



Exploring problematic internet use among non-latinx black and latinx youth using the problematic internet use questionnaire-short form (PIUQ-SF)



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ARTICLE INFO

Keywords:

Problematic internet use
Latinx youth
Non-latinx black youth
Problematic Internet Use Questionnaire
Latent profile analysis
Psychosocial factors

ABSTRACT

Non-Latinx black and Latinx youth have reported more frequent Internet use compared to White youth, yet problematic Internet use among these groups of youth remains underexplored. This study aimed to validate the Problematic Internet Use Questionnaire-Short Form (PIUQ-SF) and investigate the characteristics of problematic Internet use among non-Latinx black and Latinx youth. Cross-sectional data were collected from a convenience sample of 235 high school students in Southeastern Florida (*Mean Age* = 16.1; 69.2% non-Latinx black; 27.4% Latinx). Psychometric analyses supported the reliability and construct validity of the PIUQ-SF among non-Latinx black and Latinx youth. Latent profile analyses revealed that 37.2% of non-Latinx black youth and 25.4% of Latinx youth were identified as having problematic Internet use. Multivariate regression analyses revealed that less parental monitoring was linked to higher levels of problematic Internet use among non-Latinx black and Latinx youth. Further, sleep problems were positively related to problematic Internet use among non-Latinx black youth. The present findings provide insight into the problematic Internet use among these understudied minority groups in the literature and have important implications for research and practice with non-Latinx black and Latinx youth.

1. Introduction

Problematic Internet use refers to excessive and compulsive patterns of Internet use that leads to psychosocial impairments (Fineberg et al., 2018; Spada, 2014). Youth's problematic Internet use is an emerging behavioral concern internationally, and in the United States (U.S.). Across varying samples and measurements, the extant literature proposes that approximately 1% to 18% of American youth have problematic Internet use (Liu et al., 2011; Moreno et al., 2011). Most research on problematic Internet use among U.S. youth examined samples mainly comprised of White youth (Moreno et al., 2011; Jelenchick et al., 2014). Consequently, knowledge on problematic Internet use among traditionally underrepresented youth, such as non-Latinx black and Latinx youth, is limited. Studies investigating cross-cultural differences in *Internet use* suggested that compared to their White peers, non-Latinx black and Latinx youth use the Internet more frequently (Lenhart, 2015), and experience different psychosocial problems associated with Internet use (Carson et al., 2012). Considering potential differences in Internet use behaviors, it is imperative to explore whether

problematic Internet use and known psychosocial issues associated with problematic Internet use among White youth are applied to non-Latinx black and Latinx youth.

A critical step to accurately assess problematic Internet use among non-Latinx black and Latinx youth is the validation of a standardized measure. Various measures for problematic Internet use have been developed, such as Young's Internet Addiction Test (Widyanto et al., 2011), the Compulsive Internet Use Scale (Meerkerk et al., 2009), and the Problematic Internet Use Questionnaire (PIUQ; Demetrovics et al., 2008). Among these scales, the PIUQ has been widely used in research among cross-cultural populations (e.g., Fineberg et al., 2018; Laconi et al., 2018; Kelly and Gruber, 2010; Koronczai et al., 2011; 2017). Specifically, a short form of the PIUQ (PIUQ-SF) consisting of nine items has been validated to assess symptoms of problematic Internet use (e.g., losing control over Internet use, neglecting obligations due to Internet use, and obsessive Internet use) in samples of European and Chinese adolescents (Koronczai et al., 2011; 2017). However, to date, no study has validated this measure among Latinx and non-Latinx black youth.

