

Are different types of trading a potential form of gambling?

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Gamban

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Introduction

Online gambling accounts for nearly 40% of the UK's gambling market. When gambling online, an individual can choose from a plethora of gambling games ranging from poker to sports betting, with some operators/platforms even offering their users the ability to bet on political events. A survey by YouGov found that approximately 2.7% of adults in Great Britain were problem gamblers (GambleAware, 2020). The above figure was presented with caution as it potentially overestimated the amount of problem gamblers in Great Britain since the Gambling Commission had previously found that approximately 0.7% of adults in Great Britain were problem gamblers (Gambling Commission, 2020). Previous research attempted to understand where the true figure lies. Sturgis (2020) performed an assessment of the accuracy of survey estimates of the prevalence of problem gambling in the United Kingdom. Sturgis (2020) aimed to better understand the discrepancy between the findings of the 2016 combined health surveys, which found 4.2% of the UK adult population to be experiencing gambling harm, a value that was different to the findings of a 2019 YouGov survey which found that 13.2% of UK adults to be experiencing gambling harm. Sturgis (2020) explained that "it seems credible that the true level of the people experiencing gambling harms lies somewhere in between their two bounds" while further explaining that "this is not to contend that we should simply 'split the difference' and take the mid-point as the most reasonable estimate".

In the last few years, and especially during the coronavirus pandemic, online trading, including cryptocurrency trading, has grown significantly (Nefedova et al., 2020). The increase in online trading activity has resulted in the birth of new online trading platforms, larger budgets dedicated to advertising on various social media channels and an increased overall awareness of online trading. Additionally, cryptocurrency trading specifically has seen a significant rise over the last year with many day traders "shifting their attention to more speculative assets" (Financial Times, 2021).

Previous research has identified that excessive trading can be a gambling disorder. Grall-Bronnec et al (2017) found that addictive-like trading behaviour can be a subset of gambling disorders. Similarly, a study by Mills et al (2019) presented preliminary findings on cryptocurrency trading among regular gamblers and found that over 50% of regular gamblers have traded cryptocurrencies in the previous year and that trading cryptocurrencies was associated with risk for problem gambling, depression and anxiety.

Gamban is a cross-platform application that blocks access to online gambling websites and applications. As a software company that has a customer base with an average Problem Gambling Severity Index (PGSI)

score of 14.9, a score above 8 indicates signs of problem gambling, it is important that we take the appropriate steps to ensure our users are protected from any activities that closely resemble gambling, especially when those activities are closely linked to problem gambling behavior. Understanding whether our block-list content should expand beyond the traditional forms of gambling will allow us to better protect our users as well as provide recommendations on combating problem gambling for the rest of the responsible gambling industry.

Thus, the aim of this report is to understand whether different types of trading can be considered as gambling, the effect that different types of gambling may have on the perception of trading as gambling as well as provide an overview of the current literature on whether different types of trading can lead to problem gambling.

Methods

Procedures

An 8-item survey was distributed to 1007 people through the research participant recruitment website prolific.co. In addition to the questions prepared by the investigators, the survey also contained the PGSI quiz (Victorian Responsible Gambling Foundation, 2021). The survey can be found in Appendix 1.

The survey was hosted on the website typeform.com and all users were informed about the study's aims & objectives and were asked to provide informed consent prior to completing the survey.

The following inclusion criteria was used for participants recruited through prolific.co: no restrictions on gender, UK as the current country of residence, minimum 18 years of age – maximum 100 years of age, participation in online gambling games which included: baccarat, blackjack, bingo, craps, lottery, pachinko, poker, race & sports book, roulette, slots, video poker, virtual sports betting, none of the above (other). Participants were also required to have a minimum approval rate of 90%.

In addition to the survey, a brief review of the available literature was also performed which aimed to summarize the key findings of studies that were relevant to the research question.

Statistical analysis

We opted to avoid dichotomizing the existence of an effect for the main results and therefore did not employ traditional null hypothesis significance testing, which has been extensively critiqued (Amrhein et al., 2019, McShane et al., 2019). Instead, we consider the implications of all results compatible with these data, from the lower limit to the upper limit of the interval estimates, with the greatest interpretive emphasis placed on the point estimate.

