

Effects of neighborhood disadvantage on problem gambling and alcohol abuse

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Background and aims: Based on social disorganization theory, the present study examined the effects of neighborhood disadvantage on gambling behaviors and problems as well as on alcohol use and abuse. *Methods:* Findings were based on a combined sample of two representative U.S. telephone surveys of gambling and substance use. One survey ($n = 2,631$) included adults 18 years and older and the second survey (2,274) included young people aged 14–21 years old. *Results:* Neighborhood disadvantage had a highly significant effect on problem gambling over and above the significant individual effects of gender, age, race/ethnicity and socioeconomic status. Alcohol abuse did not show the same relationship to neighborhood disadvantage as did problem gambling. Furthermore, when neighborhood disadvantage was high and individual socioeconomic status was low, the highest levels of problem gambling were observed. *Conclusions:* This study provides strong evidence for the effects of neighborhood ecology on the occurrence of problem gambling.

Keywords: gambling, alcohol, neighborhood disadvantage, general population

INTRODUCTION

Neighborhood ecological factors have been linked to crime and delinquency in decades of theory and empirical research. More recently, empirical studies have shown significant relationships between neighborhood/ecological factors and other problem behaviors, particularly substance abuse. However, there have been relatively few studies examining the relationships between neighborhood factors and problem gambling.

Shaw and McKay (1942, 1969) provided the early groundwork for the concept of social disorganization by demonstrating that high delinquency rates were linked to characteristics of certain neighborhoods in Chicago as opposed to the personal characteristics of the people living in such neighborhoods. They argued that ecological factors, such as poor economic conditions within square-mile areas and population instability, resulted in loss of social control in a geographic area and thus, resulted in increased levels of delinquency. Since this early work, social disorganization theory has been extended and empirically tested in a large body of scholarly work applied to the explanation of crime and delinquency. Wilson (1987, 2010) developed the concept of *concentration effects* or *concentrated poverty* to characterize impoverished neighborhoods with high proportions of poor, female-headed and minority households. These disadvantaged neighborhoods were associated with lack of access to jobs, lack of quality schools, and lack of exposure to conventional role models, resulting in a variety of negative outcomes including joblessness, low educational achievement and involvement in crime (Wilson, 2010). The theory further maintains that regardless of individual characteristics, the ecological concentration of poverty gives rise to structural barriers and cultural adaptations that undermine social organization and the control of crime (Sampson & Wilson, 1995). Thus, the concept of social disorganization may be viewed as the inability of particular neighborhood communities to maintain effective social controls (Sampson & Wilson, 1995). Sampson, Morenoff and Gannon-Rowley

(2002) analyzed over 40 studies focused on neighborhood effects and demonstrated that there are geographic “hot spots” for crime and other problem behaviors and further that these areas are characterized by the concentration of social and economic disadvantage.

Studies of the effects of neighborhood disadvantage have been extended to substance abuse. Boardman, Finch, Ellison, Williams and Jackson (2001) examined the relationship between neighborhood disadvantage using census tract data and individual drug use from interviews with a general population sample of adults in the Detroit area. The authors found a positive relationship between neighborhood disadvantage and drug use even after controlling for individual-level socioeconomic status. Using a large national survey on drug use and health among 12–17-year-old youths, Winstanley et al. (2008) showed that self-reported neighborhood disadvantage was associated with alcohol and drug use and dependence. Martinez, Rosenfeld and Mares (2008) examined the relationships between social disorganization based on neighborhood-level census tract data, drug activity measured by official records of drug-overdose deaths, and neighborhood violent crime in Miami. The authors concluded that social disorganization predicts drug activity which in turn leads to higher levels of criminal violence. Karriker-Jaffe et al. (2012) found interaction effects in the relationship between neighborhood disadvantage and adult alcohol outcomes, such that neighborhood disadvantage was negatively associated with heavy drinking among whites but positively associated with heavy drinking among African-Americans.

Empirical tests of problem behavior theory have long found that alcohol, other drug use as well as crime and delinquency co-occur and constitute a problem behavior syn-

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drome (e.g., Donovan & Jessor, 1985; Jessor & Jessor, 1977). More recently, problem gambling has been linked with these other problem behaviors (Barnes, Welte, Hoffman & Dintcheff, 2005; Barnes, Welte, Hoffman & Tidwell, 2009, 2011) and thus, common predictors such as neighborhood disadvantage may provide insights into the occurrence of gambling behaviors as well as substance abuse and other problem behaviors.

