

Child Maltreatment, Alexithymia, and Problematic Internet Use in Young Adulthood

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As the people here grow colder, I turn to my computer and spend my evenings with it, like a friend.
—Kate Bush (1989)

Abstract

The goals of this study were to (a) examine the phenomenology and developmental correlates of problematic Internet use (PIU) in a large and diverse college student sample; (b) evaluate a developmental process model of PIU in which the expected association between child maltreatment and PIU would be explained by alexithymia; and (c) explore these relations as a function of gender and race. PIU was assessed in a sample of 1,470 college students (62.9 percent female, 37.1 percent male; $M_{\text{age}} = 19.13$ years [$SD = 1.49$]; 46.1 percent Asian, 28.2 percent Hispanic, 16.3 percent White, 5.9 percent Black, and 3.5 percent Multiracial/Other) who participated in a larger study of young adult adaptation, which included measures of child maltreatment, alexithymia, self-concept, social support, and psychopathology. Males and Asian students endorsed higher levels of PIU than females and other ethnorracial groups, respectively. PIU was related to contemporaneous maladaptation in the form of decreased self-concept, lower social support, and increased psychopathology across groups. Experiences of child maltreatment were related to increased PIU, and mediation analyses showed that this relation was partially explained by alexithymia. These relations were comparable across males and females and between Asian and non-Asian respondents. The analyses provide evidence for the significant role of child maltreatment and the cognitive-affective deficits it precipitates in understanding pathways toward PIU in young adulthood. Our findings suggest that maltreated youth are at disproportionate risk for PIU, and their capacities to regulate and process emotion are important targets for prevention and therapeutic intervention.

Introduction

THE INTERNET HAS BECOME a widely accessible, invaluable, and integral tool in modern life. Unfortunately, our virtual appetite for Internet access and applications has outpaced our real-world understanding of its developmental significance. Indeed, the past two decades highlight the prescience of the lyrics quoted above. Given emerging evidence that excessive Internet use is a serious health concern,^{1–5} particularly among young people,^{6–8} there is a pressing need for developmentally informed research efforts to trace the emergence and implications of problematic Internet use (PIU).

Alternately conceptualized as an addictive,⁹ problematic,¹⁰ compulsive,¹¹ excessive,¹² or pathological⁸ behavior pattern, PIU is characterized by (a) compulsive Internet use, (b) withdrawal symptoms when use is restricted, (c) comfort seeking or exaggerated pleasure attached to online activities, and (d) negative effects on social, academic, or occupational

functioning.^{13,14} PIU rates vary across college student samples,⁶ but in most studies, they fall between 5 percent and 15 percent.^{5,8,15} Gender differences are similarly variable, with most studies showing elevated rates of PIU among males relative to females,^{8,16,17} but others reporting no differences.^{18,19} Limited cross-cultural research suggests that rates of PIU may be elevated in Asian countries,¹⁷ and some evidence shows that this pattern may extend to Asian American youth.¹⁸

In 1998, Young concluded that “excessive use of the Internet resulted in significant personal, family, and occupational problems similar to those documented in other established addictions, such as pathological gambling, eating disorders, and alcoholism.”⁹ (p. 241) Since then, research has confirmed Young’s assertion, demonstrating that PIU is associated with significant distress and impairment, including increased loneliness, self-consciousness, anxiety, depression, impulsivity, and academic problems in the United States^{5,16,20,21} and abroad.^{19,22–25} Yet little is known about the

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developmental antecedents of PIU nor about mechanisms that may account for developmental pathways toward PIU.

A Developmental Model of PIU

The absence of a developmental view on PIU is notable amidst increasing research on the role of computers in child development broadly,²⁶ and mechanisms underlying PIU in particular, such as maladaptive cognitions,^{27,28} social skill deficits,²⁹ and deficient self-regulation.³⁰ Efforts to elucidate both the antecedents of PIU and the processes by which they act will provide important information for prevention initiatives that target high-risk youth groups and for interventions that may redirect pathways away from PIU.

