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Abstract A number of studies have suggested that depressive mood might lead to the development and/or maintenance of a gambling disorder (GD). The pathways by which such relationships are fostered may involve deficits in emotional regulation capacity and dysfunctional coping styles. This study aims to explore the role played by depressive symptomatology and the regulation of positive emotion in GD. We administered the South Oaks Gambling Inventory (SOGS, Lesieur and Blume in *Am J Psychiatry* 144(9): 1184–1188, 1987), the 21-item Depression Anxiety Stress Scale (DASS-21, Lovibond and Lovibond in *Manual for the depression anxiety stress scales*. Psychology Foundation, Sydney, 1995) and the Kill-joy Thinking subscale of the Ways of Savoring Checklist (WOSC, Bryant and Veroff in *Savoring: a new model of positive experience*. Lawrence Erlbaum, Mahwah, 2007) to a sample of pathological gamblers (n = 91) and a sample of community participants (n = 105). The pathological gamblers scored higher on the DASS-21 subscales and obtained higher scores on the Kill-joy Thinking subscale of the WOSC compared to the controls. Moreover, the SOGS scores positively correlate with the DASS-21 subscales, and with the Kill-Joy Thinking measure. Finally, it is evident that Kill-joy Thinking fully mediates the relationship between depressive symptomatology and GD severity. Our results further confirm the roles of depression, anxiety and stress in GD. Moreover, this is the first study to explore the mediating role of dampening processes in the relationship between depression and GD. Future lines of research are also discussed.

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Keywords (separated by '-') Gambling disorder - Depression - Anxiety - Emotion regulation - Savoring - Dampening

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2 **Struggling with Happiness: A Pathway Leading Depression**  
3 **to Gambling Disorder**

4 Guyonne Rogier<sup>1</sup> · Giancarlo Picci<sup>1</sup> · Patrizia Velotti<sup>1</sup>

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7 **Abstract**

8 A number of studies have suggested that depressive mood might lead to the development  
9 and/or maintenance of a gambling disorder (GD). The pathways by which such relation-  
10 ships are fostered may involve deficits in emotional regulation capacity and dysfunctional  
11 coping styles. This study aims to explore the role played by depressive symptomatology  
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25 study to explore the mediating role of dampening processes in the relationship between  
26 depression and GD. Future lines of research are also discussed.

27 **Keywords** Gambling disorder · Depression · Anxiety · Emotion regulation · Savoring ·  
28 Dampening

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## 29 Introduction

## 30 Gambling Disorder and Depression

31 Gambling disorder (GD) is characterised by a maladaptive and persistent gambling  
32 behaviour, which can lead to clinically significant discomfort or impairment (American  
33 Psychiatric Association 2013). Moreover, GD is characterized by various psychiatric  
34 comorbidities (el-Guebaly et al. 2006; Kim et al. 2006; Lorains et al. 2011; Rogier and  
35 Velotti 2018a; Rogier et al. 2017).

36 In particular, a systematic review of the extant literature (Lorains et al. 2011) indi-  
37 cates that 38% of pathological gamblers (PGs) suffer from a comorbid mood disorder.  
38 Since comorbid depression in PGs increases the risk of suicide (Blaszczynski and Far-  
39 rell 1998; Petry and Kiluk 2002), it is necessary to address this issue in treatment pro-  
40 tocols. The causal relationship between depression and GD is still controversial, with  
41 some studies indicating that depression symptomatology is a risk factor for GD (Blasz-  
42 czynski and Farrell 1998; Chou and Afifi 2011; Parhami et al. 2014), while others con-  
43 clude that GD should be considered a facilitator of depression (Afifi et al. 2016), and  
44 still others argue that there are mutual direct links between the two disorders (Dussault  
45 et al. 2011).

46 Laboratory studies have examined the role of depressive mood in gambling behaviour.  
47 For instance, Griffiths (1995) has investigated the moods of 60 individuals (habitual gam-  
48 blers and non-habitual gamblers) while playing with a fruit machine. Habitual and patho-  
49 logical gamblers reported high levels of depressive mood before the gambling task, while  
50 non-habitual gamblers did not. A very recent study used a mood induction paradigm to  
51 estimate the causal influence of sadness in a slot machine task, providing a monetary rein-  
52 forcement to recreational gamblers (Devos et al. 2018). In the experimental group (sadness  
53 induction), the participants exhibited more persistent gambling behaviour compared to par-  
54 ticipants assigned to the control condition (no emotional induction).

