Traditional, Heavy and Skill Game Problem Gamblers: A Typology of Gambling Patterns among Problem Gamblers

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Abstract: The article applies a threefold distinction between bank games of pure chance (roulette, slot machines, etc.), bank games of chance and skill (sports betting, blackjack, etc.) and social games of chance and skill (poker) to investigate gambling patterns among problem gamblers. The study uses Latent Class Analysis to investigate a sample of problem gamblers (N = 2309), who have been enrolled in treatment programs at the Danish Centre for Ludomania. Three distinct classes of problem gamblers are identified: 'Traditional problem gamblers' are most likely to play bank games of chance exclusively. 'Heavy problem gamblers' are likely to play bank games of chance in combination with the other two types of skill games.' Skill game problem gamblers' tend to play only games of skill. The analysis also map out the characteristics of the classes with respect to gender, age, education, gambling debt, family background, criminal activity, and substance abuse.

The gambling market has seen great transformations over the last decade. The most obvious is the internet revolution, which has moved a great share of the global gambling activity from 'real life' venues to online settings. However, in relation with the internet revolution we have also seen a qualitative transformation in the types of games that are available and popular among gamblers. One notable example is the globalization of poker. The game has evolved from a subcultural phenomenon, which was played mostly in specific locations in North America, to a mainstream cultural activity played all over the world (Wilson, 2007; Bjerg, 2011). Similar developments can be found in sports betting. In Britain there is a long standing tradition for betting on almost everything and a large number of betting shops have given ample opportunity do so (Schwartz, 2006, p. 169ff). In recent years, such opportunity to bet has become available to gamblers in many other countries as well and the market is constantly coming up with new ways wagering money on sports events.

The current study is initiated in collaboration with Centre for Ludomania in Denmark. The background for the current study as well as for a recent qualitative study (Bjerg, 2010) is that counsellors at the centre report a sense of a transformation in the composition of the clientele of the centre. This article raises the question of whether the changing landscape of the gambling market also leads to a changing landscape in the field of problem gambling. Do different forms of gambling produce different kinds of problem gamblers? Can we predict the characteristics of a problem gambler based on his or her preferred gambling games? We shall be exploring these issues through a quantitative analysis of data from a survey among 2309 Danish gamblers enrolled in a

treatment program for problem gambling at some time between 2005 and 2009. The assumption to be tested is that different subgroups of gamblers can be identified. These subgroups are distinct with respect to the types of games that they engage but also with respect to their background and the conditions of their current social situation.

Since I believe that issues of epistemology and ontology are highly relevant yet often glossed over in gambling studies, I shall start with a philosophical framing of the analysis.

Towards a Materialist Approach in Gambling Studies

> The mode of production of material life conditions the social, political and intellectual life process in general. (Marx K. , 1962, p. 363)

There are only sporadic references to gambling in Marx and certainly no coherent account of the phenomenon. On the one hand, this is a great shame. Marx is arguably the greatest scholar of money and capital and it would have been interesting to know what he thought about gambling insofar as we find here the mechanisms of capitalism at work in exaggerated fashion (Bjerg, 2011). On the other hand, the absence of gambling in Marx writings makes it so much the more interesting to try to imagine, what he would have said about the topic. In the following, I shall be making the case for an approach to gambling studies inspired by Marx.

Marx' trademark is the materialist approach to the study of social phenomenon. This approach is summed up in the quote above. In order to understand social as well as

psychological phenomenon, Marx urges us to look into the mode of production of the material life of people. ‘Life is not determined by consciousness, but consciousness by life’ (Marx & Engels, 1970, p. 47). Marx himself implements this approach by starting his account of capitalism by analyzing the structures of the production and circulation of value and money. As we know, these structures divide people into two fundamental classes, the proletariat and the bourgeoisie, which differ according to their position relative to the production and circulation of value. The class division based on the material mode of production is then carried over into the level of ideology in that the individual’s mode of thinking and believing is shaped by his or her class position.

If we were to apply this materialist approach to gambling studies, we might start by looking into the structural composition of the games gamblers play. Just as the exchange processes studied by Marx, i.e. C-M-C and M-C-M’ (Marx K. , 1973, pp. 161-170), gambling games are particular systems for the exchange and circulation of value and money. Even though no production of value takes place in the gambling game, we can still regard it analytically as part of ‘material life’.

Now, what kind of system of economic circulation does a gambler enter into, when he sits down at the roulette table? How do the organizing principles of slot machine playing differ from pari-mutuel betting at the racetrack? How are the relations between bingo players compared to the relations between players at a poker table? These are the kinds of questions raised by the materialist approach. And once these kinds of questions have been analyzed we might proceed to look into the way that the structural composition of gambling games is connected to the ‘ideological level’, i.e. the way that gamblers think about themselves and the world. Along these lines, problem gambling could be viewed as exemplary of the way that ‘the mode of production of material life

conditions the social, political and intellectual life process.' Problem gambling is developed as the gambler exposes him-/herself to the particular kinds value circulation (the gambling games), which then ultimately shapes his/her mind and brings the individual into a state of addiction (Bjerg, 2009).

