Why the Poor Play the Lottery.

Sociological Approaches to Explaining

Class-based Lottery Play

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ABSTRACT: Why do the poor spend more on lottery tickets than their wealthier and better educated peers? While social scientists generally agree that there is an inverse relationship between socioeconomic position and patterns of lottery play, there is debate on what factors cause lottery gambling. Using survey data from a nationwide probability sample, we test three sociological approaches—socio-structural, cultural and social network accounts—to explain why the poor play the lottery. While controlling for cognitive bias theory, we find that peer-play, educational attainment and self-perceived social deprivation have strong effects on lottery play. Culture, the study finds, plays a much lesser role. Although lottery players demonstrate fatalistic value orientations, it is not a lack of a "Protestant" work ethic that makes the poor spend proportionally more on lottery tickets. The findings of this study generally point to the importance of social structures in explaining lottery gambling.

State lotteries are a mass phenomenon in most parts of the world. Thirteen per cent of US citizens spend money on lotteries on a weekly basis; between 55 and 66 per cent play at least once a year (Kearney, 2005: 2274; Welte et al., 2002: 319). Figures for Europe are similar. In the UK, 41 per cent play regularly and 67 per cent gamble occasionally. In Germany, 40 per cent of adults play once a year, and in Spain as many as 70 per cent (Garvía, 2007: 605). During the past ten years, world lottery sales have almost doubled from around $115 billion to over $200 billion (Guillén et al., 2012). In the US, state lotteries generated around 53 billion dollars in tax revenues in 2009 (La Fleur and La Fleur, 2010).

Social scientists agree that there is an inverse relationship between socioeconomic position and lottery play. Low-income individuals spend a larger share of their incomes on lottery tickets than those with higher incomes (Beckert and Lutter, 2009; Clotfelter and Cook, 1987; Livernois, 1987; Miyazaki et al., 1998). According to a national survey, households in the US spend annually around $162 on lottery tickets, with low income households spending around $289. These figures double for those households who play lottery at least once a year; and for lottery players on incomes of less than $10,000 there is a per capita spending of $597 (Clotfelter et al., 1999). Demand for lottery tickets correlates not only with levels of income but also with a general lower socioeconomic status as measured by lower educational levels, employment status and membership of an ethnic minority (Brown et al., 1992; Lang and Omori, 2009).

Although it is well established that a greater proportion of low-income individuals engage in lottery spending, the question remains open as to what factors explain this socially stratified form of consumption. The literature mentioned above mostly addresses the regressive taxation effects of lotteries, not the causes of these patterns of expenditure. This holds true despite the considerable interest by social scientists in explaining lottery demand (Garvía, 2007: 604), especially in economics (Friedman and Savage, 1948; Hartley and Farrell, 2002; McCaffery, 1994) and cognitive psychology (Griffiths, 1990; Rogers, 1998; Rogers and Webley, 2001).

Lottery demand has been treated in these disciplines as a natural laboratory to test and model theories of (bounded) rationality. These studies either mathematically model utility functions using gambling scenarios, or explain gambling with cognitive biases and heuristics, personality variables or psychological pathologies. As a consequence, explanations of why people gamble are largely dominated by behavioural or individualistic approaches.

Sociological accounts, on the contrary, have not been influential in the literature in explaining gambling behaviour. For instance, a recently published literature review mentions cognitive biases as the sole explanatory model of lottery play (Ariyabuddhiphongs, 2011). Casey (2003: 246) states that "it is extremely difficult to find any sociological analysis" on lottery play. Yet a small body of sociological research does actually exist (Casey, 2003, 2006, 2008; Garvía, 2007; Hedenus, 2011; Light, 1977; Nibert, 2000; Reith, 1999; Sallaz, 2009). However, while most of this research provides insightful historical or ethnographic accounts on lottery gambling, quantitative approaches that test sociological theories on why people play the lottery have been scant.[1]

This article addresses this gap in the understanding of gambling. Using survey data from a representative, nationwide probability sample of residents in Germany, we test three sociological approaches, and perform controls for alternative, individualistic explanations (cognitive bias theory). First, drawing on the classic approach by Edward C. Devereux, we test deprivation or strain theory that explains lottery gambling through structural factors of disadvantaged social position and assumes that lottery participation serves as compensation for and release of tensions arising from social inequalities and feelings of deprivation (Bloch, 1951; Devereux, 1980[1949]; Frey, 1984). Second, we examine cultural explanations which view lottery participation as an expression of prevailing pro-gambling value orientations. These include superstitious beliefs, reliance on fate and luck for upward mobility and the rebuttal of a Protestant work ethic (Binde, 2007; Ellison and Nybroten, 1999; Murell, 1979; Reith, 2007). Third, we test network-analytical

explanations which focus on the influence of social network structures on the demand for lottery tickets (Adams, 1996; Garvía, 2007; Guillén et al., 2012).