Given the potential differences in Internet use behaviors between

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White and non-Latinx black/Latinx youth, validation of the PIUQ-SF with non-Latinx black and Latinx youth is fundamental before applying this measure to assess problematic Internet use among these youth. Compared to White youth, non-Latinx black and Latinx youth are less likely to access the Internet via a desktop computer at home and more likely to access the Internet via smartphones (Lenhart, 2015). Accessing the Internet via smartphones has been found to increase the risk of problematic Internet use (Škařupová et al., 2016). Further, non-Latinx black youth are more likely to use the Internet for video gaming in comparison to White youth (Lenhart, 2015), which may also increase the risk of developing problematic Internet use (Gunuc, 2015). On the contrary, Latinx youth are more likely to believe Internet use takes time away from other social activities compared to their White peers (Jones et al., 2009), indicating they may be less likely to engage in problematic Internet use. As differences in behaviors and attitudes toward Internet use may be related to problematic Internet use, an instrument validated among White youth may not account for cross-cultural differences among non-Latinx black and Latinx youth.

Similarly, the associates of problematic Internet use observed among general youth population may or may not be detected among non-Latinx black and Latinx youth. The extant literature indicates that problematic Internet use is associated with impaired physical health (e.g., sleep problems; Lam, 2014), mental health problems (e.g., depression and anxiety; Ko et al., 2012; Ho et al., 2014; Okwaraji et al., 2015), anger issue (e.g., Ko et al., 2009), and substance misuse (e.g., Anderson et al., 2017; Liu et al., 2011) across different youth populations. Problematic Internet use may contribute to these psychosocial problems; conversely, these correlates may serve as risk factors that initiate or exacerbate youth's problematic Internet use (Anderson et al., 2017; Dong et al., 2011). No study, however, has explored the associations between problematic Internet use and the aforementioned psychosocial problems specifically among non-Latinx black and Latinx youth. Carson et al. (2012) examined cross-cultural differences in *Internet use* and associated mental health issues in a large sample of American youth. They found that non-Latinx black youth with internalizing problems (e.g., mental distress and emotional difficulties) had lower levels of Internet use compared to White youth. However, Carson et al. (2012) only assessed psychosocial problems associated with *Internet use* rather than *problematic Internet use*. Consequently, it remains unclear whether psychosocial problems associated with problematic Internet use among non-Latinx black/Latinx youth are consistent with similar findings among general populations.

Parental monitoring has also been identified as an important factor related to youth's problematic Internet use (Anderson et al., 2017; Ding et al., 2017; Lin et al., 2009). Parental monitoring refers to parental knowledge of their children's whereabouts, peers, and activities (Stattin and Kerr, 2000). Prior studies have found that parental monitoring was related to a decrease in the amount of time youth spent on the Internet and lower levels of problematic Internet use (Bleakley et al., 2016). To date, the association between parental monitoring and problematic Internet use among non-Latinx black and Latinx youth remains understudied. White parents and parents with higher education have better knowledge of their children's Internet use (Anderson, 2016). That is to say, it is possible that youth from families of higher socioeconomic status (SES) may receive more parental monitoring related to their Internet use. Moreover, youth from families of low SES and non-Latinx black/Latinx youth are more likely to access the Internet via smartphones; while White youth and youth of higher SES are more likely to access the Internet via desktops at home (Lenhart, 2015). It is reasonable to assume that youth use the Internet via desktop at home receive more parental monitoring compared to those who access the Internet mainly via smartphones. Therefore, it is necessary to control for family SES when investigating the relationship between parental monitoring and youth's problematic Internet use.

To better understand problematic Internet use among non-Latinx black/Latinx youth, this study aimed to 1) validate the PIUQ-SF as a

