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Maciej Barański
A,B,C,D,E,F
Ryszard Poprawa
A,B,D,E

Profiles of loneliness types and social support sources in emerging adulthood, and their relevance to forms of problematic Internet use: a person-centered perspective

BACKGROUND
Young people start using the Internet in problematic ways partially because it allows them to escape real-life problems or compensate for relational deficits such as loneliness and lack of social support. So far, especially loneliness has usually been treated as a one-dimensional construct, despite its complexity. Moreover, considering various combinations of relational deficits can offer a more comprehensive understanding of human behavior.

PARTICIPANTS AND PROCEDURE
Participants (N = 2210, aged 18-25, M_{age} = 20.55 ± 2.12 years) completed questionnaires on loneliness types, social support sources, generalized and specific forms (social media, online games, online pornography) of problematic Internet use, and Big Five personality traits. We performed a latent profile analysis to distinguish groups of Internet users with specific combinations of loneliness types and social support sources. Next, differences between these groups in forms of problematic Internet use were examined, controlling for gender and personality traits.

RESULTS
Five profiles were identified: (1) family lonely, (2) lonely in every aspect, (3) supported in every aspect, (4) romantic lonely, and (5) social lonely. Lonely in every aspect exhibited the most problematic Internet, online game, and online pornography use. In contrast, supported in every aspect had the lowest levels of problematic Internet, online game, and online pornography use. Other profiles obtained intermediate scores, but there were specific differences depending on the form of problematic Internet use. Distinguished groups did not differ in terms of problematic social media use.

CONCLUSIONS
Individuals lacking satisfying interpersonal relations are particularly susceptible to using the Internet and its applications in problematic ways.

KEY WORDS
loneliness; social support; problematic Internet use; emerging adulthood; person-centered perspective

ORGANIZATION – Institute of Psychology, University of Wrocław, Wrocław, Poland

AUTHORS' CONTRIBUTIONS – A: Study design · B: Data collection · C: Statistical analysis · D: Data interpretation · E: Manuscript preparation · F: Literature search · G: Funds collection

CORRESPONDING AUTHOR – Maciej Barański, Institute of Psychology, University of Wrocław, 1 Dawida Str., 50-529 Wrocław, Poland, e-mail: maciej.baranski@uwr.edu.pl

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BACKGROUND

Nowadays, the scarcity of satisfying interpersonal relationships is one of the most important problems of young people (Twenge et al., 2021). Having close relationships is one of the basic psychological needs, and the absence of these can lead to ill-being and a search for substitutes (Vansteenkiste & Ryan, 2013). Individuals grappling with loneliness may seek fulfillment of unmet real-life needs in cyberspace. The compensatory Internet use model assumes that real-life deficits can increase the motivation to use the Internet to alleviate negative mood or compensate (Kardefelt-Winther, 2014). However, the absence of relationships is a complex phenomenon (Corsano et al., 2019; Hawkins-Elder et al., 2018). It remains unclear how these states – perceived loneliness or social support – and their combinations contribute to problematic engagement with the Internet and its applications.

LONELINESS AND SOCIAL SUPPORT

Loneliness is a subjective experience and can be described as an aversive response to a discrepancy between desired and achieved social relations (Peplau & Perlman, 1982). This definition underscores that loneliness is a subjective experience and should not be equated with objective social isolation. This unpleasant state is commonly reported by young adults (Lim et al., 2020). Experiencing loneliness is weakly to moderately related to personality traits – positively with neuroticism and negatively with extraversion, agreeableness, conscientiousness, and openness (Buecker et al., 2020). Loneliness is related to many negative physical and mental health outcomes, such as elevated blood pressure, higher cortisol levels, poorer sleep quality, anxiety, and depression (Lim et al., 2020; Wang et al., 2018).

Weiss (1973) postulated two types of loneliness: emotional (absence of a close emotional attachment) and social (absence of an engaging social network). People may suffer different consequences depending on the type of loneliness they experience. The absence of one type of relationship cannot be replaced with relations in other domains; for example, a widowed woman will still experience romantic loneliness even if she has friends. People may cope with their loneliness by looking for missing provisions in still available relations, accepting their situation, or attempting to establish new "supplementary" relationships (see also: Rokach, 2018).

On the other hand, social support can be understood as the opposite of loneliness, but a lack of it is not necessarily accompanied by experiencing loneliness (Zhang & Dong, 2022). It has been studied from multiple perspectives. One of the basic distinctions is between objective and perceived (subjective) social support. The latter refers to how individuals perceive others as sources of support during times of need (Ioannou et al., 2019). Another distinction is the source of support. For example, Zimet et al. (1988) proposed a distinction between three sources of perceived support: family, significant others, and friends. In contrast to loneliness, social support can be beneficial for both physical and mental health – it reduces stress, protects against cognitive decline in the elderly, reduces the risk of early death, and much more (Taylor, 2011; Wang et al., 2018).

Loneliness and social support have so far been studied from both a variable- and person-centered perspective. The latter perspective assumes that people are not homogeneous, and that groups with specific characteristics (profiles of studied variables) can be distinguished (Morin et al., 2017). The number and structure of profiles depend on the methodology used and the sample studied. For example, Hawkins-Elder et al. (2018) identified four profiles of loneliness among New Zealand participants: 'low-loneliness', 'high-loneliness', 'appreciated outsiders', and 'superficially connected'. These groups differed significantly in self-rated health, self-esteem, life satisfaction, perceived social support, and distress, as well as in the personality traits neuroticism and extraversion. In turn, Bai et al. (2023) distinguished four profiles of perceived social support from different sources (such as partners, family, and friends) among Chinese parents, which they labeled 'low', 'moderate', 'high', and 'divergent'. Only the latter two profiles were associated with depressive symptoms.

PROBLEMATIC INTERNET USE

Problematic Internet use (PIU) can be defined as use of the Internet that creates psychological, social, academic, or occupational difficulties and has clear characteristics of addictive behavior (Beard & Wolf, 2001; Griffiths et al., 2016; Poprawa, 2012). According to the components model of addictive behavior, PIU is one of the behavioral addictions whose symptoms include salience, mood modification, tolerance, withdrawal symptoms, conflict (interpersonal and intrapsychic), and relapse. All of these elements should be present to define the behavior as an addiction (Griffiths, 2005). It is related to depression, addictions, sleeping disorders (Kuss et al., 2014), and other phenomena, such as fear of missing out, nomophobia, cyberchondria, and cyberbullying (Kamolthip et al., 2022). Depending on the diagnostic criteria adopted, between 0.8% and 26.4% of users manifest symptoms of PIU (Kuss et al., 2014). Davis (2001) suggested two types of PIU: generalized and specific. Generalized PIU refers to misuse of the Internet that does not relate to a specific Internet function or application. It can manifest itself in wasting time online without a clear purpose and

is strongly linked to the social aspect of the Internet. In contrast, specific PIU refers to the excessive use of particular Internet applications, such as games or pornography. Its substrate may be pre-existing psychopathology. Later research confirmed the validity of distinguishing between forms of PIU (Montag et al., 2015). Hence, it is valuable to analyze them separately, as they can attract different users with specific needs and motivations.

