THE NATIONAL LONGITUDINAL STUDY OF GAMBLING BEHAVIOUR (NLSGB): PRELIMINARY RESULTS

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INTRODUCTION

- The NLSGB tracked 300 gamblers over a 15-month period.
- A comprehensive survey instrument was compiled to analyse factors that might influence changes in risk of gambling problems over time.
- The study was conducted in the four major metropolitan areas of South Africa: Johannesburg, Tshwane, Durban and Cape Town.

We will discuss the study's design and implementation and some preliminary results.

BACKGROUND

- In 2008 we conducted the National Urban Prevalence Study of Gambling Behaviour (NUPSGB). The mandate was to establish baseline prevalence rates for gambling and problem gambling in the country and to analyse risk factors for pathological gambling (PG).
- To this end, a sample of 3000 people was drawn from the four major metropolitan areas of the country.
- While crucial for establishing baseline prevalence rates, the NUPSGB was a blunt instrument for detecting factors that may influence changes in gambling behavior over time.

STUDY DESIGN

- Unlike other panel studies that typically have long gaps between waves of data collection – the norm being one year – we decided to focus on the short run determinants of gambling behaviour by visiting a sample of 300 gamblers every three months.
- With 6 visits in total over a period of 15 months, we could collect a wealth of data on each person while minimising sample attrition.
- To our knowledge, no study has made this number of repeat visits to a sample of gamblers.

QUESTIONNAIRE DESIGN

- A literature review was conducted to determine which questions and screens warranted inclusion in the survey instrument.
- This process culminated in the development of a questionnaire that included 26 questions on personal and household demographics and 29 questions on gambling participation, expenditure and attitudes.
- We also included 12 questions focusing on people's expectations with respect to the future.
- In addition, a number of validated psychological screens were included to assess gambling behaviour and other factors.
- The list includes, but is not limited to: the PGSI, the BDI-II, the BAI, the BIS-11 and the WHO ASSIST.

DIARY INTERVENTION

- The research team also designed a simple randomised control trial (RCT) that took place during the final two waves of the study.
- This "diary intervention" randomly allocated research subjects in each category of risk severity, based on their scores on the PGSI, to a treatment and control group.
- The treatment group received a weekly telephone call that gathered information on their gambling behaviour during the past week. The control group were not contacted.
- The rationale for this intervention was to test whether people who monitored and reported their gambling behaviour on a weekly basis would be significantly different on measures of gambling behaviour and risk severity at follow-up to those who were not contacted.

TRANSLATION

- SA has 11 official languages but the research instruments were only translated into the five languages with substantial prevalence in the survey areas: Afrikaans, IsiZulu, IsiXhosa, Sesotho and Setswana.
- Extensive back-translation and validation through pilots were conducted.

SAMPLING

- Using the PGSI classification of severity of risk for PG, we aimed to recruit 100 people in the no and low risk categories, 100 people in the moderate risk category and 100 people in the problem gambler category.
- The NUPSGB provided a large pool of gamblers from which to draw. However it did not provide enough gamblers in each category of severity so in December 2009 and February 2010 advertisements were placed in local newspapers in the Johannesburg and Cape Town areas to recruit more participants.

SAMPLING CONTD.

- Given the 14-month lag between the NUPSGB and the start of the panel study we expected some people's PG risk severity to have changed over that time. This was assessed during the first wave of fieldwork.
- To bolster the credibility of the research project and to prevent attrition between recruitment and commencement of the study, people who agreed to participate were paid R14.50 two days after they were recruited; this money was delivered to their houses.

ATTRITION

- As with any longitudinal study there was sample attrition over time.
- 300 people were initially recruited for the study. 298 took part in wave 1.
- The number of participants dropped to 291 in the second wave, 281 in the third, 270 in the fourth, 258 in the fifth and 248 in the sixth.
- The following table presents sample attrition across waves of the study according to initial PGSI classification.

SAMPLE ATTRITION ACROSS WAVES OF THE STUDY

	Number of participants					
Initial PGSI classification	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6
No Risk	96	94	93	86	85	84
Low Risk	36	36	33	33	31	30
Moderate Risk	73	71	66	63	60	57
Problem Gambler	93	90	89	88	82	77
Total	**298**	**291**	**281**	**270**	**258**	**248**

SUMMARY STATISTICS

TABLE I
SUMMARY STATISTICS OF NLSGB DATA - WAVE 1

Variable	Mean	Std Deviation
Female	0.479	0.500
African	0.674	0.469
White	0.144	0.352
Coloured[1]	0.107	0.310
Asian/Indian	0.074	0.262
Education	12.323	2.359
Cape Town	0.186	0.389
Durban	0.162	0.369
Johannesburg[2]	0.588	0.493
Pretoria/Tshwane	0.065	0.247
Employed[3]	0.601	0.491
Age	38.188	12.201
Number of dependents	3.507	2.422
LSM score[4]	6.842	1.693
Gamble (last month)	0.862	0.345
Amount spent gambling (last month)	999.166	3064.523
Drink alcohol	0.534	0.499
Smoke tobacco	0.366	0.482
Depression score	11.507	11.056
Anxiety score	9.128	10.035
Impulsivity score	61.960	9.862