cross-culture measure, and 2) assess and characterize problematic Internet use among these youth. Prior studies have used either one standard deviation above the mean of the PIUQ score as the cutoff point (Demetrovics et al., 2008; Kelly and Gruber, 2010), or employed probabilistic modeling approach to identifying youth with problematic Internet use (Koronczai et al., 2011). For instance, Koronczai et al. (2011) classified a sample of European youth into two subgroups (i.e., problematic Internet use and non-problematic use) based on their PIUQ-SF scores and suggested a cutoff score of 22. However, this recommended threshold has yet to be tested to identify problematic Internet use among Latinx/non-Latinx black youth. To that end, latent profile analysis was used to identify youth with problematic Internet use in the current sample. Finally, the study examined the associations between psychosocial problems and problematic Internet use among the entire sample and the subsamples. Informed by prior research, this study investigated 1) whether adaption to the PIUQ-SF was needed to assess problematic Internet use among non-Latinx black and Latinx youth; 2) whether problematic Internet use was associated with psychosocial problems (i.e., depression, anxiety, anger, sleep problems, and substance misuse) as suggested in the extant literature for other youth; and 3) whether youth with problematic Internet use presented a lack of parental monitoring.

2. Methods

2.1. Study procedure and participants

Cross-sectional survey data were collected from 247 youths in an inner-city high school in Southeastern Florida. The researchers collaborated with the school administration and teachers to coordinate scheduled group meetings with students for data collection. Students who agreed to participate in the survey completed an online questionnaire through Qualtrics (2015) via their smartphones or tablet computers provided by the researchers. To maintain confidentiality, each participant was given an identification number. During the group interview, the researchers were present to clarify any questions raised by participants and monitor the data input process. Informed consent was obtained from parents or legal guardians for all participants under 18 years old, and electronic assent was obtained via Qualtrics from these participants. For those who were 18 years and older, electronic consent was acquired from them via Qualtrics. Twelve participants did not respond to any of the PIUQ-SF items and, therefore, were excluded from the analysis.

Participants' ($N = 235$) age ranged from 14 to 19 years old ($M = 16.1$, $SD = 1.8$). More than half of the sample were female (63.7%, $n = 151$). Participants were primarily non-Latinx black and Latinx youth as – more than two-thirds of the sample (69.2%, $n = 164$) self-identified as non-Latinx black, and 27.4% of the sample ($n = 63$) self-identified as Latinx. The remaining 3.4% of the sample ($n = 8$) self-identified as belonging to other racial and ethnic groups.

2.2. Variables and measures

2.2.1. Problematic Internet use

The severity of problematic Internet use was measured using the PIUQ-SF (Koronczai et al., 2011). Items of the PIUQ-SF are presented in the Appendix A. The PIUQ-SF includes nine items (categorized in three subscales) that measure an individuals' cognitive engagement with the Internet (i.e., "Obsession"), the extent to which individuals neglect their daily obligations due to Internet use (i.e., "Neglect"), and a loss of control over Internet use (i.e., "Control disorder"). The item responses were rated on a five-point Likert-type scale ranging from 1 = *never* to 5 = *always*. Higher scores indicate higher levels of problematic Internet use.

2.2.2. Psychosocial problems

Psychosocial problems were measured using the DSM-5 Cross-Cutting Assessment-Child (APA, 2013). This instrument included questions that assess depression (e.g., “How much have you been bothered by feeling down, depressed, or hopeless?”), anxiety (e.g., “How much have you been bothered by feeling nervous, anxious, frightened, worried, or on edge?”), anger (e.g., “How much have you been bothered by feeling more irritated, grouchy, or angry than usual?”), sleep problems (e.g., “How much have you been bothered by problems with sleep that affected your sleep quality?”), and substance misuse (e.g., “How frequent have you been drinking at least 4 drinks in a single day?”). The responses were rated on a five-point Likert-type scale (1 = none, 2 = slight, 3 = mild, 4 = moderate, 5 = severe). A response of mild or greater (i.e., ≥ 3) on any symptoms of a disorder (except for substance misuse) indicated that the participant evidence clinical concern for the specific disorder. For substance misuse related questions, a response of slight or greater (i.e., ≥ 2) on any item indicated that the participant might be misusing substances. The Cronbach's alpha was 0.92 in this sample.