A cognitive-behavioral model of pathological Internet use (Davis, 2001) posits that maladaptive cognition, resulting from pre-existing psychopathology, underlies PIU. However, social isolation and lack of social support also contribute to PIU, especially its generalized form, which is strongly related to seeking relations. Online social interactions can be a powerful reinforcement for lonely people, which strengthens the habit of using the Internet. Caplan (2003) suggests that problematic psychosocial predispositions, such as depression and loneliness, predispose individuals to assess their social competence more negatively. As a result, they prefer online social interactions to face-to-face interactions, perceiving them as less threatening and themselves as more effective in such interactions. This preference leads to excessive use of the Internet for social purposes, which in turn causes problems in other areas of life. Kardefelt-Winther (2014) posited that people use the Internet to escape real-life problems, to alleviate dysphoric moods, or to compensate for psychological problems. Because of its interactional nature, the Internet can be perceived by lonely individuals as a problem-solving tool.

To summarize, the Internet has strong potential for gratification, which can lead users with specific characteristics to habitual or addictive behavior (Brand et al., 2016). Among other things, relational deficits may prompt people to escape to the Internet, compensate for deficits and alleviate negative states in various 'online ways', for example through the use of social media, online games and even online pornography (Efrati & Amichai-Hamburger, 2019; Lin et al., 2024; Melodia et al., 2022; Snodgrass et al., 2014). This results in the development of harmful habits with addiction-like characteristics (Kardefelt-Winther, 2014). While the Internet provides quick but short-term gratification at the beginning of the addiction process, over time it produces more and more negative consequences that intensify the need for further escape and compensation (Brand et al., 2016). This mechanism creates a vicious cycle of problematic Internet use.

PURPOSE OF THE STUDY

There is abundant evidence of a positive relationship (probably dynamic and bidirectional) between loneliness and PIU (Moretta & Buodo, 2020). Nevertheless, few studies examining the relationship between emotional and social loneliness and PIU have yielded inconsistent results (Andangsari & Dhowi, 2016; İskender, 2018). To our knowledge, there is still limited information on the importance of perceived support from various sources for PIU (Prievara et al., 2019). Moreover, clarifying the relevance of different loneliness types and social support sources for PIU requires taking into account currently identified specific forms of PIU.

The main goal of this study was to adopt a person-centered perspective and identify groups of people in emerging adulthood with profiles of loneliness types and social support sources, and then determine their relevance to forms of generalized and specific (social media, online games, online pornography) PIU. Because personality traits and gender are related to PIU (Kayiş et al., 2016; Su et al., 2020), we decided to control for them.

PARTICIPANTS AND PROCEDURE

PARTICIPANTS

We surveyed 2210 Polish Internet users aged 18-25 (M_{age} = 20.55 ± 2.12 years), including 1253 women (56.7%). Most of the respondents had a high school education (70.8%), were studying (68.4%), and were single (58.5%). Nearly half were employed (48.1%) and lived in large cities (45.6%). Details of the sociodemographic characteristics of the sample (already divided into profiles) are shown in Table 4.

Data were collected online. Questionnaires were preceded by a detailed description of the study, which included information about the conditions for taking part in the study (age from 18 to 25) and informed about the voluntariness of participation in the study and the anonymity of the respondents. Informed consent was obtained from all participants. All procedures performed in this study were approved by the Research Ethics Committee of the Institute of Psychology, University of Wrocław (approval number of research project: 2023/DEFBN) and in accordance with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

MEASURES

Social and Emotional Loneliness Scale for Adults (DiTommaso et al., 2004) in Polish adaptation by Adamczyk and DiTommaso (2014). It consists of 15 items regarding experiencing family, romantic, and social loneliness. Participants respond on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*) – the higher the score, the greater the loneliness.

Multidimensional Scale of Perceived Social Support (Zimet et al., 1988) in Polish adaptation by Buszman

and Przybyła-Basista (2017). It consists of 12 items regarding perceptions of support from family, significant other, and friends. Participants respond on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*) – the higher the score, the greater the social support.

Internet Use Test (Poprawa, 2012). The scale consists of 23 items measuring the symptoms of problematic Internet use, including difficulty with self-control, defense of addiction, escape from stress, neglect of alternative activities, harm and conflict, loss of satisfaction, and obsessive and compulsive involvement. Participants respond on a scale from 0 (*never*) to 5 (*always*) – the higher the score, the greater the generalized PIU.

Bergen Social Media Addiction Scale (Andreassen et al., 2016) in Polish translation by Balcerowska et al. (2022). It consists of six questions about the addictive use of social media according to Griffiths' (2005) components model. Respondents answer on a scale from 1 (*very rarely*) to 5 (*very often*) – the higher the score, the greater the problematic social media use.

Internet Gaming Disorder Scale – Short-Form (Pontes & Griffiths, 2015) in Polish adaptation by Schivinski et al. (2018). As the instruction for this scale refers (despite its name) to both online and offline gaming, it was modified to recommend that respondents focus only on Internet gaming activities. It consists of nine questions about the symptoms of gaming disorder proposed in the DSM-5 (APA, 2013). Respondents answer on a scale from 1 (*never*) to 5 (*very often*) – the higher the score, the greater the problematic online game use. Due to the modifications, we conducted CFA using robust DWLS estimation, which confirmed a fit for the one-factor solution ($\chi^2(27) = 156.47$, $p < .001$, CFI = .998, TLI = .998, RMSEA = .047 [90% CI: .040-.054], SRMR = .029).

Brief Pornography Screen (Kraus et al., 2020) in a Polish version with modified instructions ("Internet" was added to the word "pornography"). It consists of five items about problematic pornography use. Participants respond on a three-point scale: 0 (*never*), 1 (*occasionally*), and 2 (*very often*) – the higher the score, the greater the problematic online pornography use. Due to the modification of the scale instruction, to verify the one-factor structure of the scale we conducted the CFA using robust DWLS estimation (as did the scale authors). The analysis yielded an excellent fit ($\chi^2(5) = 7.50$, $p = .186$, CFI = 1.00, TLI = 1.00, RMSEA = .015 [90% CI: .000-.036], SRMR = .012).

International Personality Item Pool – Big Five Markers – 20 (Donnellan et al., 2006) in Polish adaptation by Topolewska et al. (2014). It consists of 20 items relating to the Big Five personality traits (extraversion, emotional stability, intellect, conscientiousness, agreeableness). Participants respond on a scale from 1 (*describes me completely inaccurately*) to 5 (*describes me completely accurately*) – the higher the score, the higher the level of the trait.

The descriptive statistics and internal consistency of the scales are shown in Table 1.

DATA ANALYSIS

Data analysis was carried out using TIBCO Software Statistica v.13.3 and R with the *tidyLPA* (Rosenberg et al., 2018) and *lavaan* (Rosseel, 2012) packages. Pearson's *r* correlation coefficient was used to analyze the relationships between the variables. Latent profile analysis (LPA) on standardized scores was carried out to distinguish groups with specific profiles of loneliness and social support. To determine the optimal number of profiles, the following statistical indicators were considered: Akaike information criterion (AIC), Bayesian information criterion (BIC), sample size-adjusted BIC (SABIC), entropy, bootstrapped likelihood-ratio test (BLRT) significance, posterior classification probabilities. The model with the lowest AIC, BIC, and SABIC values offers the best fit. Higher entropy indicates better model fit. The lack of significant BLRT for a model with $k + 1$ profiles suggests that the solution is not superior to a k profile solution (Spurk et al., 2020). To confirm the obtained solution, a MANOVA and ANOVAs were conducted. To examine differences in types of PIU between profiles controlling for gender and personality traits, we performed MANCOVA and ANCOVAs.