We find that all three sociological accounts play a significant role in explaining the stratified patterns of lottery expenditure. This leads to the conclusion that in addition to cognitive mechanisms, social factors have to be taken into account for a more comprehensive understanding of lottery play. We begin the article with a detailed discussion of the three sociological approaches to socially stratified lottery play. For each approach, we derive testable hypotheses. In the empirical section, we describe the data, methods and the results of this study. We then conclude by summarizing the main contributions of this study and its implications for future research.

SOCIAL STRATIFICATION AND THE DEMAND FOR LOTTERY TICKETS

Why do those who can least afford it play the most? An answer to this question must be based on those factors that motivate people to spend money on lotteries. It must also show that to people of a lower social status situations which result in lottery gambling have a greater attraction than to people of a higher social status.

There are two general approaches to explaining socially stratified demand in lottery markets, individualistic and contextual theories. Individualistic theories reconstruct lottery participation either as a rational investment decision or as a cognitively biased decision arrived at by an incorrect understanding of the statistics of the game. Economists view lottery participation as a rational wealth maximizing strategy for the middle and lower-middle classes (Friedman and Savage, 1948). Once basic needs are fulfilled and the opportunity costs for lottery tickets are low, playing the lottery can be reconstructed as a rational choice for those who otherwise lack the means to accumulate substantial wealth (McCaffery, 1994). In contrast, cognitive psychologists and behavioural economists, in the tradition of Kahneman and others (Kahneman et al., 1982), view lottery participation as a function of incorrect probability assessments, cognitive biases and

heuristics (Griffiths, 1990; Ladouceur et al., 1995; Rogers, 1998). Lottery players systematically overestimate the very low probability of the game and have overly optimistic assessments of the chance to win. The relation to class can be explained by the assumption that biased knowledge on the statistical properties of games of chance and limited cognitive abilities are more prevalent among lower rather than higher social classes.

From the contextual viewpoint, gambling is socially anchored. Lottery play is, as we outline below, either socio-structurally explained, arising from tensions and frustrations caused by disadvantaged positions, or culturally from shared beliefs in fate, luck and magic, or perceived as a result of social contagion through peer group influences.

Socio-structural factors: Lottery playing as tension management

The first approach assumes factors such as low levels of education and disadvantaged socio-economic positions are associated with higher states of tension, leading to compensatory patterns of behaviour. Gambling is such a pattern. According to functionalist and deprivation theories (Bloch, 1951; Devereux, 1980[1949]; Frey, 1984), gambling is a socially accepted way of channelling frustrations and tensions resulting from contradictory or unattainable demands imposed on the individual in modern societies (see Parsons 1968: 307). Gambling is a practice in which these tensions can be released without having a disruptive impact on the social order. It is "a 'safety valve' through which the repressed wishes crowd for escape" (Devereux, 1980[1949]: 781); it compensates for the monotony of daily work routines (Goffman, 1967), maintains hope for material success and relieves strain "in a socially acceptable" (Frey, 1984: 109) manner. Participation in gambling provides a form of catharsis, giving an outlet for feelings of disadvantage and dissatisfaction about one's own status.

Compared with other forms of gambling, lotteries are especially well suited to the release of tensions. Only lotteries offer prizes that can fundamentally transform the winner's material situation. Time and again, the jackpot from the U.S. Powerball lottery yields sums of several

hundred million dollars. One of the central attractions of the game is that it evokes daydreams of desired but unachievable status positions (Beckert 2011; Lutter 2010). Lottery players "indulge in fantasies about what could be done with the prize money" (Clotfelter and Cook, 1991: 9). This "lure of the lottery" (Cohen, 2001) makes lottery tickets not a monetary investment but rather a trigger for daydreams, a vehicle for the momentary escape from reality.

Fantasy worlds stemming from the purchase of lottery tickets are comparatively cheap. Lower social strata are excluded from most other "evocative" consumer goods that also create dream worlds, for example status goods such as fine clothing, wines or luxury cars. Because of this relative exclusion from alternative opportunities for imaginative goods consumption one can assume that individuals from lower social strata are more likely to be drawn to lottery tickets than members of higher social strata (Cohen, 2001: 730ff.).

Recent studies point to a possible relevance of this approach. Using macro panel data for US states between 1976 and 1995, Freund and Morris (2005) find that the increasing prevalence of state lotteries corresponds to rising income inequality in the US. Another study employs a geospatial statistical analysis of the density of lottery outlets and finds a higher concentration of outlets within ethnically segregated neighbourhoods (Wiggins et al., 2010). Haisley et al. (2008) demonstrate with experimental data that people are more likely to buy lottery tickets when they perceive their income as relatively low compared to others (see also Callan et al. 2011). Finally, on the basis of in-depth interviews, Casey (2003: 259) shows that female working-class lottery gamblers express dissatisfaction with their social situation and maintain the hope that the lottery will reduce their socio-economic constraints.[2]

We derive two hypotheses from this. First, low socio-economic status leads to higher personal states of tension and therefore more frequent lottery participation. Second, if gambling is a method to relieve strain, then people who experience monotony and meaninglessness in their personal and working lives should devote higher expenditure to playing the lottery.

