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### **The Janus-faced role of gambling flow on addiction issues**

#### **Abstract**

Flow experience has been widely investigated in experiential activities such as sports, the performing arts, gaming and Internet usage. Most studies focus on the positive aspects of flow experience and its effect on performance. In stark contrast, gambling research focusing on the negative side of addiction lacks an in-depth investigation of gamblers' (positive) flow encounters. This separation of research lines seems out of place given that recent research indicates connections between flow and addiction. Joining both constructs in a causal effects model helps to gain a better understanding of their relationship and its contingencies. This paper empirically investigates whether and how it is possible to observe a "Janus face" of flow with its various sub-dimensions in online gambling. Empirical data was collected from 500 online gamblers by applying a structured questionnaire with established scales. The data was analyzed with a confirmatory factor analysis and a double-hurdle model to separate casual gamblers who are unsusceptible to any addiction issues from gamblers affected by initiatory addiction issues. The findings indicate that online gambling addiction is negatively influenced by two sub-dimensions of flow experience, namely a sense of control and concentration on the task at hand, while enhanced by a transformation of time and autotelic experience.

Keywords: Flow experience, addiction, double-hurdle model, online gambling.

## **Introduction**

Immersion in an activity, which is commonly identified as “flow experience,” is characterized by a “holistic experience that people feel when they act with total involvement”.<sup>1</sup> Flow experience is considered to be a positive state and contributes to performance enhancement and behavioral reinforcement.<sup>2,3</sup> It has been investigated in a broad set of experiential activities ranging from sports or athletic performance<sup>4</sup> to online experiences such as banking,<sup>5</sup> gaming,<sup>6</sup> and social networking sites.<sup>7</sup>

As the experience of flow may lead to ever increasing participation,<sup>8</sup> a compulsive pursuit of this experience can have undesirable consequences.<sup>9,10</sup> Csikszentmihalyi<sup>1</sup> argues that a flow state has “addictive properties” (p. 139). A few of the studies from the gaming literature suggest that this positive state of experience has negative consequences for gamers, including dropping out from school, withdrawing from family life, losing interest in other activities, and having a negative effect on the gamer’s health and job.<sup>11,12</sup> Considering such unintended negative consequences of deeper immersion, scholars have examined the relationship between flow and addiction.<sup>13</sup> However, the results of online gaming studies provide contradictory and inconclusive findings: A few studies indicate a positive relationship between flow state and addiction,<sup>9,14</sup> while others suggest a weak or even a non-significant relationship.<sup>6</sup>

One reason for these inconclusive results might be that the studies that relate flow to online gaming addiction treat flow as a unidimensional concept.<sup>6,7</sup> However, it is well established in the flow literature that flow is a multi-dimensional construct.<sup>15,16,17</sup> Consequently, Wu et al.<sup>14</sup> call for additional research in this direction to provide robust empirical evidence. In addition, Wan and Chiou<sup>6</sup> ask for a differentiation of the effects of flow as an enabler and/or intensifier of addiction problems.

To further investigate the relationship between positive states of mind depicted by flow experience with negative consequences of addiction, our study explores the domain of online gambling. Online gambling is characterized by several features that support a player's flow experience: It provides accessibility, convenience, disinhibition, anonymity, and instant reinforcement.<sup>11,18,19</sup> This combination of factors results in "more mindless consumption of gambling and resultant losses."<sup>20</sup> Again, the relationship between addiction problems and "flow experience" as a possible antecedent, as well as its various sub-dimensions, is yet to be explored. Using a double-hurdle model, this study fills a void in literature by investigating the relationship between flow dimensions and online gamblers' addiction. It differentiates six major sub-dimensions of flow to assess their specific impact on online gambling addiction.

## **Literature review**

### *Online gambling and addiction*

With the increasing social acceptance of various forms of gambling across the globe and expanding Web and Web-based technologies, online gaming has emerged as a popular form of entertainment over the past two decades.<sup>21</sup> The global online gambling market has grown exponentially, and market practitioners estimate that it has grown from \$28.32 billion in 2012 to \$49.64 billion in 2017.<sup>22</sup> According to a recent British Gambling Prevalence Survey,<sup>23</sup> 73 percent of respondents had participated in some form of gambling over the previous year, and about 14 percent of adults had gambled online.

