores located in the same geographic region during data collection were included in the sample to ensure representativeness.

The final sample of 313 retail outlets included 184 chain and franchise outlets (i.e. outlets owned and operated exclusively by a corporation, or locally owned outlets with basic requirements set by a parent corporation) and 129 independently owned stores (i.e. stores entirely owned and operated by an autonomous proprietor). Since the focus of this study is to compare retailer compliance for the sale of alcohol vs scratch cards, the sample population was limited to retailers licensed to offer both products; specifically, convenience stores ($N = 276$) and petrol stations with convenience stores ($N = 37$). Every sampled outlet was visited a minimum of one and a maximum of six separate occasions (mode = 6, $SD = 1.83$); variations in outlet sampling resulted from store closures or purchaser absences on the store sampling dates. However, no store was ever visited twice by the same purchaser. Consequently, a total of 1219 compliance checks were successfully completed.

Of these 1219 compliance checks, 494 were selected for analysis based on two selection criteria: (1) all vendors surveyed in the same outlet had to be of the opposite sex, had to differ in estimated age by 15 or more years, and had to be of a noticeably different ethnicity (e.g. Caucasian vs Black), and (2) all compliance checks had to be completed on different dates. This final analytical sample was chosen to ensure that each compliance check represented an independent observation.

Survey form design

A survey form, developed for the purposes of the larger research project on vendor compliance, was used to collect relevant descriptive information across four broad domains:

- (1) Purchaser characteristics: Purchasers were asked to indicate their gender and age.
- (2) Store characteristics: Purchasers were required to indicate the store operation type based on certain specifications. Chain and franchise outlets were defined as stores with an easily identifiable corporate or parent corporation name, whereas independently owned outlets were defined as stores without a discernable corporate or parent company name. A list of recognized corporate or parent company names was provided at training. Respondents were also required to record the presence of witnesses (e.g. customers in line during the purchase attempt, other employees, and managerial staff).
- (3) Vendor characteristics: Purchasers were asked to identify the gender, the estimated age and the estimated ethnicity of the vendor (Caucasian; African American; East Asian; South Asian; Middle Eastern or North African; Hispanic or Latino; Native; other). Although the vendor's exact age and ethnicity cannot be determined without his or her explicit knowledge, purchasers were trained to estimate a vendor's age and ethnicity with reasonable accuracy.
- (4) Purchase characteristics: Purchasers were expected to indicate the type of product to be purchased (Can\$1.00 scratch card, 950ml can of domestic beer, or combination of both), as well as the date and time of purchase.

In addition to reporting relevant descriptive information, respondents were required to record whether age identification was requested, and whether a sale was completed. A sale was considered complete when the vendor accepted the purchaser's money and allowed the purchaser to leave the premises with the product.

Procedure

This study's protocol and materials were approved by the university's research ethics review board prior to initiation. Letters explaining the study and its protocol were sent to the homes of selected purchasers. All purchasers were required to obtain parental consent and provide assent for participation in the study.

Compliance checks, completed between June and December 2007, followed a similar standardized protocol that is used in studies of youth access to tobacco and alcohol. Equipped with a directory of retail outlet names and addresses, a research assistant drove purchasers to a selected retail outlet and parked the vehicle in a location where the purchaser could be monitored from within the car. Prior to entering the outlet, the purchaser consulted a personalized list to determine the product to be purchased at this location. Then, the purchaser entered the store and attempted to purchase the assigned product. If asked to state his or her age during the transaction, the purchaser lied and responded with, 'I am 18 years old'. If asked for age identification, the purchaser indicated that he or she did not have identification with him or her. Purchasers permitted to buy the products did so and requested a receipt. However, if they were refused, purchasers politely left the establishment without protest. Once the purchase attempt was complete, the purchaser exited the store, returned to the vehicle, and recorded all observations and data on a survey form. The research assistant subsequently escorted the next purchaser to a selected outlet. Frequently, the research assistant returned to the first outlet and instructed a new purchaser to complete a compliance check. However, visits to the same store were dispersed over time to encourage transactions with different vendors. Any beer or scratch ticket purchased was returned to the research assistant and disposed of at the end of the study.

