

Global Limit Setting as a Responsible Gambling Tool: What Do Players Think?

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Abstract Many companies offer tools to help their clientele gamble more responsibly. Such tools include pre-commitment facilities where the gambler can set voluntary time and money limits. However, empirical evidence is lacking as to whether voluntary or mandatory limit setting has any positive impact on subsequent gambling behavior and whether such measures are of help to high-intensity and/or problem gamblers. In the present study, 2352 gamblers who had played games with *Norsk Tipping* (NT), the Norwegian Government-owned gambling operator, were surveyed after NT had introduced a mandatory global loss limit across its gaming portfolio. The survey included questions relating to whether players had heard about the new global loss limits, their attitudes towards limit setting, whether they found the global limits personally relevant, the most important reasons for setting the limits, and whether they gambled elsewhere if they reached their loss limits. Findings demonstrated that three-quarters of the sample were aware the new global loss limit had been introduced, two-thirds of the sample knew how to set limits on their gambling, and four-fifths of the sample had a positive attitude towards the global loss limit. Very few gamblers played with other operators after they had reached their spending limits. It is concluded that the introduction of a global loss limit had a positive impact among *Norsk Tipping's* clientele and the implications for the present findings are discussed.

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Social responsibility in gambling has become a major issue for the gaming industry (Harris and Griffiths 2017). Typically, social responsibility practices in gambling involve policies, procedures, and tools that promote responsible gaming and minimize problem gambling (Griffiths and Wood 2008). A number of the social responsibility tools that have been incorporated by gaming companies have involved innovation in both information technology and technology more generally. Researchers (e.g., Monaghan 2009; Wood and Williams 2007) have pointed out that many responsible gambling (RG) initiatives may actually be more effective online because of their technological infrastructure. Furthermore, Parke and Griffiths (2012) reported that regular gamblers endorse information technology developments as being helpful in reducing negative consequences associated with gambling.

Limit Setting as a Responsible Gambling Tool

One of the more widespread types of social responsibility tools concerns limit setting (Wood and Griffiths 2010). These pre-commitment tools allow players to preset the amount of time and/or money they wish to spend on gambling in a specified time period (typically per day and/or per calendar month). The practice of limit setting is viewed by some scholars and members of the gambling industry as a method of putting informed player choice at the heart of responsible gambling (Griffiths and Wood 2008). At present, there are a number of different spending limit options that have been introduced by responsible gambling operators. For instance, a player's spending can be restricted in terms of play limits, deposit limits, bet limits, and loss limits (Wood and Griffiths 2010). More specifically:

- *Play limit*—this is the maximum amount of money (or time) that a gambler can play with (or for) at any given time.
- *Deposit limit*—this is the maximum amount of money that a gambler can deposit into their playing account at any given time.
- *Bet limit*—this is the maximum amount of money that a gambler can bet on a single game (or concurrent games).
- *Loss limit*—this is the maximum amount of money that a gambler can lose in any one session or sessions.

Furthermore, it was also noted by Wood and Griffiths (2010) that some limit setting practices are voluntary (i.e., gamblers can make their own choice as to whether to take advantage of the limit setting tools on offer) while others are mandatory (i.e., gamblers have to set limits if they want to access the games operated by a specific gambling service provider). Some gambling operators offer the flexibility for players to choose different limits for different games (e.g., gamblers may want to set strict limits for playing an online slot machine but have no such limit for the playing of a lottery game). While pre-commitment tools are generally seen as positive by the gamblers themselves (Griffiths et al. 2009), it has also been noted that fixed limits set by the gambling operator do not necessarily encourage and facilitate gamblers to take individual responsibility for managing and monitoring how much money and/or time

they spend gambling (Wood and Griffiths 2010). More recently, Walker et al. (2015) proposed the use of win limits that limit the amount of money a gambler can win. They tested this feature with a number of players and a simulated slot machine and found that a self-enforced win limit resulted in increased player performance and reduced casino profit.