There are relatively few studies examining the effects of neighborhood factors on gambling behaviors and problem gambling. Clotfelter and Cook (1991), in their seminal work on lotteries in America, document that disadvantaged, poor neighborhoods had a high density of lottery outlets and that the financial burden associated with state lotteries fell disproportionately on the poor. Ecological studies of video lottery terminal (VLT) gambling in Canada also have shown strong neighborhood effects. The spatial distribution of VLTs in Quebec was strongly correlated with poorer neighborhoods (Gilliland & Ross, 2005). Similarly, Wilson, Gilliland, Ross, Derevensky and Gupta (2006) examined VLT access among high school students in Montreal and found that VLT access was more prevalent near schools located in socioeconomically-deprived neighborhoods as compared with schools located in more affluent neighborhoods. These studies were spatial analyses of VLT locations and were not designed to link individual gambling behaviors with neighborhood disadvantage. Martins, Storr, Lee and Ialongo (2012), in a study of 596 low income, urban young adults, found that higher neighborhood disadvantage concerning the inhabitants (e.g., kids in the neighborhood get beat up or mugged), was associated with gambling frequency and gambling problems.

GOALS OF THE STUDY

In the national Survey of Gambling in the U.S. (SOGUS), neighborhood disadvantage was significant in predicting adult respondents' frequency of gambling in the past year as well as past year problem gambling, even after taking into account respondents' socioeconomic status (Welte, Wiczorek, Barnes, Tidwell & Hoffman, 2004). The present investigation extends this investigation in several ways. This study examines the effects of neighborhood disadvantage across the lifespan from 14 years to 90+ years using a combined sample of two comparable national samples of youth and adults (cf., Barnes, Welte, Tidwell & Hoffman, 2011). Furthermore, gender as well as age, socioeconomic status, and race/ethnicity are included in the analyses to examine possible interaction effects of neighborhood disadvantage and socioeconomic status (SES) on gambling behaviors and problems after controlling for interactions of neighborhood disadvantage and SES with these other demographic factors. An additional consideration in the present paper is the inclusion of alcohol use and alcohol abuse/dependence variables, as well as gambling outcome variables, to permit a comparison of the neighborhood and other socioeconomic predictors of both gambling and alcohol behaviors.

The hypotheses for this investigation are as follows:

- 1) Based on social disorganization theory, it is hypothesized that neighborhood disadvantage will predict gambling and problem gambling over and above the effects of gender, age, race/ethnicity and individual socioeconomic status.

- 2) Because tests of problem behavior theory have shown that problem gambling and alcohol abuse co-occur, it is hypothesized that the same neighborhood and sociodemographic factors which predict gambling and problem gambling will also predict alcohol use and abuse.

METHODS

Sample and procedure

Two comparable national telephone surveys of gambling behaviors and substance use in the United States were conducted at the University at Buffalo's Research Institute on Addictions. One survey consisted of interviews with adults aged 18 years and older and the second survey consisted of interviews with youth and young adults aged 14 to 21 years old. Because the two surveys were similar in aims, telephone sampling procedures, and measures of gambling and substance use, the two surveys were combined into a dataset of 4,905 respondents aged 14 to 94 years throughout all 50 states in the U.S. and the District of Columbia. The studies were approved by the University at Buffalo's Social and Behavioral Sciences Institutional Review Board. Details of the combined dataset have been published (Barnes, Welte, Tidwell & Hoffman, 2011; Welte, Barnes, Tidwell & Hoffman, 2011).

The first survey of adults carried out in 2000 resulted in 2,631 completed interviews and the second survey of youth and young adults was initiated in 2005 and resulted in 2,274 completed interviews. Despite the time lag between the two surveys, analysis of gambling data from both surveys indicated there were no meaningful differences and thus, no evidence of a chronological gambling trend in the time between the two surveys (see Barnes, Welte, Tidwell & Hoffman, 2011 for details). Descriptions of the sampling methods have been reported for each study separately (e.g., Welte, Barnes, Wiczorek, Tidwell & Parker, 2001; Welte, Barnes, Tidwell & Hoffman, 2008). The combined dataset was created by using the ADD FILES command in SPSS (SPSS, Inc., 2008) allowing for comparable variables from both datasets to be merged.

In both the adult and youth surveys, cases were statistically weighted inversely to their probability of selection and weighted to align the sample with the gender, age and race distributions for the U.S. The final weight variable was scaled so that it had a mean of 1, and the weighted N equaled the true N . Weights from the two separate surveys were placed unaltered into the combined dataset, such that the weighted N of the adult survey was equal to the true N of 2,631 and the weighted N of the youth survey was equal to the true N of 2,274. The gender and race distributions of the combined sample are approximately equal to the distributions in the U.S. However, the age distribution of the combined file does not equal the age distribution of the U.S., because young people aged 14 to 21 years are over-represented in the combined file.

