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PROBLEMATIC INTERNET USE: DEFICIENT SELF-REGULATION OR PATHOLOGY?

SHUMAILAYOUSAFZAI
UZMA JAVED
MIRELLAYANI-DE-SORIANO
Cardiff Business School, Cardiff University

Abstract

Increasing research on problematic internet use (PIU) makes it necessary to distinguish between the generalized use of internet and its specific applications. This study explores the relationships amongst psychosocial vulnerabilities, specific PIU (SPIU), generalized PIU (GPIU), time spent online (general and specific), and negative outcomes in a sample of British young adults. The results indicate that both SPIU and GPIU are caused by psychosocial vulnerabilities. However, in the case of specific internet applications, these vulnerabilities foster deficient self-regulation (SPIU), leading to excessive time spent online, which produces negative outcomes. Conversely, in the case of generalized use of internet, it is GPIU as pathology, rather than excessive time spent online on general activities, which leads to negative outcomes.

INTRODUCTION

In the 21st century, with over 2 billion users worldwide, the internet has emerged as a vital medium for communications, research, entertainment, and information exchange and has become an integral part of our economic, social, and political life. As the beneficial aspects of internet have been recognized, unease continues to increase about its problematic use. Problematic internet use (PIU) (Caplan, 2002; Davis et al., 2002), often termed as internet addiction (Hall, 2001; Young, 1999), internet dependence (Yuen and Lavin; 2004), pathological internet use (Davis, 2001), compulsive internet use (Meerkerk et al., 2006), unregulated internet use (LaRose et al., 2003), or excessive internet use (Suhail and Barges, 2006), is a multidimensional concept that refers to an unhealthy attachment to internet-based technologies and consists of emotional, cognitive and behavioral symptoms resulting in

difficulties with managing life outside the internet domain. Research on PIU, starting from the mid-1990s, has become a critical topic for both scholars and policy makers alike and has shown a clear link with psychological, social, academic, and professional impairment. Calls have been made for researchers to focus on what actually is that people are addicted to. Is it the social interaction, unlimited access to information, anonymity, or the activity with which the individual is occupied? (Beard and Wolf, 2001). The precise distinction between the problematic use of internet and its various applications is an under-researched area. In order to advance research and theory and to develop a wider characterization of different types of PIU, the present study contributes to the existing literature by specifically examining the relationships amongst psychosocial vulnerabilities, specific and generalized types of PIU, time spent online on specific and general activities, and negative outcomes in a sample of British young adults.

Specific vs. Generalized PIU

As the field of PIU research matures, it is becoming increasingly crucial to understand that individuals might not develop problems with the medium of internet itself, but rather with the various activities enabled by the internet (Hall et al., 2001; Van Rooij et al., 2011).Defining PIU as a single category and overlooking the important role played by specific internet-related technologies in the development of PIU, can restrict researchers and misguide clinicians by implying that the medium (i.e., internet) is the primary source of PIU (Shaffer et al., 2000). Young (1999) suggested that certain users may develop five specific types of problematic internet behaviors: cyber-sexual addiction, cyber-relationship addiction, obsessive online shopping, trading or gambling, compulsive web surfing or database searches, and obsessive computer game playing. Griffith (1999) supported this contention but argued that excessive internet users can not always be branded as ‘internet addicts’, as the internet might just be used by them as a medium to engage in a specific activity, in which they might not engage in except on the internet itself. This emphasizes on the need to distinguish between addiction to the internet and addiction on the internet. Davis (2001) refers to this distinction as Specific PIU (SPIU) and Generalized PIU (GPIU). SPIU is dependence on internet content-specific functions (e.g., online gaming, cybersex, cyberstalking), whilst GPIU is a general, multidimensional overuse of the internet without a

clear objective (e.g., chatting, surfing, downloading). Caplan (2002) expands on this classification by suggesting SPIU as one of many possible manifestation of a broader behavioral disorder and GPIU as a pathology associated with the unique social context available on internet. Previous research suggests specific internet activities which are immersive and interactive in nature and provide a mental or emotional escape, make the experience more rewarding and addictive (Whang et al., 2003; Leung, 2004; Meerkerk et al., 2006).