Results

Levels of vendor compliance

Vendor compliance was conceptualized as two distinct but related merchant behaviours: requesting valid identification from young-looking customers attempting to purchase age-restricted products, and refusing to sell age-restricted products to underage customers. Since refusing to sell age-restricted products may occur independently of asking for identification, these merchant behaviours were examined separately. Again, it is important to note that the sale of lottery and alcohol products to minors under the age of 18 years is prohibited, and that vendors are required to ask for identification from purchasers appearing 25 years of age and younger.

From the total sample of completed purchase attempts, age identification was requested 61.1% of the time, and 58.1% of the purchase attempts resulted in a sale refusal when no identification was presented. No statistically significant effects of the type of product purchased on the frequency of requests for age identification or on the frequency of sale refusals were found. Of interest, the proportion of purchase attempts resulting in a sale refusal was comparable to the percentage of purchase attempts resulting in a request for identification. Thus, sales of age-restricted products were extremely low (3.6%) when age identification was requested but not produced.

Factors associated with vendor compliance

Exploring gender differences for the frequency of requests for age identification and for the frequency of sale refusals revealed that more male than female purchasers were asked to provide proof-of-age [$\chi^2(1, N = 494) = 7.28, p = 0.007$, odds ratio [OR] = 1.65], and refused a sale [$\chi^2(1, N = 494) = 8.60, p = 0.003$, OR = 1.71]. Specifically, male purchasers were asked to provide valid age identification 67.1% of the time, and refused the sale of an age-restricted product 64.6% of the time, compared to female purchasers who were asked to provide identification and refused the sale of a product about half of the time (55.2% and 51.6%, respectively). The frequency of requests for age identification also varied depending on the gender of the vendor, $\chi^2(1, N = 494) = 5.20, p = 0.023$, OR = 1.53. Female vendors were more likely to ask purchasers to provide identification (66.7%) than male vendors (56.6%). However, no statistically significant effect of the vendor's gender on the purchase outcome was observed [$\chi^2(1, N = 494) = 2.16, p = 0.141$].

To facilitate the investigation of age differences, vendors were classified into two age groups using the purchasers' estimates of the vendors' age: (1) younger vendors (less than 30 years of age), and (2) older vendors (vendors 30 years of age or older). The distribution of younger and older vendors in the total sample was roughly equivalent ($n = 262$ vs $n = 232$). No statistically significant effect of the vendor's age group on requests for age identification was observed [$\chi^2(1, N = 494) = 2.10, p = 0.148$]. Similarly, no statistically significant difference in purchase outcome between vendor age groups was found [$\chi^2(1, N = 494) = 2.58, p = 0.108$].

Over 70% of the total sample of vendors surveyed in this study were identified as Caucasian ($n = 177$) or East Asian ($n = 180$). The remaining vendors ($n = 137$) were combined into an 'other' group for analysis. Therefore, the present study used this three-level variable to examine ethnic differences. The frequency of requests for age identification and the frequency of sale refusals varied by the estimated ethnicity of the vendor, $\chi^2(1, N = 494) = 8.55, p = 0.014$, Cramer's $V = 0.132$, and $\chi^2(1, N = 494) = 8.23, p = 0.016$, Cramer's $V = 0.129$, respectively. Pairwise comparisons

between groups revealed that vendors identified as Caucasian asked purchasers to provide identification significantly more frequently (68.4%) than vendors identified as East Asian (53.3%), $\chi^2(1, N = 357) = 8.46, p = 0.004, OR = 1.89$. However, the difference between vendors identified as Caucasian and those identified as 'other' did not approach statistical significance [$\chi^2(1, N = 314) = 1.37, p = 0.242$]. Similarly, vendors identified as East Asian and those identified as 'other' [$\chi^2(1, N = 317) = 2.41, p = 0.121$] did not differ statistically in the proportion of requests for age identification. Pairwise comparisons between groups also revealed that vendors identified as Caucasian refused the sale of age-restricted products significantly more frequently (65.5%) than vendors identified as East Asian (50.6%), $\chi^2(1, N = 357) = 8.22, p = 0.004, OR = 1.86$, but differences between vendors identified as Caucasian and those identified as 'other' as well as differences between vendors identified as East Asian and those identified as 'other' did not approach statistical significance [$\chi^2(1, N = 314) = 1.68, p = 0.195$ and $\chi^2(1, N = 317) = 1.92, p = 0.165$], respectively.