55 Despite these preliminary evidences, the way in which depressive symptomatology  
56 leads to GD remains partially unexplained. The emotional regulation framework pro-  
57 vides a useful tool to approach this issue. Several authors have suggested that unsuc-  
58 cessful emotional regulation processes may be implicated in both the development and  
59 maintenance of gambling activity (Blaszczynski and Nower 2002; Lesieur 2001; Rogier  
60 and Velotti 2018b; Sharpe 2002). Indeed, all of these models assert that some PGs gam-  
61 ble to “escape” depressive moods. For instance, Lesieur (2001) has labelled this sub-  
62 type of PGs as “escape-seekers”, whereas Blaszczynski and Nower (2002) identify them  
63 as the “emotionally-vulnerable” subgroup. In accordance with this, the nosographical  
64 definition of the disorder itself encompasses a criterion referring to the use of gambling  
65 behaviour as a regulator of dysphoric affect (APA 2013). The hypothesis that depression  
66 leads to GD due difficulties with emotion regulation, is supported by studies that indi-  
67 cate high levels of emotion dysregulation in PGs (e.g. Williams et al. 2012; Navas et al.  
68 2018; for a narrative review see Rogier and Velotti 2018b), as well as research that has  
69 proven a mediating role of emotion dysregulation in the relationship between psychopa-  
70 thology and GD (Jauregui et al. 2016; Rogier and Velotti 2018a).

71 However, the concept of emotional dysfunction, in both GD and depression, has not  
72 been examined exhaustively. In particular, as already noted in the broadest field of psy-  
73 chopathology (Carl et al. 2013), the scientific community has primarily neglected the  
74 role of positive emotion regulation in both GD and depressive symptomatology.

## 75 Hedonic Dysregulation in Depression: the Role of Kill-joy Thinking

76 A core symptom of depression is anhedonia, which is the inability to experience positive  
77 emotional states (APA 2013). Studies have found that depressed individuals exhibit  
78 low levels of trait positive affect (i.e. how much people experience positive affect) and  
79 that blunted neural responses to gambling rewards (i.e. reward insensitivity) is a factor  
80 in depression (Watson et al. 1988; Weinberg et al. 2015). Additionally, a recent meta-  
81 analysis has further found that depression is associated with diminished reactivity to  
82 positive emotional stimuli (Bylsma et al. 2008).

83 The healthy regulation of positive emotions is a wide construct that includes the  
84 capacity to *savour* (Bryant and Veroff 2007). This concept refers to a range of cognitive  
85 and behavioural strategies used to upregulate the emotional states connected to positive  
86 experiences. In accordance with the literature on the role played by the regulation of  
87 positive emotions in psychopathology (Carl et al. 2013), studies have shown that *savour-*  
88 *ing* is related to low levels of depression (Smith and Hollinger-Smith 2015) and help-  
89 seeking behaviours in depressed individuals (Straszewski and Siegel 2018). More spe-  
90 cifically, Bryant and Veroff (2007) have identified a dysfunctional strategy of *savouring*  
91 known as Kill-joy Thinking, a dampening cognitive process that down-regulates rather  
92 than increases positive emotions. The set of dampening processes elicited by a positive  
93 emotional trigger includes reactions as such as feeling guilty, thinking of ways in which  
94 the positive events could have been better, or reminding oneself about things one should  
95 be doing or responsibilities that one must still face. Preliminary results indicate that  
96 dampening processes are related to a negative mood after experiencing a success (Wood  
97 et al. 2003) and to depressive symptoms (Feldman et al. 2008; Raes et al. 2012). Despite  
98 the fact that Kill-joy Thinking and depression appear closely related, evidence supports  
99 the idea that these are two separate constructs. Several studies have revealed that, when  
100 controlling for depression levels, dampening processes are associated with panic dis-  
101 order, social phobia, generalized anxiety disorder and obsessive-compulsive disorder  
102 (Carl et al. 2013; Eisner et al. 2009). In accordance with this, experimental evidence  
103 suggests that blunted responses to positive stimuli is not an exclusive characteristic of  
104 depressed individuals. For instance, using a cue-exposure paradigm, Larson et al. (2007)  
105 have observed that individuals with anxious symptomatology do not exhibit blink atten-  
106 uation during and following the presentation of enjoyable stimuli. Thus, as suggested by  
107 Eisner et al. (2009), the role of dampening in psychopathology should not be reduced to  
108 a hallmark of depression, but may play other functions, such as the reduction of positive  
109 arousal experienced as disturbing in individuals with a panic disorder.