PIU: Deficient Self-Regulation Model vs Pathology Model

In their meta-analysis of 100 PIU studies, Tokunga and Rains tested two models of PIU: the deficient self-regulation model and the pathology model (Tokunga and Rains, 2010). Although both models study the relationship between psychosocial vulnerabilities, PIU and time spent online, they are different.In the deficient self-regulation model, PIU is termed as a "benign problem... that compensates for a lack of satisfaction in other areas of life and PIU lie within the scope of the ordinary person to correct", implying that these individuals do not require professional treatment (Hall et al., 2001; LaRose et al., 2003). This approach is based on Bandura's social cognitive theory of self-regulation and suggests that PIU is something that may periodically arise and that may, with time, be self-remedied (Bandra, 1991). Under this approach, the amount of time spent online is viewed as an outcome of PIU, which in turn is developed by psychosocial vulnerabilities fostering deficient self-regulation and hindering an individual's capacity to closely regulate his involvement in internet-related behaviours (LaRose et al., 2003). In other words, an individual's failure to control the time spent online is caused by his inability to successfully regulate his internet use (Caplan, 2002; Davis, 2002; LaRose et al., 2003). Previous research supports the claim that psychosocial vulnerabilities are associated with PIU (Caplan, 2002, 2003; Amichai-Hamburger and Ben-Artzi, 2003; LaRose et al., 2003). On the other hand, although not currently included in the Diagnostic and Statistical Manual of Mental Disorders (DSM), under the pathology model,PIU is characterized as a clinical pathology or psychological dependence (Young, 1999). It is caused by psychosocial vulnerabilities of individuals who presumably seek comforting communications by spending excessive amounts of time online, in order to relief dysphoric moods (Young, 1998; Morahan-Martin, 1999; Hurr, 2006). This cognitive association

between internet use and need fulfilment becomes self-perpetuating and leads to the development of PIU (Tokunga and Rains, 2010). These two models are summarized in Figure 1a and 1b.

FIGURE 1a

Deficient self-regulation model of PIU

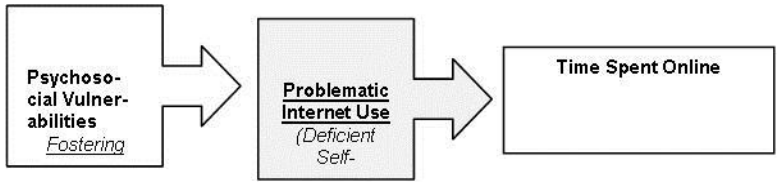


FIGURE 1b

Pathology Model of PIU

The path analyses results of Tokunga and Rains (2010) provided support for the deficient self-regulation model but did not validate the pathology model, suggesting that the deficient self-regulation characterization provides a tenable explanation for the relationship between psychosocial vulnerabilities, PIU, and time spent using the internet. They further suggested two directions to inform future research and theorizing about PIU. First, time spent online should not be confounded with PIU as an individual might spend a substantial amount of time online without experiencing PIU. It is important to distinguish between problematic and excessive use of internet as they are closely related but conceptually distinct behavioral patterns. Excessive use of internet, which refers to the frequency or degree of online activity that exceeds the normal, usual or planned amount of time, might not necessarily indicate a problem. For example, academics may spend what many would consider to be an excessive time online, but that might be a necessary requirement to successfully complete their research work. Caplan (2003) found that although both excessive and problematic internet use were

significant predictors of negative outcomes associated with internet use, excessive use was a weaker predictor. Second, PIU should not be theorized as a general, multi-dimensional overuse of the internet. Rather, PIU involves either using a specific internet application (e.g., online gaming) or general use of internet (e.g., online chatting).

Focus of the Present Study

Following the two latest research directions pointed out by Tokunga and Rains, the aim of the present study is to clarify the conceptual and empirical ambiguities surrounding the associations amongst psychosocial vulnerabilities, SPIU, GPIU, time spent online (specific and general), and negative outcomes (Caplan, 2003). Thus the following research questions are proposed:

- *RQ1a: Which model (deficient self-regulation or pathology) can better explain the relationships underlying SPIU?*
- *RQ1b: Is SPIU a stronger predictor of negative outcomes than time spent online (specific)?*
- *RQ2a: Which model (deficient self-regulation or pathology) can better explain the relationships underlying GPIU?*
- *RQ2b: Is GPIU a stronger predictor of negative outcomes than time spent online (general)?*

METHODS

Participants

Participants were 212 undergraduate students (83 females and 129 males). Sixty percent of the participants were between 18-20 years, 37% between 21-30 years, and only 3% were aged 31 and above. To follow the ethics guideline of keeping the anonymity of the students, a professional research firm collected the data from the overall UK undergraduate student population.