> *H 1.1:* *People with low levels of education spend more money on lottery tickets.*

> *H1.2:* *People who feel their work and everyday lives to be boring and monotonous spend more money on lottery tickets than those experiencing interesting and eventful lives.*

Cultural factors: Lottery as an expression of beliefs

A second approach sees the lower strata's increased fascination with lotteries as a function of a culture that both emphasizes beliefs in fate and luck instead of personal achievement, and lacks orientation towards the values associated with a "Protestant" work ethic (Binde, 2007; Ellison and Nybroten, 1999; Murell, 1979; Reith 2007). Following Max Weber (1988) the Protestant work ethic proclaims virtues of diligence, thriftiness, efficiency and profitability as well as productivity. From this perspective, gambling is a waste of time and money and might even undermine values of self-discipline, prudence and sober rationality. To quote Gerda Reith, "the state-sponsored fantasy of the big win turns the ethos of production and accumulation on its head" (Reith, 2007: 36). The reliance on chance moves gambling close to fatalism, superstition and magic. Participation in the lottery can be regarded as a flight from the all-embracing merit principle of modern societies: "The element of chance also provides an escape from the rationality of the culture, since gambling permits one to rely on fate and superstition" (Murell, 1979: 92).

A central attraction of lotteries seems to be that everybody, independently of their skill, class, education, or family background, has an equal chance of success (McCaffery, 1994: 88). This attraction, however, should vary with social position: members of the lower social strata should find the egalitarian distribution of chance more attractive because their opportunities for success are greater if outcomes are randomly distributed compared to a situation where meritocratic or ascriptive mechanisms prevail.

Using an experimental setting, Haisley et al. (2008: 290) demonstrate that people purchase more lottery tickets when they are reminded of the equality of chance. Other previous research

shows that compulsive gambling corresponds with stronger beliefs in fate and luck (Chiu and Storm, 2010). Another study finds that religious activity seems to lower gambling participation (Lam, 2006). Therefore, we assume that "Protestant" values reduce the temptation to play the lottery and that beliefs in fate and luck promote playing the lottery.

> *H2.1: People who deny the Protestant work ethic spend significantly more money on the lottery.*
>
> *H 2.2: People who express beliefs in fate and luck as a basis for personal success spend more money on the lottery.*

Network Factors: Lottery play as a result of peer influence

A third explanation for the socially stratified demand in lottery markets focuses on the effects of social networks. In the literature on gambling, the network perspective has been explored in qualitative studies mainly on other games of chance and rarely in studies on the lottery. Exceptions include the works of Light (1977), Adams (1996) and especially Roberto Garvía (2007; 2008), who emphasizes peer play in his study of the Spanish lottery market. According to Garvía (2007), the exceptionally high demand for lottery tickets in Spain can be traced back to the widespread tradition of sharing lottery tickets by playing in syndicates among friends, relatives or colleagues. In a recent study, Guillén, Garvía and Santana (2012) analyse the motives for playing in syndicates. The authors show that syndicate players share tickets not primarily out of economic reasons of maximizing their chances, but mostly to establish cohesive social groups and to maintain friendships.

Therefore, we assume that syndicates positively affect demand by making lottery participation part of social interaction and group life. Shared tickets and the activity around playing the lottery constitute a group identity—a phenomenon also known from Bingo hall gambling (Downs, 2009; Bedford, 2011: 377, 382), off-course betting (Cassidy, 2010; Neal, 1998) and even financial investment clubs (Harrington, 2008). As a group activity, the utility of a shared

lottery ticket is not defined primarily by the expected monetary return from a ticket—although in the minds of the players winning remains an evoked possibility—but by the secondary social effects which evolve from membership in the informal group. The lottery ticket generates shared experiences and forms a basis for communication. Affirmative attitudes toward gambling are promoted in the group. Losses are less likely to stop future participation, since quitting would threaten the continuity of the group or one's own group membership.

In addition to the effects from these voluntary syndicates, we can also assume effects of social contagion through the player's social surroundings. The gambling habits of close ties should have an influence on gambling participation. According to the homophily principle in social network theory, close networks tend to be homogenous with regard to sociodemographic characteristics as well as to attitudes and behaviour (McPherson et al., 2001). Therefore, we expect status homophily among the player's social network. Because of the higher likelihood of playing the lottery, people with lower status should have closer ties to more intensive players. At the same time network links influence and maintain gambling habits. Thus, the following hypotheses arise from this discussion:

> _H 3.1:_ _Playing in a syndicate positively correlates with more money spent on lottery tickets._
> _H 3.2:_ _The more members of a respondent's close network (friends, partner and parents) play the lottery,_
> _the more money a respondent spends on lottery tickets._