Of course, we should be careful to apply uncritically Marx' analyses of class and capital to gambling. First, there is the issue of will. For Marx, the class position of a person was not a matter of individual choice. Instead, 'men enter into definite relations that are indispensable and independent of their will' (Marx K. , 1962, p. 363). Even though the question of free will is indeed complicated in the case of problem gambling, gambling behaviour must still be regarded as a matter of individual choice and certainly not 'independent of will'. Second, there is the issue of determinism. In the reception of Marx, it is vigorously debated how to understand the idea that material life 'determines' the social, political and intellectual superstructure (Crompton, 1998, p. 26). Certainly, in the study of gambling it would be a gross reductionism to explain the gambler's consciousness as simply determined by the structure of the game, in which he or she is engaged.

Yet, even with these reservations, there is much to gain from a materialist approach to the study of gambling. What we may take from Marx is an analytical sensibility to the structural and material properties of the various games gamblers engage in. Even though gamblers may chose to play these games out of their own will and even though their minds are not determined solely by the games, it seems highly plausible that there is a strong interrelation between the structural composition of particular gambling games and the emotional and intellectual life of the gambler.

Existing Research

Although the field of gambling studies has been opening up in recent years to a variety of disciplinary approaches, existing research in problem gambling still seems to be dominated by cognitive and behavioural psychology (Viets & Miller, 1997; Raylu & Oei, 2002; Toneatto & Ladouceur, 2003). The focal point of these approaches is the cognitive, perceptual and emotional constitution of the gambling subject such as cognitive distortions (Gadboury & Ladouceur, 1989; Griffiths, 1994; Toneatto, Blitz-Miller, Calderwood, Dragonetti, & Tsanos, 1997), irrational thinking (Walker, 1992), alexithymia (Lumley & Roby, 1995), and reinforcement (Petry & Roll, 2001). Hence, cognitive and behavioural psychology constitutes, from a Marxist perspective, an idealist approach to the study of gambling. It is the consciousness of the gambler, which explains the gambling and not the other way around.

Although these idealist approaches have made major contributions not only to our understanding of problem gambling but also to treatment programs (Echeburúa, Báez, & Fernãndez-Montalvo, 1996; Sylvain, Ladouceur, & Boisvert, 1997; Ladouceur, Sylvain, Boutin, & Doucet, 2002) there are certain relevant research questions which seem to elude their analytical framework. In 2002, Blaszczynski and Nower raised the following *en bloc* critique of the existing research in the field of problem gambling, which seems especially cogent in relation to cognitive and behavioral psychology:

> The pervasive but faulty assumption embedded within each model is that pathological gamblers form a homogeneous population, and that theoretically derived treatments can be applied effectively to all pathological gamblers irrespective of gambling form, gender,

> developmental history or neurobiology. (Blaszczynski & Nower, 2002, p. 489)

A central concern in existing studies of problem gambling seems to have been the mapping of the mind of the pathological gambler as opposed to the mind of a 'normal' person. This question is at the heart of research into defining and screening for pathological gambling. Now, if we become all too fixated on the distinction between the pathological mind and the non-pathological mind other analytical distinctions traversing this distinction might elude our analytical attention. Blaszczynski and Nower touches upon some such distinction as they mention in the above for instance gambling form and gender. Other relevant analytical categories include ethnicity, socio-economic class and age. The need for exploring the specificities of different kinds of gamblers and gambling games is indeed recognized within the field of gambling studies (Raylu & Oei, 2002; Toneatto & Ladouceur, 2003; Toneatto & Millar, 2004). Yet, much of the work along these lines remains to be done.

The current paper is primarily concerned with the distinction between different kinds of gambling games. This distinction has recently been explored in a couple of path breaking studies. Young and Stevens take up Roger Callois' classic distinction between *alea*, i.e. games where the outcome is wholly independent on decisions made by the players, and *agôn*, i.e. competitive games, to distinguish between gambling games of pure chance and gambling games with an element of skill (Callois, 2001; Young & Stevens, 2009; Stevens & Young, 2010). Gausset and Jansbøl invoke a similar distinction, as they explore the relation between gambling habits on the one hand and political, socio-economic values on the other in two samples of Danish university

students (Gausset & Jansbøl, 2009). Both studies are remarkable in relation to conventional cognitive studies, as the skill is not merely written off as a cognitive distortion in the gambler's perception of the game. On the contrary, the possibility of skilfully influencing the outcome is taken into account as an actual property of the material constitution of certain games. In both studies, the difference between games of chance and games of skill is a material and not merely an idealist distinction.