Measures

Psychosocial vulnerabilities. Kessler et al.'ssixteen-item scale was used to assess the level of psychosocial vulnerabilities (α = 0.90; M = 14.53; SD = 5.14).[23]All items were measured on a 5-point Likert scale (1 = none of the time, 5 = all of the time). Negative outcomes. Caplan's three-item scale, related to social, academic and professional aspects of life, was used to measure the negative outcomes associated with internet use (α = 0.91; M = 9.45; SD = 6.95).[24]All items were measured on a dichotomous (1 = Yes; 2 = No) scale.

Generalized problematic internet use (GPIU). Young's eight-item scale was used to assess the level of GPIU (α = 0.79; M = 2.70; SD = 2.20).[22] All items were measured on a dichotomous scale (1 = Yes; 0 = No).Specific problematic internet use (SPIU). Charlton's ten-item online gaming addiction scale was used to assess SPIU (α = 0.82; M = 27.4; SD = 6.00).[25]Items were measured on a five-point Likert scale (1 = strongly agree to 5 = strongly disagree).

Time spent online (specific and general). To estimate the amount of time spent online, participants were asked to answer two questions about the number of hours they spent on the internet in a typical day, not counting when they used it for work or studies (general internet use) and on playing online games (specific internet use). The participants reported spending 1-7 hours per day (M = 2.50; SD = 1.10) on general and between 1-10 hours per day (M = 3.67; SD = 2.53) on specific internet activities.

RESULTS

Hierarchical Regression Analysis for Specific Internet Use

A hierarchical regression test was conducted to test whether the deficient self-regulation model or the pathology model better explains the nature of relationships amongst psychosocial vulnerabilities, SPIU, time spent online (specific), and negative outcomes in the context of specific internet use.

Deficient Self-Regulation Model

In the first regression analysis, SPIU was entered into the equation at Step 1. Results indicate that SPIU accounts for 15% of the variance in negative outcomes, R^2 = 0.15, F

(1,208) = 38.30, $p < 0.001$. Next, time spent online (specific) was entered at Step 2, which increased the predictive power of the model significantly, R^2 change = 0.16, F (1,207) = 44.62, $p < 0.001$ and eliminated the previously significant SPIU effect on negative outcomes. Next, psychosocial vulnerabilities were entered into the equation at Step 3. The addition of psychosocial vulnerabilities increased the percentage of explained variance by another 16%, R^2 change = 0.16, F (1,206) = 62.03, $p < 0.001$.

Pathology Model

In the second regression analysis, the order of entry of SPIU and time spent online (specific) was reversed. In Step 1, time spent online (specific) was entered into the equation. Results indicate that time spent online (specific) accounts for 30% of the variance in negative outcomes, $R^2 = 0.30$, F (1,208) = 87.27, $p < 0.001$. Next, SPIU was entered at Step 2, which did not significantly increase the predictive power of the model, R^2 change = 0.01, F (1,207) = 2.88, $p = 0.091$. Next, psychosocial vulnerabilities was entered into the equation at Step 3. The addition of psychosocial vulnerabilities increased the percentage of explained variance by another 16%, R^2 change = 0.16, F (1,206) = 62.03, $p < 0.001$.

These results indicate that the relationship between SPIU and negative outcomes is spurious, and that time spent online (specific) confounds that relationship. These results support the use of the deficient self-regulation model for a specific internet activity to the extent that time spent online (specific), and not SPIU, is the actual predictor of negative outcomes.

Hierarchical Regression Analysis for Generalized Internet Use

A hierarchical regression test was conducted to test whether the deficient self-regulation model or the pathology model better explains the nature of relationships amongst psychosocial vulnerabilities, GPIU, time spent online (general) and negative outcomes, in the context of generalized internet use.