DATA AND METHODS

Data

The data used to test these hypotheses come from a CATI survey on the demand structure of Lotto players in Germany. The survey was designed for this particular research project. The field

work was carried out by a professional social science survey institute in spring 2006. Our questionnaire was quality-tested across several phases: by holding qualitative group discussions with a group of regular lottery players; by obtaining expert evaluations from specialists in survey research; and by conducting two pre-tests out in the field. In the survey's defined population, we included every individual over 18 years of age residing in Germany and living in households with a landline telephone. The main sample consists of 1,508 interviews. We used a random digit dialing (RDD) sampling procedure, modified for the particular German structure of landline telephone numbers (Gabler and Häder, 1997), to generate a simple random sample of the defined population. Target persons within the household were selected randomly using the last birthday method and were then asked whether or not they had played Lotto at least once within the past year. These respondents are defined as Lotto players. We then employed an approach using a disproportionally stratified sample (Kish, 1995: 92ff.) in which we selected Lotto players overrepresented by a factor of approximately 1.66 in relation to their absolute frequency in the population. Prior to the main survey, we estimated the ratio of Lotto players to non-players in the population using a larger pre-test with a sample size of n=200; we also used this data to employ a standardized cognitive pre-test for the questionnaire following a method developed by Deutschmann et al. (2003).

Measurements

Table 1 presents basic descriptive statistics of all variables used in this study. Our central dependent variable is the amount of monthly expenditure for lottery tickets. In addition, we use two further dependent variables to check the robustness of our findings. First, participation frequency counts the number of days a respondent had been playing within the last year. Second, we use monthly expenditures as a percentage share of income. In doing this, we try to capture the "intensity" of expenditure or the degree of financial involvement in lottery gambling.

We use the following set of indicators as independent variables. Following hypothesis H1.1, which assumes that people of low levels of education play the lottery more often, we take the number of years spent in school and higher learning institutions. Hypothesis H1.2 indicates an association between lottery gambling and work or life dissatisfaction. We measure work/life dissatisfaction with a simple additive index of three seven-point Likert items (ranging from 7 = "I fully agree" to 1 = "I don't agree at all"), taken from a scale by Firestone et al. (2005). The items are (a) "I often feel that I am doing something meaningful in my work (in my everyday life)", (b) "My work (everyday life) often bores me" and (c) "I think my work (everyday life) is much more interesting than those of others." Cronbach's alpha of this index is .632.

Hypothesis H2.1 proposes a negative relation between gambling habits and the Protestant work ethic. We use a simple additive index of the following seven-point Likert items, taken from a scale by Mirels and Garrett (1971): (a) "If one works hard enough one is likely to make a good life for oneself.", (b) "There are few satisfactions equal to the realization that one has done his best at a job", (c) "The self-made person is likely to be more ethical than the person born to wealth." Cronbach's alpha is .5023. As for hypothesis H2.2, which assumes an association between the intensity of play and fatalistic value orientations, we use an additive index of the following three seven-point Likert items: (a) "In order to get along in life, it is good to have luck on your side", (b) "Most people are not aware of how much of their life depends on chance and luck" and (c) "Life is mostly controlled by fate." The items are taken from a scale used by Pearlin et al. (1981) and Darke and Freedman (1997). Cronbach's alpha is .675. All items were recoded in such a way that higher values represent greater beliefs.

With regard to social network effects, we use two indicators. The first hypothesis examines the effects of playing in a syndicate (H3.1). Here, we use a dummy variable that captures respondents playing in a syndicate with friends, colleagues or acquaintances (1 = player usually plays in a syndicate; 0 = player usually plays alone or not at all). In order to assess the influence of the players' social networks on the demand for lottery tickets (H3.2), we generate

ego-centric network data from our survey. Respondents were asked to consider two very close friends and how often each had played the lottery, if at all, within the past year (coded as 0 = never, 8 = a few times a year, 18 = once or twice a month, 52 = at least once a week). We also asked how often the respondent's life partner and parents played the lottery. We then matched the data of the four variables into a single additive index which measures the intensity of lottery play in the respondent's close social network.

In all statistical models, we use the following set of control variables: a dummy for gender (1 = female), monthly available net income (in euros), age (in years), level of employment (where 1 = full time, 0 = otherwise), unemployed (1 = yes, 0 = no), retired (1 = yes, 0 = no), cohabitation (1 = living together with a partner, 0 = otherwise), urbanity (1 = living in region with more than 200.000 inhabitants, 0 = otherwise), Catholic (1 = yes, 0 = no), Protestant (1 = yes, 0 = no), minority (1 = citizenship other than German, 0 = otherwise).

To control for possible cognitive biases, as suggested, we use a variable that measures biased or overly optimistic assessments of the game's winning probabilities. Survey respondents were asked if they believe that winning the jackpot is either "likely" (coded as 1), "unlikely" or "very unlikely" (both coded as 0). We assume that players who think they are "likely" to win the lottery have an overly optimistic perception of the true winning chances of the game, and hence, spend more money on lottery tickets.

