Adv Psychiatry Neurol 2019; 28 (3): 199-207
DOI: https://doi.org/10.5114/ppn.2019.89136

ADVANCES IN PSYCHIATRY & NEUROLOGY
POSTĘPY Psychiatrii i Neurologii

THE RELATIONSHIP BETWEEN PROBLEMATIC INTERNET USE AND THE NEED FOR COGNITIVE CLOSURE

ZWIĄZEK MIĘDZY PROBLEMOWYM UŻYWANIEM INTERNETU A POTRZEBĄ DOMKNIĘCIA POZNAWCZEGO

Andrzej Cudo[1], Natalia Kopiś[1], Agnieszka Jarząbek-Cudo[2], Rafał Szewczyk[3], Marcin Demczuk[4]

[1]The John Paul II Catholic University of Lublin, Lublin, Poland
[2]Institute of Psychiatry and Neurology, Warsaw, Poland
[3]Jagiellonian University, Cracow, Poland
[4]Maria Curie-Sklodowska University, Lublin, Poland

[1]Katolicki Uniwersytet Lubelski Jana Pawła II, Lublin, Polska
[2]Instytut Psychiatrii i Neurologii, Warszawa, Polska
[3]Uniwersytet Jagielloński, Kraków, Polska
[4]Uniwersytet Marii Curie-Skłodowskiej, Lublin, Polska

Correspondence to/
Adres do korespondencji:

Andrzej Cudo
Katolicki Uniwersytet Lubelski Jana Pawła II
Katedra Psychologii Eksperymentalnej
Al. Racławickie 14
20-950 Lublin, Polska
e-mail: andrew.cudo@gmail.com

Submitted/Otrzymano: 28.12.2018
Accepted/Przyjęto do druku: 31.07.2019

Abstract

Purpose: The aim of this study was to identify relationships between problematic Internet use and cognitive motivation. Particular attention was given to the need for cognitive closure, a factor of great importance when it comes to motivations for decision-making and organizing incoming information, including that originating from the Internet.

Methods: The sample consisted of 280 persons aged from 19 to 31. The Problematic Internet Use Test and the Need for Closure Scale were used in order to measure the five aspects of Need for Closure: affective discomfort occasioned by ambiguity, preference for order and structure in the environment, the predictability of future contexts, closed-mindedness and decisiveness.

Results: The analysis showed that problematic Internet use is correlated with certain dimensions of the need for cognitive closure, namely closed-mindedness and decisiveness. It was also observed that these dimensions were associated with lower and higher levels of problematic Internet use. It was further shown that, together with the number of hours per week spent using the Internet, these dimensions were significant primary predictors of membership in the less problematic Internet-use group.

Conclusions: The results are in agreement with the existing studies on the question of problematic Internet use. They also draw attention to possible new variables related to the need for cognitive closure and indicate the possible determinants of problematic Internet use in the studied group. Therefore, they may lead to a better understanding of the causes of problematic Internet use. The results obtained may lead to the more effective planning of preventive actions.

Key words: problematic Internet use, need for cognitive closure, epistemic motivation, closed-mindedness, decisiveness.

Streszczenie

Cel: Celem pracy było poszukiwanie związków między problemowym używaniem Internetu a motywacją poznawczą. Szczególną uwagę zwrócono na potrzebę domknięcia poznawczego, czynnika o dużym znaczeniu w odniesieniu do motywacji do podejmowania decyzji i organizowania napływających informacji, w tym pochodzących z Internetu.

Poglądy: Próba badawcza składała się z 280 osób w wieku od 19 do 31 lat. W badaniu wykorzystano Test Problematycznego Używania Internetu oraz Skalę Potrzeby Domknięcia Poznawczego, która została wykorzystana w celu pomiaru pięciu aspektów potrzeby domknięcia poznawczego, do jakich należą: nietolerancja wieloznaczności, preferencja porządku, preferencja przewidywalności, zamkniętość umysłowa i zdecydowanie.

Wyniki: Na podstawie wyników można przypuszczać, że problemowe używanie Internetu jest skorelowane z pewnymi wymiarami potrzeby domknięcia poznawczego, a mianowicie zamkniętością umysłową i zdecydowaniem. Zaobserwowano też, że wymiary te są związane z niższym i wyższym poziomem problemowego używania Internetu. Wykazano również, że wraz z liczbą godzin tygodniowo spędzonych w Internecie są one istotnymi predykatorami, które umożliwiają przewidywanie przynależności do grupy użytkowników Internetu przejawiających niższy poziom problemowego używania Internetu.

Wnioski: Otrzymane wyniki są zgodne z badaniami dotyczącymi problemowego używania Internetu. Zwracają także uwagę na możliwe nowe determinanty problemowego używania Internetu wśród badanej grupy, dlatego mogą prowadzić do lepszego zrozumienia przyczyn tego typu zachowania problemowego. Uzyskane wyniki mogą też umożliwić bardziej efektywne planowanie działań profilaktycznych.

Słowa kluczowe: problemowe używanie Internetu, potrzeba domknięcia poznawczego, motywacja epistemiczna, zamkniętość, zdecydowanie.