Deficient Self-Regulation Mode

In the first regression analysis, GPIU was entered into the equation at Step 1. Results indicate that GPIU accounts for 37% of the variance in negative outcomes, $R^2 = 0.37$,

TABLE 1

Hierarchical Regression Equations Predicting Negative Outcomes For Specific Internet Use (Online Gaming)

Step	Variables entered	Std. β	t	R^2 change	F change (df)	Total R^2	F total (df)
Deficient Self-Regulation Model							
1	SPIU	0.39	6.19**	0.15	38.30 (1,208)**	0.15	38.30 (1,208)**
2	SPIU	0.12	1.70	0.16	44.62 (1,207)**	0.31	45.47 (2,207)**
	Time Spent Online (Specific)	0.47	6.68**				
3	SPIU	0.10	1.60	0.16	62.03 (1,206)**	0.46	59.93 (3,206)**
	Time Spent Online (Specific)	0.29	4.28**				
	Psychosocial Vulnerabilities	0.45	7.90**				
Pathology Model							
1	Time Spent Online (Specific)	0.54	9.34**	0.29	87.27 (1,208)**	0.29	87.27 (1,208)**
2	Time Spent Online (Specific)	0.47	6.68**	0.01	2.88 (1,207)	0.30	45.47 (2,207)**
	SPIU	0.12	1.70				
3	Time Spent Online (Specific)	0.29	4.28**	0.16	62.03 (1,206)**	0.46	59.93 (3,206)**
	SPIU	0.10	1.60				
	Psychosocial Vulnerabilities	0.45	7.88**				

* p< 0.01; **p < 0.001.

F (1,209) = 125.69, p < 0.001. Next, time spent online (general) was entered at Step 2, which did not increase the predictive power of the model significantly, R^2 change = 0.002, F (1,208) = 0.63, p < 0.001. Next, psychosocial vulnerabilities were entered into the equation at Step 3. The addition of psychosocial vulnerabilities increased the percentage of explained variance by another 15%, R^2 change = 0.15, F (1,207) = 63.65, p < 0.001.

Deficient Self-Regulation Mode

In the first regression analysis, GPIU was entered into the equation at Step 1. Results indicate that GPIU accounts for 37% of the variance in negative outcomes, R^2 = 0.37, F (1,209) = 125.69, p < 0.001. Next, time spent online (general) was entered at Step 2, which did not increase the predictive power of the model significantly, R^2 change = 0.002, F (1,208) = 0.63, p < 0.001. Next, psychosocial vulnerabilities was entered into the equation at Step 3. The addition of psychosocial vulnerabilities increased the percentage of explained variance by another 15%, R^2 change = 0.15, F (1,207) = 63.65, p < 0.001.

Pathology Model

In the second regression analysis, the order of entry of GPIU and time spent online (specific) was reversed. In Step 1, time spent online (general) was entered into the equation. Results indicate that time spent online (general) accounts for 3% of the variance in negative outcomes, R^2 = 0.03, F (1,209) = 7.70, p < 0.05. Next, GPIU was entered at Step 2, which increased the predictive power of the model significantly, R^2 change = 0.34, F (1,208) = 114.22, p < 0.001 and eliminated the previously significant time spent online (general) effect on negative outcomes. Next, psychosocial vulnerabilities was entered into the equation at Step 3. The addition of psychosocial vulnerabilities increased the percentage of explained variance by another 15%, R^2 change = 0.15, F (1,207) = 63.65, p < 0.001.

These results indicate that the relationship between time spent online (general) and negative outcomes is spurious, and that GPIU confounds that relationship. These results support the use of the pathology model for general internet activities to the extent that GPIU, and not time spent online (general), is the actual predictor of negative outcome.

TABLE 2

Hierarchical Regression Equations Predicting Negative Outcomes for General Internet Use

Step	Variables entered	Std. β	t	R^2 change	F change (df)	Total R^2	F total (df)
Deficient Self-Regulation Model							
1	GPIU	0.61	11.21**	0.37	125.69 (1,209)**	0.37	125.69 (1,209)**
2	GPIU	0.63	10.69**	0.002	0.63 (1,208)	0.37	63.05 (2,208)**
	Time Spent Online (General)	-0.05	-0.79				
3	GPIU	0.45	8.06**	0.15	63.65 (1,207)**	0.52	75.91 (3,207)**
	Time Spent Online (General)	-0.05	-0.93				
	Psychosocial Vulnerabilities	0.42	7.98**				
Pathology Model							
1	Time Spent Online (General)	0.19	2.78**	0.03	7.70 (1,209)*	0.03	7.70 (1,209)*
2	Time Spent Online (General)	-0.05	-0.79	0.34	114.22 (1,208)**	0.37	63.05 (2,208)**
	GPIU	0.63	10.68**				
3	Time Spent Online (General)	-0.05	-0.93	0.15	63.65 (1,207)**	0.52	75.91 (3,207)**
	GPIU	0.45	8.06**				
	Psychosocial Vulnerabilities	0.42	7.98**				