Although researchers have begun to explore the broader familial context within which PIU may develop,^{19,24,31} they have not evaluated the potential contributory role of child maltreatment to PIU. Child maltreatment is associated with a host of negative developmental outcomes, including various risk behaviors and addictive disorders.^{32,33} Preliminary findings suggest that family violence,¹⁹ harsh parenting,²⁴ and parent-child conflict³¹ are positively associated with PIU, yet the present study is the first to evaluate whether, and more importantly *how*, child maltreatment relates to PIU during young adulthood.

Among the many deleterious effects of child maltreatment, difficulties processing emotional experience may be particularly salient for understanding pathways from maltreatment to PIU. Alexithymia refers to a cluster of cognitive-affective characteristics, including difficulty identifying and describing feelings, an externally oriented cognitive style, and a constricted fantasy life.³⁴⁻³⁶ The well-documented association between child maltreatment and alexithymia³⁷⁻³⁹ is explained, in part, by an attentional bias toward affectively neutral stimuli, which may mitigate the intrusive arousal that typifies abusive rearing environments.³⁴ Yet alexithymia exacts a toll on individuals' capacity for and comfort in emotionally nuanced relationships and experiences, which may contribute to PIU.^{29,40}

Literally translated as "no words for mood,"³⁶ the concrete, externally oriented cognitive style that typifies alexithymia may render the Internet a preferred site for interpersonal relationships.²⁹ In addition to evidence that alexithymia rates are elevated among individuals with substance or sexual addictions,⁴¹⁻⁴³ research showing that Internet addiction rates are disproportionately high among individuals who use the Internet for interpersonal connections,^{8,10,21,44} including cybersex,⁴⁵ suggests that alexithymia may be an important process for understanding PIU. A recent study of 312 undergraduate students showed that difficulty identifying feelings, which is a core feature of alexithymia, was associated with increased PIU,¹⁵ but the present study is the first to evaluate a process model of PIU wherein alexithymia may explain the expected relation between child maltreatment and PIU.

Study Aims and Hypotheses

In this investigation, we evaluated a developmental process model of PIU in a large, ethnically diverse sample of college students. Our first aim was to examine the phenomenology and developmental correlates of PIU. Based on prior research, higher levels of PIU were expected to relate to lower

levels of self-concept and social support, and to higher rates of psychopathology.^{4,12,24,46}

Our second aim was to evaluate the relations between child maltreatment and PIU as explained through alexithymia. Consistent with the broader literatures on child maltreatment, alexithymia, and addictive disorders,^{34,41,47} we hypothesized that observed relations would support a model wherein child maltreatment instantiates a developmental pathway toward specific deficits in cognitive-affective processing that render individuals less able to identify, process, and reflect on emotions and more dependent on the concrete cognitive style embodied in the concept of alexithymia. Further, we expected that alexithymia would be positively related to PIU because the virtual world renders real-time affective signals, as well as individuals' own deficits in providing them, less salient.

Finally, our third aim was to explore these relations as a function of gender and race.

Method

Participants

The present sample of 1,470 college students participated in a larger study of youth adjustment that included a well-validated measure of PIU.⁴⁸ The sample was predominantly female (62.9 percent) and young ($M_{\text{age}}=19.13$ years, $SD=1.49$). More than half the students (57.4 percent) were in their first year of college, 21.3 percent were sophomores, 15.0 percent were juniors, and 6.2 percent were seniors. The sample was ethnoracially diverse with 46.1 percent of respondents identifying as Asian, 28.2 percent as Hispanic, 16.3 percent as White, 5.9 percent as Black, and 3.5 percent as Multiracial/Other.

Participants were recruited from introductory psychology courses and received class credit in exchange for their completion of a 2-hour computerized survey, which was administered through the survey management company, Survey Monkey. Participants completed the survey in private cubicles in a laboratory setting under the supervision of a trained research assistant. Respondents were informed that the purpose of the study was to examine relations between various experiences in childhood and adaptation in young adulthood, and were assured that their participation was anonymous. Participants were required to stay for the full 2-hour assessment to minimize the incentive to rush through the questionnaires. Responses were encrypted until download and cases were identified by a numeric code to ensure data security. Study procedures were reviewed and approved by the University's Human Research Review Board.