Measures

Dependent measures – gambling. Three measures of gambling in the past year were used for the present analysis – any gambling, frequent gambling and problem gambling. Both

surveys included questions on the frequency of specific types of gambling during the past year. These types were: raffles, office pools, and charitable gambling; pulltabs; bingo; cards, not in a casino; games of skill, e.g., pool, golf; dice, not in a casino; sports betting; horse or dog track; horses or dogs off-track; gambling machines, not in a casino; casino; lottery; video-keno; internet gambling; and other gambling. The gambling in the past year variable was created by summing the frequency of these types of gambling and recoding the variable to produce dichotomous variables indicating any gambling in the past year and frequent gambling, i.e., 52+ times in the past year.

Both the youth and adult surveys also included two problem/pathological gambling scales. The first scale was the Diagnostic Interview Schedule (DIS) for pathological gambling (Robins, Marcus, Reich, Cunningham & Gallagher, 1996), which contains 13 items such as preoccupation with gambling and needing to gamble with increasing amounts of money to get the same excitement (“tolerance”). Endorsement of five or more items is considered pathological gambling (American Psychiatric Association, 1994) with three or more items considered problem gambling (Welte et al., 2001). The second scale was the revised South Oaks Gambling Screen (SOGS-R) for adults (Volberg, 1996) and the comparable version of the South Oaks Gambling Screen, Revised for Adolescents (SOGS-RA) (Winters & Henley, 1993). The 11 items which were common to both the adult and adolescent versions of the SOGS were added to the DIS items. Three or more symptoms denoted problem gambling for the present analysis. [It should be noted that although there is some overlap in subject matter measured by the two scales, no two of the individual questions had a high enough correlation to be considered redundant; most of the correlations between similar items were in the 0.2 to 0.5 range (see Welte, Barnes, Wiczorek, Tidwell & Hoffman, 2007 for more detail)].

Dependent measures – alcohol. Three measures of alcohol use in the past year were used for the present analysis – any alcohol use, heavy drinking (5+ drinks on 12+ days) and alcohol abuse and/or dependence. Both surveys included quantity-frequency questions for alcohol consumption. A drink of alcohol was defined as a drink of beer, ale, malt liquor, wine, fortified wine, wine coolers, liquor, and flavored malt beverages or any other beverage containing alcohol. *Drinkers* were defined as those respondents who indicated that they had a drink of any beverage containing alcohol in the past 12 months. A dichotomous measure of heavy drinking was based on whether or not respondents indicated that they drank five or more drinks in one day on 12 or more days in the past 12 months. DSM-IV-based measures of alcohol abuse and dependence also were included in the adult survey (Diagnostic Interview Schedule, Robins et al., 1996; Welte et al., 2001) and the youth survey (Adolescent Diagnostic Interview (ADI), Light (Winters & Henley, 1993; Barnes, Welte, Hoffman & Tidwell, 2011).

Independent variables. *Gender* was coded 0 for females and 1 for males. For this report, seven *age* groupings ranging from 14 to 17 years to 61+ years were derived from the continuous age variable. This report used a collapsed three-level race/ethnicity variable – black, Hispanic and whites plus all others. This classification allows sufficient numbers in each group for meaningful analysis.

For the adult survey, *socioeconomic status* (SES) was based on the mean of two equally weighted factors: respondent’s years of education and respondent’s occupational

prestige. When one of these factors was absent (as with a non-working respondent), the other was used. Only 129 respondents had any missing data on the SES variable. For the youth survey, the measure of socioeconomic status was based on the mean of four equally weighted factors: father’s years of education, mother’s years of education, father’s occupational prestige and mother’s occupational prestige. Occupational prestige was coded based on the census occupational categories (Stricker, 1988; Hauser & Warren, 1997). Both of these SES variables were scaled from 1 to 10 and had similar variances, enabling them to be merged for the combined analysis of the two studies. A five-level categorical variable, based on fifths, was also derived for use in the descriptive analysis.

Neighborhood disadvantage is an ecological measure based on objective data from the respondent’s census block group (Boardman et al., 2001). Data from each respondent’s census block group was attached to her/his case. The four census block-level variables used to create the neighborhood disadvantage scale were: (1) percentage of households on public assistance; (2) percentage of families headed by a female; (3) percentage of adults unemployed; and (4) the percentage of persons in poverty. These variables were standardized and averaged with equal weights. A standardized Z score was used in the logistic regression analyses with a score of 0 representing average neighborhood disadvantage.

RESULTS

Table 1 gives the demographic distributions for the various levels of gambling and alcohol use in this study. Gambling in the past year is more prevalent than drinking any alcohol in the past year (75% vs. 60%); this pattern is consistent for both females (70% vs. 57%) and males (81% vs. 62%). Males have twice the rate of frequent gambling (52+ times in the past year) as females (28% vs. 13%); similarly, males have twice the rate of problem gambling (3+ symptoms) as females (10.6% vs. 4.6%). Heavy drinking and alcohol abuse/dependence are likewise twice as common among males as females with 19% of males drinking five or more drinks on 12 or more days compared with a rate of 9% for females; 12.4% of males, as compared with 6.5% of females, have past year alcohol abuse or dependence.