The main analysis examined the multiple response category variable (MRCV) response estimating what particular kinds of trading activities are deemed gambling or not. For analysis of MRCVs a generalised estimating equations (GEE) approach was used as suggested by Suesse and Liu (2011) for analysis of dependent items within MRCVs; however, we were able to apply unstructured covariance specification to the model, due to the size of our sample, thus yielding the best model fit. In essence, this GEE approach meant we did not make any assumptions about subject-specific joint distributions. Instead, it permitted identification of correlation structures between items within the MRCV for respondents. Unique

respondent IDs (i.e., 'case') was specified as the cluster. From these models we extracted and present the predicted marginal probabilities of a positive response (i.e., 1 = Yes) for a given item within the MRCV along with their model specific 95% compatibility (confidence) intervals. This was chosen over the presentation of model coefficients as log-odds or odds ratios given that most people find these unintuitive to interpret with many mistaking the latter for probability or risk anyway. These probabilities were then qualitatively interpreted and described. A supplementary model summary table is available in the supplementary files including log-odds estimates, 95% compatibility (confidence) intervals, and p values (note, the reference category for 'item' is the first item on the question based on how it was presented to respondents). Analyses were also performed in a purely exploratory manner through visualisation of the dataset. We explored the relationships between current gambling habits, current trading habits, and age (we intended to explore PGSI score, however in this sample it was heavily right skewed on inspection suggesting the majority of respondents were either non-problem gamblers, or low-risk gamblers). For continuous demographic predictors we plotted smoothed conditional means using loess in 'ggplot' and for categorical demographic predictors we plot means with compatibility (confidence) intervals produced using basic nonparametric bootstrap sampling from the 'Hmisc' package. All analyses were conducted using R (version 4.1.0; R Core Team, 2021) and RStudio (version 1.4.1717; RStudio Team, 2021). GEE models were produced using the package 'geepack' (Halekoh et al., 2006), interaction plots for MRCVs were produced using the package 'sjplot', and all other data visualisation was produced using 'ggplot'.

Results

Overview of the current literature

The current available literature offers insight on whether trading can sometimes be considered as a potential form of gambling. Grall-Bronnec et al (2017) investigated whether excessive trading may be a gambling disorder. They performed semi-structured interviews with 8 excessive traders out of a cohort of 221 outpatients in a Problem Gambling. The participants also completed self-report questionnaires. They found that some of the diagnostic criteria for gambling disorder are applicable to excessive trading and that excessive traders were all male high sensation seekers. Similarly, Markiewicz et al (2013) explored whether the Domain-Specific-Risk-Taking (DOSPERT's) gambling risk-taking propensity scale can predict excessive stock trading. They found that day trading is particularly at risk to induce excessive trading and loss of money and that gambling risk-taking propensity predicted day trading propensity. In a study investigating the associations between costly excessive stock market trading and problem gambling, Mosenhauer et al (2021) found that motivations of individuals to trade excessively may “be troublesome” and that excessive trading and thus the associated losses may be driven by a behavioural dependence. Delfabbro et al (2021) examined the relationship between gambling, problem gambling and the intensity of crypto-currency trading and found that engagement in gambling and stock trading was linked to cryptocurrency trading. Additionally they found that problem gambling scores were positively linked to cryptocurrency trading. In addition to the study by Delfabbro et al (2021), Mills & Nower (2019) found that over 50% of regular gamblers have engaged in cryptocurrency trading and that trading cryptocurrencies is linked with risk for problem gambling. Ruben et al (2019) investigated whether investors in the financial markets display symptoms of compulsive gambling or an addiction to trading. Using two survey data sets, both utilizing Dutch retail investors as participants, they found that 4.4% of investors meet the criteria for compulsive gambling and 3.6% meet the criteria for problem gambling.

Overall, the literature suggests that more volatile forms of trading are closely linked to problem gambling behaviour and that problem gamblers often engage in different forms of trading with cryptocurrency trading being the most prevalent. A summary of all the above studies can be found in Table 1.