Empirical Studies on Limit Setting in Gambling

A number of studies over the past 15 years have examined the extent to which online gambling operators include different types of limit setting on their gambling website. For instance, Smeaton and Griffiths (2004) evaluated the social responsibility practices of 30 British online gaming companies. They found that there was a wide variety of bet limits among the gaming sites they visited. Only 10% of the gambling websites visited ($n = 3$) contained no information about either maximum or minimum bet sizes. The study found that minimum bet size among the 30 companies was £1, whereas the maximum bet size (of those companies that set upper limits) was £20,000. They also reported that many of the gambling websites typically had £250–£1000 maximum bets and £10–£25 minimum bets. However, this study is now very old. In the early 2000s, social responsibility, responsible gambling, player protection, and harm minimization were rarely discussed by gambling operators.

More recently, Kazhaal et al. (2011) examined 74 online poker sites and found that less than half of these sites offered any limit setting tools. Bonello and Griffiths (2017) reviewed the social responsibility practices comprising 50 of the world's most well-known online gambling sites. They reported that 45 sites (90%) offered players the opportunity to voluntarily set monetary spending limits. The most common types of limit setting were deposit limits and spending limits. Only one operator had spending limits by product type. Marrisonneau and Järvinen-Tassopolous (2017) reviewed consumer protection among all 18 licensed online operators in France. All 18 of the operators offered betting limits as well as deposit limits. Calvosa (2017) reviewed ten regulated online gambling sites in Italy and all ten had a mandatory requirement for players to choose a deposit limit before they could play.

Other studies have examined players' attitudes towards limit setting tools. A study of 10,865 online gamblers from 96 different countries by the International Gaming Research Unit (2007) reported that over two-thirds of players (70%) thought that voluntary spending limits would be a useful RG feature. Further focus group work from the same study found that the majority of players were opposed to mandatory spend limits. Mandatory spend limits were viewed by the focus groups as patronizing and overly restrictive. Bernhard et al. (2006) reported similar findings in their focus groups of Las Vegas gamblers. In this study, mandatory spend limits were strongly opposed, whereas player-set limits were more widely regarded as useful. However, problematic and pathological gamblers who are increasingly losing control of their time and money spending are not susceptible to voluntary responsible gaming features. This group of gamblers can effectively be protected by setting mandatory limits. Jurisdictions, like the one in Austria, often introduce these mandatory limits to protect the most vulnerable (Auer and Griffiths 2013). The only way for the player to continue is to choose other gaming sites which do not protect players with mandatory limits. As appropriate prevention tools, voluntary responsible gaming features require a certain level of self-awareness. Players should be introduced to responsible gaming from the very start of their gambling during registration on a specific site. Wohl et al. (2013) showed that players who watched an educational animation more often stayed within their preset limits compared to players who did not watch the video.

In a study investigating players' behavior and attitudes towards using RG tools, Griffiths et al. (2009) surveyed 2348 Swedish online gamblers (all online gamblers at *Svenska Spel*). Findings indicated that of all RG tools, the most useful were limit setting options with 70% of respondents reporting spending limits to be "quite useful" or "very useful." The participants were also asked which RG tools (if any) that they had personally used. Results showed that the setting of spending limits had been used by over half of the online gamblers (56%). Wiebe and Philander (2012) reviewed RG practices of internet gambling sites. The results were collected via a literature review, an evaluation of 50 online gambling sites, and player interviews. They found that monetary limit setting tools were generally positively viewed because they encouraged gamblers to reflect on the amount of time they spent gambling. However, usage is often low because operators are falling short of properly promoting the tools. They found deposit limits to be most common in online gambling sites.

To date, few studies have examined the behavior of gamblers following the setting of monetary limits. A Canadian study by Focal Research (2007) among video lottery players in Nova Scotia found that RG features (including limit setting tools) generally reduced the overall levels of player expenditure. However, Wood and Griffiths (2010) pointed out that the specific impact of monetary limit setting was not separated out from the other RG features. Other studies that have been carried out have used behavioral tracking data provided by online gambling operators. Using data provided by *bwin Interactive Entertainment*, Broda et al. (2008) investigated the effects of player deposit limits among sports bettors ($N=47,000$) over a 2-year period and examined the gambling behavior of those who tried to exceed their deposit limit compared to all other players that did not. In this particular study, the deposit limit was simply the amount of money that was deposited into a gambler's spend account (excluding any winnings that the gambler had accumulated). It should also be noted that at the time data were collected in 2005, it was mandatory for *bwin* players to set a deposit limit. Furthermore, players could not set a limit of more than €1000 a day or €5000 a month. There was also the facility for players to set their own deposit limits below that of the mandatory requirement. The results showed that only 0.3% of the gamblers tried to exceed their deposit limit.