In a recent article, I have added another distinction to the classification of different types of gambling games (Bjerg, 2010). This is inspired by Schwartz' history of gambling, where he mentions the distinction between *bank games*, in which gamblers play against one central figure (the house, the casino, the bookmaker, etc.), and *social games*, in which gamblers play against each other on statistically even footing (Schwartz, 2006, pp. 73, 152). When we combine this distinction with the distinction between games of pure chance and games involving an element of skill, we get the following table of classifications:

Table 1: Classification of gambling games (Bjerg, 2010, p. 241)

	Bank Games	**Social Games**
Pure Chance	Roulette	Coin tossing
	Slot machines	Rock-paper-scissors
	Lottery	
	Bingo	
	Expected value <0	Expected value = 0
Skill and Chance	Black-Jack	Poker
	Craps	Backgammon
	Sports- and horserace	Bridge
	Betting	Rummy
	Expected value <0	Expected value variable below and above 0

This classification was initially constructed as basis for a qualitative investigation of problem gambling in poker. The analysis demonstrated how the particular structural

composition of poker has implications for the way in which problem gambling emerges in relation to the game.

The classification also forms the basis of the current study. Yet, the scope is broadened, as we shall be looking at all three types of gambling games (social games of pure chance do not figure in the analysis, as problem gambling does not seem to occur in relation to this type game). Furthermore, the methodological approach is quantitative rather that qualitative. The purpose of the study is to identify different classes of problem gamblers based on their preferred types of gambling games.

Method and Data

The participants in the study comprise 2309 individuals enrolled in a program for the treatment of problem gambling at the Centre for Ludomania in Denmark at some point in the period between 2005 and 2009. At their first meeting at the centre, each respondent was interviewed by a counsellor and a survey containing a number of questions related to socio-economic background, gambling behaviour, gambling problems and other kinds of social/psychological problems was completed. Unfortunately, some of the questions in the survey were changed from year to year, which limited the amount of data that was comparable during the entire period. In the final analysis, the following variables are used:

Table 2: Variables and Valid Frequencies

Variable	Description	Categories	Valid Frequencies	
Gender		Male	2039	(88.4 %)
		Female	268	(11.6 %)
Age		15-25 years	469	(20.5 %)
		26-30 years	401	(17.5 %)
		31-35 years	440	(19.2 %)
		36-40 years	365	(15.9 %)
		Over 40 years	618	(27 %)

Education	Post-secondary education	No post secondary education	803	(35 %)
		Vocational training	731	(31.9 %)
		Middle range higher education (<5 year)	427	(18.6 %)
		Higher education (5 year)	108	(4.7 %)
		Student	226	(9.8 %)
Gambling debt	"What is the amount of your current gambling debt?"	No debt	857	(37.2 %)
		Debt less than DKK 100.000 (≈USD 18.000)	765	(33.2 %)
		Debt more than DKK 100.000	679	(29.5 %)
Gambling in family	"Are there gambling problems in your immediate family?"	No problems	1720	(74.8 %)
		Problems	578	(25.2 %)
Crime	"Have you ever committed crime to finance gambling?	No crime	1597	(70 %)
		Crime	686	(30 %)
Substance abuse	"Have you ever had problems with alcohol or drug abuse?"	No abuse	1777	(77.9 %)
		Abuse	505	(22.1 %)
Gambling Games	"Which games do you find difficult to control?"		See below	

Respondents were asked, which games they had difficulties controlling. In the analysis, their responses are coded according to the aforementioned classification of gambling games. Since social games of pure chance to not figure in the survey, three relevant categories of games are derived comprising the following games:

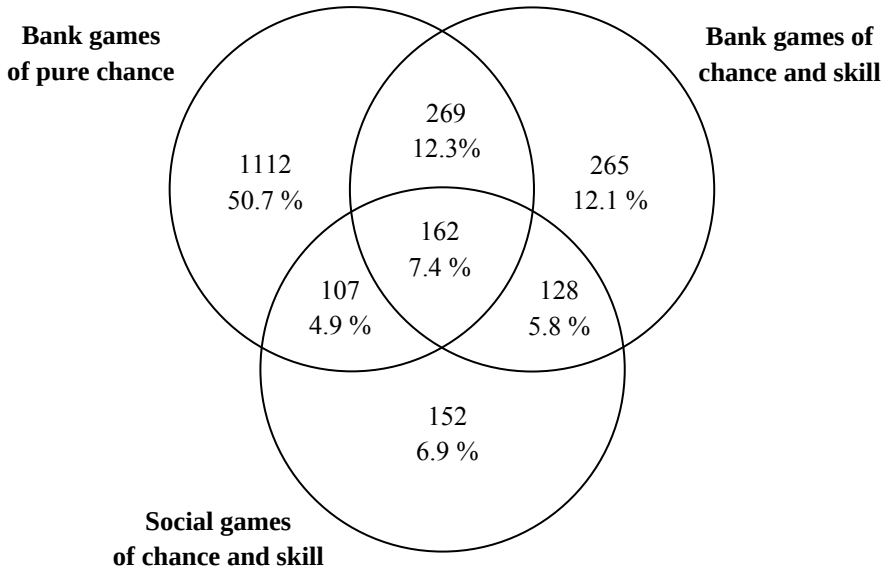
Bank games of pure chance (BC): Slot machines, scratch cards, toto, lotto, roulette, bingo.