Table 1 – Overview of the current literature

Study	Aim	Methods	Findings
Excessive trading, a gambling disorder in its own right? A case study on a French disordered gamblers cohort <i>Grall-Bronnec et al (2017)</i>	To better acknowledge the existence of an addictive-like trading behaviour and to discuss its phenomenological similarities with gambling disorders.	The data of 8 excessive traders out of a cohort of 221 outpatients seeking treatment in our Problem Gambling unit were analysed	<ul style="list-style-type: none"> Diagnostic criteria for gambling disorder are applicable to excessive trading The excessive traders were all male high sensation-seekers Trading and gambling share structural characteristics
DOSPERT's gambling risk-taking propensity scale predicts excessive stock trading <i>Markiewicz et al (2013)</i>	To understand whether DOSPERT's gambling risk-taking propensity scale can predict excessive stock trading	3780 Polish students participated in an investment simulation and completed an online questionnaire which used DOSPERT's gambling risk-taking propensity scale	<ul style="list-style-type: none"> Gambling risk-taking propensity predicted day trading propensity Day trading is particularly at risk to induce excessive trading and loss of money.
The stock market as a casino: Associations between costly excessive stock market trading and problem gambling <i>Mosenhauer et al (2021)</i>	Investigating associations between problem gambling and stock market portfolio trading	Cross-sectional study of 798 personal investors from the US	<ul style="list-style-type: none"> Results indicate that motivations of individuals to trade excessively may indeed be troublesome Losses from excessive trading may be thus viewed as a fee for entertainment Excessive trading, and thus the associated losses, may be driven by a behavioural dependence
Cryptocurrency trading, gambling and problem gambling <i>Delfabbro et al (2021)</i>	To examine the relationship between gambling, problem gambling and the intensity of crypto-currency trading	Survey involving 543 people who reported at least monthly sports-betting, crypto-currency trading or both	<ul style="list-style-type: none"> Engagement in gambling and stock trading was positively related to crypto trading Problem gambling scores were positively related to crypto trading
Gambling behaviour in the cryptocurrency Market <i>Senarathne (2019)</i>	This article examines whether the investment strategies of cryptocurrency market involve high-risk gambling	Econometric approach – see paper for more details	<ul style="list-style-type: none"> Results show that the cryptocurrency risk premiums co-move closely with the return on CBOE Volatility Index (VIX) The strategies of cryptocurrency trading closely resemble that of high-risk gambling. In other words, traders' expectations co-move closely (significantly) with the expected future payoffs from gambling
Preliminary findings on cryptocurrency trading among regular gamblers: A new risk for problem gambling? <i>Mills & Nower (2019)</i>	Exploring crypto trading among regular gamblers (i.e., those who gamble at least every month)	Cross-sectional online survey with 876 participants	<ul style="list-style-type: none"> >50% of regular gamblers have traded cryptocurrencies in the past year Trading cryptocurrencies is linked to high-risk stock trading Trading cryptocurrencies is associated with risk for problem gambling, depression and anxiety
Compulsive gambling in the financial markets: Evidence from two investor surveys <i>Ruben et al (2019)</i>	To investigate whether investors in the financial markets display symptoms of compulsive gambling	Data collected using two different panels of Dutch individual investor (Dutch National Bank Household Survey & Dutch Authority for Financial Markets)	<ul style="list-style-type: none"> 4.4% of the Dutch retail investors show symptoms of compulsive gambling, or an addiction to trading, with a 95% confidence interval of [2.5%, 7.0%] Another 3.6% of the investors display symptoms of problem gambling ([1.9%, 6.0%]), which is less a severe condition, but still worrisome

Survey Results

Descriptive demographics of the sample are shown in the table below. The sample was primarily White British, with a reasonably even split of males and females, with an average age of 36 years, and with the majority in employment.

Table 2 - Participant demographic characteristics

Characteristic	N = 1,007 ¹
<i>Gender</i>	
Female	597 (59%)
Male	408 (41%)
Prefer not to say	2 (0.2%)
<i>Age (years)</i>	36 (29, 47)
<i>Ethnicity</i>	
Asian/Asian British - Bangladeshi	5 (0.5%)
Asian/Asian British - Chinese	7 (0.7%)
Asian/Asian British - Indian	18 (1.8%)
Asian/Asian British - other Asian background	16 (1.6%)
Asian/Asian British - Pakistani	16 (1.6%)
Black/ African/Caribbean/Black British - African	29 (2.9%)
Black/ African/Caribbean/Black British - Caribbean	5 (0.5%)
Black/ African/Caribbean/Black British - other Black/ African/Caribbean/Black British background	3 (0.3%)
Mixed/Multiple ethnic groups - other Mixed/Multiple ethnic background	6 (0.6%)
Mixed/Multiple ethnic groups - White and Asian	10 (1.0%)
Mixed/Multiple ethnic groups - White and Black African	4 (0.4%)
Mixed/Multiple ethnic groups - White and Black Caribbean	9 (0.9%)
Other ethnic group	2 (0.2%)
Other ethnic group - Arab	2 (0.2%)
White - English/Welsh/Scottish/Northern Irish/British	800 (79%)
White - Gypsy or Irish Traveller	2 (0.2%)
White - Irish	9 (0.9%)
White - Other White background	64 (6.4%)