2.2.3. Parental monitoring

Youth's perceived parental monitoring was measured using an eight-item standardized measure (Stattin and Kerr, 2000). A sample item is “Do your parents/guardians normally know where you go and what you do after school?” The responses were scored on a Likert-type scale ranging from 1 = always to 5 = never. Responses were reverse coded for analysis. Higher scores indicated higher levels of parental monitoring. The Cronbach's alpha was 0.85 in this sample.

2.2.4. Sociodemographic information

The analysis controlled for factors associated with youth's problematic Internet use, psychosocial problems, and parental monitoring. Specifically, participants' sociodemographic characteristics, including age, gender, race, ethnicity, and family SES (i.e., the composite score of the Family Affluence Scale; Currie et al., 1997) were collected. Youth reported their race (i.e., black, white, other) and ethnicity (i.e., Latinx, non-Latinx) separately. No participant had self-identified as both Latinx and non-Latinx black. The analysis also controlled for participants' self-reported engagement in online-gaming.

2.3. Statistical analyses

To evaluate the construct validity of the PIUQ-SF, a confirmatory factor analysis (CFA) was performed with maximum likelihood estimation using Mplus 7.11. Missing data (0.84% - 5.91% among all variables) were handled using full information maximum likelihood (FIML). To determine the adequacy of model fit, we sought a non-significant χ^2 value, a cut-off of > 0.90 for the comparative fit indices (CFI), Tucker-Lewis Fit index (TLI), and a cut-off of < 0.08 for the point estimates of the standardized root mean square residual (SRMR) and root mean square error of approximation (RMSEA; Hu and Bentler, 1999).

After confirming the construct validity of the PIUQ-SF, latent profile analyses (LPAs) were performed to identify the subgroup of participants with problematic Internet use. The LPAs used continuous indicators (i.e., participants' scores on the PIUQ items) to define the latent groups of participants who endorsed similarly to the PIUQ items via maximum likelihood estimation. To determine the optimal number of groups, Lo-Mendell-Rubin Adjusted Likelihood Test (LMRT), Akaike Information Criteria (AIC), Bayesian Information Criteria (BIC), and sample-size-adjusted BIC (SSABIC) were used. The LMRT compares the fit of the estimated model with a model that specifies one less group. A non-significant result of LMRT ($p > 0.05$) indicates that the estimated model may be rejected and the model with one less group may be accepted (Lo et al., 2001). The AIC, BIC, and SSABIC are descriptive fit indices in which smaller values indicate better model fit (Muthen and

Muthen, 2002). The interpretability of the findings was also taken into consideration when determining the optimal number of groups.

Subsequently, bivariate analyses were performed to characterize participants with problematic Internet use. Finally, multivariate regression analyses were performed to explore psychosocial factors that are associated with problematic Internet use after controlling for age, gender, family SES, and engagement in online-gaming. To avoid having inflated significant results by adding many predictors in the regression model, we used the Bonferroni correction method and set the significance level at $\alpha /$ the number of tests (Bland and Altman, 1995).

3. Results

3.1. Psychometric properties of the PIUQ-SF

The three-factor structure of the PIUQ-SF suggested in Koronczi et al. (2011) was tested. The three-factor model fitted the data adequately within the entire sample [$\chi^2(24) = 36.75$, $p = 0.05$, RMSEA = 0.048 [90%CI 0.006, 0.077], CFI = 0.98, TLI = 0.97, SRMR = 0.042], the non-Latinx black subsample [$\chi^2(24) = 21.54$, $p = 0.06$, RMSEA = 0.000 [90%CI 0, 0.056], CFI = 1.00, TLI = 1.01, SRMR = 0.035], and the Latinx subsample [$\chi^2(24) = 33.52$, $p = 0.09$, RMSEA = 0.079 [90%CI 0, 0.138], CFI = 0.95, TLI = 0.92, SRMR = 0.088]. All factor loadings were statistically significant ($p < 0.001$), and the range of loadings was between 0.40 and 0.88 within the entire sample, between 0.40 and 0.91 within the non-Latinx black subsample, and between 0.37 and 0.96 within Latinx subsample (see Fig. 1). The Cronbach's alpha of the PIUQ-SF was 0.81 for the entire sample, 0.83 for the non-Latinx black subsample, and 0.78 for the Latinx subsample.