Bank games of skill and chance (BS): Sports betting, horserace betting, Black Jack, dice.

Social games of skill and chance (SS): Poker.

Since the categories are not mutually exclusive, a variable of the seven different possible combinations of gambling behaviour is constructed. Figure 1 shows the valid frequencies of the different combinations:

Figure 1: Valid frequencies of different combinations of gambling games



The aim of the study is to identify subgroups of problem gamblers, which conform to similar patterns of gambling behaviour with respect to the types of gambling games they engage in, while at the same time displaying similar characteristics with respect to the other variables in the analysis. For this purpose, Latent Class Analysis (LCA) is applied (Lazarsfeld & Henry, 1968; McCutcheon, 1987). The model assumes that variations on a number of observed (manifest) variables can be explained by one or more unobserved (latent) variables. The current study operates with only one latent variable. One the basis of the observed variables, LCA can be used to estimate this underlying variable, which consists in a number of distinct subgroups (latent classes). These latent classes constitute virtual rather than real existing groups of individuals and characteristics are expressed in probabilistic rather than exact terms. Hence, LCA produces an underlying probabilistic typology, which explains to a greater or lesser degree the actual distribution of characteristics among individuals.

LCA is especially suited for the purpose of the current study. Contrary to more common statistical analyses such as regression models, LCA does not focus on the predictive relation between a dependent variable on the one hand and a number of independent variables on the other. Instead, LCA explores the co-variation of a multiple of variables without distinguishing between dependent and independent and the expression of the analysis is much less deterministic and much more qualitative than regression type models. LCA allows us to sidestep the usual question: '*Why* do individuals become problem gamblers?' and to explore instead the question: '*How* do problem gamblers differ from each other?' Thus, LCA provides a powerful methodological tool for breaking away from the uniform conception of problem gambling, which is often found in gambling studies.

LCA is not widely used in gambling research. Most recently, LCA has been applied in gambling studies by Boldero, Bell and Moore to examine gambling patterns among Australian youth (2010). This study is remarkable in relation to the current one, as it focuses on gambling patterns and six latent classes are identified based on the gambling games in which respondents engage. Other LCA gambling studies include Hong, Sacco and Cunningham-Williams (2009) and Goudriaan, Slutske, Krull and Sher (2009).

Hypotheses

The general assumption of the study that distinct subgroups of problem gamblers exist can be specified into three hypotheses:

> Two or more distinct classes of problem gamblers can be identified with respect to the games that they find difficult to control.

One class of problem gamblers gravitate towards bank games of pure chance. This class of gamblers is also tends to be more socially disadvantaged in general. They are expected to have a lower level of education, to have experienced gambling problems in the family, to have committed crime and to have problems of abuse other than gambling. This class of problem gamblers is expected to be relatively older.

Another class gravitates towards games of chance and skill. The social situation of this group tends to be relatively better than the other classes. They are expected to have a higher level of education, to have no gambling problems in the family, to have not committed crime and to have no other problems of abuse than gambling. This class of problem gamblers is expected to be relatively younger.

Hypotheses two and three express the assumption that for some individuals, gambling is part of a more general pattern of social problems and marginalization, while for others gambling is a more isolated problem. The first group is expected to play games of pure chance, while the latter is expected to play games with an element of skill. We might even speculate that for the first group, the gambling problem is a symptom of their general conditions of life, whereas for the latter group, gambling is the problem itself. It is of course beyond the scope of the investigation to test the validity of this kind of speculation.

A Typology of Problem Gamblers

The Latent Class Analysis is performed with the statistical software *R* with the extension of the poLCA package (Linzer & Lewis, in press). The first stage in the

Latent Class Analysis is the determination of the number of classes in the model. Table 3 shows the maximum log-likelihood values for models containing two, three and four classes. Akaike information criteria (AIC) (Akaike, 1987) and Bayesian information criterion (BIC) (Schwarz, 1978) are used to compare the fit of the different models.

Table 3: Fit indices of two, three and four latent class models

Model	**Max log-likelihood**	**AIC**	**BIC**	
2 classes	-12974.93	26015.85	26203.05	
3 classes	-12889.33	25878.66	26162.30	
4 classes	-12840.31	25814.61	26194.69	*R* Alert: Maximum likelihood not found!

The table shows an increase in the log-likelihood value from the two-class model to the three-class model suggesting a better fit of the latter. This is further indicated by a decrease in the AIC- as well as the BIC-values. The comparison between the three-class and the four-class models is less unambiguous. The log-likelihood value as well as the AIC-value suggests a better fit of the four-class model. Yet, the BIC-value suggests a better fit of the three-class model. However, these measures should be interpreted with great caution, as the model search could not find a final maximum log-likelihood. The three-class model is therefore determined to be the best fitting model.