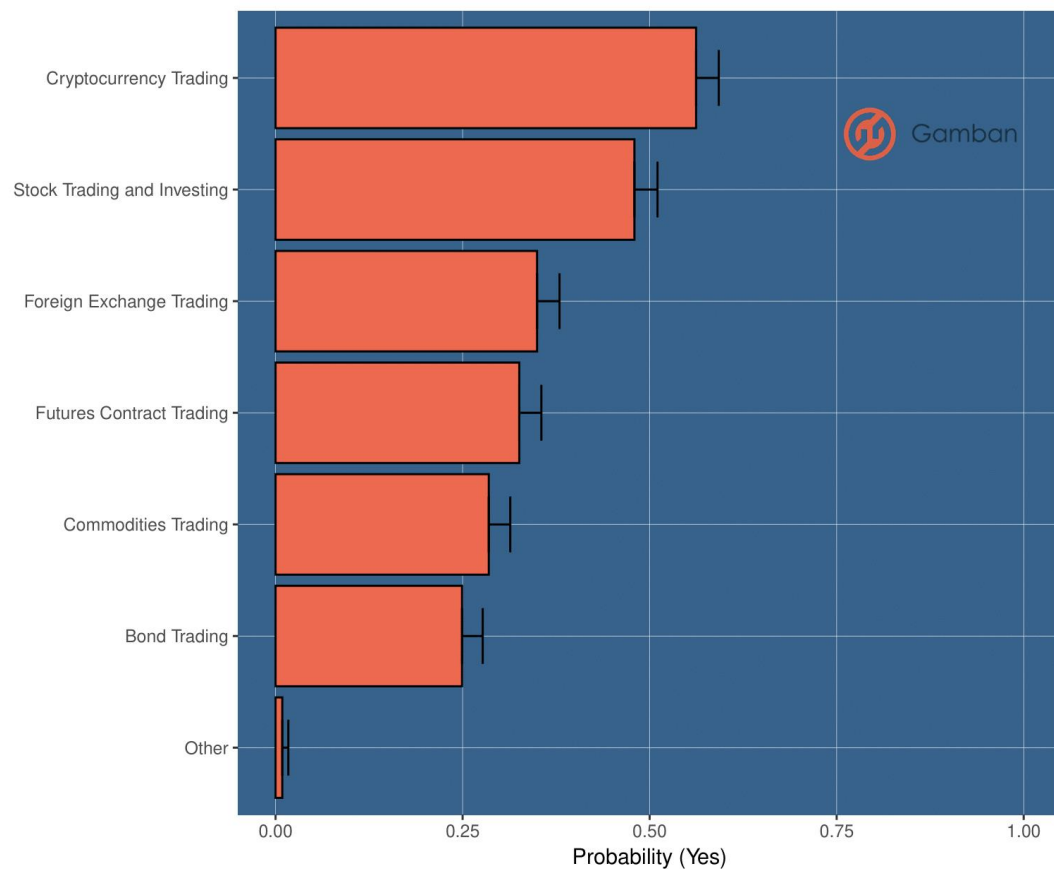
Table 2 - Participant demographic characteristics

Characteristic	N = 1,007 ¹
<i>Occupational status</i>	
Carer of other household member	13 (1.3%)
Casual worker - not in permanent employment	20 (2.0%)
Higher managerial/ professional/ administrative (e.g. Doctor, Solicitor, Board Director in a large organisation (200+ employees, top level civil servant/public service employee)	41 (4.1%)
Homemaker	35 (3.5%)
Intermediate managerial/ professional/ administrative (e.g. Newly qualified (under 3 years) doctor, Solicitor, Board director small organisation, middle manager in large organisation, principal officer in civil service/local government, teacher)	230 (23%)
Not working due to long-term sickness	29 (2.9%)
Other	46 (4.6%)
Prefer not to say	7 (0.7%)
Retired and living on state pension	23 (2.3%)
Semi or unskilled manual work (e.g. Manual workers, all apprentices to be skilled trades, Caretaker, Park keeper, non-HGV driver, shop assistant)	86 (8.5%)
Skilled manual worker (e.g. Skilled Bricklayer, Carpenter, Plumber, Painter, Bus/ Ambulance Driver, HGV driver, AA patrolman, pub/bar worker, etc.)	71 (7.1%)
Student	64 (6.4%)
Supervisory or clerical/ junior managerial/ professional/ administrative (e.g. Office worker, Student Doctor, Nurse, Foreman with 25+ employees, salesperson, etc.)	294 (29%)
Unemployed	48 (4.8%)
<i>Received training in trading</i>	
No	415 (97%)
Yes	12 (2.8%)
Unknown	580
<i>PGSI score</i>	1 (0, 3)
Unknown	1

¹n (%); Median (IQR)

The GEE model yielded estimates with reasonable tight intervals (see figure below) and so the point estimates are noted here. Cryptocurrency trading and stock trading and investing were most likely to be considered as gambling with probabilities of ~56% and ~48% respectively. In exploratory analysis there was little to suggest that either current gambling habits, current training habits, or age interacted with items to influence the probabilities that they were considered to be gambling or not (see supplementary plots below).

What kinds of trading do you consider gambling?



Survey (n = 1007) collected through Prolific.io
 Probabilities and confidence intervals from generalised estimating equations model for multiple category response variables

Figure 1 – What kind of trading do you consider gambling?

Summary

The results of the survey revealed that cryptocurrency and stock trading were most likely to be considered as gambling (probabilities of 56% and 48% respectively) even in non-problem gamblers. Current gambling habits, current trading training or age did not influence the probabilities of whether different types of trading are considered gambling or not. Even when accounting for the above factors, cryptocurrency trading and stock trading were still the two forms of trading to that were most likely to be considered as a gambling. In addition, the current available literature indicates that trading and gambling share similar characteristics and that some forms of trading may be closely linked with problem gambling behavior.