RESULTS

CORRELATION ANALYSIS

Loneliness types were positively correlated with each other, as were support sources. Loneliness types and support sources were negatively correlated with each other, with the strongest negative correlations between family loneliness with family support, romantic loneliness with significant other support, and social loneliness with friends' support. Every loneliness type was positively weakly related to forms of PIU. Support sources were weakly negatively related to generalized problematic Internet, online game, and online pornography use. Only family support was weakly correlated with problematic social media use. Correlations between forms of PIU were positive and weak or average. Only generalized PIU was strongly correlated with problematic social media use. The detailed results are shown in Table 1.

IDENTIFICATION OF GROUPS WITH SPECIFIC PROFILES OF LONELINESS TYPES AND SOCIAL SUPPORT SOURCES

To identify groups with specific profiles of loneliness and social support, we carried out LPA. Firstly, we in-

Table 1

Descriptive statistics, internal consistency, and correlations of studied variables

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1. Family loneliness	–														
2. Romantic loneliness	.10***	–													
3. Social loneliness	.33***	.07***	–												
4. Support from family	−.84***	−.09***	−.28***	–											
5. Support from significant other	−.24***	−.50***	−.36***	.29***	–										
6. Support from friends	−.28***	−.08***	−.79***	.30***	.46***	–									
7. GPIU	.19***	.14***	.20***	−.14***	−.14***	−.16***	–								
8. PSMU	.12***	.08***	.05*	−.08***	.01	−.01	.56***	–							
9. POGU	.14***	.05*	.15***	−.11***	−.17***	−.15***	.47***	.17***	–						
10. POPU	.12***	.13***	.10***	−.08***	−.14***	−.09***	.30***	.15***	.35***	–					
11. Extraversion	−.20***	−.13***	−.27***	.19***	.20***	.26***	−.16***	.00	−.09***	−.05*	–				
12. Emotional stability	−.28***	−.07***	−.22***	.26***	.04	.15***	−.16***	−.25***	−.14***	.03	.27***	–			
13. Intellect	−.10***	−.08***	−.19***	.10***	.14***	.18***	−.24***	−.17***	−.14***	−.03	.26***	.14***	–		
14. Conscientiousness	−.18***	−.06**	−.07**	.18***	.05*	.05*	−.28***	−.19***	−.20***	−.13***	.22***	−.08***	.20***	–	
15. Agreeableness	−.18***	−.04*	−.27***	.18***	.23***	.30***	−.20***	.03	−.28***	−.10***	.06**	.14***	.05*	.12***	–
Range	5-35	5-35	5-35	4-28	4-28	4-28	0-115	6-30	9-45	0-10	4-20	4-20	4-20	4-20	4-20
M	15.03	19.31	13.59	19.15	22.21	21.90	29.06	17.58	15.49	2.29	12.29	9.67	14.79	12.37	15.53
SD	7.41	9.59	6.83	6.51	6.32	5.72	21.96	5.44	7.72	2.89	4.19	3.65	3.08	4.03	3.03
Skewness	.61	.05	.82	−.51	−1.14	−1.05	.84	.02	1.31	1.12	−.04	.37	−.42	−.07	−.59
Kurtosis	−.38	−1.28	−.06	−.64	.49	.59	.06	−.56	1.17	.13	−.80	−.44	−.17	−.79	−.13
Cronbach's α	.87	.85	.85	.91	.92	.93	.95	.79	.92	.89	.84	.77	.67	.78	.66

Note. GPIU – generalized problematic internet use; PSMU – problematic social media use; POGU – problematic online game use; POPU – problematic online pornography use. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Table 2

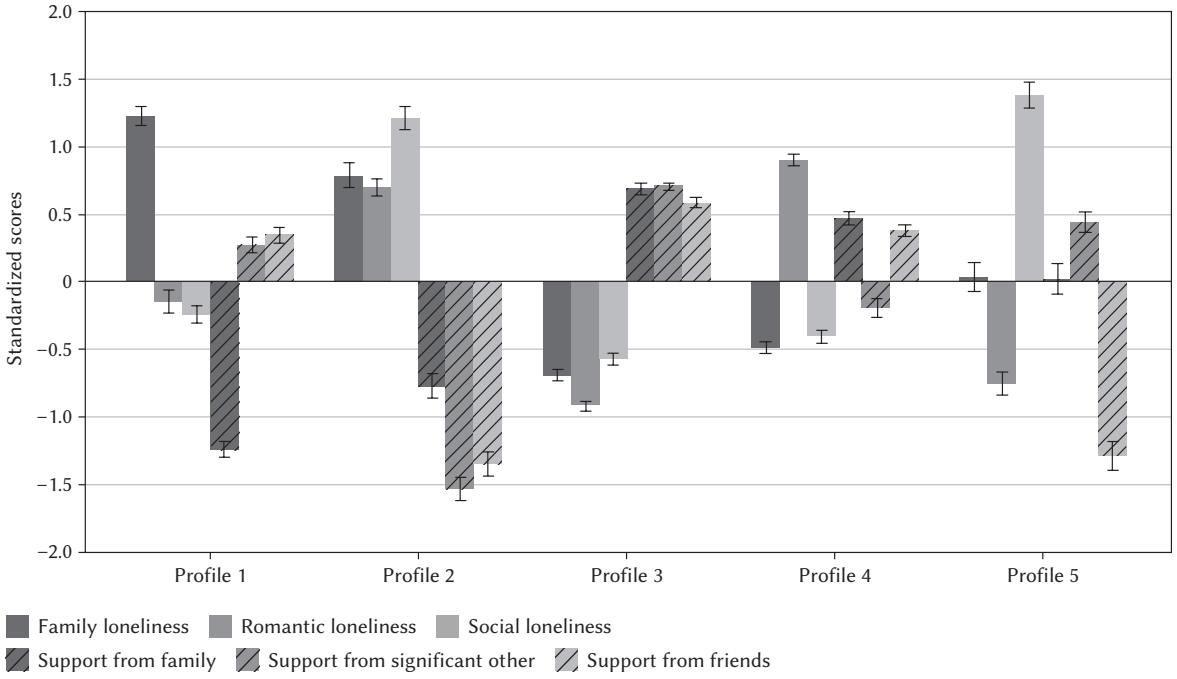
Fit indices, entropy, and model comparisons estimated for the latent profile analysis solutions

Number of profiles	LogLik	AIC	AWE	BIC	CAIC	CLC	KIC	SABIC	ICL	Entropy	BLRT(*p*)	ProbMin	ProbMax	*n* Min (%)
1	−18812.12	37648.25	37648.25	37716.66	37728.66	37626.25	37663.25	37678.53	−37716.66	1	> .05	1	1	1
2	−17536.67	35111.34	35111.34	35219.65	35238.65	35074.97	35133.34	35159.29	−35505.14	.816	> .05	.925	.958	37.10
3	−17352.32	34756.64	34756.64	34904.86	34930.86	34706.18	34785.64	34822.25	−35451.65	.772	> .05	.875	.919	30.59
4	−16430.45	32926.89	32926.89	33115.02	33148.02	32862.61	32962.89	33010.17	−33543.47	.856	> .05	.868	.955	9.37
5	−16171.13	32422.26	32422.26	32650.29	32690.29	32343.96	32465.26	32523.20	−33148.03	.851	> .05	.806	.957	7.38
6	−16258.92	32611.84	32611.84	32879.78	32926.78	32519.52	32661.84	32730.45	−33503.80	.839	> .05	.845	.923	7.33
7	−15883.59	31875.19	31875.19	32183.03	32237.03	31768.86	31932.19	32011.46	−32863.16	.836	> .05	.785	.922	4.62
8	−15707.46	31536.91	31536.91	31884.66	31945.66	31416.61	31600.91	31690.85	−32562.42	.848	> .05	.806	.922	5.75
9	−15561.63	31259.27	31259.27	31646.92	31714.92	31124.98	31330.27	31430.87	−32314.15	.854	> .05	.779	.907	2.71
10	−15364.64	30879.29	30879.29	31306.85	31381.85	30731.00	30957.29	31068.56	−32015.77	.856	> .05	.803	.937	2.67