Wood and Griffiths (2010) subsequently argued that the large daily and monthly mandatory limits may have been the main reason for so few gamblers trying to exceed their limits. In fact, Broda et al. (2008) reported that most gamblers in their sample got nowhere near the maximum deposit limit. More specifically, 95% of gamblers never deposited more than €1050 per month (i.e., approximately one-fifth of the monthly maximum €5000). It is also worth noting that the study did not report any findings relating to those who tried to exceed either their own personally set expenditure limits.

Auer and Griffiths (2013) analyzed a random sample of 100,000 players who gambled on the *win2day* gambling website during a 3-month period. This sample comprised 5000 registered gamblers who chose to set themselves limits while playing on *win2day* where deposits were limited to €800 per week. The results of this study clearly showed that overall, voluntary limit setting had a specific and statistically significant effect on high-intensity gamblers. Therefore, the study showed that voluntary limit setting had an appropriate effect in the desired target group (i.e., the most gaming intense players). More specifically, the analysis showed that (in general) gaming intense players specifically changed their behavior in a positive way after they limited themselves with respect to both time and money spent. In most of the analyses (with the exception of poker players), the setting of voluntary time duration limits was less important than voluntary monetary limits.

Contextual Background to the Present Study

In October 2016, *Norsk Tipping* (the Norwegian Government-owned gaming company) introduced a new global limit setting procedure for all players. *Norsk Tipping's* product portfolio comprises lottery, casino, sports betting, and video lottery terminals (VLTs) and players can either play offline or online (via computers, laptops, tablets, and smartphone). To play on *Norsk Tipping* games, players have to use a player card. It should also be noted that this is not a customer loyalty card, but a card that was specifically introduced from a responsible gambling perspective so that a customer's play is individually identified across all *Norsk Tipping* products. Consequently, all games played (apart from the buying of scratchcards offline) can be monitored via behavioral tracking technology. Therefore, each and every players' bet, win, or loss is recorded on every different game they play.

The global limit as a maximum allowed loss per month, which is NOK 20,000 per month across all games and all sales channels (NOK 20,000 equals approximately €2100 or \$2450 [USA]). For specific game categories in digital channels, it is mandatory for all customers to set a personal global limit before they can play these games. This requirement applies to games classified as medium- to high-risk games (using the game design evaluation tool *GAM-GaRD*). If players want to play online casino/bingo/scratchcards in digital channels, they also have to choose a personal maximum daily and monthly loss limit specific to this game group. This limit has a maximum daily loss limit of NOK 4000 and a maximum monthly loss limit of NOK 10,000. On VLTs, there is a maximum daily (NOK 2700) and monthly (NOK 4400) loss limit specific to that channel and players must choose a lower personal daily and monthly VLT loss limit. The present study surveyed *Norsk Tipping* clientele asking a number of questions relating to the new global loss limits (see next section for further details).

Method

Participants and Procedure In November 2016, *Norsk Tipping* sent out an online survey to 25,000 of its player clientele. Players were sampled according to whether they had or had not played with *Norsk Tipping* during October 2016 when the global loss limits had been introduced. Just under 10% of those contacted responded to the survey ($N=2352$). The average age was 51 years ($SD=17.51$) and was representative of *Norsk Tipping* players more generally. Prior to data analysis, all players in the final sample were classified according to their *PlayScan* gambling risk status. *PlayScan* is a player-tracking tool which classifies players into one of three risk groups (“green,” “yellow,” and “red”) according to their actual playing behavior where red indicates that the player is at high risk of problem gambling, yellow indicates the player is at medium risk of problem gambling, and green indicates the player is at low risk of problem gambling (Griffiths et al. 2009; Forsström et al. 2016; Wood and Wohl 2015). The survey included questions relating to whether players had heard about the new global loss limits, their attitudes towards limit setting, whether they found the global limits personally relevant, how thoroughly they thought about the limits they set themselves, the most important reasons for setting the limits, and whether they gambled elsewhere if they reached their loss limits. The survey took approximately 10 min to answer.