The above probabilities, in conjunction with some of the findings of the current available literature, indicate that problem gamblers may be at risk when exposed to different forms of online trading. More volatile forms of trading, eg: cryptocurrency & stock trading, may be higher-risk trading options for problem gamblers when compared to bond or commodity trading and thus access to such forms of trading may need to be restricted. As mentioned above, gamban's users have an average PGSI score of 14.9, indicating that they are problem gamblers. Blocking access to the more volatile forms of trading, and potentially other forms of trading, may be beneficial to the recovery journey of gamban's users.

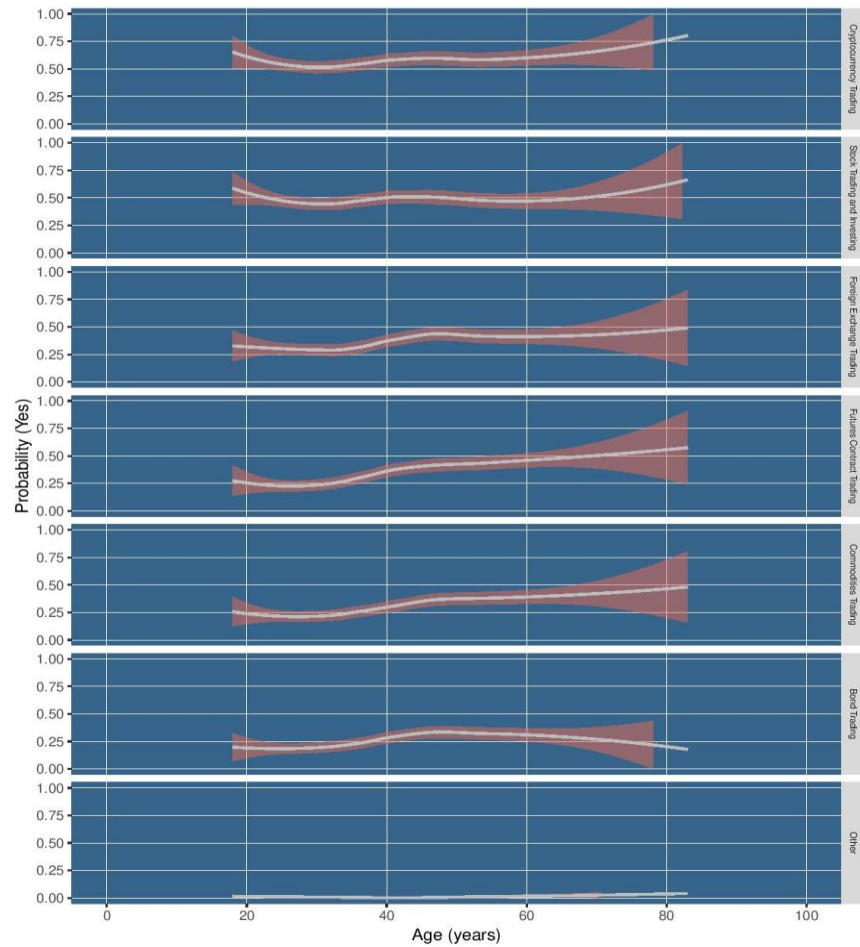
Key Points

- Cryptocurrency trading and stock trading and investing were most likely to be considered as gambling with probabilities of ~56% and ~48% respectively
- Albeit surveying a sample of non-problem gamblers different forms of trading were still considered to be gambling
- Trading and gambling share structural characteristics
- >50% of regular gamblers had engaged in cryptocurrency trading in the span of a year
- Trading can act as a form of gambling with some forms of trading being closely associated with an increased risk for problem gambling behavior
- Blocking access to more volatile forms of trading may be beneficial for the recovery journey of problem gamblers

Supplementary plots

What kinds of trading do you consider gambling?