Both overall gambling and drinking are highest within the 22–30 year age group. However, the age-related patterns of frequent and problem gambling show differences from the age-related patterns of heavy alcohol use and alcohol abuse/dependence. Frequent gambling (i.e., gambling 52+ times in the past year) is highest in the three middle age groups, 30s through 60s, and problem gambling is highest among the 22–30 age group (12.9%) and the 31–40 age group (10.7%). In contrast, heavy drinking is highest in the 18 to 21 age group (27%) and likewise, alcohol abuse/dependence is highest (22.3%) in this same 18 to 21 young adult age group.

As was the case for age patterns, race patterns are different for frequent and problem gambling than for heavy drinking and alcohol abuse/dependence. For example, whereas blacks have higher rates of frequent gambling and problem gambling than whites/others, blacks have lower rates of heavy drinking and alcohol abuse/dependence than whites/others (Table 1).

Frequent gambling and problem gambling are highest in the lowest socioeconomic group and highest in the group

Table 1. Gambling and alcohol involvement (percent in past year) by demographic factors (N = 4,905)

	N	Gambled	Gambled 52+ times	3+ Gambling symptoms	Any alcohol use	5+ Drinks on 12+ days	Alcohol abuse or dependence or both
ALL	4905	75	20	7.5	60	14	9.4
Female	2496	70	13	4.6	57	9	6.5
Male	2409	81	28	10.6	62	19	12.4
Age (in years)							
14–17	1171	62	15	5.7	34	8	9.3
18–21	1370	76	19	7.8	67	27	22.3
22–30	451	89	21	12.9	78	16	4.0
31–40	511	86	25	10.7	75	14	1.9
41–50	528	83	25	8.6	70	9	2.1
51–60	365	81	28	5.0	64	6	1.3
61+	509	69	21	3.8	52	3	.9
Race/ethnicity							
Black	649	67	25	12.3	40	8	6.7
Hispanic	675	76	22	10.3	54	16	11.6
All others	3581	77	19	6.1	64	15	9.5
SES							
Low fifth	1056	78	28	11.1	59	14	4.4
Second fifth	1014	76	21	8.8	53	12	7.1
Third fifth	970	75	21	6.4	58	16	11.7
Fourth fifth	952	75	18	6.1	63	17	14.7
Highest fifth	914	73	13	4.8	65	12	9.7
Neighborhood disadvantage							
Best fifth	960	75	15	5.1	65	13	9.6
Second best fifth	967	79	19	5.4	66	16	9.0
Middle fifth	958	76	22	7.7	62	16	10.5
Second worst fifth	948	73	21	7.6	56	13	9.4
Worst fifth	1058	73	25	11.5	50	12	8.2

with the greatest neighborhood disadvantage (i.e., the worst fifth). These same socioeconomic and neighborhood patterns do not apply to alcohol use and abuse. Overall alcohol use is highest in the two highest SES groups and highest in the two groups with the best neighborhood conditions. For heavy drinking and alcohol abuse/dependence, there is no consistent relationship to SES or neighborhood disadvantage in this large dataset.

Logistic regression analyses were used to predict dichotomous gambling and alcohol variables after entering all of the predictor variables. Table 2 shows the results for the three gambling dependent variables. In predicting any gambling in the past year, being male results in an 84% increase in gambling over being female. The age category 22–30 was set as the reference group in the logistic regression analyses. The age 31–40 is not significantly different from the reference group (22–30 years) whereas all of the other younger and older age groups have a significantly lower likelihood of gambling than the reference group. Being black is significantly predictive of a lower odds of being a gambler as compared with all other race/ethnic groups. Being Hispanic versus all other racial/ethnic groups results in no difference in gambling prevalence. Neither socioeconomic status or neighborhood disadvantage are significant predictors of overall gambling in the past year.

The logistic regression results for frequent gambling (gambling 52+ times in the past year) and problem gambling (3+ gambling problems in the past year) show some striking differences from the ‘any gambling’ analyses. Males have over twice the odds of being a frequent gambler or a problem gambler as do females. Blacks have a significantly increased odds of being a frequent gambler or being a problem gambler as compared with all others. Lower SES and higher

neighborhood disadvantage both are significant risk factors for frequent gambling and problem gambling. The interaction between SES and neighborhood disadvantage was significant in predicting problem gambling after controlling for all main effects and all interactions between SES and neighborhood disadvantage and age, gender, and race/ethnicity. Thus, problem gambling was highest when both SES is low and neighborhood disadvantage is high (Figure 1).