INTRODUCTION

In today's world the development of modern technologies, including the Internet, has led to easier access to information, communication, and services (such as shops, banks, public institutions, etc.). Network users may take advantage of many applications which assist them in everyday tasks. For these reasons, fewer and fewer people are able to imagine living without this communication tool [1, 2]. Apart from the observed positive changes, however, there is more and more data indicating some problems and harm that may be caused by dysfunctional, addictive use of the Internet [3, 4]. Among young adult males, it has been found that 6.3% of them manifest problematic Internet use, while the figure for females is 4.3% [5]. Similar results have been obtained in other studies on Polish samples [6, 7]. However, new studies [8] indicate a contradictory relationship or no difference in problematic Internet use between men and women [9]. Moreover, Poprawa [10], who carried out a study in Poland on a group of 6119 people aged from 9 to 65, found that 13.06% of those aged below 24 belong to the group at risk of problematic Internet use, while 2.08% exhibit addictive use; the respective percentages for those aged over 24 were 12.79% and 1.96%. In this context, Cudo *et al.* [9] showed that 0.3% (women: 0.4%; men: 0.3%) of young Polish adults displayed symptoms of problematic Internet use and 6.6% (women: 5.8%; men: 8.8%) of individuals belonged to the group at risk of problematic Internet use. In the adolescent group, Rębisz *et al.* [11] presented evidence to the effect that 0.4% of adolescents exhibited addictive use of the Internet, and 10.7% of individuals were in the risk group. Similar results were obtained by Cudo *et al.* [12]. They also showed that 0.4% of adolescents presented symptoms of problematic Internet use. Additionally, they found that 5.9% of adolescent individuals belonged to the group at risk of problematic Internet use. Hence, the problem of addictive Internet use is one of the most significant issues faced by contemporary society.

There are many terms used in the subject literature related to dysfunctional network use: Internet addiction, problematic Internet use, compulsive computer use, netoholism, pathological Internet use, etc. [13]. This results from the fact that different researchers approach the phenomenon in different ways [14, 15]. Tokunaga and Rains [16] distinguish three approaches to the issue of problematic Internet use, wherein it is treated as: 1) a behaviour on the spectrum of obsessive-compulsive disorders or impulse control disorders; 2) a behaviour analogous to dependence on psychoactive substances; or 3) a behaviour linked to deficits in resources related to social relations and their formation. To date, however, no systematic or uniform criteria for Internet addiction that could be used in international classifications have been established. Only a dependency on online games – Internet Gaming Disorder – appears in the American Psychiatric Association's fifth Diagnostic and Statistical Manual of Mental Disorders (DSM-5), although not as a separate nosological unit, but in Section III, as a behavior requiring further research [17]. According to Kimberly Young [18] Internet addiction is a disorder of habit control which does not cause intoxication, but significantly and visibly impairs a person's functioning in all areas of life (social, familial, professional, personal). It ought to be diagnosed when five of the following eight symptoms are found to have occurred in the past year: 1) strong absorption in the Internet, 2) increasing need to spend more and more time online, 3) repeated unsuccessful attempts to control one's own Internet use, 4) the appearance of strong negative emotions when Internet use is restricted, 5) problems with organising one's online time, 6) stress, personal problems and social problems resulting from Internet use, 7) manipulation in relations and 8) regulation of the emotions by means of online activity. In addition, Beard and Wolf assert that the following five symptoms must occur: 1) committed online activity, 2) need to spend more and more time using the Internet to achieve a similar level of satisfaction, 3) unsuccessful attempts to control Internet use, 4) appearance of anxiety and irritation, and 5) spending more time online than originally planned [19]. According to Augustynek [20], the syndrome of Internet addiction is characterised by six symptoms: 1) strong desire or feeling of compulsion to use the Internet, 2) increasing difficulties in stopping oneself from going online, 3) negative feelings caused by lack of access to the Internet (anxiety, psychomotor stimulation, obsessive thoughts and fantasising about the Internet, and depressive mood), 4) increasing frequency and duration of Internet use in spite of its destructive effect on health and social relations,

5) reduction or complete loss of non-computer-related interests, social and professional activities and ability to rest, 6) devotion of a large amount of time to activities that are indirectly Internet-related. For the purposes of the present work, the term 'problematic Internet use' will be used.

Previous research into problematic Internet use has primarily considered personality, and social and emotional issues [21-25]. There are few studies addressing the question of the cognitive functioning of persons who exhibit such problematic Internet use [26, 27]. Brand *et al.* [28] state that problematic Internet use is a consequence of predisposing neurobiological and psychological factors, which are moderated by, among other things, coping style and cognitive errors. They also show that significant mediating factors are the cognitive and emotional ways of reacting in Internet-use situations, in combination with reduced effectiveness of cognitive control. In this context, research into the cognitive functioning of persons experiencing problematic Internet use has shown that they have problems with decision-making [24], similarly to persons with a dependency on narcotics [30]. Persons with an Internet gaming dependency also display such a tendency [31], particularly in situations contextually related to the situation of gaming [32]. They take riskier and unfavorable decisions in spite of being aware of the negative consequences. The results of these studies appear to be analogous to earlier results concerning persons with opiate dependencies and gamblers [33].