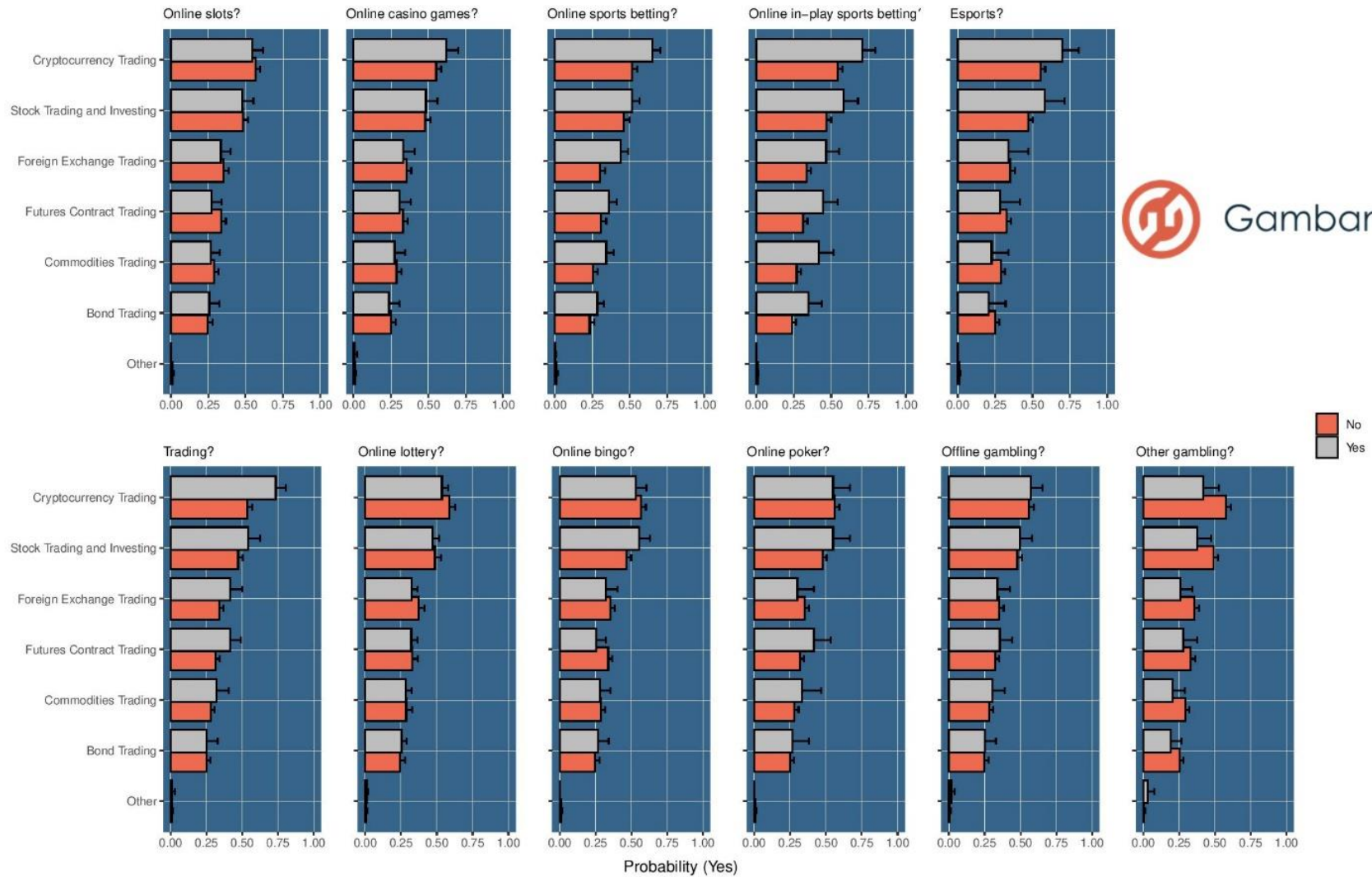
By age in years



Gamban

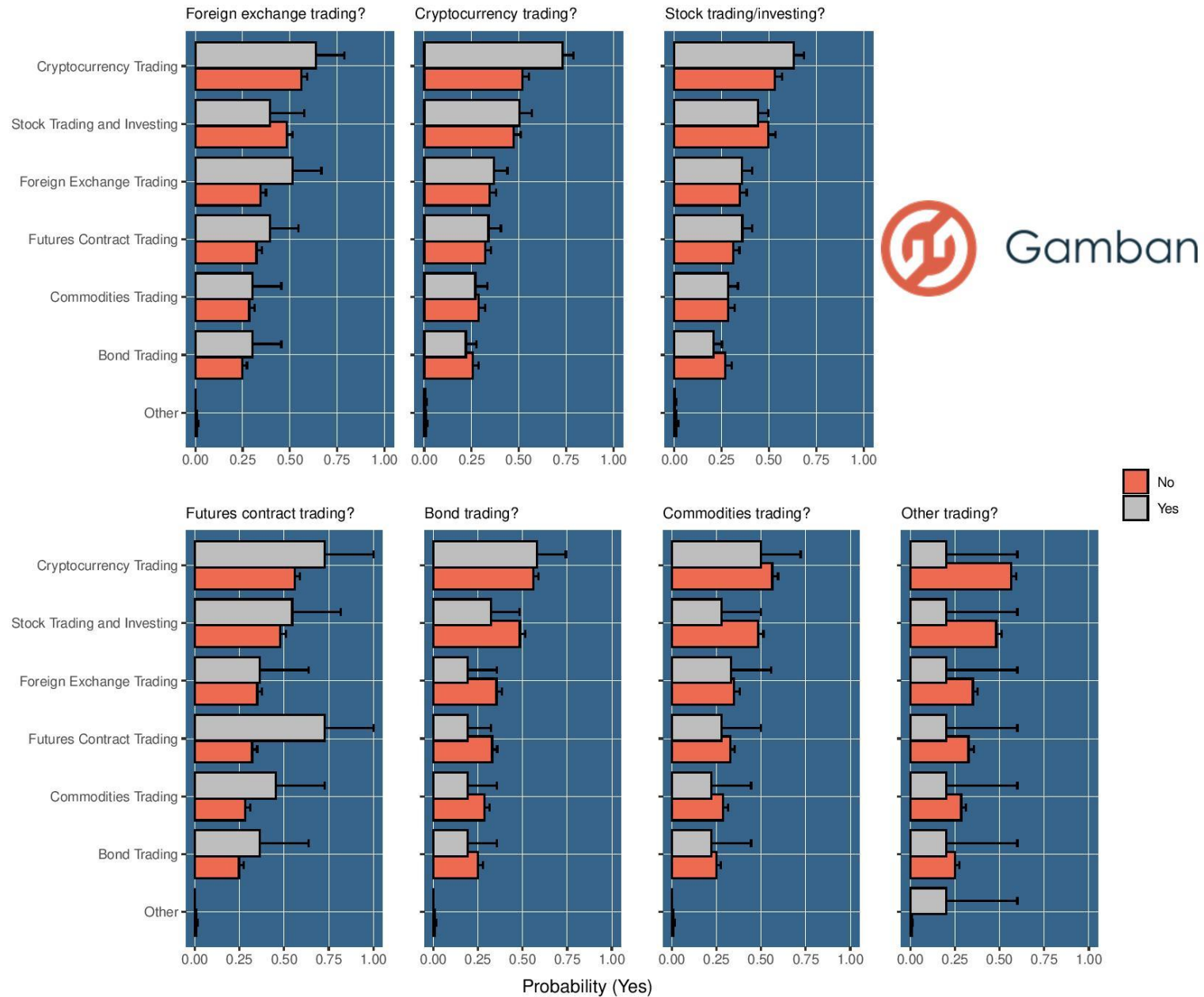
Survey (n = 1007) collected through Prolific.io
LOESS smooth and confidence band applied