Past research indicates that store operation type is an important mediating factor in prohibited sales to minors. However, the fact that 80.2% of the total sample of younger vendors in this study was surveyed at chain and franchise retail outlets suggests a legitimate need for investigating the relationship between this factor and vendor compliance. The frequency of requests for age identification and the frequency of sale refusals varied by the store operation type, $\chi^2(1, N = 494) = 14.36, p = 0.000, OR = 2.05$ and $\chi^2(1, N = 494) = 14.43, p = 0.000, OR = 2.04$, respectively. Purchase attempts completed in chain and franchise establishments resulted in a request for identification and in a sale refusal more often than purchase attempts completed in independently owned stores. Further examination revealed that the proportion of requests for age identification was virtually identical to the proportion of sale refusals, irrespective of the type of store surveyed. For chain and franchise outlets, the frequency of requests for identification (67.6%) corresponded with the frequency of sales refusal (64.7%). Similarly, for independently owned establishments, the frequency of requests for age identification (50.5%) was comparable to that of sales refusal (47.3%). Thus, sales of age-restricted products were extremely low at both chain/franchise outlets (2.9%) and at independently owned stores (3.2%) when age identification was required but not presented.

To further evaluate the contribution of individual- and store-level factors in vendors' compliance behaviour, separate logistic regression analyses were performed to predict the two outcome variables, request for age identification (vs non request) and sale refusal (vs sale). Product type, purchaser gender, vendor gender, vendor age group, vendor ethnic group, and store operation type were used as predictors. A test of the full model against the intercept-only model was statistically significant, indicating that the set of predictors reliably distinguished vendors' requesting behaviour from non-requesting behaviour [$\chi^2(8, N = 494) = 35.27, p = 0.000$]. Further, the Hosmer–Lemeshow test of goodness-of-fit suggested that the model to fit the data well [$\chi^2(8, N = 494) = 2.69, p = 0.952$]. Overall prediction success was 65% (88% for vendor requests of age identification and 28% for vendor non-requests). As shown in Table 1, the store operation type made a significant contribution to the prediction of vendors' requesting for age identification; the odds of being asked to provide age identification for chain and franchise establishments was 1.9 times greater than the odds for independently owned stores. The gender of the purchaser was also found to be a significant predictor of vendor compliance with age identification policies, with male purchasers approximately 70% more likely to be asked to provide identification than female purchasers. Moreover, the odds of being asked to

Table 1. Logistic regression analysis for vendor's request for age identification ($N = 494$).

Predictor	β	S.E.	Wald χ^2	df	p	Exp (β)	CI _{0.95}
Product type ^a			3.819	2	0.148		
Scratch card	-0.377	0.237	2.521	1	0.112	0.686	0.431–1.092
Beer	-0.435	0.241	3.255	1	0.071	0.647	0.404–1.038
Purchaser gender ^b							
Male	0.553	0.193	8.229	1	0.004	1.738	1.191–2.535
Vendor gender ^c							
Female	-0.531	0.198	7.226	1	0.007	0.588	0.399–0.866
Vendor estimated age group ^d							
Younger (< 30 years)	-0.120	0.217	0.302	1	0.582	0.887	0.579–1.359
Vendor estimated ethnicity ^e			3.648	2	0.161		
Caucasian	0.123	0.249	0.242	1	0.623	1.130	0.693–1.843
East Asian	-0.370	0.263	1.984	1	0.159	0.691	0.413–1.156
Store ownership type ^f							
Chain/franchise	0.632	0.229	7.623	1	0.006	1.882	1.201–2.948

Notes: Nagelkerke $R^2 = 0.09$. β is the parameter estimate. S.E. is the standard error. Exp (β) is the odds ratio. CI_{0.95} is the 95% confidence interval.

^a Combined is the reference for product type.

^b Female is the reference for purchaser gender.

^c Male is the reference for vendor gender.

^d Older (≥ 30 years) is the reference for vendor estimated age group.

^e Other is the reference for vendor estimated ethnicity.

^f Independent is the reference for store ownership type.

provide age identification for male vendors was significantly less than the odds for female vendors, with male vendors nearly 41% less likely to request identification than female vendors. All other variables in the model were not statistically significant predictors.