Following the CFAs, measurement variance of the PIUQ-SF was tested between the non-Latinx black and Latinx youth subsamples (see Appendix B for detailed analysis and results).

3.2. Characteristics of problematic Internet use

The LPAs were performed using participants' responses to the PIUQ-SF. Models of two to five latent groups were specified. The fit indices were presented in Table 1. For the entire sample, the AIC, BIC, and SSABIC continuously decreased as additional latent groups were added. However, the LMRT suggested that the three-group solution fit the data better compared to the two-group solution given a significant LMRT result ($p < 0.01$); and the four-group solution was not statistically different from the three-group solution ($p > 0.05$). Therefore, the three-group solution was considered the best fit to the data for the entire sample. Using the same criteria, the LPAs revealed a two-group solution for both the non-Latinx black and Latinx youth subsamples. The mean scores of the PIUQ-SF items and group patterns were presented in Fig. 2. A total of 37.2% ($n = 61$) of non-Latinx black youth ($M_{PIUQ} = 28.6$, $SD = 4.9$) and 25.4% ($n = 16$) of Latinx youth ($M_{PIUQ} = 28.8$, $SD = 5.7$) were identified as having problematic Internet use. Non-Latinx black youth who were identified as having problematic Internet use reported significantly higher PIUQ scores compared to their peers with non-problematic Internet use ($t(162) = -14.50$, $p < 0.001$, $d = 2.34$). Same difference was observed within Latinx subsample ($t(61) = -7.03$, $p < 0.001$, $d = 2.04$).

Although the LPAs revealed two subgroups within the non-Latinx black and Latinx youth subsamples (i.e., problematic Internet use vs. non-problematic Internet use), the patterns of problematic Internet use were different between these two subsamples (see Fig. 2). Specifically, Latinx youth who were classified as having problematic Internet use endorsed much higher scores on item 5 (i.e., lacking sleep due to compulsive Internet use), item 7 (the need to decrease the time spent on the Internet), and item 8 (unsuccessful attempts to reduce the time spent on the Internet), in relative to their non-Latinx black counterparts. In contrast, non-Latinx black youth who were identified as having