## 110 Hedonic Dysregulation in GD

111 Similarly, in the field of addiction, the role of positive emotions remains on the side-  
112 lines of empirical investigations (Carroll and Huxley 1994; Rogier and Velotti 2018b).  
113 This is rather surprising considering that several theoretical models have argued that the  
114 management of positive emotions is involved in the disorder (e.g. Jacobs 1986; McDou-  
115 gall 2004; McConaghy et al. 1988). Promising preliminary data suggests that the dif-  
116 ficulty to cope with positive emotional states is central to GD. The most convincing  
117 results reveal an association between positive urgency—a personality trait describing  
118 the proneness to act rashly under the influence of positive emotional states—and GD

119 (Haw 2017; Steward et al. 2017; Blain et al. 2015; Cyders and Smith 2008; Cyders et al.  
120 2007).

121 An interesting line of research examined the specific nature of pleasurable experiences  
122 in individuals suffering from addiction. These contributions theorized the existence of  
123 a hedonic dysfunction in addicted individuals that would explain an excessive approach  
124 to hedonic stimuli. One of these theories, known as the incentive-sensitization theory of  
125 Berridge and Robinson (2008), asserts that addicted individuals, due to the excessive and  
126 repeated consumption of highly rewarding stimuli (such as gambling), have developed an  
127 unbalanced hedonic state. This would be expressed throughout an asymmetric hedonic sen-  
128 sitivity with elevated responses to addictive rewards and complementary blunted hedonic  
129 responses to other sources of pleasure, such as natural rewards. In accordance with this,  
130 a recent mindfulness-inspired treatment for addiction has the central objective of restor-  
131 ing hedonic function through training the savouring capacities (Garland 2016). Similarly,  
132 the reward deficiency syndrome theory (Volkow et al. 2002; Comings and Blum 2000)  
133 postulates the existence of a chronically impaired reward system, likely due to a hypo-  
134 dopaminergic state of subcortical areas. From this perspective, PGs would be driven to  
135 compensate for this impairment through involvement in activities providing high hedonic  
136 rewards. Unfortunately, the evidence presented by the neuroimaging field are inconclusive,  
137 with several studies reporting increased (Joutsa et al. 2012) reactivity of the reward sys-  
138 tem among PGs, while other report a decreased reactivity (Balodis et al. 2012; Chase and  
139 Clark 2010; de Ruiter et al. 2009; Reuter et al. 2005). An interesting and related study was  
140 conducted by Sescousse et al. (2013), who observed that PGs exhibit a decreased reactivity  
141 (measured throughout the activity of the ventral striatum) to erotic stimuli (i.e. a natural  
142 reward). Importantly, it has been recently argued that these two main theories should not  
143 necessarily be considered self-exclusive, but that they may be conceptualized as two com-  
144plementary explanations of the development of GD. As a whole, both converge towards the  
145 idea that levels of hedonic dysfunctions (e.g. dampening processes, Kill-joy Thinking)  
146 should be associated with levels of GD severity.

## 147 The Present Study

148 Despite these interesting premises, to date there remains a lack of research examining the  
149 complex interplay between depression, Kill-joy Thinking and GD. As such, we aim to  
150 bridge this gap by investigating the topic among a clinical sample of PGs and comparing  
151 the results to a group of community participants. Specifically, we formulated the following  
152 hypotheses:

153 **H1** We expect to find high levels of both internalizing symptomatology (i.e. depression,  
154 anxiety and stress) and down-regulation strategy of positive emotions (i.e. Kill-joy Think-  
155 ing) among PGs, compared to community participants. This hypothesis was formulated on  
156 the basis of previous literature that has suggested high levels of depressive symptomatology  
157 among PGs, as well as based on neurobiological and theoretical literature that has dis-  
158 covered abnormalities in the hedonic response of addicted individuals.