For these reasons, it is important to investigate relationships between problematic Internet use and ways of making decisions and organizing incoming information. This question is significant, on the one hand, in order to ensure adequate assistance for people displaying this type of problematic behavior and, on the other hand, for the purpose of organizing educational systems. In this regard, the need for cognitive closure would appear to be an important factor to be considered when analyzing an individual's motivation to seek and possess knowledge, leading to a reduction in cognitive uncertainty [34, 35]. High levels of the need for cognitive closure are linked to (1) shallow analysis of incoming information, and (2) motivation to seek information consistent with the individual's existing knowledge structure. This may lead to the formation of a rigid and unchangeable picture of a situation. It should be emphasized that such actions may lead to the simplification of given situations, and, that in this way the person may construct a scheme that provides a feeling of predictability, rationality, and order. Moreover, people with a high need for cognitive closure avoid ambiguous situations. In turn, a low need for cognitive closure is associated with greater tolerance of uncertainty, which may lead to a deeper and more thorough analysis of a situation and greater openness to incoming information. Such persons have a tendency to seek information about new situations and to consider various alternatives, and more easily adapt to alternative situations. They are also more prone to seek non-stereotypical solutions to problems and accept ambiguity more easily [36-38].

Besides this, the need for cognitive closure is related to the way in which individuals perceive the surrounding social world and act within it [39, 40]. Kruglanski and Webster [40] also describe the "seizing" and "freezing" of information as two processes underlying that need: persons with a high need for cognitive closure have a tendency to take a selective approach to incoming information, based particularly on whether it is consistent with their existing knowledge. Information that is inconsistent with the individual's system of knowledge is mostly ignored. Hence, it is difficult for such persons to change their opinions, convictions and beliefs under the influence of incoming information [36, 41].

It has been shown that persons with low and high levels of the need for cognitive closure have different ways of browsing and using websites [42, 43]. The former prefer pages with large numbers of links and additional content, while the latter tend to avoid such pages [42]. A positive correlation has been found between the need for cognitive closure and the ability to suppress reaction [39], which in turn is reduced in persons exhibiting problematic Internet use [44]. Moreover, the need for cognitive closure is also related to other executive functions [45], a deficit of which, according to the model of Brand *et al.* [28], is a significant element related to the mechanism of problematic Internet use. Other researchers have demonstrated a negative correlation between the need for cognitive closure and risky decision-making [46]. In this context, it should be noted that persons using the Internet problematically have an increased tendency to make risky choices [47]. Therefore, the need for cognitive closure may be an important motivational factor in understanding problematic Internet use, in particular the mechanism related to the difficulty of controlling the use of the network.

Considering the significance of the need for cognitive closure in the context of information seeking and cognitive rigidity [37], it appears to be of importance in understanding how such a need affects problematic Internet use. The results reported here may lead to a better understanding of why problematic behaviors persist in spite of knowledge about their adverse effects. They may also help to analyze the ways in which people exhibiting problematic Internet use obtain and consolidate knowledge about the surrounding world and about themselves. Considering the link between the need for cognitive closure and the ability to suppress reactions [39], and the taking of risky decisions [46], it may be expected that a higher level of this type of epistemic need may be a protective factor against problematic Internet use. Therefore, considering differences in the strategies of online informa-

tion seeking between persons with a low and high need for cognitive closure, it may be expected that links will be found between this type of need and problematic Internet use. Hence, the aim of this study was to examine the relationship between this factor and whether the level of need for cognitive closure correlated with lower and higher intensities of problematic Internet use. Based on the theoretical discussions and empirical findings referred to above, we have formulated the hypothesis that a higher need for cognitive closure will be related to lower problematic Internet use. Also, we postulate that the need for cognitive closure will be a differentiating factor between persons with lower and higher problematic Internet use.

METHODS

Study group

The study was carried out on a group of 288 young adults (203 of whom were women) who completed a paper questionnaire. Data from 8 participants were removed from further analyses due to incomplete data scores. The final sample consisted of 280 participants. The participants' ages ranged from 19 to 31 years (M = 21.99; SD = 2.43); most of them were university students from Lublin. Four categories were defined depending on the place of residence: rural areas (23.1%), towns with up to 30,000 inhabitants (13.7%), towns with up to 70,000 inhabitants (10.2%) and larger towns (53.0%). Surveys were carried out from January to April 2016. The mean time spent on using the Internet per week was 41.91 hours, with a standard deviation of 24.37 hours. All subjects were volunteers and they received no monetary reward. They were informed that their responses would be anonymous. The study was conducted in compliance with the Declaration of Helsinki.