Results

The first question asked players whether they had heard about the new global loss limits of NOK 20,000 per day/month that *Norsk Tipping* introduced in October 2016. Three-quarters of the sample responded that they had (76%). However, there was a significant difference between risk groups with 71% of green, 92% of yellow, and 94% of red players responding that they were aware of the new global loss limits ($\chi^2 = 22.42$, $df = 3$, $p < 0.0001$). Two-thirds of players (68%) said they knew how to set, check, or change their limits. There was a significant difference between risk groups with 62% of green, 86% of yellow, and 80% of red responding that they knew how to do this ($\chi^2 = 12.58$, $df = 3$, $p < 0.0001$). Players were also asked how easy or difficult they thought it was to understand what a maximum loss limit entails. The majority of players found it easy/very easy (76%; see Table 1). After answering this question, respondents were given a detailed explanation of the mechanism. Following this written explanation, players were asked to answer the same question again and the number of players saying it was easy/very easy rose to 83%, a significant increase ($\chi^2 = 2591.5$, $df = 25$, $p < 0.00001$).

A series of questions were asked in order to understand players' attitudes towards the new global loss limit. Asked whether they feel positive towards the new maximum loss limit, four-fifths of players (79%) agreed in part or entirely (see Table 2). Two-thirds of red players (67%) agreed in part or entirely compared to 75% of yellow players and 82% of green players, a statistically significant difference ($\chi^2 = 93$, $df = 15$, $p < 0.0001$). Out of 2352, a total of 752 players (32%) reached their personal loss limit in October 2016. This meant that they could not gamble anymore with *Norsk Tipping* because they lost as much as they had chosen as their personal limit. Three-quarters of this subgroup of players who had reached their monthly limit (74%) agreed in part or entirely that they were positive about global loss limit. This is significantly less compared to 79% of all players who agreed entirely or in part ($\chi^2 = 23$, $df = 5$, $p < 0.0002$).

One-quarter of all players (25%) agreed entirely or in part that a maximum loss limit was relevant to them. Two-fifths of red players (41%) agreed entirely or in part that the maximum loss limit was relevant to them compared to 41% of yellow players and 18% of green players, a difference that was statistically significant ($\chi^2 = 191.35$, $df = 15$, $p < 0.0001$).

The great majority of players (91%) agreed entirely or in part when asked whether they believe they have a sufficient overview of, and control over, how much money they lose (see Table 3). There was a statistically significant difference on this question ($\chi^2 = 130.77$, $df = 15$, $p < 0.0001$) when comparing red players (85%), yellow players (87%), and green players (93%). Just under half of the sample (45%) agreed entirely or in part when asked whether loss limits are helpful to maintain a sufficient overview of, and control over, how much money they lose (see Table 3). There was a statistically significant difference on this question ($\chi^2 = 78.4$,

Table 1 How easy or difficult do you think it is to understand what a maximum loss limit entails ($n = 1923$)?

| | Before explanation | After explanation |
|------------------------|--------------------|-------------------|
| Very difficult | 29 (2%) | 31 (1%) |
| Difficult | 89 (5%) | 72 (3%) |
| Not difficult nor easy | 276 (14%) | 253 (11%) |
| Easy | 812 (42%) | 1002 (43%) |
| Very easy | 663 (34%) | 946 (40%) |
| Don't know | 54 (3%) | 48 (2%) |

Table 2 Attitude towards the global loss limits ($n = 2352$)

| | I feel positive towards Norsk Tipping's introduction of a maximum loss limit | I think that a maximum loss limit is relevant to me |
|-------------------|--|---|
| Disagree entirely | 172 (7%) | 1088 (46%) |
| Disagree in part | 101 (4%) | 241 (10%) |
| Neither | 211 (9%) | 381 (16%) |
| Agree in part | 318 (14%) | 239 (10%) |
| Agree entirely | 1518 (65%) | 359 (15%) |
| Don't know | 32 (1%) | 44 (2%) |

$df = 15$, $p < 0.0001$) when comparing red players (56%), yellow players (56%), and green players (40%).