An overview of the variables that go into the LCA was already presented in table 3. It should be noted that age is not initially included in the LCA model. The LCA assumes local independence, which means that observable variables are independent within latent classes. There are reasons to believe that age is correlated with education, as some of the respondents in the sample are not even old enough to have completed a higher education. Furthermore, age is also believed to be correlated with crime and abuse as respondents have simply been at risk of ever having been involved in any of the two for a longer period of time, the older they are. The same might even also be the case for the

accumulation of gambling debt. In order to avoid violating the condition of local independence, age is initially excluded from the LCA. Instead, the variable is introduced post hoc by comparing it to the respondents' predicted class membership. This means that the percentages on age in table 4 are the outcome of a simple cross tabulation between the class membership predicted by the initial LCA and the five-category age variable. This is indicated by asterisk.

In table 4, the outcome of the Latent Class Analysis with three classes is shown.

Table 4: Latent Class Analysis

	I. Traditional Problem Gamblers	**II. Heavy Problem Gamblers**	**III. Skill Game Problem Gamblers**
Estimated population shares	39.0 %	24.7 %	36.3 %
Bank Chance	90.8 %	48.7 %	8.6 %
Bank Chance + Bank Skill	3.3 %	17.9 %	18.7 %
Bank Chance + Social Skill	5.5 %	6.5 %	3.0 %
Bank Chance + Bank Skill + Social Skill	0.0 %	14.2 %	10.9 %
Bank Skill	0.0 %	6.4 %	29.0 %
Bank Skill + Social Skill	0.0 %	3.9 %	13.0 %
Social Skill	0.4 %	2.5 %	17.0 %
Male	75.7 %	91.5 %	99.0 %
Female	24.3 %	8.5 %	1.0 %
Age 15-25 years	8.0 %*	16.6 %*	35.1 %*
26-30 years	14.1 %*	22.1 %*	17.8 %*
31-35 years	18.9 %*	21.7 %*	19.3 %*
36-40 years	18.4 %*	17.0 %*	13.0 %*
More than 40 years	40.6 %*	22.6 %*	14.8 %*
No post secondary education	36.1 %	52.9 %	24.5 %
Vocational training	37.0 %	31.7 %	27.8 %
Middle range higher education (<5 year)	19.9 %	11.3 %	21.6 %
Higher education (5 year)	4.2 %	0.9 %	7.0 %
Student	2.9 %	3.3 %	19.2 %
No debt	48.1 %	15.2 %	40.8 %
Debt less than DKK 100,000	31.5 %	35.8 %	31.9 %

Debt more than DKK 100,000	20.4 %	49.0 %	27.4 %
No gambling problems in family	70.2 %	68.4 %	82.6 %
Gambling problems in family	29.8 %	31.6 %	17.5 %
No crime	89.6 %	31.9 %	73.5 %
Crime	10.4 %	68.1 %	26.5 %
No substance abuse	76.7 %	57.9 %	91.6 %
Substance abuse	23.3 %	42.1 %	8.4 %

Reading the table, we should keep in mind that the percentages do not refer to a real distribution of frequencies in the sample of respondents. The measures produced by the LCA are probabilistic characteristics of a number of virtual classes. In the following, we shall be looking into each of these classes in turn.

The Traditional Problem Gamblers

The LCA identifies one class of problem gamblers with a predominant probability of being engaged with bank games of pure chance such as slot machines, scratch cards, roulette, etc. This class of gamblers have 90.8 % probability of gambling only on this type of game, 3.3 % probability of gambling on this type of game in combination with bank games of skill and 5.5 % probability of gambling on bank games of pure chance in combination with social games of skill and chance. We see that this class of gamblers has only very little probability of having a gambling behaviour that does not involve bank games of pure chance. With an estimated 39 % population share, this is the class, into which problem gamblers are most likely to fall.

At least in the Danish setting, this type of gambling behaviour is well known in therapy centres. Since the founding in 1992, the Centre for Ludomania has been funded almost exclusively by money coming in from taxation of revenues on slot machines. If we see this arrangement as an indication of a popular form of thinking about problem

gambling, this type of gambler seems to fit the image of what has hitherto been regarded as the core clients of the centre. Hence, I shall be referring to this class as the 'Traditional Problem Gamblers'.

Gamblers in this class have 24.3 % probability of being female. This figure should be seen in light of a vast majority of men in the population, so even though this probability in itself is low, it is the highest compared to the other classes. In other words, if a woman is a problem gambler she is most likely to fall into the class of traditional problem gamblers. With 40.6 % probability of being over 40 years old, gamblers in this class are also more likely to be relatively older than gamblers in the other two classes. They have only 8 % probability of being between 15 and 25 years.