What kinds of trading do you consider gambling?
By current gambling habits



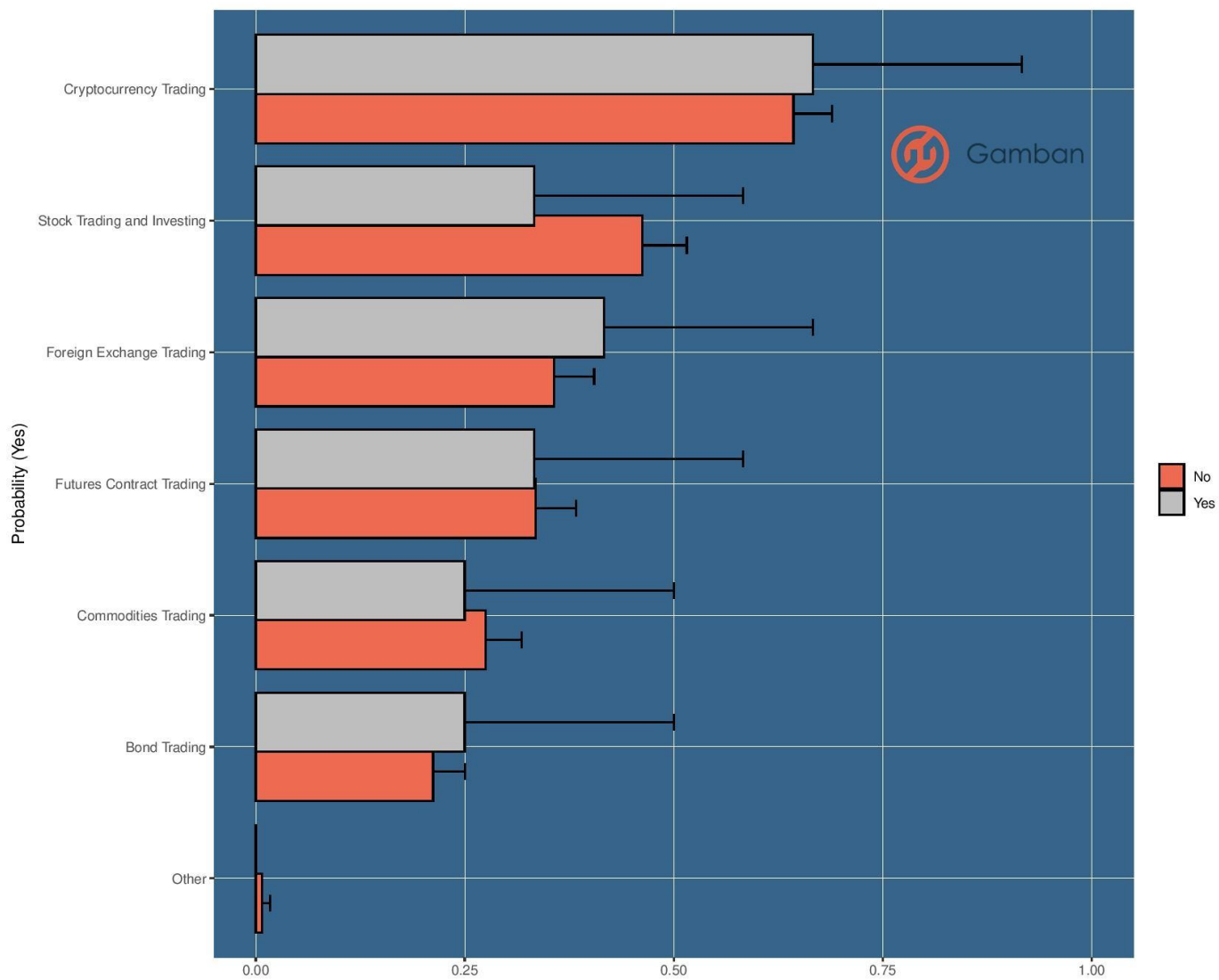
What kinds of trading do you consider gambling?