Table 4 demonstrates that only a small minority of players did not think thoroughly about the daily limit that they set (15%) or monthly limit they set (16%). One in ten red players (10%) did not think thoroughly about the daily limits they set compared to 16% of yellow players and 18% of green players, a difference that is statistically significant ($\chi^2 = 51.824$, $df = 15$, $p < 0.0001$). The distribution across the three risk groups for the monthly limit setting was identical and the difference was also statistically significant ($\chi^2 = 45.123$, $df = 15$, $p < 0.0001$).

Players were also provided with a series of statements about limit setting and asked which of them they personally applied when choosing the maximum personal monthly limit (see Table 5). Just under one-fifth of green players (18%) set their money limits without considering how much they normally lose compared to 22% of red players. Over one-quarter of green players (27%) said they set their limits based on how much money they thought they normally lose compared to 23% of red players. Approximately one-seventh of green players (14%) said they set a limit based on how much money they previously lost compared to 9% of red players. Just under one-fifth of green players (18%) said that they chose a money limit that was high enough to lose what they want compared to 28% of red players. Approximately one-eighth of green players (13%) said that they chose a money limit at random compared to 8% of red players. The difference between the total distribution of responses to the statement that most applied to the gamblers when setting maximum personal monthly limits compared to the distribution of green, yellow, and red players was statistically significant ($\chi^2 = 43.281$, $df = 15$, $p < 0.0007$).

Players were also asked about the most important reasons for choosing their personal money limits. However, multiple options could be chosen in answering this item (see Table 6).

Table 3 Personal relevance of the global loss limits ($n = 2352$)

| | I believe that generally I have a sufficient overview of, and control over, how much money I lose | Loss limits will help me to maintain a sufficient overview of, and control over, how much money I lose |
|-------------------|---|--|
| Disagree entirely | 69 (3%) | 602 (26%) |
| Disagree in part | 49 (2%) | 152 (6%) |
| Neither | 84 (4%) | 489 (21%) |
| Agree in part | 262 (11%) | 296 (13%) |
| Agree entirely | 1873 (80%) | 763 (32%) |
| Don't know | 15 (1%) | 50 (2%) |

Table 4 How thoroughly do you think about which daily/monthly limit to set (*n* = 1453)?

| | How thoroughly do you think about which daily limit to set? | How thoroughly do you think about which monthly limit to set? |
|-----------------------|---|---|
| Not thoroughly at all | 224 (15%) | 230 (16%) |
| Moderately thoroughly | 184 (13%) | 181 (12%) |
| Thoroughly | 376 (26%) | 384 (26%) |
| Quite thoroughly | 476 (33%) | 464 (32%) |
| Very thoroughly | 172 (12%) | 160 (11%) |
| Don't know | 21 (1%) | 34 (2%) |

Consequently, the percentages by the gambling risk group in Table 6 were computed based on the total number of participants who agreed to a specific option. In order to determine whether an option was chosen by more or less red/yellow/green players, the percentages have to be compared to the overall gambling risk group status distribution. The latter is reported at the bottom of Table 6. One-quarter of the players who said that they had set a limit because some games require it were red players (26%). The difference compared to the overall gambling risk group status distribution was significant ($\chi^2 = 49$, *df* = 3, *p* < 0.0001). Over one-quarter of the players who said that they had set a limit in order to achieve better control over the amount of money they lose were red players (29%). The difference compared to the overall gambling risk group status distribution was significant ($\chi^2 = 127$, *df* = 3, *p* < 0.0001). Approximately one-sixth of the players who said that they set a limit because they thought they had to in order to be able to gamble were red players (17%). The difference compared to the overall gambling risk group status distribution was significant ($\chi^2 = 15.26$, *df* = 3, *p* = 0.0016). The result showed that mandatory limit setting makes more at-risk players set personal limits.