Notes

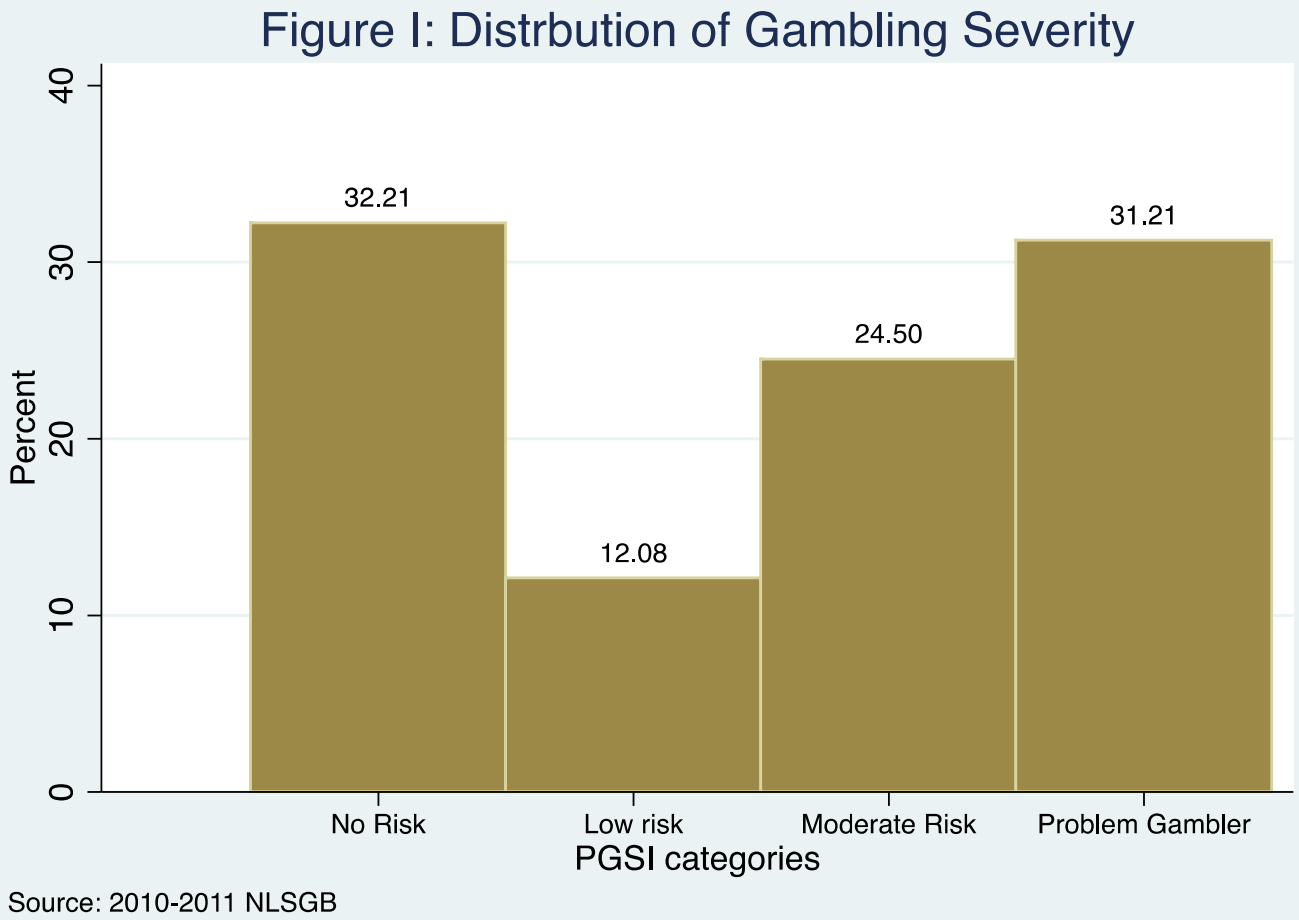
[1] 'Coloured' refers to people of mixed-race origin

[2] Johannesburg includes Soweto, the East Rand and the West Rand

[3] Employment includes full-time, part-time and seasonal employment

[4] Score on the Living Standards Measure (Range 0 - 10)

DISTRIBUTION OF PG RISK SEVERITY, WAVE 1



GAMBLING ACTIVITY PARTICIPATION

TABLE II

PROPORTION OF SAMPLE PLAYING EACH ACTIVITY ACROSS WAVES

Activity	**Wave 1**	**Wave 2**	**Wave 3**	**Wave 4**	**Wave 5**	**Wave 6**
Lucky draws excluding lottery	12.42%	9.62%	4.27%	3.70%	1.56%	4.03%
Scratch cards	23.15%	18.21%	19.22%	15.56%	14.34%	17.34%
Fafi / iChina	11.74%	7.56%	8.19%	8.52%	7.36%	8.87%
Lotteries (e.g. Lotto, Powerball)	73.49%	71.82%	74.02%	67.78%	65.50%	70.56%
Bingo	3.36%	2.06%	1.42%	2.22%	0.39%	1.21%
Dice games for money	6.38%	6.87%	4.27%	5.56%	5.04%	3.63%
Roulette	7.72%	6.53%	7.47%	9.26%	4.26%	6.45%
Card games for money	13.09%	11.34%	7.83%	9.26%	3.88%	5.24%
Slot machines	28.86%	23.02%	21.35%	22.22%	17.44%	18.15%
Animal betting	8.72%	6.19%	4.98%	5.56%	5.81%	6.45%
Sport betting	13.76%	8.93%	6.41%	7.04%	6.59%	11.69%
Electronic gaming machines	9.06%	5.15%	2.85%	5.93%	3.10%	2.42%
Other	1.34%	0.69%	0.36%	0.74%	0.39%	1.21%