Methods

1. **Problematic Internet Use Test** (TPUI22). This is a Polish adaptation of Kimberly Young's IAT, made by Ryszard Poprawa [10]. The method is based on Young's Internet addiction criteria [17]. It consists of 22 items. Respondents give answers on a six-point scale, indicating how often they perform certain actions or experience certain feelings related to Internet use. Possible final scores lie in the range 0-110, where results above 49 indicate a greater number of confirmed symptoms of problematic Internet use. The method has very good psychometric properties: Cronbach's alpha is 0.935, the discriminative power of items ranges from 0.40 to 0.70, and the split-half reliability is 0.95, with a correlation between halves of 0.91 [10]. Moreover, it is based on one of the most globally popular and frequently used tools for the evaluation of the intensity of problematic Internet use.
2. **The Need for Closure Scale** [35], used in the Polish version made by Małgorzata Kossowska [36]. The questionnaire consists of 32 questions. Answers are supplied on a six-point scale, where 1 denotes strong disagreement and 6 denotes complete agreement (Cronbach's alpha: 0.86). The questionnaire is composed of five subscales: 1) preference for order and structure in the environment (Cronbach's alpha: 0.81); 2) preference for predictability of future contexts (Cronbach's alpha: 0.73); 3) affective discomfort occasioned by ambiguity (Cronbach's alpha: 0.66); 4) closed-mindedness (Cronbach's alpha: 0.61), and 5) decisiveness (Cronbach's alpha: 0.73) [36]. An overall index of need for cognitive closure is computed out of the first four of these [48]. The Decisiveness subscale pertains more to the ability to make decisions than to the motivational aspect related to the expression of the need for cognitive closure [49].
3. A questionnaire about socio-demographic details and about the number of times spent on using the Internet (hours per week).

RESULTS

Descriptive statistics are presented in the form of means and standard deviations for each variable studied. Also, for all study subjects, coefficients of correlation between variables were computed on the basis of Pearson's *r*. The calculations showed a weak positive correlation between affective discomfort occasioned by ambiguity, and level of problematic Internet use. A weak negative correlation between the result on the Decisiveness subscale and problematic Internet use, and between the Closed-mindedness subscale and problematic Internet use were also identified. Detailed results appear in Table 1. The SPSS 22 software was used for all statistical analysis.

To enable comparisons between persons with lower, moderate and higher levels of problematic Internet use, respondents were classified according to norms determined for the Polish population (lower problematic Internet use group: $n = 43$; TPUI22 score: M = 6.07, SD = 3.22, range from 0 to 10; moderate problematic Internet use group: $n = 194$; TPUI22 score: M = 26.03, SD = 9.83, range from 11 to 49; higher problematic Internet use group: $n = 43$; TPUI22 score: M = 62.91, SD = 11.29, range from 50 to 88) [10]. To determine differences between the groups with regard to the various dimensions of the need for cognitive closure and time spent using the Internet per week, an analysis was performed using a 1-MANOVA model of type II [50] and Bonferroni's post hoc test.

The analysis revealed statistically significant differences between the levels of problematic Internet use with

Table 1. Descriptive statistics and correlations between the studied variables (*N* = 280)

Variables		M	SD	1	2	3	4	5	6	7
PIU		26.99	11.96							
Time – Internet		42.07	24.28	0.24***						
Need for Closure Scale	Affective discomfort occasioned by ambiguity	4.15	0.78	0.18*	0.01					
	Preference for order and structure in the environment	4.07	0.89	–0.10	–0.08	0.56***				
	Predictability of future contexts	3.65	0.79	0.09	–0.04	0.51***	0.47***			
	Closed-mindedness	2.87	0.61	–0.14*	–0.03	–0.25***	–0.23***	0.02		
	Decisiveness	3.49	0.90	–0.24***	–0.08	–0.21***	0.08	–0.06	0.09	
	Total score	4.61	0.50	0.01	–0.06	0.73***	0.79***	0.84***	0.09	–0.03

****p < 0.001, **p < 0.01, *p < 0.05*

Table 2. Differences between levels of problematic Internet use with regard to these results obtained on subscales of the Need for Closure Scale and the amount of time spent on the Internet

Variables		Problematic Internet use						ANOVA			Significant differences among the groups
		Lower (*n* = 43) (1)		Medium (*n* = 194) (2)		Higher (*n* = 43) (3)					
		M	SD	M	SD	M	SD	F	$p \leq$	n_p^2	
Time – Internet		33.74	21.97	41.30	24.13	52.86	24.41	13.84	0.001	0.05	1-3
Need for Closure Scale	Affective discomfort occasioned by ambiguity	4.05	0.85	4.13	0.73	4.34	0.89	3.10	0.079	-	-
	Preference for order and structure in the environment	4.23	1.05	4.08	0.86	3.89	0.85	3.21	0.074	-	-
	Predictability of future contexts	3.64	0.86	3.63	0.72	3.70	1.01	0.13	0.720	-	-
	Closed-mindedness	3.06	0.53	2.84	0.61	2.79	0.66	4.47	0.035	0.02	-
	Decisiveness	3.84	0.95	3.48	0.83	3.20	1.03	11.58	0.001	0.04	1-3 1-2
	Total score	4.67	0.59	4.60	0.45	4.58	0.61	0.63	0.427	-	-

regard to the results obtained on subscales of the Need for Closure Scale and the number of hours of weekly Internet use ($F_{(7.272)} = 5.60$, $p < 0.001$, $\eta^2 = 0.13$). These differences relate to amount of time devoted to Internet use and to the Closed-mindedness and Decisiveness subscales (see Table 2).