A total of 752 players reached their limit during October 2016. This meant that they had lost as much as they had chosen as their personal maximum loss. These specific players were asked about what they did with regard to gambling having reached their limit and could choose one of four options (see Table 7). A total of 74% of green players and 71% of red players said that they did not play again until their limit was reset. A small minority of green players (6%) and red players (16%) said that they gambled with other companies after their limits had been reached. A small minority of green players (12%) and red players (9%) said that they did not continue to gamble because they had been prevented from doing so. The difference of the total distribution in response to what the gamblers did once they had reached their money limits

Table 5 Which of the following statements most applies to how you were thinking when you set your maximum personal monthly spending limit (*n* = 1406)?

| | Total sample | Green players | Yellow players | Red players |
|---|--------------|---------------|----------------|-------------|
| I set the limit without considering how much I normally spend | 281 (19%) | 148 (18%) | 55 (22%) | 77 (22%) |
| I set the limit based on how much I think I normally spend | 374 (26%) | 228 (27%) | 59 (23%) | 84 (23%) |
| I set the limit based on how much I have spent previously | 173 (12%) | 113 (14%) | 27 (11%) | 33 (9%) |
| I set a limit that was high enough to ensure that I could spend all I wanted to | 326 (22%) | 151 (18%) | 73 (29%) | 101 (28%) |
| I set the limit at random | 154 (11%) | 105 (13%) | 19 (8%) | 29 (8%) |
| Other | 98 (7%) | 56 (7%) | 15 (6%) | 25 (7%) |
| I don't know | 47 (3%) | 33 (4%) | 5 (2%) | 9 (3%) |

Table 6 What is/are your most important reason(s) for setting your personal limits ($n = 1612$)?

| | Total sample | Green players | Yellow players | Red players |
|--|--------------|---------------|----------------|-------------|
| I set a limit because some games require that I set such limits | 438 | 246 (56%) | 78 (18%) | 114 (26%) |
| I set a limit in order to achieve better control over the amounts I lose | 524 | 253 (48%) | 117 (22%) | 151 (29%) |
| I set a limit because I thought I had to in order to be able to play | 500 | 337 (67%) | 72 (14%) | 87 (17%) |
| Other | 48 | 30 (63%) | 5 (10%) | 12 (25%) |
| I don't know | 102 | 67 (66%) | 13 (13%) | 22 (22%) |
| Overall gambling risk group distribution* | | 65% | 13% | 19% |

*This does not add up to 100% because there were a few players who do not have a *PlayScan* status because of a lack of data to make a reliable rating of risk status

compared to the distribution of green, yellow, and red players was statistically significant ($\chi^2 = 35.196$, $df = 3$, $p < 0.000001$).

Discussion

The present study investigated players' self-reported behavior and attitudes concerning *Norsk Tipping's* introduction of a global financial loss limit in October 2016. Three-quarters of players (76%) said that they had heard about the introduction of the global limit at the time of the survey. Predictably, this percentage increased by the gambling risk group with 94% of red players saying they had heard about it. This is because those at highest risk of problem gambling in the sample would be far more likely than other groups to be playing regularly (if not every day) and would be more likely to have heard about the changes to limit setting because of their more frequent interaction with *Norsk Tipping* products. The findings also demonstrated that gamblers are positive to limit setting if they had actually experienced it themselves.

Two-thirds of players said that they knew how to set a money limit for their gambling. Again, the percentage of players who said "yes" when asked was higher for yellow and red players compared to green players. It is also worth noting that the yellow and red players (as assessed using *PlayScan*) played yellow and red games more often (as assessed by *GAM-GaRD*), where it is mandatory to set personal global limit and sub-limit for specific games. Again, the higher percentages among yellow and red players are likely be due to the fact that they are generally more involved in gambling and therefore were more exposed to advertisements of such features and would have been more exposed to *Norsk Tipping's* limit setting features simply due to the fact that they would have visited gambling venues and/or their online gambling website more regularly.