* p< 0.01; **p < 0.001

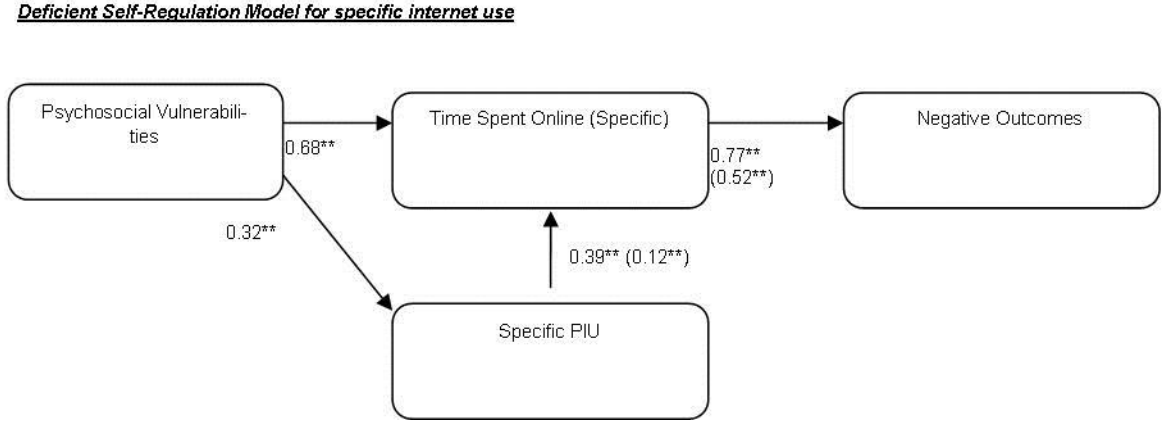
Structural Equation Modelling (SEM Analysis

Although the hierarchical regression analysis reported above was useful for clarifying whether the deficient self-regulation model or the pathology model is the best framework for explaining the relationships involved in general and specific internet use, SEM analysis was employed to test the underlying structure of these models using MPlus software. SEM allows for the simultaneous assessment of multiple hypothesized direct and indirect effects.

Specific Internet Use

Figure 2 summarizes the SEM results of the deficient self-regulation model for specific internet use. Overall, the deficient self-regulation model fits the data very well for specific internet use, χ^2(df) = 823.06 (41); CFI = 0.90; TLI = 0.94; RMSEA = 0.07. The model accounted for 59% of the variance in negative outcomes. The results support the model confirming that due to existing psychosocial vulnerabilities, an individual fails to regulate his specific use of internet (online gaming) and this loss of control results in the formation of habitual and compulsive behavior i.e. SPIU ($\beta = 0.32$, $p < 0.001$). This SPIU eventually lead to excessive time playing online games ($\beta = 0.39$, $p < 0.001$), which finally results in negative outcomes ($\beta = 0.77$, $p < 0.001$). Psychosocial vulnerabilities was included as an exogenous predictor of both SPIU and time spent online (specific) ($\beta = 0.69$, $p < 0.001$). Additionally, time spent online (specific) was included as a direct predictor of negative outcomes.

FIGURE 2
Structural equation model results for specific internet use under the deficient self-regulation model.