INSERT TABLE 1

Analytical approach

We start by presenting survey estimates and descriptive statistics on how spending patterns relate to income levels. In order to test the proposed hypotheses, we then estimate a series of nested regressions on monthly expenditures, each model adding a set of theoretically relevant variables. Due to the fact that our dependent variable is a counted non-negative integer, the use of OLS

could lead to inefficient, inconsistent or biased estimates (Cameron and Trivedi, 1998: 89). Therefore, we make use of regression models for count data. In particular, we fit negative binomial regression models.[3] We begin with a baseline model which includes socioeconomic variables and controls. This model allows us to estimate the influence of socioeconomic factors on the intensity to play the lottery. The second model adds the work/life dissatisfaction scale. The third model incorporates cultural measures (Protestant work ethic and belief in fate and luck scale). The fourth model enters social network measures, and Model 5 controls for cognitive bias by including the optimism variable. In order to examine which factors have the largest impact, the last column, Model 6, displays standardized coefficients. By gradually adding sets of measures, we evaluate not only their direct effects on lottery expenditure, but also how they change the impact of the socioeconomic baseline model. If the effects of the socioeconomic variables decline and the model fit increases, then the substantial predictors pick up explanatory power of the social position variables. This would demonstrate that the predictors are related to class.

RESULTS

Lottery participation can be regarded as a mass phenomenon, as our survey estimates indicate. A total of 40 per cent play the lottery at least once a year, 22.3 per cent play regularly at least once a month and 17 per cent play at least once a week. For those playing at least once a year, monthly expenditures average at 17 euros. The Lotto players' average stake varies according to the frequency of their participation: occasional gamblers spend an average 6.1 euros, monthly gamblers approximately 13.2 euros and regular weekly players an average of 30.1 euros per month.

INSERT TABLE 2

Table 2 shows the spread of lottery expenditure over income quintiles. While absolute expenditure increases with income levels, expenditure as a percentage of income decreases and is highest in the lowest income quintile. For many players, lottery expenditure is clearly a trivial amount of their disposable income. However, for frequent players who participate at least once a month (22.3 per cent of the population), expenditure make up 2.21 per cent of their income; for those in the lowest income quintile, expenditure represents 3.7 per cent of their monthly income. Since most demand patterns in markets follow a Pareto-type 80/20 distribution, meaning that a relatively small part of customers account for the largest part of turnover, it makes sense to look at "heavy players", i.e. those in the top 25% quartile with highest expenditure. As can be seen from Table 2, for heavy players in the lowest income group, expenditure averages at 6.7 per cent of their income.

Table 3 presents the regression results on the amount of lottery expenditure. The results are largely consistent with our expectations. A number of statistically significant differences can be observed for the baseline model, revealing insights into the sociodemographic composition of lottery players. Income, age, cohabitation and ethnic minority are significant predictors of lottery spending. Coherent with our first hypothesis, education proves to be a significant factor in explaining the demand for lottery tickets. People with lower educational levels spend significantly more on lottery tickets than the better educated. In line with this argument, hypothesis H1.2 concerns the subjective assessment of strain arising from socially disadvantaged positions, and proposes an association between lottery gambling and work or life dissatisfaction. As the model results show, dissatisfaction is significantly related to lottery expenditure.

INSERT TABLE 3

The cultural factors proposed by hypotheses H2.1 and 2.2 partly explain lottery expenditure. While fatalistic value orientations have a clear impact on expenditure, spending

patterns do not correspond to work-ethic value orientations. Although lottery players maintain a culture of beliefs in fate and luck, they do not play because they lack or deny a "Protestant" work ethic. By far the strongest predictors of lottery expenditure are the network-related factors, peer play and syndicate play. This is shown by the substantial increase in model fit when including network variables (Pseudo R^2 increases from .018 to .030 in Model 4). In addition, both network variables have highly significant coefficients. At the same time, the effect of education diminishes to some extent when these predictors are included. Therefore, controlling for social network affects the social composition of lottery playing with regard to educational attainment. Social class differences in gambling to some extent can be explained by the social network structure. This speaks for the homophily assumption, suggesting that the stratification of lottery demand partly operates through player networks.

In order to control for cognitive bias theory, Model 5 includes the optimism variable. As expected, results show a positive and significant effect. All other factors remain unaffected and stable. Model 6 displays the standardized model solution, suggesting that the sociological factors have the highest overall impact. It reveals that network factors are the most influential predictors, followed by optimism, work/life dissatisfaction, fatalism and education.