To identify the factors which discriminate to the greatest degree between persons with lower and higher levels of problematic Internet use, stepwise discriminant analysis based on Wilks' lambda was used. The criterion for the inclusion of variables was F = 3.84, and the criterion for exclusion was F = 2.71. Analysis of variance was also performed, where the dependent variable was the discriminant results, and the independent variable was group membership. Discriminant analysis was also used to verify the extent to which the selected predictors lead to the correct assignment of persons to groups with lower ($n = 43$) and higher ($n = 43$) levels of problematic Internet use. The a priori probability was computed on the basis of the group's size.

The analysis showed that among the young adults studied, the predictors in the model explaining the difference between persons with lower and higher levels of problematic Internet use are ($F_{(1.69)} = 20.67$, $p < 0.001$, $\eta^2 = 0.23$). The assumption of equality of covariance matrices was satisfied (Box's M test: $F_{(6.51123)} = 0.58$, $p = 0.744$). Group membership explains approximately 28% of the variance in the discriminant results. Furthermore, the result obtained for canonical correlation indicates that the function found is significantly related to the grouping variable. It was found that a lower level of closed-mindedness and decisiveness, in combination with a greater number of hours of weekly Internet use, leads to a greater probability of a higher level of problematic Internet use. The detailed analysis appears in Table 3.

Based on the classification obtained, it was shown that Closed-mindedness, Decisiveness, and number of hours of weekly Internet use make the greatest contribution to the correct assignment of subjects with a lower level of problematic Internet use (79.1% correct classifications), and the correct prediction of membership of the group with a higher level of problematic Internet use (62.8% correct classifications). Detailed results are given in Table 4.

Table 3. Analysis of variance and statistics of the discriminant function

ANOVA Results of the discrimination function					
Function	**Sum of squares**	**df**	**Mean square**	**F**	***p* ≤**
Between groups	33.21	1	33.21	33.21	0.001
Within groups	84.00	84	1		
Total	117.21	85		η^2	0.28
Eigenvalues					
Function	**Eigenvalues**	**% variance**	**% accumulated**	**Canonical correlation**	
1	0.39	100	100	0.53	
Wilks's λ					
Function test	**Wilks's λ**	**χ^2**	**df**	***p* ≤**	
1	0.72	27.49	3	0.001	
Determinants of the discrimination function					
Unstandardized canonical discriminant function coefficients	Closed-mindedness	0.84	Average discriminant score for subjects in the two groups	Lower PIU	0.62
	Decisiveness	0.57			
	Time – Internet	–0.03		Higher PIU	–0.62

Table 4. Results of classification based on selected discriminants

		Predicted group affinity			
		Lower problematic Internet use		Higher problematic Internet use	
		Quantity	Percent	Quantity	Percent
Initial group affinity	Lower problematic Internet use	34	79.1	9	20.9
	Higher problematic Internet use	16	37.2	27	62.8

DISCUSSION

We hypothesized that a higher need for cognitive closure would be related to lower problematic Internet use. Also, we postulated that need for cognitive closure would be a differentiating factor between persons displaying lower and higher levels of problematic Internet use. The analysis has shown that problematic Internet use is only linked to certain dimensions of the need for cognitive closure, namely to Closed-mindedness and Decisiveness. It has been also observed that these dimensions discriminate between participants with lower and higher levels of problematic Internet use. Along with the number of hours of weekly Internet use, they are also significant predictors, enabling primarily the prediction of membership to the group of persons with a lower level of problematic Internet use. Lower results on the aforementioned subscales of the Need for Closure Scale were associated with higher levels of problematic Internet use, as were greater numbers of hours of weekly Internet use.

It should be noted that persons with a higher level of Closed-mindedness are motivated to resist or ignore information conflicting with their existing beliefs but rely on expected categories. This is also linked to resistance to new ideas and experiences, and thus to resistance to change [51]. Chernikova *et al.* [52] showed that a higher level of Closed-mindedness was associated with stronger anxiety towards new technologies and lower willingness to use them. Thus, persons with this type of epistemic motivation avoid contact with new technologies, and for this reason may exhibit lower levels of dysfunctional behavior connected with such technologies. Moreover, Closed-mindedness is linked to lower creativity and greater preference for the values of conformity and tradition [53]. In this sense, conformity relates to the suppression of one's actions, goals, and impulses that might harm or annoy other people or violate social expectations and norms. Tradition as a value relates to the acceptance and maintenance of customs, ideas, and the traditions of one's own culture, religion or family; also to the respect shown towards tradition. In addition, this type of motivation is associated with a lower preference for the value known as self-direction, namely independence in thought, action and choices, creativity and freedom [54]. It has also been shown that a higher level of Closed-mindedness is linked to a lower tendency for compromise and lower confidence in one's own intellect [55]. Thus, on the one hand people with a higher level of Closed-mindedness prefer conservative values. However, one the other hand, in view of their low creativity and willingness to compromise, they may decline to choose new technologies and their mobile ap-

plications. This is particularly linked to the fact that persons with a higher level of Closed-mindedness exhibit a strong affective reaction to uncertainty [56].