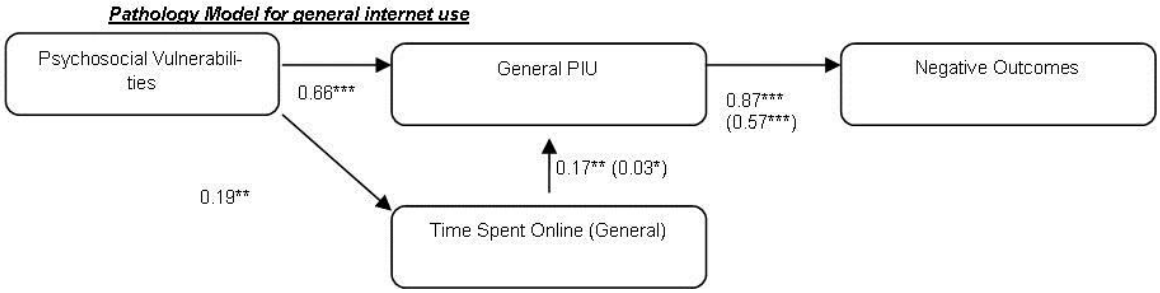
Note. Values in parentheses are indirect effects; * $p < 0.01$; **$p < 0.001$.

Generalized Internet Use

Figure 3 summarizes the SEM results of the pathology model for general internet use. Overall, the pathology model fits the data very well for general internet use χ^2(df) = 930.43 (39); CFI = 0.90; TLI = 0.96; RMSEA = 0.06. The model accounted for 76% of the variance in negative outcomes. The results support the model confirming that existing psychosocial vulnerabilities lead an individual to spend excessive time online on general internet activities ($\beta = 0.19$, $p < 0.01$), which ultimately develops into GPIU ($\beta = 0.17$, $p < 0.01$) ultimately causing negative outcomes ($\beta = 0.87$, $p < 0.001$). Psychosocial vulnerabilities was included as an exogenous predictor of both GPIU ($\beta = 0.66$, $p < 0.001$) and time spent online (general). Additionally, GPIU was included as direct predictor of negative outcomes.

FIGURE 3

Structural equation model results for general internet use under the pathology model.



Note. Values in parentheses are indirect effects; * $p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

DISCUSSION AND CONCLUSIONS

The aim of this study was to shed light on the conceptual and empirical ambiguities surrounding the relationships amongst psychosocial vulnerabilities, problematic internet use (SPIU and GPIU)), excessive time spent online (specific and general), and negative outcomes. The conceptual framework developed in this research employs Davis' (2001) cognitive behavioural model of PIU, suggesting that the first stage in the development of both types of PIU is the presence of psychosocial vulnerabilities. This implies that cognitive symptoms are the main source of PIU and they precede and cause the affective or behavioral

symptoms of PIU rather than vice versa. Furthermore, the framework assumes that excessive time spent on the internet should not be confounded with PIU (specific or general) and that both result in negative outcomes for the individual. Hierarchical regression results supported these assumptions and SEM results provided good fit for both the deficient self-regulation model and the pathology model.

On the one hand, the deficient self-regulation model showed that excessive time spent online is the actual predictor of negative outcomes suggesting that this model is more useful and should be employed when studying SPIU. Although previous research theorizes PIU as a generalized multidimensional overuse of internet, PIU involves a specific use of a technology supported by the internet (e.g., in this case, online gaming). The results suggest that in the case of specific use of internet, it is not the SPIU which results in negative outcomes, but the actual harm is caused by the excessive amount of time spent on that specific activity. Therefore, an individual might experience compulsive behavioral symptoms toward online gaming, but these would only result in negative outcomes when conscious self-control is relatively reduced and the individual is unable to regulate his overuse of the specific application and starts spending excessive amounts of time on this activity (LaRose et al., 2003). This process can be described as lapses in effective self-regulation and not a pattern of consumption consistent with a psychological disease or an addiction to chemical substances (Tokunga and Rains, 2010). The findings are consistent with La Rose et al., who found that depression predicted deficient self-regulation (SPIU), which, in turn, predicted the amount of time spent online (LaRose et al., 2003).

On the other hand, the pathology model showed that GPIU is the actual predictor of negative outcomes, suggesting that this model is more useful and should be employed when studying GPIU. In the case of generalized internet use, it is not the amount of time spent online which results in negative outcomes, but the actual harm is caused by the compulsive behavioral aspects of GPIU. Therefore an individual might spend which might seem abnormal amounts of time online without actually experiencing negative outcomes. The findings are consistent with Caplan (2007), who argued that behavioral aspects of PIU are better predictors of negative outcomes than those which are simply defined as use exceeding a certain amount of time (i.e, frequency of use).

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