We estimate several alternative specifications in order to verify the robustness of the findings (see Table 4). Results reveal that our findings are robust to different methodological approaches. In Model 1 we replicate the main model using OLS regression and find no substantial changes in the results. In the following two columns, we regress the predictors on the two additional dependent variables, participation frequency and expenditures as a share of income (Model 2 and 3). While participation frequency (number of days played within last year) is count data and again modelled via negative binomial regression, we estimate Model 3 using a generalized linear modelling procedure for fractional response data (following Papke and Wooldridge, 1996). None of these alternatives reveal different results to those reported. The last two columns finally estimate a zero-inflated negative binomial regression on monthly

expenditures (see Cameron and Trivedi, 1998: 123ff.), taking into account the binary decision to play vs. not to play (Model 4a), and subsequently, spending patterns given a positive decision to play (Model 4b). Again, all the discussed results stay robust. In line with the theories, education, status frustration, fatalism and especially network factors are the main drivers of lottery spending.

INSERT TABLE 4

CONCLUSION

Lotteries are by far the most popular games of chance, both in terms of participation frequency and expenditure. Moreover, lotteries are highly relevant to fiscal revenue and redistribution. They generate substantial regressive tax revenue as low-income players spend a higher proportion of their income on lotteries. However, the question of why people participate to different degrees in this form of taxation has not been fully explored in the literature. Most studies that have addressed this question make use of individualistic explanations and focus on cognitive biases. Using survey data from a nationwide probability sample, our study examines three sociological approaches: socio-structural, cultural and social network accounts.

The study yields the following results. First, we find that culture plays a much lesser role in explaining class-based gambling than the literature suggests. Lottery spending is not related to work-ethic value orientations. Although fatalistic value orientations correlate with lottery expenditures, it is not a lack of the "right" work-ethical values that sustains playing. This result supports case study findings that working-class females are reluctant to spend money on the lottery when such expenditure negatively affects their household budgets (Casey 2003: 250).

Second, the social networks of players strongly affect lottery expenditure. Compared with all other factors, network variables have the largest impact on lottery play. This finding is consistent with previous work on syndicate play (Garvía, 2007; Guillén et al., 2011). It adds to the literature by pointing to the "social embeddedness" (Granovetter 1985) of gambling: the greater

the involvement of an individual's social surrounding in lottery gambling, the greater the expenditure by that individual on lottery tickets.

Finally, the results support the long theorized but never quantitatively stated "classical" strain hypothesis that was first introduced by Devereux (1980[1949]). Those who lack autonomy and express feelings of futility about their everyday routines spend significantly more money on lottery tickets. These results are consistent with findings from qualitative studies (see Casey 2003: 259). However, to the best of our knowledge, up to now there has been no published quantitative evidence, based on representative survey data, to support this theory.

Applying strain theory to other forms of gambling would confirm the approach taken here. Although other forms of gambling differ in skills, pay-out rates and prizes, the same factors might be relevant in explaining why people gamble to different degrees, depending on their socioeconomic position. A further confirmation would be to take seriously the assumption that gambling functions as an outlet for strain by studying the consequences of (non-pathological) gambling involvement. If gambling really does function as a "safety valve" for feelings of dissatisfaction, as the theory predicts, it should lead to the acceptance of one's situation. This would have consequences at the societal level: gambling involvement could divert players away from making real efforts to reduce their disadvantaged positions, for example, by participating politically or by individual endeavour for upward mobility. We might observe less investment in education, less party memberships, less community activities, or greater numbers of non-voters.

Beyond these specific results and the possible implications for further research, the article's main contribution is its simultaneous testing of three sociological approaches while controlling for cognitive bias theory. This represents a much more sophisticated approach to the understanding of gambling. Most previous research tends to show that a single mechanism is at work in explaining lottery gambling. By testing several approaches on a large representative survey, this study intends to overcome this limitation. Moreover, the bulk of existing research explains lottery gambling from an individualistic perspective and is often interested in

demonstrating associations between gambling decisions and cognitive biases. This article adds to the literature by emphasizing the role of contextual structures in individual decision making. While many cognitive studies use gambling behaviour as a "test field" to study cognitively biased decision making, the findings from this study can be used to argue that individual decisions are significantly bound to social contexts. Hence, the results can be expanded on to better understand individual choices more generally: what matters in individual decision making is not only cognition; of equal importance is social context and structure.

NOTES

[1] Though see a few studies dealing with other forms of gambling such as sports betting or casino gambling (Downes et al., 1976; King, 1985; Smith et al., 1976; Tec, 1964).

[2] Casey also notes that buying lottery tickets can be a pleasurable activity resulting from positive feelings of romantic daydreams on winning and spending large amounts of prize money (Casey 2008: 128).

[3] Due to the results of a likelihood-ratio test for overdispersion (Cameron and Trivedi, 1998: 77), the use of the negative binomial is superior over a Poisson regression.