Griffiths and Barnes<sup>18</sup> state that online gambling provides instant reinforcement and has relatively shorter time intervals between gambling activities. This results in an increase in opportunities, time spent, and frequency of bets on online platforms.<sup>20</sup> Various researchers provide empirical evidence that online gambling is more harmful to players than casino

gambling.<sup>23, 24, 25, 26, 27</sup> Cotte and Latour<sup>20</sup> also find that online gamblers have higher gambling-related problems, such as a feeling of detachment, boredom, and anonymity.

Several studies find online gambling to be highly addictive<sup>28</sup> and clinically more problematic than casino gambling.<sup>29</sup> Shaffer and Kidman<sup>30</sup> argue that a combination of biological, psychological, and social aspects leads to an online gambling addiction. Owing to increased social isolation and accessibility coupled with the availability of funds online and much fewer geographic and timing restrictions, an online gambler is at a higher risk of developing an addiction. Consequently, this may lead to various issues like problems with employment, social relationships, financial condition or a deterioration in physical and mental health.<sup>31,32</sup> Studies by Griffiths et al.<sup>23</sup> and Wood and William<sup>25</sup> find that online gamblers have a higher probability of using drugs and alcohol than casino gamblers do. In light of these negative consequences, a few researchers have proposed a complete ban on online gambling,<sup>33</sup> while others say it should be more tightly regulated (Smeaton and Griffiths, 2004).<sup>34</sup>

#### *Flow state and addiction in online gambling – two sides of the Janus face*

Csikszentmihalyi<sup>1</sup> conceptualizes the concept of flow as a positive state that occurs when the performer is totally connected with the performance, and most prominent definitions of flow include three common elements: absorption, enjoyment, and intrinsic motivation.<sup>35</sup> In the state of flow, a person finds the experience of performing an activity highly rewarding in itself,<sup>36</sup> even while losing self-consciousness, clarity of goals, and a sense of control over the environment.<sup>37</sup>

Original flow theory suggests that the flow state is characterized by several dimensions.<sup>1,38</sup> Later studies conceptualize the flow state in several different ways.<sup>39,40</sup> Integrating those different measurement approaches, Jackson and Marsh<sup>15</sup> establish a measurement instrument

that represents the various dimensions of flow as discussed by Csikszentmihalyi.<sup>37,41</sup> In this study, the concept of flow focuses on the six major constructs of this scale: loss of self-consciousness, transformation of time, autotelic experience, clear goals, concentration on task at hand, and sense of control. It is hypothesized that some dimensions inhibit addiction issues, while others exacerbate these issues.

#### *Flow supporters of addiction*

*Loss of self-consciousness* means a person in flow becomes one with the activity and performs actions “instinctively and confidently”.<sup>15</sup> As an individual’s attention is focused on a narrow set of activities, he or she becomes more absorbed in the activity and loses self-consciousness.<sup>1</sup> This might not be problematic per se; however, an ongoing loss of self-control is considered to be a key cause of addiction issues. During online gambling, a combination of high intensity, speed, and limited stimulus, as well as higher involvement, results in a loss of self-consciousness and may lead to becoming addicted to gambling. Thus, it has been hypothesized that:

H1) In online gambling, once an initiatory threshold of addictivity is crossed, loss of self-consciousness increases the extent of the addiction problems.

*Transformation of time*, also known as distortion of the sense of time, means that during the flow, an individual’s sense of time is altered, and he or she may feel that either time has slowed down or is speeding up.<sup>15</sup> During online gambling, immersion in online gambling may result in a transformation of time. While this is unlikely to constitute a problem for casual gamblers who are unsusceptible to addiction issues, it may result in increased addiction problems for gamblers affected by initiatory addiction issues. Therefore, the second hypothesis is that:

H2) Once an initiatory threshold of addictivity is crossed, the transformation of time in online gambling increases the extent of addiction problems.