Note. LogLik – log-likelihood; AIC – Akaike information criterion; AWE – approximate weight of evidence; BIC – Bayesian information criterion; CAIC – consistent Akaike information criterion; CLC – classification likelihood criterion; KIC – Kullback information criterion; SABIC – sample size-adjusted BIC; ICL – integrated completed likelihood; BLRT(*p*) – bootstrapped likelihood-ratio test significance; ProbMin – lowest probability of a case belonging to the group; ProbMax – highest probability of a case belonging to the group; *n* Min (%) – percentage of the total group that the smallest listed group contains.

Figure 1

Distinguished profiles of loneliness types and social support sources



Note. The figure indicates 95% confidence intervals for the means.

Profiles of loneliness and social support and forms of problematic Internet use

vestigated the fit statistics for solutions with one to ten profiles (with equal variances and covariances set to zero; see Table 2). Next, we rejected models with profiles of less than 5% of participants (solutions with 7 or more profiles). Among other models, the model assuming a solution with 5 profiles had the lowest scores of AIC, BIC, and SABIC. The entropy of this model was satisfactory. Finally, we decided to adopt a solution with 5 profiles (Figure 1). To confirm this solution, we used a one-way MANOVA and ANOVAs. All included variables – loneliness types and social support sources – significantly differed across profiles, $F(24, 7676) = 462.16$, $p < .001$, Wilks' $\lambda = .044$, $\eta^2_{partial} = .541$. The detailed results are shown in the upper part of Table 4.

The following description of the profiles does not refer to external criterion but to the differences between them. People with profile 1 ("family lonely") were characterized by high family loneliness (> 1 *SD*), low family support (< −1 *SD*), and average other loneliness types and support sources (between −0.5 and 0.5 *SD*). Young with profile 2 (lonely in every aspect) had high every loneliness type (> 0.5 *SD*), especially social loneliness (> 1 *SD*), and low support from all sources (< −0.5 *SD*), especially from friends (< −1 *SD*) and significant others (< −1.5 *SD*). People with profile 3 (supported in every aspect) were characterized by low loneliness types (< −0.5 *SD*) and high social support from all sources (> 0.5 *SD*). Participants with profile 4 (romantic lonely) had high romantic loneliness (> 0.5 *SD*) and average levels of other loneliness types and social support sources (between −0.5 and 0.5 *SD*). Individuals with profile 5 (social lonely) had high social loneliness (> 1 *SD*), and low romantic loneliness (< −0.5 *SD*) and friends' support (< −1 *SD*). Other loneliness types and support sources were average (between −0.5 and 0.5 *SD*). Details of the profiles are shown in the upper part of Table 4 and Figure 1.

DIFFERENCES BETWEEN GROUPS WITH SPECIFIC PROFILES OF LONELINESS TYPES AND SOCIAL SUPPORT SOURCES

First, we checked differences between profiles in socio-demographic variables. Importantly, differences in marital status were notably consistent with levels of loneliness and social support in the profiles. Romantic lonely (93.1%), and lonely in every aspect (84.0%) were mostly singles. Supported in every aspect (69.8%) were mostly in informal relationships. The exact results are shown in Table 3.

Next, we used a MANCOVA to examine the effects of profiles on forms of PIU, controlling for gender and personality traits. Due to the small number of people who identified their gender as "other", this group was excluded from the comparative analyses. There was a significant difference in forms of PIU based on profile membership, $F(16, 8592) = 5.95$, $p < .001$, Pillai's trace = .044, $\eta^2_{partial} = .014$. Next, ANCOVAs (also controlling for gender and personality traits) were conducted to test for differences between groups

Table 3

Comparison of groups with specific profiles of loneliness and social support by age and socio-demographic variables

Variables	Profile 1 *n* = 381 (17.24%) Family lonely	Profile 2 *n* = 344 (15.57%) Lonely in every aspect	Profile 3 *n* = 641 (29.00%) Supported in every aspect	Profile 4 *n* = 628 (28.42%) Romantic lonely	Profile 5 *n* = 216 (9.77%) Social lonely	F/χ^2	Post hoc/ *z* tests
	M (*SD*) / % (*n*)	*M* (*SD*) / % (*n*)	*M* (*SD*) / % (*n*)	*M* (*SD*) / % (*n*)	*M* (*SD*) / % (*n*)		
Age	20.16 (2.00)	20.63 (2.20)	20.97 (2.16)	20.21 (1.94)	20.86 (2.32)	$F_{(4, 2205)} = 15.13$, $p < .001$, $\eta^2 = .027$	P2, P3, P5 > P1, P4
Gender							
Women	59.32 (226)	52.91 (182)	59.59 (382)	51.11 (321)	65.74 (142)	$\chi^2_{(8)} = 33.20$, $p < .001$, $V = .09$	P3 > P4 P5 > P2, P4
Men	36.75 (140)	44.19 (152)	39.78 (255)	46.02 (289)	32.41 (70)		P4 > P1, P5
Other	3.94 (15)	2.91 (10)	0.62 (4)	2.87 (18)	1.85 (4)		P1, P2, P4 > P3
Education							
Primary	11.81 (45)	13.08 (45)	7.02 (45)	10.03 (63)	10.65 (23)	$\chi^2_{(12)} = 68.01$, $p < .001$, $V = .10$	P2 > P3
Basic vocational	3.15 (12)	3.78 (13)	0.78 (5)	2.55 (16)	1.39 (3)		P1, P2 > P3
Secondary	75.07 (286)	68.02 (234)	68.64 (440)	74.36 (467)	63.43 (137)		P1, P4 > P5
Higher	9.97 (38)	15.12 (52)	23.56 (151)	13.06 (82)	24.54 (53)		P3 > P1, P2, P4 P5 > P1, P4
Marital status[1]							
Single/divorced or separated/ widowed	51.97 (198)	84.01 (289)	26.52 (170)	93.31 (586)	25.93 (56)	$\chi^2_{(8)} = 801.03$, $p < .001$, $V = .43$	P4 > P2 > P1 > P3, P5
Partner (informal relationship)	47.77 (182)	13.66 (47)	69.89 (448)	6.37 (40)	67.13 (145)		P3, P5 > P1 > P2 > P4
Married	0.26 (1)	2.33 (8)	3.59 (23)	0.32 (2)	6.94 (15)		P3, P5 > P1, P4 P2 > P4

Note. *V* – Cramér's *V*. Bonferroni post hoc test was used for age comparisons. For the other variables, a *z* test with Bonferroni significance correction was used ($p < .05$).
1Due to the low number of respondents with the marital status of "divorced or separated" and "widowed", they were included along with those with the marital status of "single" in the combined category.