In turn, persons with a higher level of Decisiveness have a greater tendency to select simple, incompatible strategies for decision-making. They also devote less time to seeking preliminary information before taking a decision [57]. The lower level of decisiveness is associated with higher level of general distress and proneness to anxiety and depressive moods [58]. These factors, in turn, are linked to higher levels of problematic Internet use [59]. A positive correlation has also been found between Decisiveness and functional impulsivity, in addition to negative correlations with dysfunctional impulsivity, urgency and lack of perseverance. Persons with higher Decisiveness more rarely exhibit non-specific behaviour characterized by difficulties in making choices in a situation in which different options are presented [60]. These results are in agreement with earlier studies that have revealed greater dysfunctional inhibitory control and impulsivity in persons exhibiting addictive behaviors [61]. As in the case of Closed-mindedness, Decisiveness is also associated with greater preference for the value of conformity and with lower self-direction [49].

Brand *et al.* [28, 62] report that in the case of functional Internet use, the network serves as a tool for the fulfillment of personal needs and goals in everyday life. In this situation, the Internet is not related to a dysfunctional coping style or with the gratification attained in contact with various specific types of online content. In this context, higher levels of Closed-mindedness and Decisiveness may prompt people to use the Internet to fulfill only those needs and goals which they have set by themselves. They also do not feel the need to seek new information, and thus to spend more time online navigating between different sites. Also, a preference for the choice of simple, incompatible strategies for decision-making may mean that such a person does not spend a lot of time online, seeking new solutions and information, but can concentrate only on performing specified tasks and finding specific information. This is consistent with previous studies that indicated that persons with low levels of the need for cognitive closure prefer pages with large numbers of links and additional information, while persons with high levels of the need for cognitive closure tend to avoid such pages [42, 43].

However, it should be noted that no relationship has been found between the overall result obtained on the Need for Closure Scale and the level of problematic Internet use. It has been shown only that Closed-mindedness and Decisiveness are linked to problematic Internet use, where Decisiveness is a factor linked more to the ability to decide than to the motivational aspect related to the expression of the need for cognitive closure [49]. In this context, Decisiveness may be described as the ability to make a quick decision rather a need to find the answer as soon as possible [63]. In this situation, perhaps the problematic Internet use is associated with a need for cognitive closure understood as some kind of ability. However, further research is needed in order to thoroughly verify this assumption.

The present study may serve as a contribution to the search for the mechanisms of problematic Internet use, in particular in the context of indicating the possible significance of cognitive motivation as a discriminating factor between persons with lower and higher levels of problematic Internet use. However, it is necessary to bear in mind certain limitations resulting from their specific nature in making use of the results. Above all, attempts at generalizing the results to the population as a whole should be made cautiously, since the sample was selected from a group of young adults and therefore it is not representative for the overall population. Additionally, the majority of the people in the study group were women. Therefore, the results should be applied with caution to men. Moreover, the quasi-experimental nature of the study means that it is not possible to draw unambiguous conclusions concerning causal directions. For these reasons, too, further research is needed in order to establish a more precise description of the causes and effects of problematic Internet use, taking epistemic motivation into account.

Conflict of interest/Konflikt interesu

Absent./Nie występuje.

Financial support/Finansowanie

Absent./Nie występuje.