*Autotelic experience* simply means the intrinsic satisfaction that a person experiences by performing an activity, and it may often be perceived as more important than other extrinsic rewards. This is identified as one of the final consequences of being in flow.<sup>1</sup> From an athlete's perspective, it represents a feeling of leaving you "on a high",<sup>15</sup> and a person has the same experience during gambling. Again, autotelic experiences are not dangerous per se and can be quite enlightening for the participant. However, if they persist, they are likely to strengthen self-immersion and thus a psychological dependence on performing such an activity. Therefore, the third hypothesis is the following:

H3) Once an initiatory threshold of addictivity is crossed, autotelic experience increases the extent of addiction problems.

#### *Flow inhibitors of addiction*

*Clarity of goals* is a precondition to success in many activities as it helps a person to remove unnecessary distractions and to optimize his or her own performance.<sup>42</sup> In a flow state, a clearly defined goal provides a sense of direction to a person with regard to his or her actions<sup>15</sup> and thus reinforces the flow experience. Moreover, it also provides structure and drives the activity to be performed.<sup>43</sup> In online gambling, individuals may set their goal for either a particular session or a specific time duration and thus channel their efforts toward achieving that defined goal. This should help gamblers affected by initiatory addiction issues. Thus, the fourth hypothesis is that:

H4) In online gambling, once an initiatory threshold of addictivity is crossed, the clarity of goals reduces the extent of addiction issues.

*Concentration on task at hand* is one of the most frequently mentioned characteristics of flow experience.<sup>44</sup> It is a key variable to explain an optimal state of involvement and flow experience.<sup>45</sup> While concentrating on a task, the goal may be to perform to the best of one's abilities.<sup>4</sup> During online gambling, an individual might concentrate entirely on the game and specify personal achievement goals. In such a case, it is likely that the gambler concentrates on the single current gambling session and on achieving specific milestones. Such a (sub-) consciously reflected setting makes an increase in compulsive patterns over time less likely. Thus, the fifth hypothesis is the following:

H5) Once an initiatory threshold of addictivity is crossed, concentration on the task at hand reduces the extent of gamblers' addiction issues.

*Sense of control* has been identified as an important element of flow.<sup>1</sup> Initially, Csikszentmihalyi<sup>1</sup> labeled it as being "in control" and subsequently changed it to "sense of control" (p. 181).<sup>41</sup> *Sense of control* refers to a person's feeling that he or she is in complete control of the task being performed without actively trying to exert control.<sup>15</sup> Sense of control might be an especially relevant dimension in the context of online gambling: Technology can create a sense of control for users by laying out multiple explicit choices among alternatives.<sup>46</sup> During an online gambling session, gamblers have multiple alternatives like poker, slots, roulette, etc. The online gambling eco-system is also highly adaptable thanks to input from an individual gambler, which results in a feeling of control. This sense of control due to the ability to choose from multiple alternatives in real time may influence addiction to online gambling. Depending on whether this control is only perceived or actually existent, the final hypothesis is that:

H6) In online gambling, once an initiatory threshold of addictivity is crossed, a factual (illusionary) sense of control reduces (increases) the extent of addiction issues.

## **Methodology**

Data was collected as part of a larger study designed to investigate the gaming and gambling sector by means of a structured, non-disguised questionnaire. Between April and May 2015, a professional market research agency collected responses by using one of the prominent online panels based in Germany. Online panel participants who have indulged in online gambling activities within the last four weeks before the survey were randomly selected from all of Germany's 16 states. The online panel participants were provided possibilities to collect points as reward for participation in the survey with the chance to convert it into gift voucher or cash. Table I presents detailed demographic information about the sample's respondents.