Table 4

Profiles of loneliness types and social support sources – means, standard deviations, standardized values, and group comparison

Variables	Profile 1 *n* = 381 (17.24%) Family lonely		Profile 2 *n* = 344 (15.57%) Lonely in every aspect		Profile 3 *n* = 641 (29.00%) Supported in every aspect		Profile 4 *n* = 628 (28.42%) Romantic lonely		Profile 5 *n* = 216 (9.77%) Social lonely		ANOVA		Group comparison
	M (*SD*)	*Z*	*M* (*SD*)	*Z*	*M* (*SD*)	*Z*	*M* (*SD*)	*Z*	*M* (*SD*)	*Z*	$F_{(4, 2205)}$	$\eta^2_{partial}$	
Family loneliness	24.08 (5.00)	1.22	20.83 (6.31)	0.78	9.96 (4.13)	−0.68	11.43 (4.37)	−0.49	15.31 (6.01)	0.04	690.45***	.556	P1 > P2 > P5 > P4 > P3
Romantic loneliness	17.91 (8.50)	−0.15	25.98 (5.95)	0.70	10.55 (4.92)	−0.91	27.94 (5.21)	0.90	12.10 (5.94)	−0.75	852.13***	.607	P4 > P2 > P1 > P5 > P3
Social loneliness	11.95 (4.57)	−0.24	21.85 (5.46)	1.21	9.68 (3.86)	−0.57	10.83 (4.95)	−0.40	23.00 (4.91)	1.38	717.67***	.566	P5 > P2 > P1 > P4 > P3
Support from family	11.08 (4.01)	−1.24	14.13 (5.47)	-0.77	23.61 (3.75)	0.69	22.19 (4.02)	0.47	19.28 (5.30)	0.02	691.50***	.556	P3 > P4 > P5 > P2 > P1
Support from significant other	23.89 (4.04)	0.27	12.53 (5.21)	-1.53	26.65 (2.15)	0.70	21.00 (5.46)	−0.19	24.98 (3.47)	0.44	672.28***	.549	P3 > P5 > P1 > P4 > P2
Support from friends	23.86 (3.46)	0.34	14.20 (4.83)	-1.35	25.24 (2.82)	0.58	24.06 (3.25)	0.38	14.55 (4.57)	−1.28	835.20***	.602	P3 > P1, P4 > P2, P5

Variables	*n* = 366 (16.95%) *M* (*SD*) [adjusted *M*]	*n* = 334 (15.93%) *M* (*SD*) [adjusted *M*]	*n* = 637 (29.50%) *M* (*SD*) [adjusted *M*]	*n* = 610 (28.25%) *M* (*SD*) [adjusted *M*]	*n* = 212 (9.82%) *M* (*SD*) [adjusted *M*]	ANOVA		Group comparison
						$F_{(4, 2148)}$	$\eta^2_{partial}$	
Generalized problematic Internet use	29.23 (20.60) [27.49]	38.34 (23.95) [34.64]	23.24 (19.86) [25.78]	28.26 (20.93) [29.64]	32.78 (25.02) [30.08]	10.32***	.018	P2 > P1, P3, P4 P4 > P3
Problematic social media use	18.10 (5.33) [17.57]	17.80 (5.30) [17.60]	16.89 (5.44) [17.18]	17.68 (5.45) [18.01]	18.06 (5.58) [17.47]	2.14	.004	–
Problematic online game use	15.71 (7.41) [15.75]	18.66 (9.07) [17.49]	13.95 (6.57) [14.54]	14.86 (7.25) [14.88]	16.37 (9.00) [16.33]	10.45***	.019	P2 > P1, P3, P4 P5 > P3
Problematic online pornography use	2.26 (2.87) [2.24]	3.19 (3.29) [3.02]	1.79 (2.65) [1.94]	2.36 (2.83) [2.28]	2.21 (2.75) [2.31]	8.18***	.015	P2 > P1, P3, P4, P5

Note. Z standardized scores; ANOVA – Bonferroni post hoc tests were used to compare groups; ANCOVA – pairwise comparisons based on adjusted means [gender and personality traits as covariates] with Bonferroni correction for multiple comparisons were used). ***$p < .001$.

in forms of PIU. The detailed results are shown in Table 4.

The groups differed in generalized PIU, $F(4, 2148) = 10.31$, $p < .001$, $\eta^2_{partial} = .019$. Lonely in every aspect had higher generalized PIU than family lonely, romantic lonely, and supported in every aspect. For romantic lonely, this type of PIU was higher than for supported in every aspect. Emotional stability ($F(1, 2148) = 17.35$, $p < .001$, $\eta^2_{partial} = .008$), intellect ($F(1, 2148) = 64.57$, $p < .001$, $\eta^2_{partial} = .029$), agreeableness ($F(1, 2148) = 27.12$, $p < .001$, $\eta^2_{partial} = .012$), and conscientiousness ($F(1, 2148) = 133.20$, $p < .001$, $\eta^2_{partial} = .058$) were significant covariates, while gender ($F(1, 2148) = 0.00$, $p = .999$) and extraversion ($F(1, 2148) = 0.75$, $p = .385$) were not significant.

The groups differed in problematic online game use, $F(4, 2148) = 10.84$, $p < .001$, $\eta^2_{partial} = .020$. Lonely in every aspect had higher problematic online game use than family lonely, romantic lonely, and supported in every aspect. This type of PIU was higher for social lonely than for supported in every aspect. Gender ($F(1, 2148) = 263.80$, $p < .001$, $\eta^2_{partial} = .109$), emotional stability ($F(1, 2148) = 6.98$, $p = .008$, $\eta^2_{partial} = .003$), intellect ($F(1, 2148) = 25.97$, $p < .001$, $\eta^2_{partial} = .012$), agreeableness ($F(1, 2148) = 50.09$, $p < .001$, $\eta^2_{partial} = .023$), and conscientiousness ($F(1, 2148) = 65.23$, $p < .001$, $\eta^2_{partial} = .029$) were significant covariates, while extraversion ($F(1, 2148) = 0.43$, $p = .513$) was not significant.

Profile membership differentiated participants in problematic online pornography use, $F(4, 2148) = 8.32$, $p < .001$, $\eta^2_{partial} = .015$. Lonely in every aspect, compared to other profiles, had higher problematic online pornography use. Gender ($F(1, 2148) = 358.94$, $p < .001$, $\eta^2_{partial} = .143$), emotional stability ($F(1, 2148) = 5.67$, $p = .017$, $\eta^2_{partial} = .003$), and conscientiousness ($F(1, 2148) = 25.15$, $p < .001$, $\eta^2_{partial} = .012$) were significant covariates, while extraversion ($F(1, 2148) = 0.13$, $p = .721$), intellect ($F(1, 2148) = 1.24$, $p = .265$), and agreeableness ($F(1, 2148) = 0.03$, $p = .860$) were not significant.

Profiles did not differ in problematic social media use, $F(4, 2148) = 2.08$, $p = .081$, $\eta^2_{partial} = .004$. Gender ($F(1, 2148) = 36.77$, $p < .001$, $\eta^2_{partial} = .017$), extraversion ($F(1, 2148) = 25.98$, $p < .001$, $\eta^2_{partial} = .012$), emotional stability ($F(1, 2148) = 80.23$, $p < .001$, $\eta^2_{partial} = .036$), intellect ($F(1, 2148) = 48.37$, $p < .001$, $\eta^2_{partial} = .022$), and conscientiousness ($F(1, 2148) = 63.35$, $p < .001$, $\eta^2_{partial} = .029$) were significant covariates, while agreeableness ($F(1, 2148) = 0.19$, $p = .667$) was not significant.