[Note: To investigate whether or not neighborhood disadvantage might simply be a proxy for gambling outlet density, we used the best available data from this study. In the adult gambling survey, respondents were asked a series of five questions regarding how convenient it was for them to buy lottery tickets, play bingo, play video gambling or slot

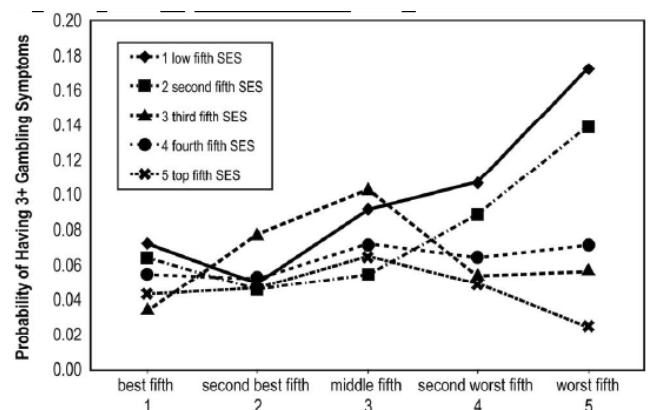


Figure 1. Probability of 3 or more problem gambling symptoms as a function of neighborhood disadvantage and individual socio-economic status

Table 2. Logistic regressions predicting the probability of any gambling, frequent gambling (52+ times), and problem gambling (3+ gambling symptoms) in the past year (N = 4,905)

Predictor	Dichotomous dependent variable		
	Any gambling OR ^a	Frequent gambling (Gambled 52+ times) OR ^a	Had 3+ gambling symptoms OR ^a
Gender			
Male	1.84***	2.80***	2.50***
Female (Reference)			
Age			
14–17	.19***	.74*	.47***
18–21	.37***	.97	.63*
22–30 (Reference)			
31–40	.73	1.28	.86
41–50	.55**	1.34	.72
51–60	.49**	1.58**	.40**
61+	.26***	1.13	.31***
Black vs. all other races	.63***	1.29*	1.51**
Hispanic vs. all other races	.97	1.06	1.27
SES (0–10)	1.00	.91***	.90***
Neighborhood disadvantage (ND) (Z score)	.99	1.11**	1.28***
Interaction between SES and ND (controlling for SES & ND interactions with other demographic variables)	NS	NS	.90***

^a OR = odds ratio; * $p < .05$, ** $p < .01$, *** $p < .001$, NS = not significant.

Table 3. Logistic regressions predicting the probability of any alcohol, heavy drinking (5+ drinks on 12+ days), and alcohol abuse/dependence in the past year (N = 4,905)

Predictor	Dichotomous dependent variable		
	Any alcohol OR ^a	Heavy drinking (5+ drinks on 12+ days) OR ^a	Had alcohol abuse, dependence or both OR ^a
Gender			
Male	1.30***	2.54***	2.17***
Female (Reference)			
Age			
14–17	.11***	.41***	2.10**
18–21	.51***	1.86***	6.42***
22–30 (Reference)			
31–40	.81	.74	.43*
41–50	.56***	.48***	.47
51–60	.42***	.30***	.29*
61+	.25***	.16***	.21**
Black vs. all other races	.41***	.42***	.60**
Hispanic vs. all other races	.72**	.79	.98
SES (0–10)	1.11***	.96	1.07**
Neighborhood disadvantage (Z score)	.86***	.94	.98
Interaction between SES and ND (controlling for SES & ND interactions with other demographics)	NS	NS	NS

^a OR = odds ratio; * $p < .05$, ** $p < .01$, *** $p < .001$, NS = not significant.

machines, visit a horse or dog track, and visit a casino. There were four response choices ranging from very inconvenient to very convenient. The five variables were averaged for a “convenience/density” variable. The correlation between the neighborhood disadvantage score and total gambling symptoms in the past year was .166 ($p < .001$). Next, a partial correlation analysis was run. The correlation between neighborhood disadvantage and gambling symptoms, controlling for the “convenience/density” of gambling, had a

negligible decrease to .165. Thus, the significant effect of neighborhood disadvantage on gambling symptoms did not diminish with convenience of gambling in the analysis.]

Table 3 shows the parallel logistic regressions for the three dichotomous alcohol variables. Males have a 30% increased odds of being a drinker as do females. Respondents 21 and younger, as well as respondents 41 and older, have a decreased likelihood of being a drinker as compared with those in their twenties and thirties. Both blacks and Hispan-

ics have a decreased odds of being a drinker as compared with others. Persons with higher socioeconomic status are more likely to be drinkers than those in lower socioeconomic groups. Similarly, those with less neighborhood disadvantage are more likely to have consumed any alcohol in the past year.