< insert Table 1 here >

Six dimensions of flow experience were measured with the scale adopted.<sup>15</sup> Three factors (challenge skills balance, action awareness, and unambiguous feedback) stemming from qualitative research with athletes,<sup>47</sup> were excluded because they did not fit with gambling issues. Internet gambling addiction was measured with nine items adopted from Beard and Wolf<sup>48</sup>. Research assistants performed and verified back translation of the scales from English to German. Answers were recorded on a five-point Likert-type scale, anchored by "strongly agree" (5) and "strongly disagree" (1), in which the rating (3) was for "neutral response."

## **Data analysis**

A confirmatory factor analysis was carried out to examine the adequacy and quality of flow scale by establishing reliability and convergent and discriminant validity by measurement model analysis. All the goodness-of-fit statistics ( $\chi^2=742.228$ ;  $df=224$ ;  $p<0.001$ ;  $\chi^2/df=3.314$ ; TLI=0.915; CFI=0.931; RMSEA=0.068) are close to or within acceptable limits. Composite reliability values are above the recommended level of 0.70, which supports the scale's convergent validity. In addition, the average variance extracted for each dimension

always exceeds the minimum acceptable level of 0.50.<sup>49</sup> Thus, the six dimensions of flow, as suggested by Jackson and Marsh,<sup>15</sup> are empirically substantiated in our study.

A double-hurdle regression model was used to measure the causal effects of flow experience on online gambling addiction. The double-hurdle model<sup>50</sup> consists of two equations: One determines whether an online gambler is affected in any way by addiction issues (the “first hurdle”), and the other determines the extent of his or her addiction issues (the “second hurdle”). By separating both stages, the model takes into account that addiction might not be an issue at all for a subset of gamblers, whatever their circumstances (specifically, their flow experience) might be. Statistically speaking, a double-hurdle model combines a probit model to separate the crossing of the first hurdle from a truncated normal model that predicts the intensity of the dependent variable (here, addiction issues) in a second hurdle.<sup>51</sup> The double-hurdle model has been applied to contexts ranging from fertilizer subsidies<sup>52</sup> to tobacco demand.<sup>53</sup> Recently, Rude et al.<sup>54</sup> used double-hurdle modeling in an econometric study to estimate gambling expenditure in Sweden.

The use of a double-hurdle regression model is based on the presumption that online gambling addiction follows a two-step process in which those gamblers who do not cross the first (left-censored) hurdle are labeled as “unsusceptible to any addiction issues,” and those gamblers who cross the first hurdle are labeled as “plausibly affected by initiatory addiction issues.” Out of 500 online gamblers who participated in the study, 229 are left-censored with a sum score of 9 on the nine items of the addiction scale. They do not exhibit any addiction-related problems at all. The 271 respondents who passed the first hurdle have an average sum value of 18.28 on the addiction scale. This is in line with previous studies in which respondents making up between 10 and 65 percent are identified as problem gamblers.<sup>29, 55, 56</sup>

The double-hurdle model is implemented by the Stata command *dhreg* developed by Engel and Moffatt<sup>57</sup>. This procedure joins a univariate probit model and a truncated regression model for the second tier.<sup>50</sup> The probit model component, which shows whether gamblers are affected by initiatory addiction issues at all, is followed by a tobit model that corresponds to the extent of initiatory addiction issues.<sup>58</sup> Combining both methods in Cragg's double-hurdle model leads to an increase in statistical efficiency.<sup>59</sup> Table 2 provides the estimation results gained from separate probit and tobit models for the purpose of comparison. This is followed by the results of the double-hurdle regression model for those 271 online gamblers who crossed the first hurdle and are identified as "plausibly affected by initiatory addiction issues."

< insert Table 2 here >

According to hypothesis 1, loss of self-consciousness in online gambling should increase the extent of addiction issues among online gamblers. Though the relationship between these two variables is positive, the effect is not statistically significant among gamblers affected by initiatory addiction issues ( $\beta=0.121$ ,  $p=.603$ , *ns*). The experience of a transformation of time exerts a significant positive effect on addiction among plausibly affected gamblers ( $\beta=0.988$ ,  $p<.01$ ), supporting hypothesis 2. Hypothesis 3 postulates that the autotelic experience enjoyed by an online gambler results in increased addiction issues. Results provide empirical evidence confirming this hypothesis ( $\beta=0.713$ ,  $p<.01$ ).