DISCUSSION

The study aimed to analyze the relevance of relational deficits to PIU, especially from a person-centered perspective. For this purpose, we identified groups of Internet users in emerging adulthood with specific profiles of loneliness types and social support sources. Correlations between loneliness, social support, and forms of PIU were in line with findings from other studies (Cudo et al., 2022; Efrati & Amichai-Hamburger, 2019; Prievara et al., 2019; Zhang et al., 2018). Lonely young may be motivated to seek relationships or alleviate negative moods in the virtual world, thus creating a habit of Internet use that is similar to addiction (Kardefelt-Winther, 2014). However, it should be noted that this is only one of many coping mechanisms for loneliness; hence, the correlations found were not high. Importantly, escapism and avoidance coping, as exemplified by PIU (Poprawa et al., 2019), are not long-term effective strategies for coping with loneliness (Rokach, 1996).

LPA distinguished five groups with specific profiles of loneliness and social support. This result supports the suggestions of Weiss (1973) and Zimet et al. (1988) that both loneliness and social support are multidimensional phenomena. Experiencing one type of loneliness (or lack of support) does not mean feeling lonely "in general" (see Figure 1; especially profile 5). However, as Weiss (1973) suggested and the results of group comparisons have shown, the absence of one kind of relationship cannot be replaced with other types of relations. Those experiencing any type of loneliness (or lack of support) may try to escape or compensate for it, for example by looking for "supplementary relations" on the Internet, risking the development of problematic use (Kardefelt-Winther, 2014). However, individuals without any satisfying relationships have higher levels of PIU forms. In other words, these individuals experience the most severe negative consequences. This is consistent with the results of other studies profiling relational resources or deficits such as loneliness or social support (for eample, Hawkins-Elder et al., 2018). An interesting question pertains to the underlying causes of these individuals' challenges in establishing interpersonal connections. In future research, in addition to the importance of experiencing loneliness and social support, it is worth investigating the determinants of relational deficits.

The mechanism of compensatory Internet use is not entirely clear and does not work without exception. People with specific deficits do not always use the Internet to compensate. For example, it has been reported that socially incompetent individuals prefer face-to-face than online dating (Poley & Luo, 2012). Nevertheless, people with deficits may seek need satisfaction and alleviate their negative mood in online applications that do not require social skills, such as pornography (Efrati & Amichai-Hamburger, 2019; Kardefelt-Winther, 2014). It is important to better understand the mechanisms explaining why individuals without any relations use the Internet excessively. In addition to compensation and mood modification, lonely individuals may engage problematically on the Internet due to impaired self-control (Özdemir

et al., 2014), problems with emotions regulation (Vescan et al., 2024) or simply coping with boredom (Li et al., 2021).

The results of this study show that individuals lacking any satisfying relationships are the most vulnerable to using the Internet and its applications problematically. In contrast, those supported from all sources are the least likely to use the Internet in problematic ways. However, there were specific differences between other profiles in types of PIU. The romantic lonely use the Internet more problematically than those supported in every aspect, while the social lonely had greater problematic online game use than those supported in every aspect. People with various relational deficits may use the Internet for compensation or escapism in different ways. It is important to note that the effect sizes for statistically significant results for problematic behavior were small (ranging from .015 to .019). In the future, it is important to study specific motivations and expectancies of people with Internet use problems to better understand their behavior (Brand et al., 2014, 2016; Kardefelt-Winther, 2014; Poprawa, 2009).

The correlations between relationship aspects and problematic social media use were notably weak or insignificant, and there were no differences between the profiles in problematic social media use. In future research, it is worth distinguishing between social support in the real world and online, as Internet use may play a different role depending on users' motivations: maintaining communication with supportive others or escaping from experienced loneliness (Nowland et al., 2018). Moreover, social media can be used either actively (chatting, sharing photos or status updates, etc.) or passively (scrolling, looking at content from others) (Thorisdottir et al., 2019), which potentially has different determinants.

The study has some limitations. Firstly, the diagnostic methods used are self-descriptive and adopt similar but not entirely consistent diagnostic criteria for the different types of PIU. Secondly, the study was cross-sectional, so the direction of the relationship and the potential mechanisms of these relationships (expectations, motives, the process of forming a harmful habit) are not clear. Thirdly, we assumed that Internet users have constant access to various online activities, and that the use of social media, online games, or pornographic materials is rather common. Hence, we did not control for whether participants were active users of social media, online games, or online pornography. Not excluding respondents who do not engage in specific online activities at all may bias the results. Future studies should consider including only respondents who are active users of specific Internet applications. It is also important to study other age groups, as Internet use can play different roles for people in other developmental periods.

CONCLUSIONS

A person-centered perspective enables the exploration of how combinations of deficits and resources relate to individuals' behavior. Individuals in emerging adulthood exhibit diverse profiles of relational resources and deficits, highlighting the complexity of experiencing loneliness and social support. These profiles of relational deficits and resources significantly explain problematic online behavior even when controlling for gender and personality traits. Individuals concurrently experiencing various types of loneliness and grappling with a lack of any social support are particularly vulnerable to engaging in problematic use of the Internet and its applications.

Disclosures

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The authors declare no conflict of interest.

References

Adamczyk, K., & DiTommaso, E. (2014). Psychometric properties of the polish version of the social and emotional loneliness scale for adults (SELSA-S). *Psihologijske Teme, 23*, 327–341.

American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders: DSM-5*. American Psychiatric Association. https://doi.org/10.1176/appi.books.9780890425596

Andangsari, E. W., & Dhowi, B. (2016). Two typology types of loneliness and problematic internet use (PIU): An evidence of Indonesian measurement. *Advanced Science Letters, 22*, 1711–1714. https://doi.org/10.1166/asl.2016.6740

Andreassen, C. S., Billieux, J., Griffiths, M. D., Kuss, D. J., Demetrovics, Z., Mazzoni, E., & Pallesen, S. (2016). The relationship between addictive use of social media and video games and symptoms of psychiatric disorders: a large-scale cross-sectional study. *Psychology of Addictive Behaviors, 30*, 252–262. https://doi.org/10.1037/adb0000160

Bai, Y., Yang, F., Chen, M., Zhang, B., Liu, X., Huang, N., Riem, M. M. E., & Guo, J. (2023). Social support profiles correlate with depressive symptoms among Chinese parents during the COVID-19 pandemic: a latent profile analysis. *Journal of Health Psychology, 28*, 760–773. https://doi.org/10.1177/13591053221144442

Balcerowska, J. M., Bereznowski, P., Biernatowska, A., Atroszko, P. A., Pallesen, S., & Andreassen, C. S. (2022). Is it meaningful to distinguish between

Facebook addiction and social networking sites addiction? Psychometric analysis of Facebook addiction and social networking sites addiction scales. *Current Psychology, 41*, 949–962. https://doi.org/10.1007/s12144-020-00625-3

Beard, K. W., & Wolf, E. M. (2001). Modification in the proposed diagnostic criteria for internet addiction. *CyberPsychology & Behavior, 4*, 377–383. https://doi.org/10.1089/109493101300210286

Brand, M., Laier, C., & Young, K. S. (2014). Internet addiction: Coping styles, expectancies, and treatment implications. *Frontiers in Psychology, 5*, 1256. https://doi.org/10.3389/fpsyg.2014.01256