FREQUENCY OF GAMBLING ACTIVITY PARTICIPATION

TABLE III

AVERAGE NUMBER OF TIMES EACH ACTIVITY WAS PLAYED LAST MONTH

Activity	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6
Lucky draws excluding lottery	6.38	4.32	6.58	6.30	3.75	5.40
	(4.57)	(2.47)	(4.54)	(3.02)	(2.06)	(2.80)
Scratch cards	8.23	6.55	6.22	6.50	7.54	7.60
	(10.14)	(6.07)	(3.82)	(6.60)	(7.52)	(9.52)
Fafi / iChina	19.00	11.09	15.61	16.74	14.47	14.27
	(20.15)	(7.30)	(13.19)	(13.61)	(12.06)	(11.61)
Lotteries (e.g. Lotto, Powerball)	7.79	6.05	6.72	7.40	6.07	5.75
	(6.99)	(3.47)	(4.00)	(6.40)	(3.33)	(3.78)
Bingo	5.60	5.50	4.75	5.17	4.00	3.67
	(3.53)	(3.89)	(4.99)	(4.12)	(0.00)	(0.58)
Dice games for money	10.21	7.45	8.42	9.00	9.31	7.56
	(8.40)	(3.50)	(5.32)	(6.74)	(10.55)	(5.43)
Roulette	5.04	5.53	4.52	5.72	6.55	5.50
	(4.59)	(4.68)	(3.16)	(3.77)	(3.98)	(5.87)
Card games for money	7.72	6.52	8.77	6.80	8.10	10.54
	(7.44)	(6.49)	(6.33)	(7.31)	(6.84)	(13.36)
Slot machines	4.86	4.34	4.42	5.02	5.16	3.89
	(3.94)	(3.75)	(4.16)	(4.48)	(8.34)	(3.71)
Animal betting	9.31	8.17	6.07	4.80	6.64	9.81
	(8.87)	(7.15)	(5.83)	(2.91)	(7.38)	(10.03)
Sport betting	7.41	7.65	7.33	6.68	8.88	11.07
	(7.82)	(9.47)	(6.16)	(4.66)	(9.43)	(16.92)
Electronic gaming machines	5.19	4.93	6.38	5.50	5.25	5.83
	(3.60)	(3.33)	(5.21)	(4.10)	(5.23)	(3.82)
Other	11.25	2.50	4.00	1.00	6.00	10.67
	(12.09)	(2.12)	(0.00)	(0.00)	(0.00)	(15.04)

Standard deviation in parentheses

MONEY SPENT ON GAMBLING ACTIVITIES

TABLE IV

AVERAGE AMOUNT SPENT ON EACH ACTIVITY IN LAST MONTH ACROSS WAVES

Activity	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6
Lucky draws excluding lottery	R144.22	R89.46	R195.42	R259.50	R242.50	R105.00
	(255.49)	(98.37)	(253.07)	(444.41)	(245.27)	(145.30)
Scratch cards	R72.99	R117.49	R58.85	R73.55	R71.03	R92.57
	(101.51)	(411.56)	(62.53)	(102.03)	(97.95)	(165.45)
Fafi / iChina	R76.91	R82.09	R101.65	R91.52	R121.26	R171.48
	(65.37)	(97.77)	(131.15)	(138.93)	(160.13)	(260.89)
Lotteries (e.g. Lotto, Powerball)	R115.28	R153.37	R111.11	R167.99	R152.70	R123.23
	(201.49)	(391.91)	(194.45)	(611.73)	(351.47)	(198.02)
Bingo	R353.00	R52.00	R102.50	R781.67	R15.00	R123.33
	(319.38)	(42.24)	(133.01)	(1578.99)	(0.00)	(25.17)
Dice games for money	R364.11	R408.75	R262.50	R294.00	R705.38	R303.89
	(608.29)	(615.76)	(366.49)	(279.48)	(1045.81)	(386.02)
Roulette	R1 590.00	R1 444.74	R1 426.19	R1 153.00	R1 803.64	R1 218.13
	(2448.10)	(1847.14)	(2723.63)	(1626.91)	(2243.60)	(2367.35)
Card games for money	R856.28	R492.73	R939.09	R1 391.12	R1 405.50	R147.31
	(2439.40)	(665.52)	(2012.30)	(4121.44)	(3729.18)	(141.74)
Slot machines	R1 068.69	R1 056.49	R1 287.67	R1 312.50	R1 104.00	R1 228.57
	(1984.38)	(1774.50)	(2428.52)	(2319.82)	(1868.24)	(2202.16)
Animal betting	R1 467.27	R1 365.94	R1 550.86	R2 866.53	R3 190.71	R3 443.75
	(4010.34)	(4664.14)	(4459.40)	(10274.15)	(10606.69)	(12419.04)
Sport betting	R464.46	R696.00	R216.72	R692.74	R601.76	R705.72
	(1588.78)	(1944.87)	(255.78)	(2267.01)	(1140.91)	(1956.06)
Electronic gaming machines	R1 168.89	R974.00	R2 531.25	R1 086.88	R717.50	R2 350.00
	(2284.96)	(1215.80)	(5155.28)	(1604.50)	(988.02)	(3980.33)
Other	R27.25	R504.00	R200.00	R30.00	R1 000.00	R87.33
	(16.88)	(701.45)	(0.00)	(28.28)	(0.00)	(140.93)