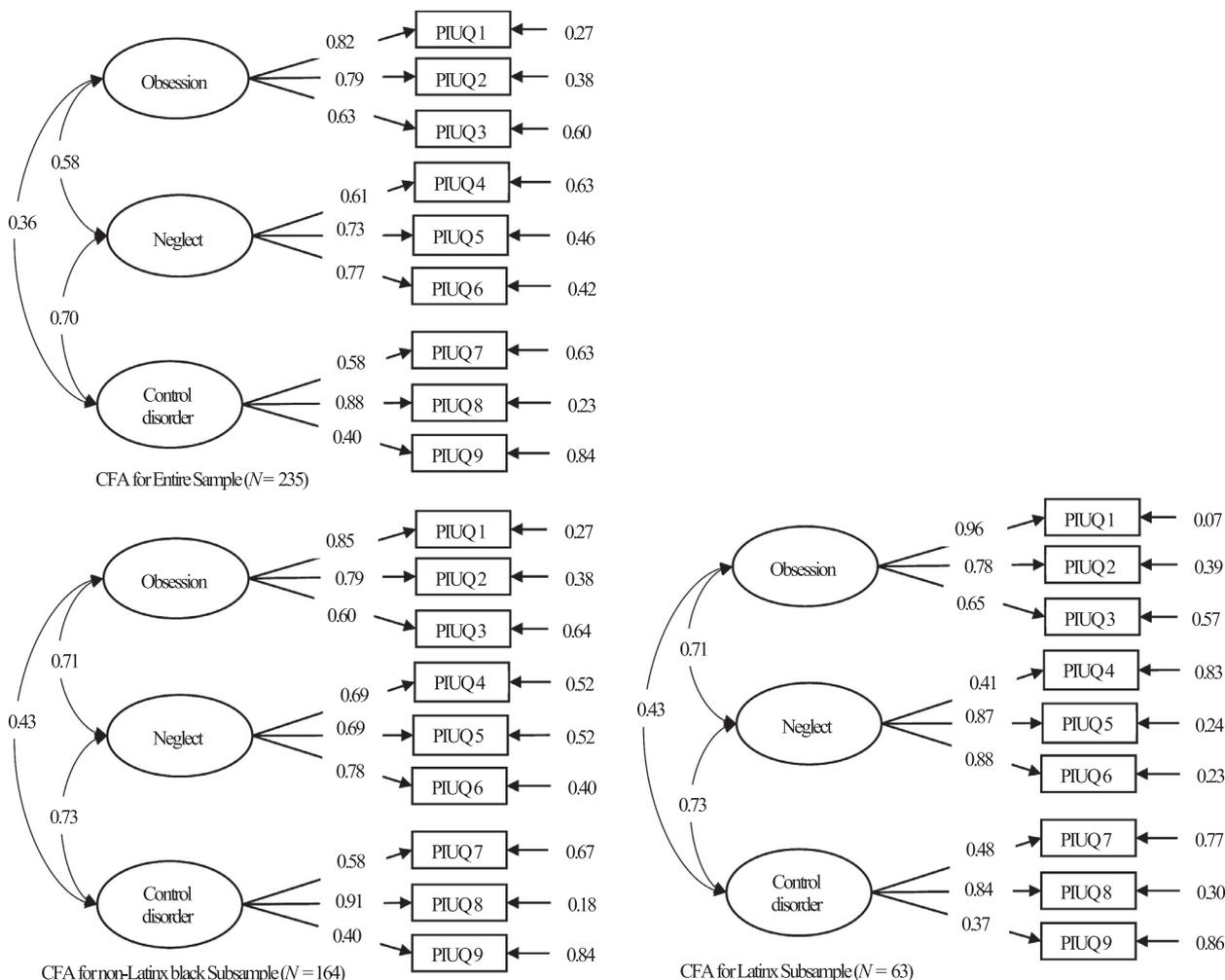


Fig. 1. Three-factor structure of the PIUQ-SF with the entire sample, and non-Latinx black and Latinx subsamples. The three-factor structure - “Control disorder,” “Obsession,” and “Neglect” - was adopted from prior studies examining the PIUQ-SF. Standardized factor loadings, residual variances of PIUQ items, and correlations among the three factors were illustrated.

Table 1
Fit Indices of the Latent Profile Analysis.

Number of latent groups	AIC ^a	BIC ^a	SSABIC ^a	Lo-Mendell-Rubin adjusted test ^b
Entire Sample (N = 235)				
2 groups	6283.20	6380.07	6291.32	371.32 (<i>p</i> = 0.01)
3 groups	6137.42	6268.88	6148.44	162.80 (<i>p</i> = 0.03)
4 groups	6086.09	6252.15	6100.01	70.05 (<i>p</i> = 0.69)
5 groups	6017.09	6217.74	6033.91	80.53 (<i>p</i> = 0.20)
Non-Latinx Black Youth Subsample (N = 164)				
2 groups	4355.24	4442.04	4353.39	300.77 (<i>p</i> , 3 < 0.001)
3 groups	4264.07	4381.86	4261.56	109.04 (<i>p</i> = 0.26)
4 groups	4217.35	4366.14	4214.18	65.44 (<i>p</i> = 0.05)
5 groups	4182.56	4362.35	4178.73	53.73 (<i>p</i> = 0.28)
Latinx Youth Subsample (N = 63)				
2 groups	1728.82	1788.83	1700.72	116.96 (<i>p</i> = 0.04)
3 groups	1700.73	1782.17	1662.59	46.95 (<i>p</i> = 0.41)
4 groups	1674.07	1776.94	1625.89	45.56 (<i>p</i> = 0.26)
5 groups	1666.44	1790.74	1608.23	26.98 (<i>p</i> = 0.38)