References/Piśmiennictwo

1. Galácz A, Smahel D. Information Society from a Comparative Perspective: Digital Divide and Social Effects of the Internet. Cyberpsychology: Journal of Psychosocial Research on Cyberspace 2007; https://cyberpsychology.eu/article/view/4204/3245.
2. Uhls YT, Zgourou E, Greenfield PM. 21st century media, fame, and other future aspirations: A national survey of 9-15 year olds. Cyberpsychology: Journal of Psychosocial Research on Cyberspace 2014; http://dx.doi.org/10.5817/CP2014-4-5.
3. Griffiths MD, Kuss DJ, Billieux J, Pontes HM. The evolution of Internet addiction: A global perspective. Addict Behav 2016; 53: 193-195.
4. Young KS. The evolution of Internet addiction. Addict Behav 2015; 64: 229-230.
5. Cudo A, Kopiś N, Stróżak P. Problematyczne używanie Internetu oraz problematyczne korzystanie z gier komputerowych wśród studentów kierunków społecznych i humanistycznych. Hygeia Public Health 2016; 51: 389-397.
6. Barłóg MJ. Uzależnienie od Internetu i jego osobowościowe determinanty. Hygeia Public Health 2015; 50: 197-202.
7. Pawłowska B, Potembska E. Objawy zagrożenia uzależnieniem i uzależnienia od Internetu mierzonego Kwestionariuszem do Badania Uzależnienia od Internetu, autorstwa Pawłowskiej i Potembskiej u młodzieży polskiej w wieku od 13 do 24 lat. Curr Probl Psychiatry 2011; 12: 439-442.
8. Su W, Han X, Jin C, Yan Y, Potenza MN. Are males more likely to be addicted to the internet than females? A meta-analysis involving 34 global jurisdictions. Comput Human Behav 2019; 99: 86-100.
9. Cudo A, Kopiś N, Stróżak P, Zapała D. Problematic Video Gaming and Problematic Internet Use Among Polish Young Adults. Cyberpsychol Behav Soc Netw 2018; 21: 523-529.
10. Poprawa R. Test problematycznego używania Internetu. Adaptacja i ocena psychometryczna Internet Addiction Test K. Young. Przegląd Psychologiczny 2011; 54: 193-216.
11. Rębisz S, Sikora I, Smoleń-Rębisz K. Poczucie samotności a poziom uzależnienia od Internetu wśród adolescentów. Edukacja–Technika–Informatyka 2016; 7: 90-98.
12. Cudo A, Dobosz M, Jarząbek-Cudo A, Basaj Ł. Problematic Internet use and intrapersonal and interpersonal attitudes in adolescents. Postępy Psychiatrii i Neurologii 2016; 25: 159-178.
13. Yellowlees PM, Marks S. Problematic Internet use or Internet addiction? Comput Human Behav 2007; 23: 1447-1453.
14. Brand M. Theoretical models of the development and maintenance of internet addiction. In: Montag Ch, Reuter M (eds.). Internet Addiction: Neuroscientific Approaches and Therapeutical Implications Including Smartphone Addiction. London: Springer International Publishing; 2017, p. 19-34.
15. Kuss DJ, Billieux J. Technological addictions: Conceptualisation, measurement, etiology and treatment. Addict Behav 2017; 64: 231-233.
16. Tokunaga RS, Rains SA. A review and meta-analysis examining conceptual and operational definitions of problematic Internet use. Human Communication Research 2016; 42: 165-199.
17. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 5th ed. Washington: APA; 2013.
18. Young KS. Internet addiction: The emergence of a new clinical disorder. Cyberpsychol Behav 1998; 1: 237-244.
19. Beard KW, Wolf EM. Modification in the proposed diagnostic criteria for Internet addiction. Cyberpsychol Behav 2001; 4: 377-383.
20. Augustynek A. Uzależnienia komputerowe. Diagnoza, rozpowszechnienie, terapia. Warszawa: Difin; 2010.
21. Chou C, Condron L, Belland JC. A review of the research on Internet addiction. Educational Psychology Review 2005; 17: 363-388.
22. Giota KG, Kleftaras G. The role of personality and depression in problematic use of social networking sites in Greece. Cyberpsychology: Journal of Psychosocial Research on Cyberspace 2013; http://dx.doi.org/10.5817/CP2013-3-6.
23. Kuss DJ, Griffiths MD, Karila L, Billieux J. Internet addiction: a systematic review of epidemiological research for the last decade. Curr Pharm Des 2014; 20: 4026-4052.
24. Weinstein A, Dorani D, Elhadfi R, Bukovza Y, Yarmulnik A, Dannon P. Internet addiction is associated with social anxiety in young adults. Ann Clin Psychiatry 2015; 27: 4-9.
25. Young KS, Yue XD, Ying L. Prevalence estimates and etiologic models of internet addiction. In: Young KS, Nabuco de Abreu C (eds.). Internet Addiction: A Handbook and Guide to Evaluation and Treatment. New Jersey: John Wiley & Sons; 2011, p. 3-18.
26. D'Hondt F, Billieux J, Maurage P. Electrophysiological correlates of problematic Internet use: Critical review and perspectives for future research. Neurosci Biobehav Rev 2015; 59: 64-82.
27. Cudo A, Zabielska-Mendyk E. Funkcjonowanie poznawcze a uzależnienie od Internetu – przegląd badań. Psychiatr Pol 2019; 53: 61-79.
28. Brand M, Young KS, Laier C, Wölfling K, Potenza MN. Integrating psychological and neurobiological considerations regarding the development and maintenance of specific Internet-use disorders: An Interaction of Person-Affect-Cognition-Execution (I-PACE) model. Neurosci Biobehav Rev 2016; 71: 252-266.
29. Sun DL, Chen ZJ, Ma N, Zhang XC, Fu XM, Zhang DR. Decision-making and prepotent response inhibition functions in excessive internet users. CNS Spectrums 2009; 14: 75-81.
30. Bechara A. Decision making, impulse control and loss of willpower to resist drugs: a neurocognitive perspective. Nat Neurosci 2005; 8: 1458-1463.