By current trading habits



What kinds of trading do you consider gambling?

By whether respondents had training in trading



Survey (n = 427, sample responding to training question) collected through Prolific.io
Confidence intervals produced through basic nonparametric bootstrapping

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Appendices

Appendix 1 – Survey Questions

Gender

- Female
- Male
- Prefer not to say

Ethnicity

- White - English/Welsh/Scottish/Northern Irish/British
- White - Other White background
- Black/ African/Caribbean/Black British – African
- Asian/Asian British – Indian
- Asian/Asian British - other Asian background
- Asian/Asian British – Pakistani
- Mixed/Multiple ethnic groups - White and Asian
- Mixed/Multiple ethnic groups - White and Black Caribbean
- White – Irish
- Asian/Asian British – Chinese
- Mixed/Multiple ethnic groups - other Mixed/Multiple ethnic background
- Asian/Asian British – Bangladeshi
- Black/ African/Caribbean/Black British – Caribbean
- Mixed/Multiple ethnic groups - White and Black African
- Black/ African/Caribbean/Black British - other Black/ African/Caribbean/Black British background
- Other ethnic group – Arab
- Other ethnic group
- White - Gypsy or Irish Traveller

Which of these activities best describes what you are doing at present?

- Supervisory or clerical/ junior managerial/ professional/ administrative (e.g. Office worker, Student Doctor, Nurse, Foreman with 25+ employees, salesperson, etc.)
- Intermediate managerial/ professional/ administrative (e.g. Newly qualified (under 3 years) doctor, Solicitor, Board director small organisation, middle manager in large organisation, principal officer in civil service/local government, teacher)
- Semi or unskilled manual work (e.g. Manual workers, all apprentices to be skilled trades, Caretaker, Park keeper, non-HGV driver, shop assistant)
- Skilled manual worker (e.g. Skilled Bricklayer, Carpenter, Plumber, Painter, Bus/ Ambulance Driver, HGV driver, AA patrolman, pub/bar worker, etc.)
- Student
- Unemployed
- Higher managerial/ professional/ administrative (e.g. Doctor, Solicitor, Board Director in a large organisation (200+ employees, top level civil servant/public service employee)
- Homemaker
- Not working due to long-term sickness
- Retired and living on state pension
- Casual worker - not in permanent employment
- Carer of other household member
- Prefer not to say
- Other

What type of online gambling activity do you engage in?

- Online lottery
- Online sports betting
- Online slots
- Online casino games
- Online bingo
- Trading
- Offline gambling
- Online in-play sports betting
- Esports
- Online poker
- Other

PGSI Questions

- Have you bet more than you could really afford to lose?
- Have you needed to gamble with larger amounts of money to get the same feeling of excitement?
- Have you gone back on another day to try to win back the money you lost?
- Have you felt that you might have a problem with gambling?
- Have people criticised your betting or told you that you had a gambling problem, whether or not you thought it was true?
- Have you felt guilty about the way you gamble or what happens when you gamble?
- Has gambling caused you any health problems, including stress or anxiety?
- Has your gambling caused any financial problems for you or your household?

Response options: *Never, Sometimes, Most of the time, Always*

Which of the following do you consider to be gambling?

- Cryptocurrency Trading
- Stock Trading/Investing
- Foreign Exchange Trading
- Futures Contract Trading
- Commodities Trading
- Bond Trading
- None
- Other

Please select the type of trading you have done or are still currently doing (if applicable)

- Cryptocurrency Trading
- Stock Trading/Investing
- Foreign Exchange Trading
- Futures Contract Trading
- Commodities Trading
- Bond Trading
- None
- Other

Have you received formal training in any type of trading?

- Yes
- No