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TABLES

TABLE 1: *Descriptive statistics*

of all dependent and independent variables

Variable	N	Mean	Std. Dev.	Min.	Max.
Expenditure (euros)	1365	10.66	20.33	0	216
Participation frequency (days/year)	1508	18.36	21.46	0	52
Expenditure (% of income)	1119	0.83	2.25	0	35.29
Female	1508	.48	.50	0	1
Income	1230	1253.74	903.86	0	12500
Age	1495	46.13	15.73	18	87
Employment full-time	1508	.46	.50	0	1
Unemployed	1508	.05	.21	0	1
Retired	1508	.21	.41	0	1
Cohabitation	1508	.63	.48	0	1
Urbanity	1508	.25	.43	0	1
Catholic	1499	.32	.47	0	1
Protestant	1499	.38	.49	0	1
Minority	1508	.02	.14	0	1
Education	1469	12.10	3.23	8	17
Work/life dissatisfaction	1490	6.97	3.42	3	21
Protestant work ethic	1471	7.19	2.95	3	21
Belief in fate & luck	1455	12.86	4.03	3	21
Syndicate play	1508	.17	.37	0	1
Peer play	1508	37.66	39.97	0	208
Optimism	1508	.05	.22	0	1

TABLE 2: *Mean and top quartile mean*

monthly expenditure, by income quintiles

and participation frequency

Participation frequency	Mean monthly expenditure				Top quartile mean monthly expenditure			
	in euros		% of income		in euros		% of income	
	rarely/ never	regular	rarely/ never	regular	rarely/ never	regular	rarely/ never	regular
Income quintiles								
Q1	2.35	22.65	0.45	3.72	10.55	32.52	1.97	6.73
Q2	3.03	26.06	0.34	2.60	14.07	33.08	1.64	3.85
Q3	3.14	25.35	0.24	1.72	13.63	33.00	1.07	2.62
Q4	2.45	29.89	0.11	1.26	10.02	34.04	0.54	1.59
Total	2.73	26.39	0.30	2.21	12.27	33.29	1.32	3.24

Notes: Mean and top quartile mean expenditure by income quintiles, each as absolute (in euros) and relative (as % of income) expenditure, subdivided into occasional ("rarely/never" means less than once a month) and regular (e. g., at least once a month) participation.

TABLE 3: *Determinants of lottery expenditure*

	Model (1) Expenditures	Model (2) Expenditures	Model (3) Expenditures	Model (4) Expenditures	Model (5) Expenditures	Model (6) Expenditures, beta
Female	0.137	0.104	0.135	0.266*	0.239*	0.121*
	(1.171)	(0.894)	(1.142)	(2.346)	(2.117)	(2.148)
Income	0.000**	0.000**	0.000**	0.000**	0.000**	0.248**
	(2.744)	(2.826)	(3.029)	(2.802)	(2.989)	(2.973)
Age	0.035***	0.037***	0.035***	0.035***	0.035***	0.556***
	(6.349)	(6.784)	(6.061)	(6.562)	(6.590)	(6.592)
Employment full-time	0.100	0.131	0.097	0.080	0.083	0.042
	(0.685)	(0.902)	(0.666)	(0.580)	(0.604)	(0.611)
Unemployed	-0.139	-0.263	-0.467	-0.187	-0.166	-0.032
	(-0.500)	(-0.943)	(-1.639)	(-0.685)	(-0.612)	(-0.573)
Retired	-0.373	-0.477*	-0.496*	-0.272	-0.295	-0.120
	(-1.641)	(-2.084)	(-2.167)	(-1.247)	(-1.356)	(-1.351)
Cohabitation	0.265*	0.258*	0.329**	0.098	0.112	0.054
	(2.242)	(2.181)	(2.746)	(0.841)	(0.960)	(0.961)
Urbanity	-0.238	-0.213	-0.191	-0.211	-0.194	-0.084
	(-1.912)	(-1.714)	(-1.528)	(-1.764)	(-1.632)	(-1.639)
Catholic	-0.134	-0.101	-0.123	-0.088	-0.130	-0.060
	(-0.965)	(-0.728)	(-0.887)	(-0.651)	(-0.969)	(-0.957)
Protestant	-0.060	0.005	-0.041	-0.077	-0.086	-0.043
	(-0.458)	(0.041)	(-0.306)	(-0.602)	(-0.675)	(-0.690)
Minority	0.799*	0.693	0.495	0.671	0.692	0.100
	(1.961)	(1.707)	(1.175)	(1.677)	(1.738)	(1.745)
Education	-0.076***	-0.078***	-0.069***	-0.041*	-0.038*	-0.121*
	(-4.321)	(-4.425)	(-3.794)	(-2.262)	(-2.103)	(-2.071)
Work/life dissatisfaction		0.050**	0.052**	0.045**	0.044**	0.149**
		(3.055)	(3.024)	(2.840)	(2.829)	(2.779)
Protestant work ethic			-0.015	-0.015	-0.013	-0.037
			(-0.738)	(-0.764)	(-0.689)	(-0.652)
Belief in fate & luck			0.050***	0.038**	0.033*	0.135*
			(3.312)	(2.683)	(2.282)	(2.328)
Syndicate play				0.657***	0.645***	0.243***
				(4.632)	(4.569)	(4.605)
Peer play				0.009***	0.010***	0.383***
				(6.710)	(6.786)	(6.823)
Optimism					0.707**	0.156**
					(2.990)	(2.989)
Constant	1.189***	0.716*	0.097	-0.562	-0.607	2.098***
	(3.707)	(2.037)	(0.221)	(-1.311)	(-1.431)	(41.081)
Ln alpha	1.080***	1.064***	1.029***	0.937***	0.924***	0.920***
	(22.188)	(21.707)	(20.539)	(18.299)	(17.990)	(17.908)
Log-likelihood	-3362.564	-3323.053	-3196.690	-3158.596	-3153.252	-3154.421
Log-likelihood, constant only	-3410.707	-3375.830	-3254.804	-3254.804	-3254.804	-3256.319
AIC	6753.128	6676.106	6427.379	6355.193	6346.503	6348.842
BIC	6823.069	6750.904	6511.560	6449.277	6445.539	6447.877
McFadden Pseudo-R^2	0.014	0.016	0.018	0.030	0.031	0.031
Observations	1092	1082	1045	1045	1045	1045