Similar results were obtained for the second regression analysis performed for the sale refusal outcome variable. Again, a test of the full model against the intercept-only model was statistically significant, indicating that the set of predictors reliably distinguished vendors' sale refusal behaviour from non-refusal behaviour [$\chi^2(8) = 34.24, p = 0.000$]. Further, the Hosmer–Lemeshow test of goodness-of-fit suggested that the model to fit the data well [$\chi^2(8) = 6.45, p = 0.597$]. Overall prediction success was 62% (80% for vendor sales refusal and 38% for vendor non-refusal). Store operation type emerged as a predictor of vendors' sale refusal; consistent with the odds of being asked to provide identification, the odds of being refused the sale of an age-restricted product for chain and franchise establishments was 1.9 times greater than the odds for independently owned stores (see Table 2). Additionally, being a male purchaser increased the likelihood of a sale refusal, with male purchasers 80% more likely to be refused the sale of age-restricted merchandise than female purchasers. The remaining variables in the model were found to be non-significant predictors.

Given that sales of age-restricted products were extremely low when age identification was requested but not produced, a third logistic regression analysis was used to estimate the contribution of requesting behaviour in addition to individual- and store-level factors in vendors' compliance behaviour. Request for age identification, product type, purchaser gender, vendor gender, vendor age group, vendor ethnic group and store operation type were entered concurrently as predictors. A test of the full model against the intercept-only model was statistically significant, indicating that the set of predictors reliably distinguished vendors' sale refusal behaviour from non-refusal behaviour [$\chi^2(8, N = 494) = 513.99, p = 0.000$]. Further, the Hosmer–Lemeshow test of goodness-of-fit

Table 2. Logistic regression analysis for vendor's sale refusal ($N = 494$).

Predictor	β	S.E.	Wald χ^2	df	p	Exp (β)	CI _{0.95}
Product type ^a			5.363	2	0.068		
Scratch card	-0.308	0.234	1.726	1	0.189	0.735	0.465-1.163
Beer	-0.549	0.237	5.348	1	0.021	0.578	0.363-0.920
Purchaser gender ^b							
Male	0.585	0.190	9.484	1	0.002	1.795	1.237-2.605
Vendor gender ^c							
Female	-0.364	0.194	3.523	1	0.061	0.695	0.475-1.016
Vendor estimated age group ^d							
Younger (< 30 years)	-0.086	0.214	0.162	1	0.687	0.917	0.603-1.396
Vendor estimated ethnicity ^e			3.648	2	0.161		
Caucasian	0.154	0.245	0.399	1	0.528	1.167	0.723-1.884
East Asian	-0.281	0.260	1.174	1	0.279	0.755	0.454-1.256
Store ownership type ^f							
Chain/franchise	0.646	0.227	8.094	1	0.004	1.907	1.222-2.975

Notes: Nagelkerke $R^2 = 0.09$. β is the parameter estimate. S.E. is the standard error. Exp (β) is the odds ratio. CI_{0.95} is the 95% confidence interval.

^a Combined is the reference for product type.

^b Female is the reference for purchaser gender.

^c Male is the reference for vendor gender.

^d Older (≥ 30 years) is the reference for vendor estimated age group.

^e Other is the reference for vendor estimated ethnicity.

^f Independent is the reference for store ownership type.

suggested that the model to fit the data well [$\chi^2(8, N = 494) = 5.89, p = 0.659$]. Overall prediction success was 96% (99% for vendor sales refusal and 91% for vendor non-refusal). Ultimately, the only variable that was found to contribute significantly to the classification of sale refusal behaviour vs non-refusal behaviour was requests for age identification (OR = 1456.11, 95% CI = 365.55, 5800.23). All remaining variables were not statistically significant predictors of vendors' sale refusal compliance behaviour.