Brand, M., Young, K. S., Laier, C., Wölfling, K., & Potenza, M. N. (2016). 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. *Neuroscience and Biobehavioral Reviews, 71*, 252–266. https://doi.org/10.1016/j.neubiorev.2016.08.033

Buecker, S., Maes, M., Denissen, J. J. A., & Luhmann, M. (2020). Loneliness and the Big Five personality traits: a meta-analysis. *European Journal of Personality, 34*, 8–28. https://doi.org/10.1002/per.2229

Buszman, K., & Przybyła-Basista, H. (2017). Polska adaptacja wielowymiarowej skali spostrzeganego wsparcia społecznego [The Polish adaptation of the Multidimensional Scale of Perceived Social Support]. *Polskie Forum Psychologiczne, 22*, 581–599. https://doi.org/10.14656/PFP20170404

Caplan, S. E. (2003). Preference for online social interaction: a theory of problematic internet use and psychosocial well-being. *Communication Research, 30*, 625–648. https://doi.org/10.1177/0093650203257842

Corsano, P., Grazia, V., & Molinari, L. (2019). Solitude and loneliness profiles in early adolescents: a person-centred approach. *Journal of Child and Family Studies, 28*, 3374–3384. https://doi.org/10.1007/s10826-019-01518-1

Cudo, A., Wojtasiński, M., Tużnik, P., Fudali-Czyż, A., & Griffiths, M. D. (2022). The relationship between depressive symptoms, loneliness, self-control, and gaming disorder among Polish male and female gamers: The indirect effects of gaming motives. *International Journal of Environmental Research and Public Health, 19*, 10438. https://doi.org/10.3390/ijerph191610438

Davis, R. A. (2001). Cognitive-behavioral model of pathological internet use. *Computers in Human Behavior, 17*, 187–195. https://doi.org/10.1016/S0747-5632(00)00041-8

DiTommaso, E., Brannen, C., & Best, L. A. (2004). Measurement and validity characteristics of the short version of the Social and Emotional Loneliness Scale for Adults. *Educational and Psychological Measurement, 64*, 99–119. https://doi.org/10.1177/0013164403258450

Donnellan, M. B., Oswald, F. L., Baird, B. M., & Lucas, R. E. (2006). The Mini-IPIP scales: Tiny-yet-effective measures of the Big Five factors of personality. *Psychological Assessment, 18*, 192–203. https://doi.org/10.1037/1040-3590.18.2.192

Efrati, Y., & Amichai-Hamburger, Y. (2019). The use of online pornography as compensation for loneliness and lack of social ties among Israeli adolescents. *Psychological Reports, 122*, 1865–1882. https://doi.org/10.1177/0033294118797580

Griffiths, M. D. (2005). A "components" model of addiction within a biopsychosocial framework. *Journal of Substance Use, 10*, 191–197. https://doi.org/10.1080/14659890500114359

Griffiths, M. D., Kuss, D. J., Billieux, J., & Pontes, H. M. (2016). The evolution of internet addiction: a global perspective. *Addictive Behaviors, 53*, 193–195. https://doi.org/10.1016/j.addbeh.2015.11.001

Hawkins-Elder, H., Milfont, T. L., Hammond, M. D., & Sibley, C. G. (2018). Who are the lonely? A typology of loneliness in New Zealand. *Australian and New Zealand Journal of Psychiatry, 52*, 357–364. https://doi.org/10.1177/0004867417718944

Ioannou, M., Kassianos, A. P., & Symeou, M. (2019). Coping with depressive symptoms in young adults: Perceived social support protects against depressive symptoms only under moderate levels of stress. *Frontiers in Psychology, 9*, 2780. https://doi.org/10.3389/fpsyg.2018.02780

İskender, M. (2018). Investigation of the effects of social self-confidence, social loneliness and family emotional loneliness variables on internet addiction. *Malaysian Online Journal of Educational Technology, 6*, 1–10. https://doi.org/10.17220/mojet.2018.03.001

Kamolthip, R., Chirawat, P., Ghavifekr, S., Gan, W. Y., Tung, S. E., Nurmala, I., Nadhiroh, S. R., Pramukti, I., & Lin, C. Y. (2022). Problematic internet use (PIU) in youth: a brief literature review of selected topics. *Current Opinion in Behavioral Sciences, 46*, 101150. https://doi.org/10.1016/j.cobeha.2022.101150

Kardefelt-Winther, D. (2014). A conceptual and methodological critique of internet addiction research: Towards a model of compensatory internet use. *Computers in Human Behavior, 31*, 351–354. https://doi.org/10.1016/j.chb.2013.10.059

Kayiş, A. R., Satici, S. A., Yilmaz, M. F., Şimşek, D., Ceyhan, E., & Bakioğlu, F. (2016). Big five-personality trait and internet addiction: a meta-analytic review. *Computers in Human Behavior, 63*, 35–40. https://doi.org/10.1016/j.chb.2016.05.012

Kraus, S. W., Gola, M., Grubbs, J. B., Kowalewska, E., Hoff, R. A., Lew-Starowicz, M., Martino, S., Shirk, S. D., & Potenza, M. N. (2020). Validation of a brief pornography screen across multiple samples. *Journal of Behavioral Addictions, 9*, 259–271. https://doi.org/10.1556/2006.2020.00038

Kuss, D. J., Griffiths, M. D., Karila, L., & Billieux, J. (2014). Internet addiction: a systematic review of

epidemiological research for the last decade. *Current Pharmaceutical Design, 20*, 4026–4052. https://doi.org/10.2174/1381612811319999061 7

Li, X., Feng, X., Xiao, W., & Zhou, H. (2021). Loneliness and mobile phone addiction among chinese college students: The mediating roles of boredom proneness and self-control. *Psychology Research and Behavior Management, 14*, 687–694. https://doi.org/10.2147/PRBM.S315879

Lim, M. H., Eres, R., & Vasan, S. (2020). Understanding loneliness in the twenty-first century: an update on correlates, risk factors, and potential solutions. *Social Psychiatry and Psychiatric Epidemiology, 55*, 793–810. https://doi.org/10.1007/s00127-020-01889-7

Lin, S., Yuan, Z., Niu, G., Fan, C., & Hao, X. (2024). Family matters more than friends on problematic social media use among adolescents: Mediating roles of resilience and loneliness. *International Journal of Mental Health and Addiction, 22*, 2907–2925. https://doi.org/10.1007/s11469-023-01026-w

Melodia, F., Canale, N., & Griffiths, M. D. (2022). The role of avoidance coping and escape motives in problematic online gaming: a systematic literature review. *International Journal of Mental Health and Addiction, 20*, 996–1022. https://doi.org/10.1007/s11469-020-00422-w

Montag, C., Bey, K., Sha, P., Li, M., Chen, Y. F., Liu, W. Y., Zhu, Y. K., Li, C. B., Markett, S., Keiper, J., & Reuter, M. (2015). Is it meaningful to distinguish between generalized and specific internet addiction? Evidence from a cross-cultural study from Germany, Sweden, Taiwan and China. *Asia-Pacific Psychiatry, 7*, 20–26. https://doi.org/10.1111/appy.12122

Moretta, T., & Buodo, G. (2020). Problematic internet use and loneliness: How complex is the relationship? A short literature review. *Current Addiction Reports, 7*, 125–136. https://doi.org/10.1007/s40429-020-00305-z