Note. a. The AIC, BIC, and SSABIC are descriptive fit indices wherein smaller values indicate better model fit. b. A nonsignificant *p*-value (*p* > 0.05) for Lo-Mendell-Rubin Adjusted Test indicates that the estimated model may be rejected and the model with one less group may be accepted.

problematic Internet use endorsed slightly higher scores on item 4 (i.e., neglecting household chores due to Internet use) compared to their Latinx counterparts. As a result, the three subgroups in the entire

sample reflected youth with non-problematic Internet use and youth with different patterns of problematic Internet use.

As shown in [Table 2](#), bivariate tests revealed that non-Latinx black youth who were identified as having problematic Internet use reported a significantly lower level of parental monitoring ($t(162) = 1.96, p = 0.03, d = 0.32$), and higher levels of depressive symptoms ($t(162) = -2.52, p = 0.01, d = 0.41$), sleep problems ($t(162) = -3.16, p = 0.002, d = 0.51$), and anger problems ($t(162) = -2.53, p = 0.01, d = 0.38$), compared to their counterparts without problematic Internet use. Moreover, Latinx youth who were identified as having problematic Internet use had a significantly higher level of depressive symptoms ($t(61) = -2.23, p = 0.03, d = 0.64$), compared to their peers with non-problematic Internet use.

Multiple regression analyses were performed to assess the associations of problem Internet use with parental monitoring and mental distress symptoms (see [Table 3](#)). Substance use was not included in multivariate analyses due to the nonsignificant results in the bivariate tests. The significance level was set at 0.006 using the Bonferroni Correction method. The results revealed that females were significantly more likely to have a higher level of problematic Internet use compared to their male peers in the entire sample ($\beta = -3.54, p = 0.001$) and the non-Latinx black subsample ($\beta = -3.77, p = 0.004$). Further, parental monitoring had a significantly negative effect on problematic Internet use among the entire sample ($\beta = -0.15, p = 0.005$), the non-Latinx black subsample ($\beta = -0.20, p = 0.004$), and the Latinx subsample