Table 7 What did you do once you had reached your personal global limit ($n = 752$)?

| | Total sample | Green players | Yellow players | Red players |
|---|--------------|---------------|----------------|-------------|
| I did not play again until the limit was reset | 549 (73%) | 311 (74%) | 101 (77%) | 135 (71%) |
| I was gambling with other gaming companies | 73 (10%) | 26 (6%) | 16 (12%) | 30 (16%) |
| I have not played since I was stopped by the loss limit | 78 (10%) | 49 (12%) | 8 (6%) | 17 (9%) |
| Don't know/don't remember | 52 (7%) | 35 (8%) | 7 (5%) | 9 (5%) |

This might also be associated with the assumptions made by Forsström et al. (2016) who argued that high usage of responsible gaming tools might be based on the perceived need to utilize healthcare and other interventions among high-intensity gamblers. The use of such interventions is important because several studies comparing self-report gambling data with actual gambling using tracking data (i.e., Auer and Griffiths (2017) Braverman et al. (2014), and Wohl et al. (2017)) have shown that high-intensity players poorly estimate their expenditure, and that they underestimate losses but overestimate wins.

Results also demonstrated that when players were given a short explanation of the maximum loss limit, there was a significant increase in the percentage of players who said the global loss limit was easy to understand (and therefore a significant decrease in the percentage of players who said it was difficult to understand). Although this might translate to an increase in players' perception of their own losses in future gambling, it cannot be concluded from the data collected. Compared to low-risk green players, red and yellow players more frequently agreed that a maximum loss limit was personally relevant to them. Because the *PlayScan* assessment reflects different levels of risky gambling, the findings appear to show that this group of (yellow and red) players is somewhat self-aware and knows that a maximum loss limit is useful to them. The percentage of players who said that they had a sufficient overview of how much they gambled declined with gambling risk status (93% of green players compared to 85% of red players). This finding appears to indicate that a small minority of high-risk gamblers do not have sufficient knowledge of what they are spending while gambling and somewhat confirms the findings of studies showing high-intensity gamblers have a low accuracy of self-perceived gambling expenditure when compared to low-intensity gamblers (i.e., Auer and Griffiths 2017; Braverman et al. 2014; Wohl et al. 2017). The findings also demonstrate that red and yellow players more often agree that loss limits help them to keep control over their gambling compared to green players. These results support the findings of Griffiths et al. (2009) who reported that a high percentage of Swedish players found limit setting a useful tool.

The present study also found that 67% of red players agreed in part or entirely when asked whether they feel positive about the global loss limit compared to green players (82%). The personal experience of reaching of the global loss limit by red players may have contributed to this finding (i.e., red players had personal experience of being protected when they reached the global loss limit whereas green players rarely reached the limit). However, the finding also means that a sizeable minority of high-risk gamblers (approximately one-third in the present study) have a less favorable attitude towards global money limits. This may be because some of the participants in this risk group felt that the limits impeded their normal type of gambling in some way. Although the number of red players viewed global money limits less positively than yellow or green players, the majority (i.e., two-thirds of them) had positive views which is in contrast to the study of Bernhard et al. (2006) who found that players in Canada strongly opposed mandatory limits. The reasons for this difference may be cultural (e.g., due to cultural norms, Norwegians might be more accepting of such initiatives compared to Canadians who might view such initiatives as impinging on their personal freedom and/or autonomy when it comes to making informed decisions about responsible gambling). Another reason for the difference may be the fact that the players in the study by Bernhard and colleagues simply gave their attitudes towards limit setting without having actually experiencing it themselves.

The study by Broda et al. (2008) found that very few players ever reached their personal deposit limit, which suggests that players in that study set their limit much higher than what they intended to spend. This raises the question of how players actually carefully work out

their disposable income and what they can afford to lose in setting their personal limits. In the present study, 15% of players said they did not think thoroughly about how to choose their personal money limits. Fewer red players than green players (10 vs. 18%) did not thoroughly think about which money limit value to choose. The higher percentage among green players may be because these players do not have problems because they play much less frequently than red players and therefore do not have to think more thoroughly about what they have spent because they gamble way within their limits anyway and know they are unlikely to ever get near spending the global limit maximum.