Standard deviation in parentheses

TABULATION OF PGSI CATEGORIES

- Table V tabulates PGSI scores across all 6 waves and decomposes counts into between and within components.
- The table shows the instability of PG risk severity classification over the short intervals of the study.

TABLE V

TABULATION OF PGSI CATEGORIES

	Overall		Between		Within
Category	Frequency	Percent	Frequency	Percent	Percent
No Risk	653	39.67	227	76.17	51.37
Low Risk	264	16.04	161	54.03	28.95
Moderate Risk	330	20.05	182	61.07	34.73
Problem Gambler	399	24.24	177	59.40	40.44
Total	1646	100	747	250.67	39.89

TRANSITION PROBABILITIES OF PGSI CATEGORIES

- Table VI shows the transition probabilities of PG risk severity categories across waves of the study.
- The principal diagonal of the table shows the likelihood that people who were classified in a particular PG risk severity category in one wave would remain there by the next.

TABLE VI

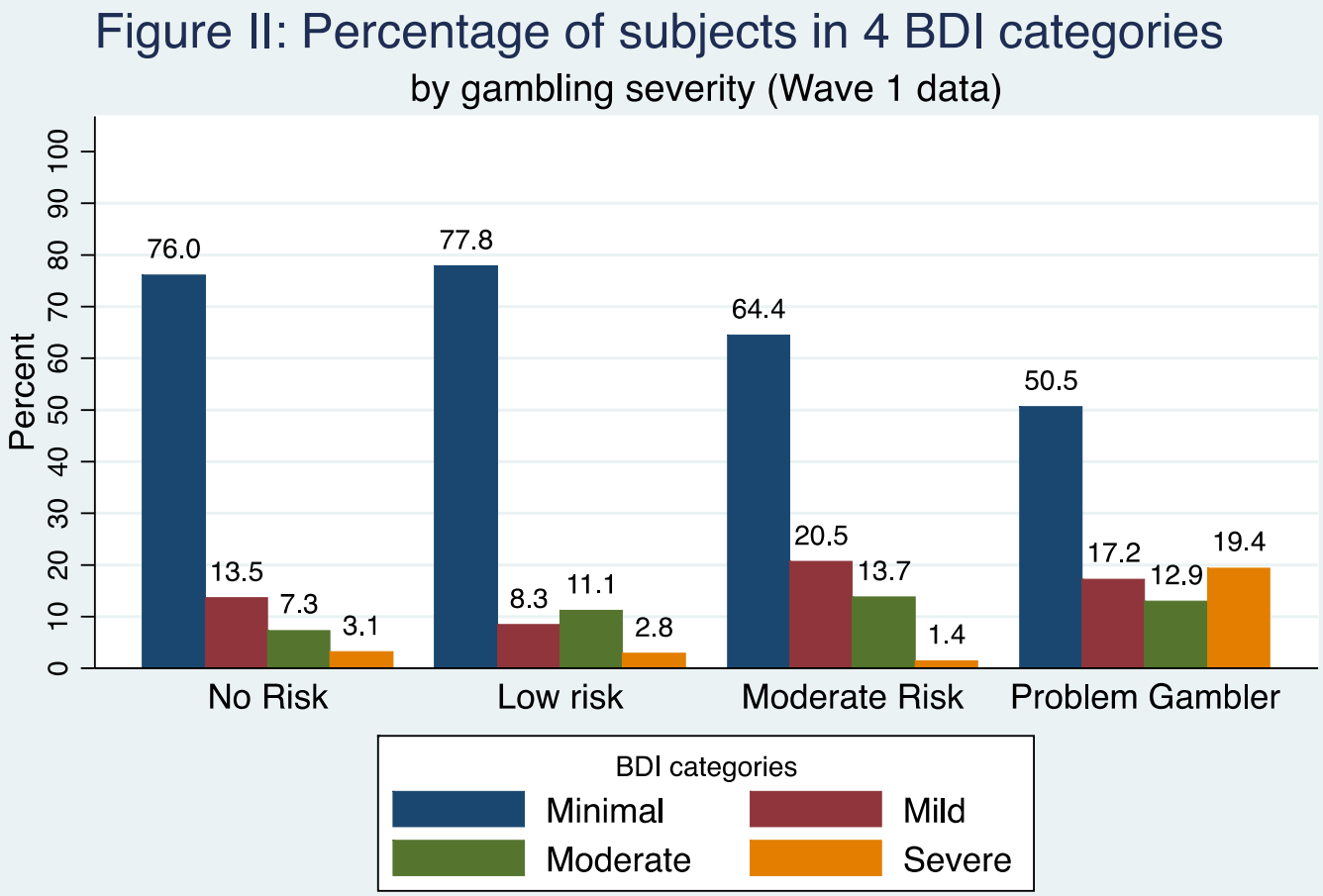
TRANSITION PROBABILITIES OF PGSI CATEGORIES

	PGSI Category (Final Values)				
PGSI Category (Initial Values)	No Risk	Low Risk	Moderate Risk	Problem Gambler	Total
No Risk	61.50	15.89	9.91	12.71	100
Low Risk	42.92	25.94	17.92	13.21	100
Moderate Risk	23.59	17.25	34.51	24.65	100
Problem Gambler	22.08	12.30	21.45	44.16	100
Total	41.32	16.91	19.07	22.70	100

CO-OCCURRING CONDITIONS

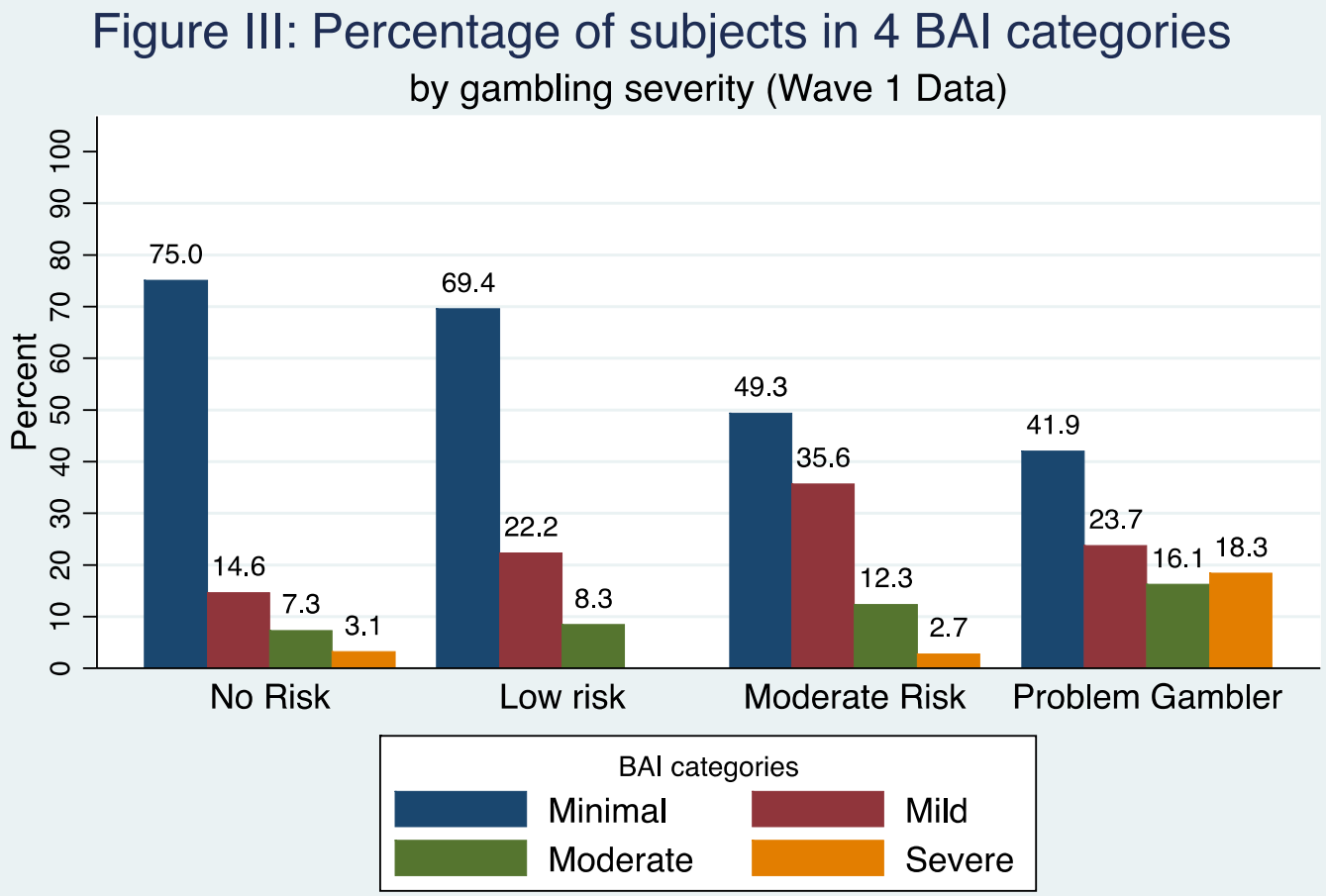
- Numerous studies have found that people with gambling problems also tend to suffer from anxiety, depression, other impulse control disorders and substance use disorders.
- The NLSGB's survey instrument included a number of modules to assess these potentially co-occurring conditions.
- Here we focus on anxiety, depression, impulsivity and alcohol and tobacco use.