Discussion

This study contributes to our evolving understanding of youth access to prohibited products, providing the first estimates of differences in the rate of vendor compliance with minimum-age legislation and age identification policies between alcohol and lottery products. Despite legal prohibitions and administrative policies, approximately 60% of the attempts to purchase age-restricted merchandise resulted in the vendor asking for a valid piece of identification or the vendor refusing the sale, indicating that a sizeable number of minors have access to alcohol and lottery products from commercial sources. It is important to note that the legal age for purchasing either product was 18 years of age, whereas the required age to ask for a valid piece of identification is 25 years of age. The study failed to reveal differences in vendor compliance with age identification policies between lottery and alcohol products. Vendors were also as likely to refuse the sale of a scratch ticket or a beer to underage purchasers.

It is possible that Loto-Québec's audit of lottery ticket retailers, carried out during the data collection period, may have incited greater vendor compliance with the province's age identification policies for lottery products, resulting in comparable levels of compliance for alcohol and lottery products. Levy and Friend (2000) suggested that retailer compliance is determined by a synergy between the number of compliance checks

conducted in a given community, the level or severity of sanctions against retailers in violation and the vendor's perceived costs for contravention of youth access laws or policies. As such, a rise in the number of compliance checks performed in a given community enhances vendor compliance. Although no direct evidence to support this hypothesis can be garnered from this study, it is interesting that the level of vendor compliance with age identification policies for lottery products found in the present investigation (59.6%) is consistent with figures from the Alberta Gaming and Liquor Commission's (AGLC) (2006) audit of lottery ticket retailers in that province. The AGLC report showed a compliance level of 55.6% with its age identification policy following a province-wide education campaign to remind retailers of the AGLC policy and inform them of forthcoming compliance checks. Despite this unknown, which would be better clarified with time-series research, the results suggest that almost half of vendors fail to comply with the province's age identification policies for lottery products, and this represents a serious public policy concern.

The importance of the purchaser's gender in vendor compliance was clearly established. The gender of the purchaser had an appreciable effect on vendors' decision to ask for age identification and on vendors' decision to decline the sale of age-restricted merchandise. Specifically, female purchasers were less likely to be required to produce age identification and less often declined a sale. Thus, girls appear to have easier access to all age-restricted products from retail outlets than boys. Although this finding is consistent with previously published compliance research for controlled products (Gosselt, van Hoof, de Jong & Prinsen, 2007; Landrine et al., 2010; Pearson, Song, Valdez & Angulo, 2007; Rossow, Karlsson & Raitasalo, 2008), it could be argued that females' greater access is an artefact of differences in the apparent age of the minors. In general, female minors tend to be perceived as older than male minors of the same chronological age (McCall, Trombetta & Natrass, 2002; Willner & Rowe, 2001). When interpreting these results related to the gender of the purchaser and retailer compliance, it is important to note that present guidelines and recommendations for the sale of alcohol and lottery products petition vendors to request identification from consumers appearing 25 years of age or younger, and none of the male or female purchasers had a mean age rating exceeding 18.5 years of age. Moreover, when the effects of apparent age are indeed controlled (e.g. Clark, Natanblut, Schmitt, Wolters & Iachan, 2000), female minors continue to be more successful at purchasing age-restricted merchandise than male minors.

Consistent with previous published and unpublished studies (Hanson, Hatsukami, Boyle & Brown, 2000; Powell, 2009), the store operation type also emerged as a robust factor in prohibited sales to minors. Purchase attempts completed at chain and franchise establishments were nearly twice as likely to result in a request for age identification or in a sale refusal compared to purchase attempts executed at independently owned stores. This is not surprising given that vendors in chain or franchise outlets are likely to receive formal training to prevent sales to minors and required to adhere to internal policies for the sale of controlled products (Altman et al., 1992; Reinert, Carver, Range & Pike, 2009). Additionally, there is generally no real financial incentive for vendors employed at chain and franchise stores to sell age-restricted products to minors; unless the vendor is actually the storeowner himself or herself, the vendor is unlikely profit from completing the illegal transaction (Schmitt, 2001). The probability that the vendors surveyed at chain and franchise outlets in this study were the business owners themselves was negligible, particularly given that 68.6% of them were estimated to be under the age of 30.

An unexpected finding was that the gender of the vendor emerged as a significant predictor of vendor compliance. Within the extant compliance literature, the vendor's

gender has had mixed effects on retailer compliance rates. Certain studies report that male vendors are significantly more compliant than female vendors (Clark et al., 2000; Pearson et al., 2007), whereas others report no differences between male and female vendors (Klonoff & Landrine, 2004; Toomey, Komro, Oakes & Lenk, 2008). Conversely, the results from this study indicate that male vendors are less likely to request valid identification from underage customers than female vendors. Consequently, it appears that male vendors are less inclined to adhere to age identification policies for lottery and alcohol products than female vendors.