159 **H2** In accordance with the findings of previous studies, we expect to observe a significant  
160 and positive predictive effect of depressive symptomatology on severity of GD. Moreo-  
161 ver, we predict the same pattern of results for Kill-joy Thinking, because the primary



162 theoretical models assert that the severity of hedonic dysregulation accounts for the pro-  
163 pensity to become addicted to gambling rewards.

164 **H3** In accordance with previous empirical evidence and, in line with the cognitive concep-  
165 tualization of depression (Beck 1976), we argue that depressive symptomatology orientates  
166 cognitive processes. We, thus, expect depressive symptomatology to predict the levels of  
167 Kill-joy Thinking.

168 **H4** Finally, as Kill-joy Thinking is strongly associated with depression, and is a hypothe-  
169 sized variable of GD, it is reasonable to predict that the pathway by which depression leads  
170 to GD would be partially mediated by an individual's level of Kill-joy Thinking.

## 171 **Methods**

### 172 **Participants and Procedure**

173 This study was conducted on 196 Italian adults. The clinical group (n=91) comprised  
174 participants (77 males) with a clinician-based current diagnosis of GD, with a mean age  
175 of 47.4 years (SD=13.11), who were recruited from three clinical centres specialized in  
176 the treatment of GD. The comparison group (n=105), with a mean age of 46.88 years  
177 (SD=10.01), included community participants (79 males) who were drawn from the gen-  
178 eral population using a purposive sampling technique.

179 Information about the research's objectives and procedure were provided, and the par-  
180 ticipants' privacy and anonymity were ensured through the signing of a written consent  
181 form. The participants filled out self-reported questionnaires in an individual context (pri-  
182 vate rooms inside clinical centres or at the University of Rome), under the supervision of  
183 a clinical psychologist. All procedures complied with the guidelines of the American Psy-  
184 chological Association, and were approved by the Research Ethic Board of the University  
185 of Rome.

### 186 **Measures**

187 A self-report questionnaire was administered to all participants to gather information on  
188 the following areas:

189 *Demographic information* such as age, gender and nationality.

190 *The severity of the participant's gambling disorder (or lack thereof)* was evaluated using  
191 the 20-item South Oaks Gambling Screen (SOGS, Lesieur and Blume 1987; Guerreschi  
192 and Gander 2002). This instrument also provided cut-off scores to differentiate between  
193 participants who were not at risk, those who were and those with pathological gamblers.  
194 The reliability of this study was confirmed through the use of a Cronbach's Alpha test  
195 (score of 0.94).

196 *Kill-joy Thinking* was measured through the use of the Ways of Savouring Checklist  
197 (WOSC, Bryant and Veroff 2007; Balzarotti et al. 2018), a self-report questionnaire that  
198 assesses capacities to savour positive emotions. This questionnaire asks the participants  
199 to describe how they typically react to positive events, using a Likert-type scale ranging  
200 from 1 (*Definitely doesn't apply*) to 7 (*Definitely applies*). The participants completed

201 all of the items of the WOSC, but only the Kill-Joy Thinking subscale was analysed.  
 202 Scores for this subscale were obtained by adding the responses given by the participant  
 203 to 7 of the total 60 items. Examples items include: "I thought about ways in which it  
 204 could have been better", "I thought about things that made me feel guilty" or "I thought  
 205 about other things that were hanging over me, problems and worries that I still had to  
 206 face." This tenth subscale of the WOSC exhibits good internal consistency, with a Cron-  
 207 bach's alpha of 0.84.