GAMBLING AND DEPRESSION



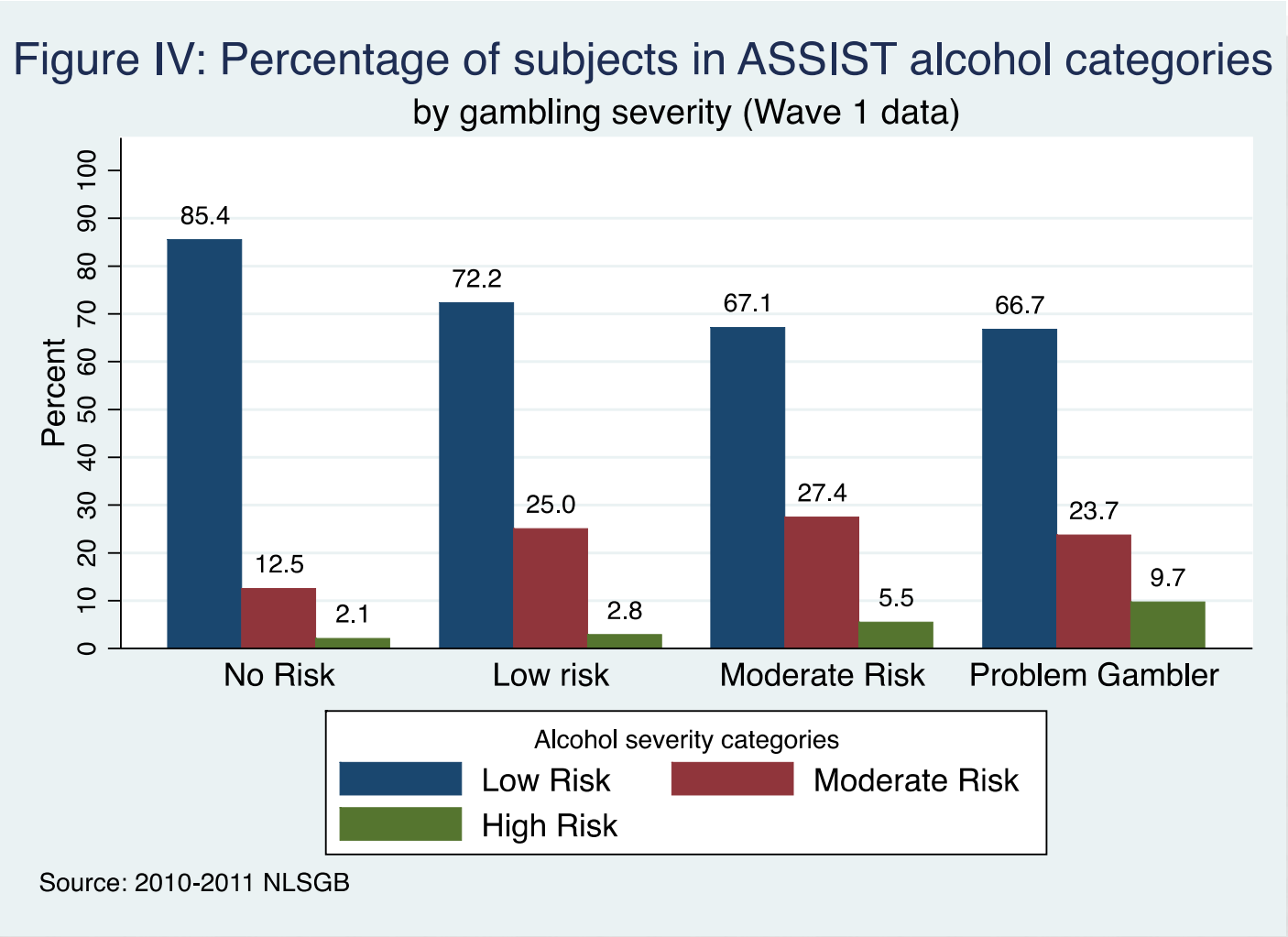
Source: 2010-2011 NLSGB

GAMBLING AND ANXIETY

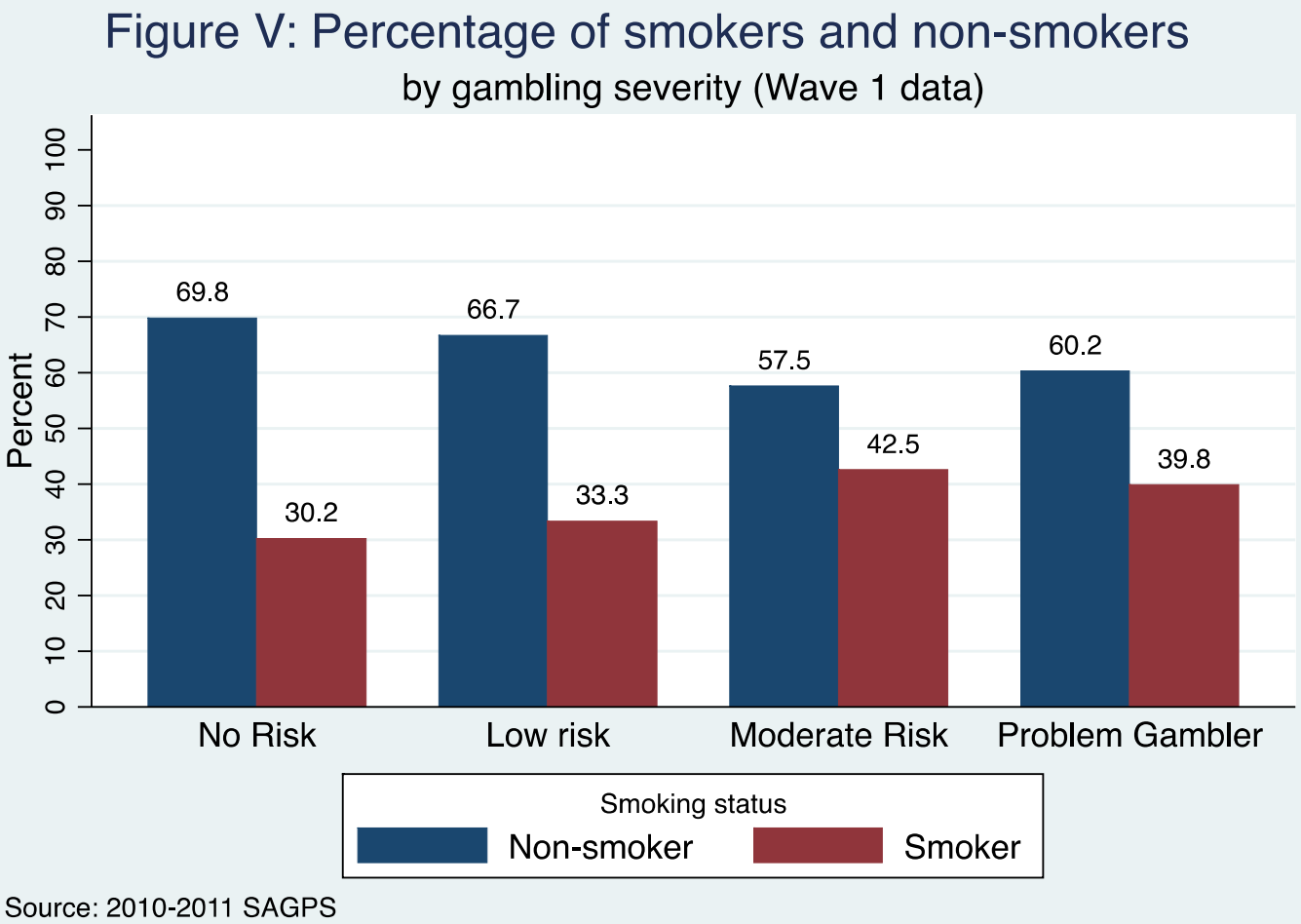


Source: 2010-2011 NLSGB

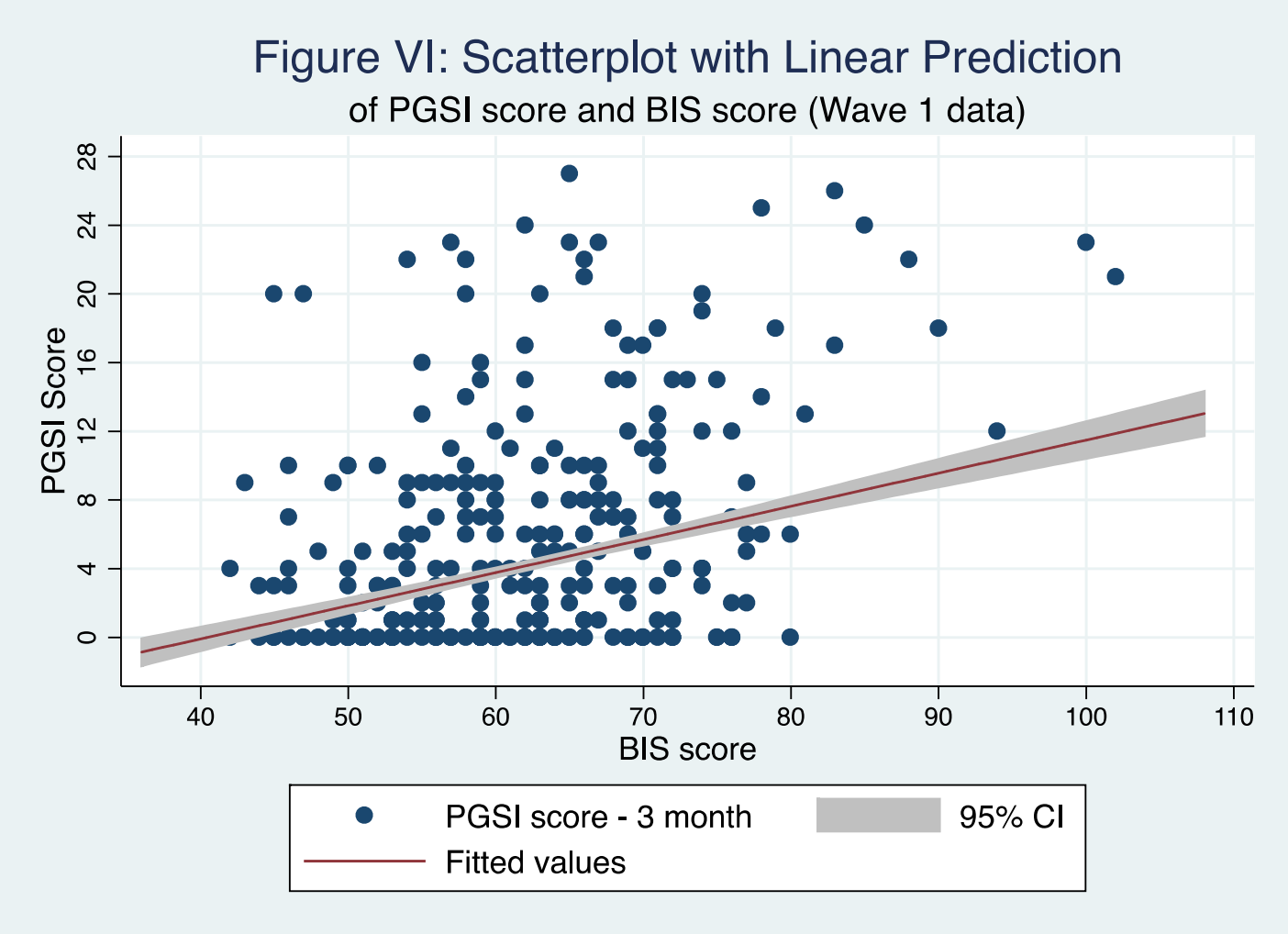
GAMBLING AND ALCOHOL USE



GAMBLING AND SMOKING



GAMBLING AND IMPULSIVITY



FACTORS AFFECTING PG RISK SEVERITY OVER TIME

- We now focus on the factors that affect PG risk severity over time, using three models.
- The first model, Pooled OLS, fits an ordinary least squares (OLS) line to the data but does not specifically take into account the panel structure of the dataset.
- The second set of estimates is based on a Random Effects model which takes into account the panel structure of the data but assumes that the variation across people is random and uncorrelated with the independent variables in the model.
- The final set of estimates is based on a Fixed Effects model which incorporates the panel structure of the data and removes the impact of any time-invariant characteristics of a person (for example, sex; or less prosaically a genetic predisposition to gambling problems).

TABLE VII

FACTORS AFFECTING GAMBLING SEVERITY OVER TIME

	Pooled OLS	Random Effects	Fixed Effects
Education	0.148	0.207**	-0.149