Males have over twice the odds of being heavy drinkers (consuming 5+ drinks on 12 or more days in the past year) and having alcohol abuse or dependence or both in the past year than do females. In general, older adults are significantly less likely to be heavy drinkers and less likely to have alcohol abuse/dependence than are respondents in the twenties reference group. However, young adults aged 18 to 21 years are significantly more likely to be heavy drinkers and to have alcohol abuse/dependence than are their counterparts in the 22 to 30 year reference group. Strikingly, 18 to 21 year olds have over 6 times the odds of having alcohol abuse or dependence in the past year than those aged 22–30 years.

Blacks have a significantly lower likelihood of heavy drinking and they have a lower likelihood of having alcohol abuse/dependence than all others. There is no significant relationship between SES and heavy drinking; however, higher SES is associated with a somewhat higher likelihood of having alcohol abuse/dependence. There are no significant relationships between neighborhood disadvantage and heavy drinking or alcohol abuse/dependence. Interactions between neighborhood disadvantage and SES were not significant for all three alcohol variables.

DISCUSSION

Despite decades of theory and research linking neighborhood disorganization to crime and delinquency, virtually no research has been carried out to examine the potential links between neighborhood disadvantage and gambling behaviors and problems among the general U.S. population; and very little research has tested the effects of neighborhood disorganization on alcohol abuse. In this paper, we examined the effects of neighborhood disorganization on gambling behaviors and problem gambling, as well as the relationships between neighborhood disorganization and alcohol use and abuse/dependence. We examined these relationships in a large ($N = 4,905$) combined sample of two comparable U.S. surveys with respondents ages ranging from 14 years to 90+ years. Using such a large general population sample allowed for a consideration of a broad range of sociodemographic variables, including gender, age, race/ethnicity and individual socioeconomic status in addition to the ecological variable of focus, i.e., neighborhood disadvantage. The sample also allowed for analyses involving interactions, especially the interaction between neighborhood disadvantage and SES for its predictive effects on alcohol and gambling variables. This approach is a significant methodological advancement for neighborhood effects research.

The findings from this study support, in part, the first hypothesis in that neighborhood disadvantage significantly predicts frequent gambling and problem gambling after accounting for the key sociodemographic factors – gender, age, race/ethnicity and respondents' socioeconomic status. However, neighborhood disadvantage does not predict *any* gambling in the past year. Neighborhood disadvantage appears only to be linked with gambling behaviors which reach frequent or problematic levels.

These problem gambling findings are consistent with the early foundations of disorganization theory as developed by Shaw and McKay (1942) such that neighborhoods with low economic indicators showed high rates of delinquency and crime. Such socially disorganized neighborhoods were characterized as lacking the capacity to regulate behaviors thereby disrupting community social organization and resulting in elevated rates of delinquency and crime.

Our finding linking neighborhood disadvantage with problem gambling is also consistent with the seminal work of Wilson (1987) which conceptualizes the effects of living in neighborhoods that are impoverished (poor, minority, female-only-headed households) as “concentration effects”. According to Wilson (2010), these impoverished neighborhoods have a lack of access to jobs and job networks, lack of quality schools, and lack of exposure to conventional role models. Sampson and Wilson (1995) characterize social disorganization as the inability of a community structure to realize common values and maintain effective social controls. Neighborhoods (institutions churches, schools, stores) remain viable if support comes from economically stable families (Sampson & Wilson, 1995). Such neighborhood disadvantage may provide a likely environmental context for the development of problem gambling.

Although social disorganization theory emphasizes the effects of ecological influences on problem behaviors over and above individual characteristics, our analyses show strong effects of individual characteristics on gambling behaviors and problems. Being male, being black and having low socioeconomic status are significant risk factors for problem gambling. In our national sample, there is also evidence of a person-ecological interaction, such that having low socioeconomic status in conjunction with living in a disadvantaged neighborhood is a highly significant condition for the occurrence of problem gambling. Thus, these findings suggest that person-environment effects are important considerations for a fuller understanding of problem gambling.

Despite previous findings that problem gambling and alcohol abuse are correlated (Barnes et al., 2005, 2009; Welte et al., 2001), all of the predictors of alcohol abuse are not the same as they are for problem gambling in the present study. Thus, the second hypothesis, that neighborhood disadvantage would predict alcohol abuse as it does problem gambling is not upheld. Alcohol abuse is not significantly related to neighborhood disadvantage, nor to the interaction of neighborhood disadvantage and SES. Alcohol abuse is highly prevalent for males and young people, in particular, across neighborhoods of all types. These findings suggest that in spite of the correlation between problem gambling and alcohol use/dependence, there is also something unique in explaining problem gambling. It may be that people who live in disadvantaged neighborhoods do not see many role models of financial success achieved through conventional means, and therefore, gambling may be viewed as one of the few opportunities for financial advancement (Welte, Wieczorek, Barnes & Tidwell, 2006). Gambling perhaps provides the lure of a means for obtaining immediate money.