A small number of studies in the compliance literature report that non-Black vendors (particularly of Asian ethnic background) are the least compliant with youth access laws (Landrine et al., 2010; Landrine, Klonoff & Alcaraz, 1997). While East Asian vendors were found to request age identification and refuse the sale of age-restricted products less frequently than Caucasian vendors, vendor ethnicity was not a significant predictor of their compliance behaviour. However, a larger proportion of the East Asian vendors surveyed in this study were employed at independently owned stores (64.9%) compared to Caucasian vendors (13.8%). Since store operation type was one of the strongest predictors of vendor compliance behaviour, it is possible that the preliminary association between the ethnicity of the vendor and retailer compliance behaviour is actually an artefact of the vendors' place of employment.

Although the principle aim of this study was to examine the contribution of individual- and store-level factors on vendors' compliance behaviour, the influence of age identification requesting behaviour on vendors' subsequent decision to refuse the sale of restricted merchandise warrants consideration. The results revealed that vendors' requests for age identification had the strongest independent effect on vendors' sale refusal, with the odds of refusing a sale when identification is asked but not produced approximately 1456 times greater than the odds of refusing a sale when identification is not requested. This figure is higher than results reported in earlier vendor compliance studies, which indicate that sales of controlled products are between 17 and 173 times more likely when vendors failed to request age identification (Klonoff & Landrine, 2004; Levinson, Hendershott & Byers, 2002; Pearson et al., 2007). Despite the inconsistencies between the figure reported in this study and those reported in earlier compliance research, the fact that age identification requesting behaviour was the strongest predictor of sale refusal behaviour suggests that asking age identification from young-looking customers is an effective instrument for limiting sales of prohibited merchandise to minors. In addition to being an effective mechanism for restricting sales of prohibited products to minors, research also suggests that asking for age identification from young-looking customers may act as a deterrent against future attempts to purchase these products; a survey of 8958 adolescents in the UK revealed that approximately one-third of underage gamblers would be 'put off' trying to purchase lottery products again if required to show age identification (Ipsos MORI Social Research Institute/Centre for the Study of Gambling, 2009).

Taken together, these results extend previous research (Gosselt et al., 2007; Hanson et al., 2000; Landrine et al., 2010; Pearson et al., 2007; Rossow et al., 2008), suggesting that gender and store operation type play an influential role in vendors' decision to comply with prohibitions and policies aimed at limiting youth commercial access to both lottery and alcohol products. This is not to say that these factors are the only variables influencing this decision-making process. The decision to ask for proof of age in the form of valid identification, and the resolution to refuse the sale of age-restricted products to underage customers is a complex operation that requires the vendor to process substantial amounts of information simultaneously (e.g. purchaser's dress, pitch, tone of voice, etc.). While

self-report data suggest that vendors are motivated to limit youth access to regulated products (Dovell, Mowat, Dorland & Lam, 1998; McCall, 1993), their decisions are not always impartial. In addition to gender and store operation type, other variables have been reported as significant predictors of illegal sales to minors, including the purchaser's ethnicity, type of clothing worn by the purchaser, and the day of purchase (Kan & Lau, 2009; Landrine et al., 2010; Levinson et al., 2002; Paschall et al., 2007). Additionally, the correlational nature of this study does not allow for firm conclusions that there is a causal relationship between these factors and retailer compliance with age identification policies. Both of these limitations suggest a need for additional research which would address these other important sociodemographic variables in predictive models.

The results of this study should also be considered in light of certain other limitations. First, the sample of convenience stores is not representative of all licensed retail outlets in Québec, much less Canada or other countries. Reported levels of vendor compliance have been shown to vary by geographic region and jurisdiction (Health Canada Tobacco Control Program, 2007; Pearson et al., 2007; Rossow et al., 2008). Differences in youth access policies and community enforcement activities likely account for some of this variability. Rates of vendor compliance similarly diverge by the type of outlet surveyed; sales to minors are reported to be higher at convenience stores and petrol stations (Glanz, Jarrette, Wilson, O'Riordan & Arriola, 2007; Paschall, Grube, Black, Flewelling et al., 2007). To improve the results' generalizability, future studies are needed to replicate these findings in other jurisdictions (both rural and urban regions) and with a wider sample of retail outlets licensed to offer these products (e.g. grocery stores).