The traditional problem gambler has 36.1 % probability of having completed no post-secondary education. There is 37 % probability of vocational training and 19.9 % probability of a middle-range higher education. The education level in this class of gamblers is generally higher than class II but lower than class III.

The traditional problem gamblers is the least indebted class of gamblers with 48.1 % probability of having no gambling debts at all and only 20.4 % probability of gambling debts exceeding DKK 100.000. The 10.4 % probability of having committed crime to finance gambling is also the lowest among all classes. With respect to the probabilities of gambling problems in the family (29.8 %) and of current or previous substance abuse (23.3 %), the traditional problem gamblers are positioned between the two other classes.

Heavy Problem Gamblers

The probabilities of the different combinations of gambling games are more evenly distributed for the second class of problem gamblers in table 4. In this class, we still find

48.7 % probability of playing bank games of pure chance exclusively. Yet, there is also 17.9 % probability of playing bank games of pure chance in combination with bank games of skill and 14.2 % probability of playing all three types of games. With an estimated population share of 24.7 %, this is the class into which gamblers are least likely to fall.

While there is indeed some difference in the gambling behaviour between class I and class II, the latter class seems to be distinct rather based on characteristics on other variables. As we find here the highest probabilities of no education, high debt, crime and substance abuse, I shall be referring to class II as 'Heavy Problem Gamblers'. The term 'heavy' refers not so much to their gambling behaviour as such but rather to the nature of their social circumstances in general.

Gamblers in this class have 8.5 % probability of being female. This is less than the equivalent probability in class I but more than class III. Also with respect to age, the heavy problem gamblers are positioned between the other two classes, i.e. likely to be younger than class I but older than class III. The probabilities of being in each of the five different age categories are relatively similar, varying only between 16.6 % and 22.6 %.

Of the three classes, the heavy problem gamblers have the highest probability of having no post secondary education (52.9 %) and the lowest probability of having completed higher education (0.9 %). Furthermore, the heavy problem gamblers have the highest probability of having large gambling debts (49 %), having experienced gambling problems in the family (31.6 %), having committed crime to finance gambling (68.1 %) and having current or previous substance abuse problems (42.1 %). These figures show

how the class of heavy problem gamblers is characterized by being in general socially disadvantaged relative to the other classes of problem gamblers.

Skill Game Problem Gamblers

The third class of problem gamblers identified by the LCA is almost diametrically opposite of class I in terms of gambling behaviour. Gamblers in class III have only 8.6 % probability of playing only bank games of chance such as slot machines, roulette, scratch cards, etc. These gamblers have also the highest probabilities of all classes of playing bank games of skill exclusively (29 %), bank games of skill in combination with social games of skill (13 %), or social games of skill exclusively (17 %). This amounts to 49 % probability of not playing bank games of chance at all. Based on these characteristics, I shall be referring to this class as 'Skill Game Problem Gamblers'.

This class of gamblers have 99 % probability of being male. The figure confirms the findings of other studies suggesting that men gravitate toward games of skill while women tend to play games of chance (Gupta & Derevensky, 1996; 1998; Bonke & Borregaard, 2006; Gausset & Jansbøl, 2009). Skill game problem gamblers also tend to be younger than the other classes of gamblers. They have the highest probability of being between 15 and 25 years (35.1 %) and the lowest probability of being more than 40 years old (14.8 %).

The skill game problem gamblers have the highest probability of having completed higher education (7 %) or middle range higher education (21.6 %) and the lowest probability of having no post secondary education (24.5 %). There is also a relatively high probability of being a student in this class (19.2 %).

The social circumstances of the skill game problem gambler are generally better the heavy problem gamblers' but if we compare with the traditional problem gamblers, the result is more ambiguous. The skill game problem gamblers have a slightly higher probability of having large debts (27.4 %) than the traditional problem gamblers and a higher probability of having committed crime (26.5 %). In turn, the skill game problem gamblers have a lower probability of gambling problems in the family (17.5 %) and a lower probability of substance abuse (8.4 %).

Hypotheses and Conclusion

The Latent Class Analysis is structured to test hypotheses one to three as stated in the above. We can now review the results of the analysis in light of these hypotheses. The first and least ambitious hypothesis was that it was possible to identify two or more distinct classes of problem gamblers with different patterns of gambling. As the LCA has identified three different classes, this hypothesis is unequivocally confirmed.

The second hypothesis states the expectation that we could identify a distinct class of problem gamblers, who play primarily bank games of pure chance and who are relatively more socially disadvantaged. This hypothesis is partially confirmed by the analysis but the picture is more nuanced than initially expected. The LCA did identify on class of problem gamblers, who play primarily bank games of chance. This is the class referred to as traditional problem gamblers. However, the class of gamblers with the highest probability of being socially disadvantaged as measure on the variables of education, debt, gambling problems in the family, crime and substance abuse is the heavy problem gamblers. Although there is also a high probability of playing bank games of chance exclusively in this class, the heavy problem gamblers seem to be more

diverse in their gambling patterns and tend to play more than one type of gambling game.