Measures

Problematic Internet use. Participants completed a modified version of Young's Internet Addiction Test (IAT),^{9,48} which assessed the degree to which Internet use affected their daily routines, social life, academic and occupational productivity, sleep patterns, and feelings. Twenty questions (e.g., "How often do others in your life complain to you about the amount of time you spend online?" "How often do you lose sleep due to late night log-ins?" and "How often do you try to cut down the amount of time you spend online and fail?") were rated on a 6-point frequency scale

from "never" (0) to "always" (5) and summed to yield a global measure of PIU. In contrast to the original IAT, which included five response options ranging from "rarely" (1) to "always" (5) and a 6th option for "not applicable" (0), the version used in this study was modified to include "never" as the 6th response option because all participants in this investigation had ready access to free Internet use on campus.

The IAT evidenced acceptable internal consistency in this sample ($\alpha=0.94$), which is consistent with other studies.⁴⁹ Given the nonclinical nature of our sample, and following others,^{50,51,52} PIU was indicated by IAT scores of 50 or higher (6.0 percent of the sample), which Young¹⁴ characterizes as moderate Internet addiction.

Child maltreatment. The Child Abuse and Trauma Scale (CATS)⁵³ was used to assess child maltreatment. Participants indicated the frequency of 38 negative childhood events on a 5-point scale from "never" (0) to "always" (4). Items covered experiences of (a) sexual abuse (e.g., "Did your relationship with your parents ever involve a sexual experience?"), (b) physical abuse/punishment (e.g., "Did your parents ever hit or beat you when you did not expect it?"), and (c) neglectful/negative household environment (e.g., "As a child or teenager, did you feel disliked by either of your parents?").

The CATS has documented concurrent validity with objective measures of child maltreatment and acceptable reliability in college student populations.⁵³ The mean maltreatment score across all items was used in these analyses ($\alpha=0.92$). The mean score of 0.99 in the current sample was slightly higher than the scores of ~ 0.78 in other nonclinical samples,^{53,54} which, as noted later, may follow from the overrepresentation of females in this study.

Alexithymia. The 20-item Toronto Alexithymia Scale (TAS-20)⁵⁵ assessed three core features of alexithymia: (a) difficulty identifying feelings (e.g., "When I am upset, I don't know if I am sad, frightened, or angry"), (b) difficulty communicating feelings (e.g., "It is difficult for me to find the right words for my feelings"), and (c) external thinking (e.g., "I prefer talking to people about their daily activities rather than their feelings"). Items were rated on a 5-point scale from "strongly disagree" (1) to "strongly agree" (5) and summed to yield a global alexithymia score ($\alpha=0.84$). TAS-20 scores of 61 or higher (15.2 percent of the sample) indicated alexithymia.

Self-concept. The Self-Perception Profile for College Students⁵⁶ evaluated respondents' self-concept across six items. Participants were asked to choose which of two contrasting statements best described them (e.g., "Some students like the kind of person they are" BUT "Other students wish that they were different"). After selecting the statement they most identified with, students were asked to indicate whether the statement was "sort of true" or "really true" for them. Items were scored on a Likert-type scale with scores of 1 and 2 corresponding to "really true" and "sort of true," respectively, for students endorsing the negative phrase, and scores of 3 and 4 corresponding to "sort of true" and "really true," respectively, for students endorsing the positive phrase. Items were summed to yield a measure of global self-concept ($\alpha=0.87$).

Social support. The Duke-UNC Functional Social Support Questionnaire (FSSQ)⁵⁷ assessed participants' percep-

tions of the support they receive across eight items (e.g., "I get help when I'm sick in bed," "I get invitations to go out and do things with other people"). Items were rated on a 5-point scale to indicate whether the amount of received support was "much less than I would want" (1) or "as much as I would want" (5). Total FSSQ scores were used in these analyses ($\alpha=0.96$).

Psychopathology. The Symptom Checklist-90-Revised (SCL-90-R)⁵⁸ was used to assess participants' overall level of psychopathology. Ninety items evaluated psychological problems and symptoms of psychopathology across multiple domains (e.g., somatization, interpersonal sensitivity, anxiety, and depression). Items were rated on a 5-point scale representing how much each symptom bothered or distressed the participant during the preceding week from "not at all" (1) to "extremely" (5). Global psychopathology was indicated by participants' total score across all 90 items ($\alpha=0.98$). *T* scores of 63 or higher based on gender-specific norms for nonclinical adults were considered clinically elevated (18.1 percent of the current sample).