Although there are a limited number of studies examining neighborhood disadvantage on respondents' substance use, Boardman et al. (2001) found a significant effect ($p < .05$) of neighborhood disadvantage on drug use (other than alcohol) in a general population adult sample in the Detroit area. Their measure of neighborhood disadvantage is

the same one we used in the present study. Boardman et al. (2001) also controlled for individual level variables (e.g., gender, age, family income) in their logistic regression model. The authors suggest that “if drug use [unlike alcohol use in our study] is more common in highly disadvantaged neighborhoods, then social contact among neighbors may be one of the primary mechanisms through which the increased risk of drug use operates” (Boardman et al., 2001, p. 162). Although our measures of neighborhood disadvantage are comparable, the samples are very different – a targeted urban adult sample in Detroit versus a national U.S. sample including adolescents as well as adults. Furthermore, illicit drug use is often perceived as more deviant than alcohol abuse although the devastating consequences are often the same. Also, unlike the present findings, Karriker-Jaffe et al. (2012) found that neighborhood disadvantage was related to heavy drinking by African-Americans but not by whites. Further research is needed to better understand the differences in neighborhood effects for problem gambling and alcohol abuse.

A limitation of this study and of neighborhood effects research in general is that there may be a differential selection of individuals into certain disadvantaged communities (Sampson et al., 2002). Thus, while neighborhood disadvantage may influence the development of problem gambling, individuals with gambling problems may move to areas where the cultural context of problem gambling is evident. In addition, a preponderance of problem gambling in a neighborhood may well contribute to further decline in that neighborhood. The present cross-sectional study cannot sort out the bidirectional effects of problem gambling and neighborhood disorganization. Future longitudinal studies are required to address this issue. A further limitation of the present study is that it did not examine social process factors in neighborhoods such as the frequency and types of interactions among neighborhoods. Such interactions are likely to have effects on individual’s gambling behaviors.

CONCLUSIONS

The important finding from the present national U.S. survey of 14 to 90+ year olds, is that neighborhood disadvantage has a highly significant effect on problem gambling over and above the significant individual effects of gender, age, race/ethnicity and socioeconomic status. Furthermore, when individual socioeconomic status is low and neighborhood disadvantage is high, problem gambling is at the highest level. This study provides strong evidence that neighborhood ecology as well as the interaction of individual and neighborhood factors are important predictors of problem gambling. Future research should extend neighborhood ecological research by examining social process factors in neighborhoods such as frequency and types of interactions among neighbors and types of social control such as availability of gambling and alcohol in communities.

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REFERENCES

- American Psychiatric Association (1994). *DSM-IV: Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: American Psychiatric Association.
- Barnes, G. M., Welte, J. W., Hoffman, J. H. & Dintcheff, B. A. (2005). Shared predictors of youthful gambling, substance use, and delinquency. *Psychology of Addictive Behaviors, 19*, 165–174.
- Barnes, G. M., Welte, J. W., Hoffman, J. H. & Tidwell, M-C. O. (2009). Gambling, alcohol and other substance use among youth in the U.S. *Journal of Studies on Alcohol and Drugs, 70*, 134–142.
- Barnes, G. M., Welte, J. W., Hoffman, J. H. & Tidwell, M-C. O. (2011). The co-occurrence of gambling with substance use and conduct disorder among youth in the U.S. *The American Journal on Addictions, 20*, 166–173.
- Barnes, G. M., Welte, J. W., Tidwell, M-C. O. & Hoffman, J. H. (2011). Gambling on the lottery: Sociodemographic correlates across the lifespan. *Journal of Gambling Studies, 27*, 575–586.
- Boardman, J. D., Finch, B. K., Ellison, C. G., Williams, D. R. & Jackson, J. S. (2001). Neighborhood disadvantage, stress, and drug use among adults. *Journal of Health and Social Behavior, 42*, 151–165.
- Clotfelter, C. T. & Cook, P. J. (1991). *Selling hope: State lotteries in America* (First Harvard University Press paperback edition). Cambridge, MA: Harvard University Press.
- Donovan, J. E. & Jessor, R. (1985). Structure of problem behavior in adolescence and young adulthood. *Journal of Consulting and Clinical Psychology, 53*, 890–904.
- Gilliland, J. A. & Ross, N. A. (2005). Opportunities for video lottery terminal gambling in Montreal. *Canadian Journal of Public Health, 96*, 55–59.
- Hauser, R. M. & Warren, J. R. (1997). Socioeconomic indexes for occupations: A review, update, and critique. *Sociological Methodology, 27*, 177–298.
- Jessor, R. & Jessor, S. L. (1977). *Problem behavior and psychosocial development: A longitudinal study of youth*. New York: Academic Press.
- Karriker-Jaffe, K. J., Zeng, S. E., Mulia, N., Jones-Webb, R., Bond, J. & Greenfield, T. K. (2012). Neighborhood disadvantage and adult alcohol outcomes: Differential risk by race and gender. *Journal of Studies on Alcohol and Drugs, 73*, 865–873.
- Martinez, R., Jr., Rosenfeld, R. & Mares, D. (2008). Social disorganization, drug market activity, and neighborhood violent crime. *Urban Affairs Review, 43*, 846–874.
- Martins, S. S., Storr, C. L., Lee, G. P. & Jalongo, N. S. (2012). Environmental influences associated with gambling in young adulthood. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, Epub ahead of print, doi: 10.1007/s11524-012-9751-1.
- Robins, L., Marcus, L., Reich, W., Cunningham, R. & Gallagher, T. (1996). *NIMH Diagnostic Interview Schedule – Version IV (DIS-IV)*. St. Louis: Dept. of Psychiatry, Washington University School of Medicine.
- Sampson, R. J., Morenoff, J. D. & Gannon-Rowley, T. (2002). Assessing “neighborhood effects”: Social processes and new directions in research. *Annual Review of Sociology, 28*, 443–478.
- Sampson, R. J. & Wilson, W. J. (1995). Toward a theory of race, crime and urban inequality. In J. Hagan & R. D. Peterson (Eds.), *Crime and inequality* (pp. 37–54). Stanford, CA: Stanford University Press.
- Shaw, C. R. & McKay, H. D. (1942; revised 1969). *Juvenile delinquency in urban areas*. Chicago: University of Chicago Press.
- SPSS Inc. (2008). *SPSS Advanced Statistics 17.0*. Chicago, IL: SPSS Inc.