The third hypothesis states the expectation of identifying a class of problem gamblers, who tend to play games with an element of skill, whose social circumstances are relatively better than the other classes, and who are younger. This hypothesis is also partially confirmed. On the one hand, the class referred to as skill game problem gamblers fits the expectation of a gambling pattern with a preference for games of skill. This class of gamblers also tends to be younger. On the other hand, the expectation of better social conditions is only confirmed with respect to education, gambling problems in the family and substance abuse, whereas the traditional problem gamblers are still more likely to have less debt and not to have committed crime.

In summary, the results of the analysis show that in the sample three distinct latent classes of problem gamblers can be identified. These classes are referred to as 'traditional problem gamblers', 'heavy problem gamblers', and 'skill game problem gamblers'. The *traditional problem gamblers* have a high probability of playing only bank games of chance. They have the highest probability of being female relative to the other classes. They are also more likely to be older than gamblers in the other classes. The educational level of the traditional problem gamblers tends to be higher than the heavy problem gamblers but lower than the skill game problem gamblers. Similarly, the probabilities of having experienced gambling problems in the family or having current or previous substance abuse are in between the levels found in the other classes. Yet, the traditional problem gamblers are less likely to be indebted and less likely to have committed crimes than gamblers in the other classes.

The *heavy problem gamblers* also tend to play bank games of chance but they are more likely to play these games in combination with other types of games than the traditional problem gamblers. The age of this class of gamblers is likely to be younger than the traditional problem gamblers but older than the skill game problem gamblers. With respect to all of the other measures, education, debt level, gambling problems in the family, crime and substance abuse, the heavy problem gamblers have the highest probability relative to the other classes of being disadvantaged.

As suggested by the name, the *skill game problem gamblers* are characterized by playing games of skill. This includes both bank games and social games of skill. This class is almost exclusively composed by men and the gamblers are most likely to be young. They are more likely to have a high level of education, come from families without gambling problems and not have any problems with substance abuse than the other classes. Yet, their probabilities of having debt or committed crime are in between the other two classes.

Perspectives for Further Research

At the onset of the article I have argued for an approach to gambling studies inspired by Marx' materialism. The analysis has shown that distinct classes of problem gamblers exist. Insofar as these classes are distinct with respect to their engagement in different types of gambling games, there is a materialist dimension in the typology of problem gamblers. Now, if we continue thinking along the lines of Marx' materialism to suggest that 'consciousness' is, if not downright 'determined', then at least highly correlated by material life, the question arises whether the classes are also distinct with regards to their 'consciousness' of gambling. In other words, may we find differences in the

perceptions, dreams, hopes, thoughts, emotions, motivations and fantasies of gambling among problem gamblers belonging to different classes of problem gamblers? Obviously, this is a question the reaches far beyond the mere registration of whether gamblers suffer from cognitive distortions and irrational thinking. We might pose hypotheses of the sort that skill game gamblers tend to seek emotional rewards such as recognition among peers, intellectual challenge, and competition whereas traditional gamblers tend to seek some form of existential recognition, relief from emotional stress, and regularity. In order to investigate such questions, it would probably be necessary to move beyond the paradigm of mere quantitative analysis and engage in more open and explorative qualitative interviews with gamblers. Hence, the typology developed in the current article is rather a call for further exploration rather than a conclusive theory about problem gambling.

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References

Akaike, H. (1987). Factor analysis and AIC. *Psychometrika , 52*, 317-332.

Bjerg, O. (2011). *Poker - The Parody of Capitalism.* Ann Arbor: University of Michigan Press.

Bjerg, O. (2010). Problem gambling in poker: money, rationality and control in a skill-based social game. *International Gambling Studies 10(3)* , 239-254.

Bjerg, O. (2009). Too Close to the Money - A Theory of Compulsive Gambling. *Theory, Culture & Society 26(4)* , 46-66.

Blaszczynski, A., & Nower, L. (2002). A pathways model of problem and pathological gambling. *Addiction, 97* , 487-499.

Boldero, J. M., Bell, R. C., & Moore, S. M. (2010). Do gambling activity patterns predict gambling problems? A latent class analysis of gambling forms among Australian youth. *International Gambling Studies , 10*, 151--163.

Bonke, J., & Borregaard, K. (2006). *Ludomani i Danmark: Udbredelsen af pengespil og problemspillere.* Copenhagen: Socialforskningsinstituttet.

Callois, R. (2001). *Man, Play and Games.* Chicago: University of Illinois Press (originally published 1958).

Crompton, R. (1998). *Class and Stratification: An Introduction to Current Debates.* Cambrigde: Polity Press.