Hypothesis 4 states that clarity of goals might result in decreased addiction issues for plausibly affected gamblers. However, the results do not provide statistical evidence to support this hypothesis ( $\beta=0.387$ ,  $p=.25$ , *ns*). Hypothesis 5 posits that a concentration on the task at hand reduces potential gambling addiction issues of plausibly affected online gamblers. The results of the second-hurdle support this hypothesis ( $\beta=-0.751$ ,  $p<.05$ ). Finally,

hypothesis 6 postulates that the sense of control experienced by online gamblers might decrease addiction issues among online gamblers. The results confirm this hypothesis for online gamblers plausibly affected by initiatory addiction issues ( $\beta=-0.719$ ,  $p<.01$ ).

### **Discussion and implications**

Online gambling has grown exponentially because of enhanced Internet penetration and the increasing adoption of gambling as an enticing form of entertainment. It has been shown that participants gambling online have higher chances of becoming addicted than do those who gamble in casinos.<sup>25</sup> Therefore, various antecedents of online gambling addiction need to be understood so as to facilitate a systematic process from consulting agencies to reduce the incidence of gambling addiction and to limit its consequences. The present study examined the relationship between six dimensions of flow experience and online gambling addiction. Results show that four out of six dimensions of flow exert statistically significant effects on addiction for online gamblers who have crossed the first threshold level, namely the first hurdle. While concentration on task and a sense of control reduce addiction issues, the transformation of time and the autotelic experience increase addiction issues among online gamblers plausibly affected by initiatory addiction issues.

Concentration on the task was found to exert a negative influence on online gambling addiction issues. Online gamblers are more concentrated on their own specific gambling session and less exposed to immediate comparisons with other players; thus, they tend to focus on performing the specific activity to the best of their abilities<sup>4</sup>. Such an achievement situation leads them to be potentially less affected by addiction issues. Sense of control also exerts a negative influence on online gambling addiction issues. During interaction with an online technology, the user decides what, when, where, with whom, and how much to communicate and interact,<sup>60</sup> which results in an increased sense of control and resultant

action. Therefore, those online gamblers who have active control over their feelings and actions performed during gambling sessions are found to control their gambling habits better and to lower the risk of becoming addicted. Consequently, from a policymaker's perspective, it is desirable to insert self-controlled checkpoints for online gamblers within the game. These can be implemented, for example, by displaying the frequency of play during a specific time period or the size of past bets. Such self-controlled checkpoints embedded in online gambling are expected to reinforce online gamblers' sense of control and to reduce addiction issues.

Both transformation of time and autotelic experience increase self-reported online gambling addiction issues. As gamblers become immersed in the game and lose their sense of time, they have a higher chance of experiencing addiction issues. Wood et al.<sup>61</sup> also find that loss of a sense of time results in an increased chance of gaming addiction and the resulting negative consequences. Taking periodic or scheduled break from a gambling session and reducing the duration of each play may help these gamblers to reduce their chance of getting addicted. While gamblers could derive an intrinsic satisfaction from online gambling or may really enjoy their experience, this might be harmful in the long run. Although online gambling may attract a gambler and allows him or her feel relaxed, relieve stress or take a break from mundane daily activities by providing a joyful or stimulating experience, it could ultimately prove harmful to those online gamblers already affected by initiatory addiction issues.

This study has inherent limitations. It explored the effects of six dimensions of flow experience on online gambling addiction without considering the specific effects of games played online. Different media like PC gambling or mobile gambling might also affect the nature and extent of this relationship. In this regard, future studies should examine how the effects of flow experience on addiction are moderated by the specific forms of gambling and by the specific media platforms that online gamblers use (especially stationary or mobile

platforms). Lastly, the use of self-reported measurements and retrospective recall of flow experience constitutes another important limitation of the study. Future researchers might employ less obvious and more implicit measurement techniques to further validate the results of the study.

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