208 *Depression, Anxiety and Stress* were measured through the use of the Depres-  
 209 sion Anxiety Stress Scales-21 items (DASS-21, Lovibond and Lovibond 1995; Bot-  
 210 tesi et al. 2015), a self-report questionnaire that asks participants to indicate how often  
 211 the described experience applies to them using a 4-point Likert scale, ranging from 0  
 212 (*Never*) to 3 (*Almost ever*). The instrument's excellent psychometric proprieties were  
 213 confirmed with Cronbach's alphas of 0.88, 0.84 and 0.90 for *Depression, Anxiety* and  
 214 *Stress*, respectively.

## 215 Statistical Analyses

216 Cronbach's alphas were calculated for each instrument to examine the reliability of the  
 217 measures. A *t* test was performed for each to ensure that the control and clinical groups  
 218 did not differ in age ( $p=0.14$ ) or on the basis of gender ( $p=.07$ ). Means and standard  
 219 deviations were calculated for each variable in the study. The relationships between all  
 220 of the variables considered in the study were examined by calculating r-Pearson correla-  
 221 tions. Subsequently, a *t* test was performed to explore the differences between groups on  
 222 the DASS-21 and Kill-joy Thinking measures. Finally, the mediating effect of Kill-joy  
 223 Thinking on the relationship between depression and the severity of GD was examined  
 224 through a series of regression analyses, in accordance with Baron and Kenny (1986).  
 225 In particular, we examined whether (1) depression effectively predicts the severity of  
 226 GD; (2) depression significantly predicted Kill-joy Thinking; (3) Kill-joy Thinking pre-  
 227 dicts GD severity; (4) depression indirectly predicts the severity of GD through Kill-joy  
 228 Thinking. Statistical significances were tested using the bootstrap method. All statistical  
 229 analyses were implemented using SPSS 23.0 software for Windows.

AQ1

**Table 1** *T* test comparing groups on Kill-joy thinking, depression, anxiety and stress

	Addicted Gamblers (n=91)		Control group (n=105)		<i>t</i>	<i>p</i>
	Mean	SD	Mean	SD		
Kill-joy thinking	23.08	8.81	15.80	6.31	6.15	< .001
DASS-21 depression	5.35	3.84	3.25	2.97	3.99	< .001
DASS-21 anxiety	4.01	3.28	2.74	2.80	2.77	.006
DASS-21 stress	7.12	4.49	5.71	3.46	2.33	.021

*SD* standard deviation, *DASS* depression anxiety stress scales-21

## 230 Results

### 231 Differences Between the Groups

232 The scores of the two groups were compared with regard to the Kill-joy Thinking and  
233 DASS-21 measures through the use of a *t* test. As displayed in Table 1, the results indi-  
234 cate that the means of the two groups differed significantly. In particular, the clinical group  
235 scored higher than the control group on the Kill-joy Thinking, depression, anxiety and  
236 stress measures.

### 237 Relationships Between GD Severity, Kill-joy Thinking, Depression, Anxiety and Stress

238 The *r*-Pearson correlations between all the study variables are illustrated in Table 2. Thus,  
239 it can be seen that GD severity is positively and significantly correlated with Kill-joy  
240 Thinking. All subscales of the DASS-21 were positively and significantly correlated with  
241 GD severity. Moreover, Kill-joy Thinking was positively and significantly associated with  
242 the subscales of the DASS-21.

### 243 The Mediating Role of Kill-joy Thinking

244 The mediating role of Kill-joy Thinking has been explored through the relationship  
245 between depression and GD severity. As Table 3 illustrates, depression positively pre-  
246 dict the severity of GD (Step 1), as well as Kill-joy Thinking (Step 2). Moreover, Kill-  
247 joy Thinking positively predicts GD severity beyond the role of depression (Step 3), and  
248 depression indirectly predicts SOGS scores through Kill-joy Thinking (Step 4). The results  
249 indicate that the predictive role of depression in GD severity is entirely mediated by Kill-  
250 joy Thinking.

## 251 Discussion

252 This study aimed to explore the role of depressive symptomatology and the regulation of  
253 positive emotions in the lives of PGs. Furthermore, we wanted to test the mediating role of  
254 Kill-joy Thinking on relationship between depression and GD severity. The results widely  
255 support our hypotheses.