Red players were significantly more likely to set a money limit high enough to be able to play as much as they want compared to green players. This finding is also in line with the findings of Broda et al. (2008) who found that players rarely hit the limits they themselves had set. Compared to green players, red and yellow players were significantly more likely to set limits in order to achieve better control over the amounts they lose. With most operators, players cannot increase limits immediately and when they have reached them, they are not able to play with that operator anymore on that day, week, or month. However, players can always continue gambling by switching to other operators' online websites or land-based venues and playing there instead. The present study found that more red players (16%) compared to green players (6%) said that they gambled with other companies when they hit their money spending limit. It is likely that the majority of these red players already had a customer relationship with other operators and gambled with them before the global loss limit was introduced. However, the great majority of red players (71%) also said that they did not gamble again until their limit had been reset. This is a particularly noteworthy finding because it suggests that the majority of high-risk gamblers (at least in this study) do not gamble elsewhere after reaching their limits. However, the finding also demonstrates that a sizeable minority of red players simply go elsewhere to gamble and that this group should be subject to further initiatives in an effort to prevent problem gambling.

The present study is not without its limitations. The study utilized self-report data and is therefore subject to well-known biases including social desirability and memory recall. Additionally, there was a low response rate to the initial 25,000 emails that were sent out so it is not known how representative the sample was of the *Norsk Tipping* player base or how representative the sample was of online gamblers more generally (although the limit setting initiative was only relevant to *Norsk Tipping* players, so therefore, the study was not trying to target online gamblers in general, just those that had experienced the introduction of the global limit). Problem gambling was not formally assessed, and therefore, red players were a proxy measure for problem gambling (and red players in the present study may not have been experiencing problems). Despite these limitations, there were arguably some major strengths to the data collected. All the data were from a confirmed sample of real gamblers (because all participants had gambled on *Norsk Tipping* games), and although there was a low response rate, the sample size was relatively large-scale compared to many survey studies in the gambling study field.

Given that *Norsk Tipping* has player card data on all of its clientele, future research should use behavioral tracking data to actually look at the impact of the global limits in terms of actual player behavior before and after the introduction of the global loss limit to see whether the mandatory loss limit helped gamblers stay in control of their gambling. The findings of the present study also need replicating with online gamblers from other gaming sites and from online gamblers in different cultures.

Overall, the present study provided many novel findings that have not been reported in the gambling study literature previously and the introduction of the global loss limit was viewed

positively by most of *Norsk Tipping's* gambling clientele. No study has ever previously evaluated gamblers' attitudes and knowledge concerning the introduction of a mandatory global loss limit. The study also found that after reaching monthly limits, the vast majority of players did not gamble on other websites. Most players appear to be positive about the RG limit setting tools that *Norsk Tipping* have introduced and the results are in line with findings on an international level. However, the number of studies carried out on limit setting is few and has used very different methods to describe and evaluate such RG initiatives. Based on the findings here, it is recommended that other gaming companies think about introducing global loss limits as another tool in the RG portfolio to help protect players and minimize harm.

Compliance with Ethical Standards

Conflict of Interest The first author's company (*neccton Ltd*) received funding from *Norsk Tipping* (the gambling operator owned by the Norwegian Government) to this work. The second author is employed by *Norsk Tipping* as Senior Advisor of Market analysis. The third author was sub-contracted by *neccton Ltd*. The third author has received funding for a number of research projects in the area of gambling education for young people, social responsibility in gambling, and gambling treatment from *GambleAware* (formerly the *Responsibility in Gambling Trust*), a charitable body which funds its research program based on donations from the gambling industry. Both the first and third authors undertake consultancy for various gaming companies in the area of social responsibility in gambling.

Ethical Approval All procedures performed in this study involving human participants were in accordance with the ethical standards of University's Research Ethics Board and with the 1975 Helsinki Declaration.

Informed Consent Informed consent was obtained from all participants.

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