	(0.10)	(0.10)	(0.28)
Employed	0.675	0.02	-0.661
	(0.42)	(0.35)	(0.41)
Age	0.02	0.024	-0.081
	(0.02)	(0.02)	(0.31)
LSM score	0.176	-0.014	-0.262*
	(0.13)	(0.11)	(0.15)
ASSIST - alcohol score	0.015	0.024	0.026
	(0.03)	(0.02)	(0.02)
Smoke	-0.123	0.008	0.036
	(0.46)	(0.40)	(0.58)
BDI score	0.104**	0.061**	0.038*
	(0.05)	(0.03)	(0.02)
BAI score	0.069**	0.071***	0.069***
	(0.03)	(0.02)	(0.02)
BIS score	0.152***	0.130***	0.118***
	(0.02)	(0.02)	(0.02)
Wave 2	-1.426***	-1.541***	-1.585***
	(0.35)	(0.34)	(0.35)
Wave 3	-1.148***	-1.274***	-1.271***
	(0.40)	(0.36)	(0.37)
Wave 4	-0.479	-0.622	-0.595
	(0.43)	(0.39)	(0.46)
Wave 5	-2.027***	-2.175***	-2.094***
	(0.39)	(0.37)	(0.50)
Wave 6	-0.883**	-0.875**	-0.683
	(0.42)	(0.41)	(0.61)
Constant	-9.745***	-7.268***	4.255
	(2.15)	(1.87)	(12.47)
N	1638	1638	1638
F-stat / χ^2	13.61	206.05	12.96
Prob > F	0.00	0.00	0.00

Results are robust to heteroskedasticity

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

FACTORS AFFECTING PG RISK SEVERITY OVER TIME

- A robust finding across all models is that depression, anxiety and impulsivity are positively associated with severity of risk for problem gambling.
- The bivariate relationship between PG risk severity and alcohol use is not confirmed in our multivariate models.
- Many studies of a wide range of mental disorders, including problem gambling, suggest that presence of co-occurring disorders is the most important barrier to successful moderation of symptoms (Heyman, 2009).

CONCLUSIONS

- Overall gambling involvement decreased across waves of the study but the average amount of time that people gambled and the average amount of money spent on gambling remained relatively stable.
- One of the key findings from this study is relatively low persistence or stability of PG risk severity classification over short time spans.
- An analysis of the factors that contribute to PG risk severity over time suggest that co-occurring conditions like anxiety, depression and elevated levels of impulsivity tend to move over time in correlation with gambling problems.
- Because co-occurring disorders predict resistance to interventions, assessments of interventions against problem gambling should monitor fluctuating severity of (at least) the disorders identified here.
- Findings about South African gamblers summarised in this presentation are broadly consistent with observations of gamblers reported over the years from other countries, including the recent wave of such reports based on panel data.