Notes: Negative binomial regression models on monthly lottery expenditures;
t statistics in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (two-sided tests)

TABLE 4: *Alternative model specifications*

	Model (1) Expenditures (OLS)	Model (2) Participation frequency (negative binomial)	Model (3) Expenditure, as % of income (GLM logit)	Model (4a) Decision not to play (zero-inflated negative binomial)	Model (4b) Expenditures (zero-inflated negative binomial)
Female	0.110	0.126	0.280*	-0.103	0.204*
	(1.372)	(1.322)	(2.190)	(-0.519)	(2.240)
Income	0.316***	0.182	-0.568***	-0.323	0.432***
	(4.061)	(1.929)	(-3.466)	(-1.651)	(4.605)
Age	0.656***	1.477***	1.407***	-0.760*	1.185***
	(4.431)	(7.959)	(5.242)	(-2.151)	(6.339)
Employment full-time	0.138	0.349**	-0.093	-0.682**	-0.252*
	(1.378)	(2.886)	(-0.532)	(-2.884)	(-2.125)
Unemployed	0.014	-0.095	-0.653*	-0.685	-0.507*
	(0.070)	(-0.408)	(-2.388)	(-1.470)	(-2.215)
Retired	0.079	0.193	-0.307	-0.457	-0.409*
	(0.535)	(1.055)	(-1.328)	(-1.306)	(-2.397)
Cohabitation	0.108	0.091	0.198	-0.284	0.048
	(1.312)	(0.889)	(1.501)	(-1.450)	(0.488)
Urbanity	-0.091	-0.068	-0.195	0.393	-0.097
	(-1.051)	(-0.657)	(-1.593)	(1.890)	(-0.980)
Catholic	-0.168	-0.218	-0.132	0.647**	0.040
	(-1.736)	(-1.863)	(-0.830)	(2.762)	(0.358)
Protestant	-0.051	-0.182	-0.131	0.270	-0.005
	(-0.564)	(-1.645)	(-0.913)	(1.195)	(-0.050)
Minority	0.310	0.173	0.077	-0.143	0.597
	(1.070)	(0.511)	(0.142)	(-0.220)	(1.854)
Education	-0.031*	-0.023	-0.043	0.022	-0.045**
	(-2.382)	(-1.487)	(-1.698)	(0.702)	(-3.126)
Work/life dissatisfaction	0.027*	0.029*	0.037*	-0.035	0.034**
	(2.355)	(2.095)	(2.163)	(-1.257)	(2.694)
Protestant work ethic	-0.018	-0.003	-0.003	0.044	-0.003
	(-1.369)	(-0.174)	(-0.177)	(1.392)	(-0.204)
Belief in fate & luck	0.032**	0.026*	0.028*	-0.071**	0.014
	(3.224)	(2.093)	(1.967)	(-2.955)	(1.190)
Syndicate play	0.828***	1.013***	0.498***	-21.063	0.248*
	(7.948)	(8.573)	(3.512)	(-0.005)	(2.504)
Peer play	0.008***	0.008***	0.006***	-0.019***	0.005***
	(8.114)	(7.086)	(5.308)	(-5.620)	(4.442)
Optimism	0.853***	0.547**	0.686**	-20.517	0.395*
	(4.891)	(2.744)	(2.660)	(-0.003)	(2.482)
Constant	-3.829***	-5.147***	-6.597***	6.018***	-4.961***
	(-5.784)	(-5.970)	(-7.095)	(3.514)	(-5.527)
Log-likelihood	-1651.450	-4105.469	-48.085	-3012.409	-3012.409
Log-likelihood, const. only	-1810.012	-4232.189		-3083.236	-3083.236
AIC	3340.900	8250.938	134.170	6102.819	6102.819
BIC	3434.947	8351.802	228.217	6295.863	6295.863
Adjusted R^2	0.249				
McFadden Pseudo-R^2		0.030			
Observations	1043	1145	1043	1043	1043

Notes: *t* statistics in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (two-sided tests)