31. Pawlikowski M, Brand M. Excessive Internet gaming and decision making: do excessive World of Warcraft players have problems in decision making under risky conditions? Psychiatry Res 2011; 188: 428-433.
32. Zhou Z, Yuan G, Yao J. Cognitive biases toward Internet game-related pictures and executive deficits in individuals with an Internet game addiction. PLoS One 2012; 7: e48961.
33. Yan WS, Li YH, Xiao L, Zhu N, Bechara A, Sui N. Working memory and affective decision-making in addiction: a neurocognitive comparison between heroin addicts, pathological gamblers and healthy controls. Drug Alcohol Depend 2014; 134: 194-200.
34. Kruglanski AW, Webster DM, Klem A. Motivated resistance and openness to persuasion in the presence or absence of prior information. J Pers Soc Psychol 1993; 65: 861-876.
35. Webster DM, Kruglanski AW. Individual differences in need for cognitive closure. J Pers Soc Psychol 1994; 67: 1049-1062.
36. Kossowska M. Różnice indywidualne w potrzebie poznawczego domknięcia. Przegląd Psychologiczny 2003; 46: 355-374.
37. Kossowska M. Osobowościowe i motywacyjne korelaty sztywności poznawczej. Przegląd Psychologiczny 2007; 50: 181-200.
38. Kossowska M, Hanusz K, Trejtowicz M. Skrócona wersja Skali Potrzeby Poznawczego Domknięcia. Dobór pozycji i walidacja skali. Psychologia Społeczna 2012; 7: 89-99.
39. Kossowska M. The role of cognitive inhibition in motivation toward closure. Personality and Individual Differences 2007; 42: 1117-1126.
40. Kruglanski AW, Webster DM. Motivated closing of the mind: "Seizing" and "freezing". Psychological Review 1996; 103: 263-283.
41. Strojny P, Kossowska M, Strojny A. When the need for closure promotes complex cognition. Roczniki Psychologiczne/Annals of Psychology 2017; 19: 27-42.
42. Amichai-Hamburger Y. Internet and personality. Computers in Human Behavior 2002; 18: 1-10.
43. Amichai-Hamburger Y, Fine A, Goldstein A. The impact of Internet interactivity and need for closure on consumer preference. Computers in Human Behavior 2004; 20: 103-117.
44. Dong G, Lu Q, Zhou H, Zhao X. Impulse inhibition in people with Internet addiction disorder: electrophysiological evidence from a Go/NoGo study. Neurosci Lett 2010; 485: 138-142.
45. Kossowska M, Bukowski M, Czarnek G. Two routes to closure: Time pressure and goal activation effects on executive control. Polish Psychological Bulletin 2014; 45: 268-274.
46. Kościelniak M, Rydzewska K, Sędek G. Effects of age and initial risk perception on balloon analog risk task: the mediating role of processing speed and need for cognitive closure. Front Psychol 2016; 7: 659.
47. Seok JW, Lee KH, Sohn S, Sohn JH. Neural substrates of risky decision making in individuals with Internet addiction. Aust N Z J Psychiatry 2015; 49: 923-932.
48. Bar-Tal Y, Kossowska M. The efficacy at fulfilling need for closure: The concept and its measurement. In: Villanueva JP (ed.). Personality traits: Classification, effects and changes. New York: Nova Publishers; 2010, p. 47-64.
49. Roets A, Van Hiel A. Separating ability from need: Clarifying the dimensional structure of the need for closure scale. Personality and Social Psychology Bulletin 2007; 33: 266-280.
50. Langsrud Ø. ANOVA for unbalanced data: Use Type II instead of Type III sums of squares. Statistics and Computing 2003; 13: 163-167.
51. Kruglanski AW. The Psychology of Closed Mindedness. New York: Psychology Press; 2004.
52. Chernikova M, Kruglanski A, Giovannini D, Vezzali L, Su J. Need for closure and reactions to innovation. J Appl Soc Psychol 2017; 47: 473-481.
53. Tadmor CT, Chao MM, Hong YY, Polzer JT. Not just for stereotyping anymore: Racial essentialism reduces domain-general creativity. Psychological Science 2013; 24: 99-105.
54. Calogero RM, Bardi A, Sutton RM. A need basis for values: Associations between the need for cognitive closure and value priorities. Personality and Individual Differences 2009; 46: 154-159.
55. Buratti S, Allwood CM, Kleitman S. First-and second-order metacognitive judgments of semantic memory reports: The influence of personality traits and cognitive styles. Metacognition and Learning 2013; 8: 79-102.
56. Iannello P, Mottini A, Tirelli S, Riva S, Antonietti A. Ambiguity and uncertainty tolerance, need for cognition, and their association with stress. A study among Italian practicing physicians. Med Educ Online 2017; 22: 1270009.
57. Wichary S, Kossowska M, Orzechowski J, Ślifierz S, Marković J. Individual differences in decisiveness: Pre-decisional information search and decision strategy use. Polish Psychological Bulletin 2008; 39: 47-53.
58. Freeman D, Garety P, Kuipers E, Colbert S, Jolley S, Fowler D, et al. Delusions and decision-making style: use of the Need for Closure Scale. Behav Res Ther 2006; 44: 1147-1158.
59. Ho RC, Zhang MW, Tsang TY, Toh AH, Pan F, Lu Y, et al. The association between internet addiction and psychiatric co-morbidity: a meta-analysis. BMC Psychiatry 2014; 14: 183.
60. Barkley-Levenson EE, Fox CR. The surprising relationship between indecisiveness and impulsivity. Personality and Individual Differences 2016; 90: 1-6.
61. Park SM, Park YA, Lee HW, Jung, HY, Lee JY, Choi JS. The effects of behavioral inhibition/approach system as predictors of Internet addiction in adolescents. Personality and Individual Differences 2013; 54: 7-11.
62. Brand M, Young KS, Laier C. Prefrontal control and Internet addiction: a theoretical model and review of neuropsychological and neuroimaging findings. Front Hum Neurosci 2014; 8: 375.
63. Mannetti L, Pierro A, Kruglanski A, Taris T, Bezinovic P. A cross-cultural study of the Need for Cognitive Closure Scale: Comparing its structure in Croatia, Italy, USA and The Netherlands. Br J Soc Psychol 2002; 41: 139-156.