Results

Descriptive statistics

Mean scores, standard deviations, and bivariate relations for the study variables are reported for the total sample and by gender in Table 1. Although males endorsed higher mean levels of PIU ($t[1468]=2.23, p=0.03$), categorical ratings of PIU (i.e., scores of 50 or higher) were not significantly different between males (7.0 percent) and females (5.4 percent; $\chi^2[1, 1469]=1.45, ns$). Females endorsed higher rates of child maltreatment ($t[1468]=-4.89, p=0.00$) and psychopathology ($t[1444]=-4.74, p=0.00$) than males. However, males and females did not differ in levels of alexithymia or self-concept, and females endorsed higher levels of social support than males ($t[1426]=4.82, p=0.00$).

Given the ethnic composition of the sample, we conducted exploratory *t* tests to examine mean differences between Asian and non-Asian participants. Asian respondents were slightly older than non-Asian participants ($t[1468]=-2.70, p=0.01$) and were more likely to be male (44.4 percent) than were non-Asians (30.9 percent; $\chi^2[1, 1469]=28.35, p=0.00$). Relative to their non-Asian peers, Asian participants endorsed higher rates of PIU ($t[1468]=-8.73, p=0.00$) with 8.6 percent of Asian respondents meeting the categorical criterion for PIU versus 3.8 percent of non-Asians ($\chi^2[1, 1469]=14.70, p=0.00$). Asian students endorsed higher rates of maltreatment ($t[1468]=-3.37, p=0.00$) and alexithymia ($t[1468]=-5.21, p=0.00$), but were not significantly more likely to be alexithymic (16.2 percent) than were non-Asians (14.4 percent). Asian students also endorsed lower levels of self-worth ($t[1456]=7.94, p=0.00$) and social support ($t[1426]=4.82, p=0.00$) than non-Asian participants.

Bivariate relations

Bivariate relations showed that PIU was associated with contemporaneous maladjustment, including decreased self-worth ($r=-0.33$), decreased social support ($r=-0.26$), and increased psychological distress ($r=0.44$). In support of the proposed mediation model, child maltreatment was

TABLE 1. DESCRIPTIVE STATISTICS AND BIVARIATE RELATIONS AMONG STUDY VARIABLES

Variable	1	2	3	4	5	6	7	M (SD)
1. Age (years)	—							19.13 (1.49) 19.05 (1.45) ^a 19.27 (1.55)
2. Year in school	0.76*** <i>0.77***</i> 0.75***	—						1.70 (0.94) 1.65 (0.90) ^a 1.78 (1.00)
3. Problematic Internet use	-0.04 <i>-0.12***</i> 0.06	-0.05 <i>-0.12***</i> 0.05	—					21.42 (16.51) 20.68 (16.02) ^a 22.66 (17.23)
4. Child maltreatment	0.04 <i>0.05</i> 0.05	0.04 <i>0.02</i> 0.09*	0.22*** <i>0.19***</i> 0.32***	—				0.99 (0.52) 1.04 (0.56) ^a 0.90 (0.45)
5. Alexithymia	-0.03 <i>-0.01</i> -0.06	-0.03 <i>-0.04</i> -0.02	0.30*** <i>0.25***</i> 0.38***	0.34*** <i>0.33***</i> 0.37***	—			48.38 (11.32) 48.37 (11.58) 48.41 (10.87)
6. Self-concept	-0.05 <i>-0.03</i> -0.07	-0.05 <i>-0.03</i> -0.08	-0.33*** <i>-0.28***</i> -0.42***	-0.32*** <i>0.30***</i> -0.36***	-0.49*** <i>-0.50***</i> -0.49***	—		17.90 (4.36) 17.87 (4.40) 17.95 (4.30)
7. Social support	0.00 <i>-0.01</i> 0.03	-0.01 <i>0.03</i> -0.05	-0.26*** <i>-0.25***</i> -0.25***	-0.27*** <i>-0.29***</i> -0.31***	-0.44*** <i>-0.42***</i> -0.49***	0.46*** <i>0.44***</i> 0.51***	—	36.44 (9.23) 37.42 (9.13) ^a 34.76 (9.18)
8. Psychopathology	0.01 <i>-0.02</i> 0.09*	0.00 <i>-0.02</i> 0.06	0.44*** <i>0.42***</i> 0.50***	0.38*** <i>0.35***</i> 0.42***	0.38*** <i>0.40***</i> 0.36***	-0.42*** <i>-0.44***</i> -0.40***	-0.29*** <i>-0.35***</i> -0.23***	0.53 (0.59) 0.59 (0.61) ^a 0.44 (0.55)