- Stricker, L. J. (1988). Measuring social status with occupational information: A simple method. *Journal of Applied Social Psychology, 18*, 423–437.
- Volberg, R. A. (1996). *Gambling and problem gambling in New York: A 10-year replication survey, 1986 to 1996*. Albany, NY: New York Council on Problem Gambling.
- Welte, J. W., Barnes, G. M., Tidwell, M-C. & Hoffman, J. H. (2011). Gambling and problem gambling across the lifespan. *Journal of Gambling Studies, 27*, 49–61.
- Welte, J. W., Barnes, G. M., Tidwell, M-C. O. & Hoffman, J. H. (2008). The prevalence of problem gambling among U.S. adolescents and young adults: Results from a national survey. *Journal of Gambling Studies, 24*, 119–133.
- Welte, J. W., Barnes, G. M., Wieczorek, W. F., Tidwell, M. C. & Hoffman, J. H. (2007). Type of gambling and availability as risk factors for problem gambling: A Tobit regression analysis by age and gender. *International Gambling Studies, 7*, 183–198.
- Welte, J. W., Barnes, G. M., Wieczorek, W. F., Tidwell, M-C. O. & Parker, J. (2001). Alcohol and gambling pathology among U.S. adults: Prevalence, demographic patterns and co-morbidity. *Journal of Studies on Alcohol, 62*, 706–712.
- Welte, J. W., Wieczorek, W. F., Barnes, G. M. & Tidwell, M-C. (2006). Multiple risk factors for frequent and problem gambling: Individual, social, and ecological. *Journal of Applied Social Psychology, 36*, 1548–1568.
- Welte, J. W., Wieczorek, W. F., Barnes, G. M., Tidwell, M-C. & Hoffman, J. H. (2004). The relationship of ecological and geographic factors to gambling behavior and pathology. *Journal of Gambling Studies, 20*, 405–423.
- Wilson, D. H., Gilliland, J., Ross, N. A., Derevensky, J. & Gupta, R. (2006). Video lottery terminal access and gambling among high school students in Montreal. *Canadian Journal of Public Health, 97*, 202–206.
- Wilson, W. J. (1987). *The truly disadvantaged – The inner city, the underclass, and public policy*. Chicago, The University of Chicago Press.
- Wilson, W. J. (2010). Why both social structure and culture matter in a holistic analysis of inner-city poverty. *The Annals of the American Academy of Political and Social Science, 629*, 220–219.
- Winters, K. C. & Henley, G. A. (1993). *Adolescent Diagnostic Interview schedule and manual*. Los Angeles, California: Western Psychological Services.
- Winstanley, E. L., Steinwachs, D. M., Ensminger, M. E., Latkin, C. A., Stitzer, M. L. & Olsen, Y. (2008). The association of self-reported neighborhood disorganization and social capital with adolescent alcohol and drug use, dependence, and access to treatment. *Drug and Alcohol Dependence, 92*, 173–182.