**Table 2** Correlations between severity of GD, kill-joy thinking, depression, anxiety and stress

	SOGS	Kill-joy Thinking	DASS depression	DASS anxiety	DASS stress
SOGS	–				
Kill-joy Thinking	.41**	–			
DASS-21 depression	.25**	.51**	–		
DASS-21 anxiety	.19*	.51**	.72**	–	
DASS-21 stress	.18*	.37**	.75**	.69**	–

SOGS south oaks gambling screen, DASS depression anxiety stress scales-21; \*  $p < .05$ ; \*\*  $p < .001$

**Table 3** Direct and indirect effects of Depression on GD severity through Kill-joy Thinking

	B	SE	Bootstrap confidence interval [95%]
<i>Step 1</i>			
DASS-21 depression → SOGS			
$R^2 = .062; p = .001$			
Constant	3.29	.65	2.1091 to 4.5361
DASS-21 depression	.41	.121	.2051 to .6190
<i>Step 2</i>			
DASS-21 Depression → Kill-joy thinking			
$R^2 = .260; p < .001$			
Constant	13.95	.84	12.3614 to 15.7373
DASS-21 Depression	1.22	.16	.8654 to 1.5029
<i>Step 3</i>			
Kill-joy Thinking → SOGS			
$R^2 = .172; p < .001$			
Constant	-.52	1.02	-2.2110 to 1.4224
WOSC10	.30	.05	.2043 to .3754
<i>Step 4</i>			
DASS-21 Depression + Kill-joy Thinking → SOGS			
$R^2 = .174; p < .001$			
Constant	-.54	1.03	-2.5816 to 1.4947
Depression → SOGS	.12	.14	-.1581 to .3872
Depression → Kill-joy Thinking → SOGS	.32	.09	.1650 to .5172

256 First, PGs exhibited higher levels of depression, anxiety and stress than the non-clinical  
 257 group. These levels are also positively correlated to GD severity, in accordance with previ-  
 258 ous literature which has found that GD is associated with depression (Chou and Afifi 2011;  
 259 Lorains et al. 2011; Parhami et al. 2014), anxiety disorders (Giddens et al. 2012; Kessler  
 260 et al. 2008) and life stressors (Roberts et al. 2017).

261 Moreover, our data illuminates the association between Kill-joy Thinking and depres-  
 262 sive symptomatology. This extends the current literature (Wood et al. 2003; Feldman et al.  
 263 2008; Raes et al. 2012) on the role of dysfunctional responses to positive events in depres-  
 264 sion, suggesting that people with depressive symptoms may tend to minimize or eliminate  
 265 (Feldman et al. 2008) self-relevant positive emotions (i.e. through dampening). Specifi-  
 266 cally, Gruber et al. (2011) have asserted that depressed individuals struggle to regulate pos-  
 267 itive emotions related to self-relevant cues.

268 Subsequently, in our study, the PGs exhibited higher levels of Kill-joy Thinking than the  
 269 community group, and these levels were found to be positively correlated with the severity  
 270 of GD. These results extend the literature on the difficulties of managing positive emotions  
 271 for PGs, and further indicate a new path of research towards the role of savouring in addic-  
 272 tions. Indeed, theories that argue in support of a deficit of hedonic regulation in traditional  
 273 addictions seem to be successfully extended to the topic of GD. Our psychological evi-  
 274 dence converges on the neurobiological data of Sescousse et al. (2015), indicating a deficit  
 275 in hedonic responses to erotic stimuli among PGs. The reward deficiency syndrome the-  
 276 ory asserts that individuals with impaired hedonic capacities are more prone to becoming

277 addicted to highly rewarding activities. Thus, and in accordance with our results, the levels  
278 of hedonic impairments appear to be a relevant predictor of GD severity.

279 Beyond this interpretation of our results, it can be speculated that Kill-joy Thinking  
280 fosters GD severity due to an increased persistence in gambling behaviour. For instance,  
281 Kill-joy Thinking refers to a propensity to think of ways in which positive events could  
282 have been better. In this regard, a dampening response to a reward may enhance persist-  
283 ent gambling behaviours, even after a win, which sustains the craving for the next suc-  
284 cess. Moreover, Kill-joy Thinking refers to the tendency to remind oneself about the things  
285 one should be doing, such as one's responsibilities. In a gambling context, this may result  
286 in increased levels of charges-related concerns, which can interfere with the capacity to  
287 savour the current experience, favouring instead a focus on the next gamble to escape from  
288 uncomfortable emotional states. It is worth noting that these are only speculations, and  
289 should be considered as hypotheses to test in future research that investigates the relation-  
290 ship between Kill-joy Thinking and gambling involvement.