Top row, bold is total sample; middle row, italics is female; bottom row, normal is male.

^aSignificantly different from males.

* $p < 0.05$; *** $p < 0.001$.

associated with increased levels of PIU ($r = 0.22$) and alexithymia ($r = 0.34$). Further, alexithymia was associated with increased PIU ($r = 0.30$). Overall, observed relations were largely consistent across males and females (see Table 1) and between Asian and non-Asian participants (not shown).

Mediation analyses

Hierarchical regressions evaluated the proposed mediation model using methods suggested by Baron and Kenny.⁵⁹ The Sobel⁶⁰ procedure was used to test the significance of observed indirect effects.⁶¹ All variables were sufficiently normal in their

distributions to render parametric statistics valid.⁶² Continuous predictors were centered to minimize collinearity.⁶³

Mediation analyses revealed a significant indirect effect on the relation between child maltreatment and PIU through alexithymia (see Fig. 1). After controlling for participant age ($\beta = -0.01$, *ns*), year in school ($\beta = -0.06$, *ns*), gender ($\beta = -0.06$, $p = 0.03$; male = 0, female = 1), and race ($\beta = 0.22$, $p < 0.001$; non-Asian = 0, Asian = 1), child maltreatment was significantly associated with increased levels of alexithymia ($\beta = 0.34$, $p < 0.001$) and higher rates of PIU ($\beta = 0.22$, $p < 0.001$). Further, alexithymia was associated with increased levels of PIU ($\beta = 0.22$, $p < 0.001$). Together, these variables accounted for 14.2 percent of the variation in levels of PIU, and the strength of the relation between child maltreatment and PIU dropped significantly when the indirect path through alexithymia was taken into account ($\beta_{\text{mediated}} = 0.14$, $p < 0.001$; Sobel $z = 7.05$, $p < 0.001$). Consistent with bivariate relations, the observed mediation model was similarly viable for males (Sobel $z = 5.30$, $p < 0.001$) and females (Sobel $z = 4.81$, $p < 0.001$; see Fig. 1) and for Asian (Sobel $z = 4.79$, $p < 0.001$) and non-Asian respondents (Sobel $z = 5.20$, $p < 0.001$; not shown).

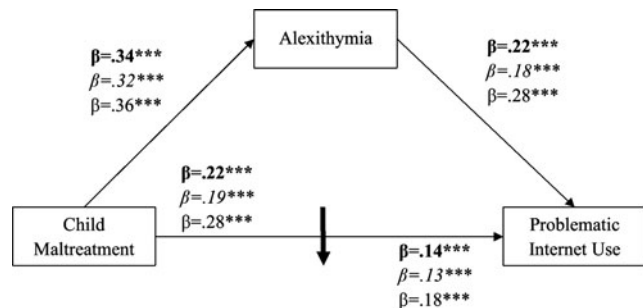


FIG. 1. Child maltreatment contributes to problematic Internet use through alexithymia. Standardized regression coefficients showing partial mediation of the relation between child maltreatment and problematic Internet use through alexithymia for the total sample (top row, bold), females (middle row, italics), and males (bottom row, normal font) controlling for participant age, year in school, gender, and race. *** $p < 0.001$.