Echeburúa, E., Báez, C., & Fernãndez-Montalvo, J. (1996). Comparative effectiveness of three therapeutic modalities in the psychological treatment of pathological gambling: Long-term outcome. *Behavioural and Cognitive Psychotherapy , 24*, 51-72.

Gadboury, A., & Ladouceur, R. (1989). Erroneous perceptions and gambling. *Journal of Social Behavior and Personality, 4* , 411-420.

Gausset, Q., & Jansbøl, K. (2009). Tell me what you play and I will tell you who you are: values and gambling habits in two Danish universities. *International Gambling Studies 9(1) , 9*, 67-78.

Goudriaan, A. E., Slutske, W. S., Krull, J. L., & Sher, K. J. (2009). Longitudinal patterns of gambling activities and associated risk factors in college students. *Addiction, 104*, 1219-1232.

Griffiths, M. (1994). The role of cognitive bias and skill in fruit machine gambling. *British Journal of Psychology, 85*, 351-369.

Gupta, R., & Derevensky, J. L. (1998). Adolescent gambling behavior: A prevalence study and examination of the correlates associated with problem gambling. *Journal of Gambling Studies*, *14*, 319-345.

Gupta, R., & Derevensky, J. L. (1996). The relationship between gambling and video-game playing behavior in children and adolescents. *Journal of Gambling Studies*, *12*, 375-394.

Hong, S. I., Sacco, P., & Cunningham-Williams, R. (2009). An empirical typology of lifetime and current gambling behaviors: Association with health status of older adults. *Aging and Mental Health*, *13*, 265-273.

Ladouceur, R., Sylvain, C., Boutin, C., & Doucet, C. (2002). *Understanding and treating the Pathological Gambler* . Chichester: John Wiley & Sons.

Lazarsfeld, P. F., & Henry, N. W. (1968). *Latent Structure Analysis.* Boston: Houghton Mill.

Linzer, D. A., & Lewis, J. B. (in press). PoLCA: An R Package for Polytomuos Variable Latent Class Analysis. *Journal of Statistical Software* .

Lumley, M., & Roby, K. (1995). Alexithymia and pathological gambling. *Psychotherapy and psychosomatics*, *63*, 201-206.

Marx, K. (1973). *Das Kapital - Kritik der Politischen Ökonomie. Erster Band.* Berlin: Dietz Verlag (originally published 1867).

Marx, K. (1962). Preface to A Contribution to the Critique of Political Economy. In K. Marx, & F. Engels, *Selected Works, vol. 1.* Moscow: Foreign Languages Publishing House (originally published 1859).

Marx, K., & Engels, F. (1970). *The german ideology.* New York: International Publishers Co (originally published 1846).

McCutcheon, A. L. (1987). *Latent Class Analysis.* London: Sage Publications.

Petry, N. M., & Roll, J. M. (2001). A behavioral approach to understanding and treating pathological gambling. *Seminars in clinical neuropsychiatry, 6(3)*, 177-183.

Raylu, N., & Oei, T. P. (2002). Pathological gambling. A comprehensive review. *Clinical psychology review, 22(7)*, 1009-1061.

Schwartz, D. G. (2006). *Roll the Bones - The History of Gambling.* New York: Gotham Books.

Schwarz, G. (1978). Estimating the dimension of a model. *The annals of statistics*, *6*, 461-464.

Stevens, M., & Young, M. (2010). Who Plays What? Participation Profiles in Chance Versus Skill-based Gambling. *Journal of Gambling Studies*, *26*, 89-103.

Sylvain, C., Ladouceur, R., & Boisvert, J. M. (1997). Congnitive and Behavioral Treatment of Pathological Gambling: A Controlled Study. *Journal of Consulting and Clinical Psychology*, *65*, 727-732.

Toneatto, T., & Ladouceur, R. (2003). Treatment of Pathological Gambling: A Critical Review of the Literature. *Psychology of Addictive Behaviors, 17(4)*, 284-292.

Toneatto, T., & Millar, G. (2004). Assessing and Treating Problem Gambling: Empirical Status and Promising Trends. *Canadian Journal of Psychiatry, 49(8)*, 517-525.

Toneatto, T., Blitz-Miller, T., Calderwood, K., Dragonetti, R., & Tsanos, A. (1997). Cognitive distortion in heavy gambling. *Journal of Gambling Studies 13*, 253-266.

Viets, V. C., & Miller, W. R. (1997). Treatment approaches for pathological gamblers. *Clinical psychology review, 17(7)*, 689-702.

Walker. (1992). Irrational thinking among slot machine players. *Journal of Gambling studies*, *8*, 245-261.

Wilson, D. (2007). *Ghosts at the Table - The amazing story of Poker ... the world's most popular game.* London: Mainstream Publishing.

Young, M., & Stevens, M. (2009). Player preferences and social harm: An analysis of the relationships between player characteristics, gambling modes, and problem gambling. *International Journal of Mental Health and Addiction*, *7*, 262-279.