Moreover, while the gender of the purchaser emerged as having a significant association with the frequency of requests for age identification and the frequency of sale refusals, studies have shown that the physical attractiveness of the purchaser and age-cueing stimuli (purchaser's pitch and tone of voice, style of dress, signs of nervousness) also play a role in vendors' decision to ask for proof of age from young-looking customers and to sell age-restricted products (McCall et al., 2002; Kan & Lau, 2010). Despite efforts to control for the physical attractiveness and style of dress of the purchasers, the selected purchasers cannot be considered representative of all youth. More rigorous, experimental research is needed to better understand the underlying mechanisms that influence vendors' decision to request proof of age from and refuse the sale of restricted products to underage customers. Nevertheless, the fact that particular groups of youth have greater access to age-restricted merchandise and that some groups of vendors are more likely to sell to minors represents a valuable concern for programs aimed at reducing the availability of these products to minors.

Implications for prevention and awareness initiatives

This study has provided a baseline of information regarding administrative measures (i.e. age identification requirements) aimed at deterring sales to minors, a population particularly vulnerable to negative gambling-related consequences. The results are particularly valuable as they provide information on weaknesses in regulatory systems that facilitate access to lottery products and alcohol. One of the most obvious vulnerabilities is the lack of uniform regulation for requesting age identification. While a formal policy was enacted in 2002 that instructs all lottery license holders to request a valid piece of identification from consumers appearing 25 years of age or younger, no comparable policies exist for alcohol licensees. To date, there is only a recommendation in place that alcohol vendors solicit consumers appearing less than 25 years old for proof of age

(Côté, 2004). Given the body of evidence suggesting that requiring age identification is a strong predictor of merchant compliance for controlled products (Klonoff & Landrine, 2004; Levinson et al., 2002; Paschall, Grube, Black, Flewelling et al., 2007; Pearson et al., 2007) as well as a possible deterrent against future purchase attempts of lottery products by minors (Ipsos MORI Social Research Institute/Centre for the Study of Gambling, 2009), and in view of this study's observation age identification requesting behaviour was the strongest predictor of sale refusal behaviour, implementation of a mandatory age verification policy for all restricted products is warranted. Further, variations in minimum-age requirements across controlled products and inconsistencies across legislations and regulations poses a significant challenge to retailer training and vigilance for businesses selling more than one product category (Age-Restricted Products Review Group, 2010). Jurisdictions with differing minimum-age requirements and divergent laws and regulations across controlled products may therefore want to consider the development of legislation governing all aspects of the sale of age-restricted products.

The results also highlight an urgent need for enforcement of policies, via covert or publicized compliance checks combined with strict penalties for violators, which has been shown to enhance vendor compliance (Pokorny, Corbin, Driscoll & Jason, 2008; Scribner & Cohen, 2001). Nevertheless, it is noteworthy that the effects of enforcement checks are temporary, and the common practice of conducting compliance checks annually or intermittently is not sufficient alone to decrease prohibited sale of restricted merchandise (Wagenaar, Toomey & Erickson, 2005). The results of this study lend support to this claim; even with the first wave of publicized compliance checks coinciding with the data collection period, over one-third of the vendors surveyed did not comply with youth access legislation and policies. A regular schedule of compliance checks is likely to further enhance vendor compliance with minimum-age laws and age identification policies (Pokorny et al., 2008).

A final crucial need that decision-makers at multiple levels must consider is the development of education and training programs that take into account the needs and characteristics of differing vendor groups. This study showed that male vendors and those in independently owned stores are more likely to sell age-restricted merchandise to minors. Although there are notable cultural and jurisdictional differences, the fact specific groups of vendors emerged as more likely to sell age-restricted merchandise warrants attention from lottery operators. Developing quality, free-of-charge education and training programs targeting these vulnerable groups may also help to improve vendor compliance with youth access legislation and policies.

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