Morin, A. J. S., Boudrias, J. S., Marsh, H. W., McInerney, D. M., Dagenais-Desmarais, V., Madore, I., & Litalien, D. (2017). Complementary variable- and person-centered approaches to the dimensionality of psychometric constructs: Application to psychological wellbeing at work. *Journal of Business and Psychology, 32*, 395–419. https://doi.org/10.1007/s10869-016-9448-7

Nowland, R., Necka, E. A., & Cacioppo, J. T. (2018). Loneliness and social internet use: Pathways to reconnection in a digital world? *Perspectives on Psychological Science, 13*, 70–87. https://doi.org/10.1177/1745691617713052

Özdemir, Y., Kuzucu, Y., & Ak, Ş. (2014). Depression, loneliness and internet addiction: How important is low self-control? *Computers in Human Behavior, 34*, 284–290. https://doi.org/10.1016/j.chb.2014.02.009

Peplau, L. A., & Perlman, D. (1982). Perspectives on loneliness. In L. A. Peplau & D. Perlman (Eds.), *Loneliness: a sourcebook of current theory, research and therapy* (pp. 1–18). John Wiley & Sons.

Poley, M. E. M., & Luo, S. (2012). Social compensation or rich-get-richer? The role of social competence in college students' use of the internet to find a partner. *Computers in Human Behavior, 28*, 414–419. https://doi.org/10.1016/j.chb.2011.10.012

Pontes, H. M., & Griffiths, M. D. (2015). Measuring DSM-5 internet gaming disorder: Development and validation of a short psychometric scale. *Computers in Human Behavior, 45*, 137–143. https://doi.org/10.1016/j.chb.2014.12.006

Poprawa, R. (2009). Oczekiwania efektów korzystania z internetu a problematyczne jego używanie [Expectations of the effects of using the internet and its problematic use]. *Psychologia Jakości Życia, 8*, 21–44.

Poprawa, R. (2012). Problematyczne używanie internetu – symptomy i metoda diagnozy. Badania wśród dorastającej młodzieży [Problematic internet use – symptoms and diagnostic method. Research among adolescent youth]. *Psychologia Jakości Życia, 11*, 57–82.

Poprawa, R., Rokosz, M., & Niezabitowska, A. (2019). Coping styles and the risk of problematic internet use. *Polskie Forum Psychologiczne, 24*, 419–442. https://doi.org/10.14656/PFP20190403

Prievara, D. K., Piko, B. F., & Luszczynska, A. (2019). Problematic internet use, social needs, and social support among youth. *International Journal of Mental Health and Addiction, 17*, 1008–1019. https://doi.org/10.1007/s11469-018-9973-x

Rokach, A. (1996). The subjectivity of loneliness and coping with it. *Psychological Reports, 79*, 475–481. https://doi.org/10.2466/pr0.1996.79.2.475

Rokach, A. (2018). Effective coping with loneliness: a review. *Open Journal of Depression, 7*, 61–72. https://doi.org/10.4236/ojd.2018.74005

Rosenberg, J., Beymer, P., Anderson, D., van Lissa, C. J., & Schmidt, J. (2018). tidyLPA: an R package to easily carry out latent profile analysis (LPA) using open-source or commercial software. *Journal of Open Source Software, 3*, 978. https://doi.org/10.21105/joss.00978

Rosseel, Y. (2012). lavaan: an R package for structural equation modeling. *Journal of Statistical Software*, *48*, 1–93. https://doi.org/10.18637/jss.v048.i02

Schivinski, B., Brzozowska-Woś, M., Buchanan, E. M., Griffiths, M. D., & Pontes, H. M. (2018). Psychometric assessment of the internet gaming disorder diagnostic criteria: an item response theory study. *Addictive Behaviors Reports, 8*, 176–184. https://doi.org/10.1016/j.abrep.2018.06.004

Snodgrass, J. G., Lacy, M. G., Dengah, F., Eisenhauer, S., Batchelder, G., & Cookson, R. J. (2014). A vacation from your mind: Problematic online gaming is a stress response. *Computers in Human Behavior, 38*, 248–260. https://doi.org/10.1016/j.chb.2014.06.004

Spurk, D., Hirschi, A., Wang, M., Valero, D., & Kauffeld, S. (2020). Latent profile analysis: a review and "how to" guide of its application within vocational behavior research. *Journal of Vocational Behavior, 120*, 103445. https://doi.org/10.1016/j.jvb.2020.103445

Su, W., Han, X., Yu, H., Wu, Y., & Potenza, M. N. (2020). Do men become addicted to internet gaming and women to social media? A meta-analysis examining gender-related differences in specific internet addiction. *Computers in Human Behavior, 113*, 106480. https://doi.org/10.1016/j.chb.2020.106480

Taylor, S. E. (2011). Social support: a review. In H. S. Friedman (Ed.), *The Oxford handbook of health psychology* (pp. 189–214). Oxford University Press.

Thorisdottir, I. E., Sigurvinsdottir, R., Asgeirsdottir, B. B., Allegrante, J. P., & Sigfusdottir, I. D. (2019). Active and passive social media use and symptoms of anxiety and depressed mood among icelandic adolescents. *Cyberpsychology, Behavior, and Social Networking, 22*, 535–542. https://doi.org/10.1089/cyber.2019.0079

Topolewska, E., Skimina, E., Strus, W., Cieciuch, J., & Rowiński, T. (2014). Krótki kwestionariusz do pomiaru Wielkiej Piątki IPIP-BFM-20 [The short IPIP-BFM-20 questionnaire for measuring the Big Five]. *Roczniki Psychologiczne, 17*, 367–384.

Twenge, J. M., Haidt, J., Blake, A. B., McAllister, C., Lemon, H., & Le Roy, A. (2021). Worldwide increases in adolescent loneliness. *Journal of Adolescence, 93*, 257–269. https://doi.org/10.1016/j.adolescence.2021.06.006

Vansteenkiste, M., & Ryan, R. M. (2013). On psychological growth and vulnerability: Basic psychological need satisfaction and need frustration as a unifying principle. *Journal of Psychotherapy Integration, 23*, 263–280. https://doi.org/10.1037/a0032359

Vescan, M., Flack, M., & Caudwell, K. M. (2024). Loneliness and problematic pornography use: What is the role of emotion regulation and interaction with content creators? *Addictive Behaviors Reports, 19*, 100550. https://doi.org/10.1016/j.abrep.2024.100550

Wang, J., Mann, F., Lloyd-Evans, B., Ma, R., & Johnson, S. (2018). Associations between loneliness and perceived social support and outcomes of mental health problems: a systematic review. *BMC Psychiatry, 18*, 156. https://doi.org/10.1186/s12888-018-1736-5

Weiss, R. S. (1973). *The experience of emotional and social loneliness*. The MIT Press.

Zhang, S., Tian, Y., Sui, Y., Zhang, D., Shi, J., Wang, P., Meng, W., & Si, Y. (2018). Relationships between social support, loneliness, and internet addiction in Chinese postsecondary students: a longitudinal cross-lagged analysis. *Frontiers in Psychology, 9*, 1707. https://doi.org/10.3389/fpsyg.2018.01707

Zhang, X., & Dong, S. (2022). The relationships between social support and loneliness: a meta-analysis and review. *Acta Psychologica, 227*, 103616. https://doi.org/10.1016/j.actpsy.2022.103616

Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment, 52*, 30–41. https://doi.org/10.1207/s15327752jpa5201_2