Discussion

This investigation confirmed the presence and developmental significance of PIU in this diverse college student sample. Moreover, our data support a developmental process model wherein child maltreatment may instantiate cognitive-affective vulnerabilities that, in turn, render individuals prone to PIU. Students who reported more PIU endorsed lower levels of self-worth, which has been found in other student samples.^{25,46} Consistent with Caplan's suggestion

that PIU may stem, at least in part, from broader deficits in social relationships,²⁹ and with evidence that PIU may cause declines in social resources,⁶⁴ PIU was associated with lower levels of social support in this sample, which also has been found in other studies.^{4,29} Finally, as in other studies,^{8,12,23–25} PIU was associated with increased reports of psychopathology.

Consistent with prior research, male students engaged in significantly higher levels of PIU than females.^{8,16,17} Moreover, as found in a recent study of high school students,¹⁸ Asian American respondents endorsed higher levels of PIU than their non-Asian peers. However, the reasons underlying these differences remain to be determined. For example, a higher proportion of our Asian respondents were male; thus, this may, in part, reflect a larger male influence in the Asian subsample. However, the pattern was consistent across males and females with Asian females endorsing higher levels of PIU relative to their non-Asian counterparts. Future research should examine patterns of PIU among Asian-Americans with particular attention to the potential for heterogeneity across different Asian ethnocultural groups, which could not be examined here.

Having established the presence and developmental significance of PIU, we evaluated alexithymia as a candidate developmental process by which child maltreatment may contribute to PIU. Students who experienced more child maltreatment endorsed higher levels of PIU, and this relation was significantly, although partially, mediated by alexithymia. Further, this indirect effect was apparent across males and females, and Asian and non-Asian students. These data are consistent with our hypothesis that child maltreatment is an important initiating condition for PIU and may follow from the influence of maltreatment on youths' emotional information processing.

This study was unique for its large and diverse sample, its explicitly developmental analysis, and its attention to both gender and racial influences on the development of PIU. Yet, there are several limitations that both constrain our ability to interpret the data and inform future research. As with most research on PIU, the present sample was drawn from a college student population at a public university, which may not represent the broader population of Internet users. Even across college students, evidence points to meaningful differences in patterns of PIU in private versus public universities.¹⁶ Researchers need to evaluate process models of PIU using nationally representative samples of Internet users to determine the extent to which the pathway observed in the present student sample generalizes to other student, clinical, and community samples. Similarly, data collected from outside informants, including parents, friends, and partners, would bolster the exclusive reliance on self-report measures in this study and in the broader literature on PIU.

This study assessed students' endorsement of problems created by their Internet use, but we did not collect information about the amount of time students were spending online, their online activities, and, perhaps most importantly, their motivations for being online. In the absence of this information, we were unable to rule out competing explanations for our findings. For example, it may be that some groups are more sensitive to the negative effects of Internet use such that they endorse higher levels of PIU, despite engaging in similar or perhaps even less time online. Alternately, some groups (e.g., science majors³⁰) may spend

more time doing school work online, which conflates Internet use with academic engagement. Extensions of our work should validate reported PIU with actual online activities and ask participants about the motivations underlying their pursuit of these activities.

Finally, the cross-sectional nature of this study, as well as of the vast majority of research on PIU, constitutes a significant barrier to a truly developmental understanding of PIU. Longitudinal investigations of PIU are needed to support the causal relations suggested in this cross-sectional investigation. Although a few researchers have examined Internet use patterns over time,^{64,65} they have not done so with the aim of evaluating causal models of PIU.

Implications and Applications

A wealth of research, across multiple countries and continents, points to the potential risks associated with high levels of Internet use. The present findings provide new insight into the development of PIU, which can inform future work on Internet use in empirical and applied settings. Our data suggest that all youth, and particularly those who have been maltreated, may benefit from targeted interventions that bolster their emotion knowledge and interpersonal functioning. Further, these findings echo prior calls for integrative, comprehensive trauma treatment approaches that attend to the effects of trauma on emerging capacities for self-regulation and cognitive-affective integration.³⁴

Acknowledgments

This research was supported by an Academic Senate Research Grant awarded to the first author by the University of California, Riverside. Portions of this work were presented at the 2010 Annual Convention of the American Psychological Association, San Diego, CA, and the 2010 Berlin Alexithymia Conference. The authors are grateful for the many undergraduate research assistants who assisted with data collection.

Disclosure Statement

No competing financial interests exist.

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