291 Finally, our results support the hypothesis that depression leads to GD through the medi-  
292 ating role of Kill-joy Thinking. The relationship between comorbid depression and GD has  
293 been traditionally understood from the perspective of the "gambling-as-an-escape" hypoth-  
294 esis. In other words, current literature mainly recommends that clinicians treat depressed  
295 PGs' inability to manage negative emotions to reduce the risk of gambling behaviour elic-  
296 ited by negative emotional triggers. Our study sheds light on another, likely complemen-  
297 tary, mechanism that links depressive symptomatology and GD: difficulty enjoying posi-  
298 tive experiences. The restoration of the hedonic capacity is a central aspect in traditional  
299 treatments for mood disorders (Beck 1976), and may be proficiently addressed in the treat-  
300 ment of comorbid GD and depression.

301 Importantly, it can be argued that Kill-joy Thinking is a stable trait that acts as a risk  
302 factor for depression which, in turn, predicts GD severity. While the predictive role of  
303 dampening processes on depression makes sense—and has been tested in other studies—  
304 the mediational model seems less convincing. Indeed, conceptually, dampening processes  
305 are considered a hallmark of cognitive depression (Beck 1976): maladaptive schemas are  
306 thought to orientate cognitive processes in a maladaptive way, which consequently per-  
307 petuates depressive symptomatology. However, our results indicated that depressive symp-  
308 tomatology, after controlling for Kill-joy Thinking levels, is not a significant predictor of  
309 GD severity.

310 The present study is insightful on both empirical and clinical levels. Indeed, this  
311 research provides preliminary results on the role of regulation of positive emotions in GD.  
312 Moreover, it stimulates future studies aiming to deepen the role of Kill-joy Thinking as a  
313 risk factor for the development of GD, as well as a maintenance mechanism of pathological  
314 gambling behaviour. Innovative treatments for GD, especially those that focus on comor-  
315 bidity with depression, will benefit from our findings. For instance, techniques inspired by  
316 the treatment options proposed by Garland (2016), which aim to train addicted individuals  
317 to enjoy natural positive experiences, may be usefully translated within the context GD  
318 treatment.

### 319 Limitations

320 Although our study provides innovative insight, several limitations should be considered.  
321 The cross-sectional nature of our study does not allow us to draw irreversible conclusion  
322 on the causal relationship between depression, Kill-joy Thinking and GD. Therefore, a

323 future longitudinal examination of this topic is needed to support our results. Subsequently,  
324 our sample was unbalanced in regard to gender, as there was a much higher proportion of  
325 male participants. As women have been shown to be especially prone to suffering from  
326 depressive symptoms (Salk et al. 2017), the role of gender should be considered. Finally,  
327 the cross-cultural research suggests that the use of dampening processes may vary across  
328 cultures (Miyamoto and Ma 2011). Thus, cultural factors may have affected our study, lim-  
329 iting its generalizability.

### 330 Future Directions

331 This study introduces a promising line of research, profiling future directions for empirical  
332 investigations into the role of positive emotions in addiction. First, future research should  
333 explore whether the observed relationships between GD severity, depression and Kill-joy  
334 Thinking vary across subtypes of gamblers. Moreover, future research should be exam-  
335 ined the nature of positive emotions by distinguishing their processes of regulation and the  
336 complex interplay between the regulation processes of negative and positive emotions. For  
337 instance, the role of guilt—elicited by Kill-joy Thinking—can foster in reaction to specific  
338 self-relevant positive cues (e.g. positive triggers eliciting pride). Finally, the role of Kill-joy  
339 Thinking in GD should be investigated by exploring the relationships between the dysregu-  
340 lation of positive and negative emotional states.

AQ2

### 342 Compliance with Ethical Standards

343 **Conflict of interest** The authors declare that they have no conflict of interest.

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