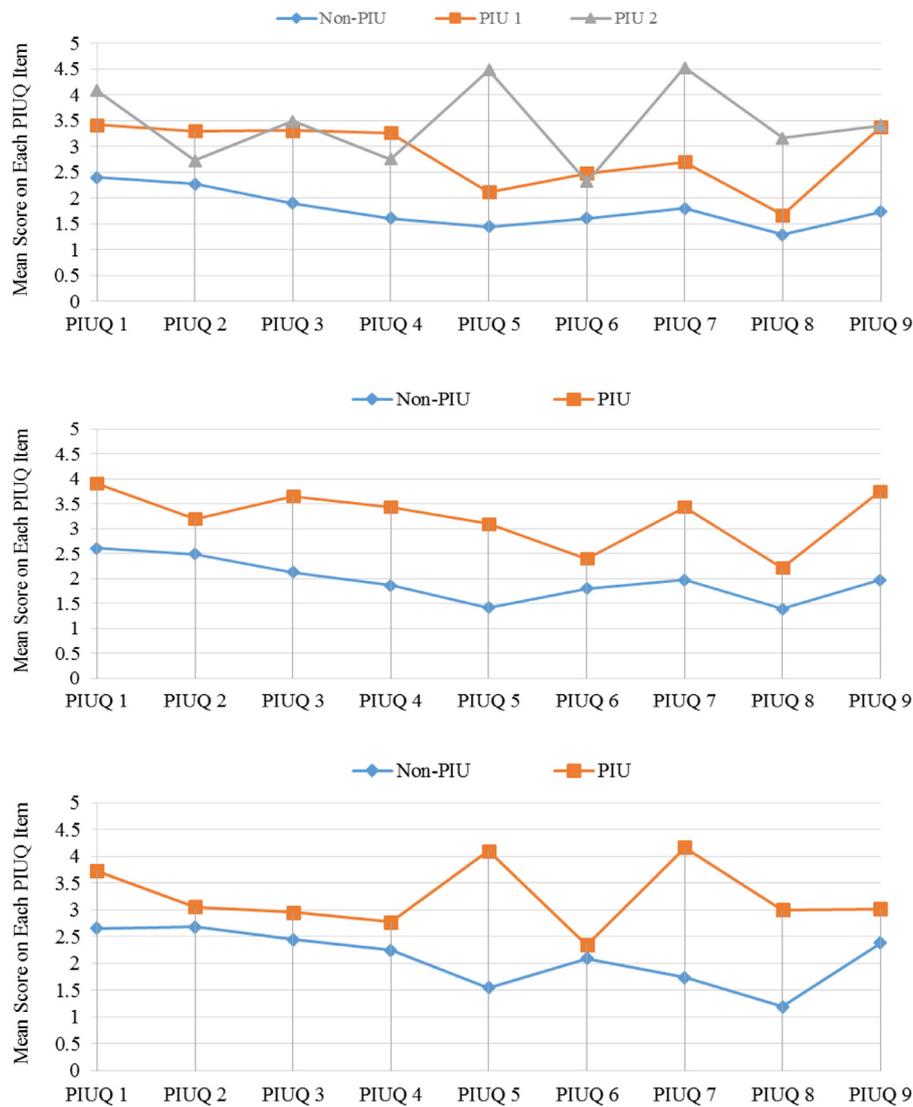


Fig. 2. Latent groups obtained from the latent profile analyses based on participants' responses on each PIUQ item within the total sample ($N = 235$), non-Latinx black subsample ($N = 164$), and Latinx subsample ($N = 63$).

($\beta = -0.33, p = 0.005$). Finally, sleep problems were significantly associated with a higher level of problematic Internet use in the entire sample ($\beta = 1.15, p = 0.006$) and the non-Latinx black subsample ($\beta = 1.69, p = 0.002$).

4. Discussion

Due to the lack of empirical evidence on the psychometric validity of standardized instruments for problematic Internet use among non-Latinx black and Latinx youth, we first examined the construct validity and reliability of the PIUQ-SF. Findings suggested that the PIUQ-SF demonstrated construct validity and internal consistency reliability in the sample of racial and ethnic minority youth in the U.S. This study provided preliminary, yet important findings in suggesting that the PIUQ-SF may be a valid instrument to measure problematic Internet use among non-Latinx black/Latinx youth.

The LPAs identified two latent groups (problematic Internet use vs. non-problematic Internet use) among the non-Latinx black and Latinx youth. This finding is consistent with Koronczi et al. (2011) classification using the PIUQ-SF in a sample of Hungarian adolescents. It is worth noting that non-Latinx black and Latinx youth in the current study presented different patterns of problematic Internet use. Specifically, Latinx youth with problematic Internet use evidenced higher

levels of immersion and obsession with Internet use; in contrast, non-Latinx black youth with problematic Internet use evidenced higher levels of neglect of daily obligations due to their Internet use. Although the cut-off score of the PIUQ-SF suggested by our finding (i.e., 29) to identify problematic Internet use was more conservative compared to the suggested cutoff (i.e., 22) by Koronczi et al. (2011), the proportions of non-Latinx black (37%) and Latinx youth (25%) classified as having problematic Internet use were higher compared to the rate of problematic Internet use observed in the previous study sample of Hungarian adolescents (22%; Koronczi et al., 2011). Accordingly, problem Internet use may be a growing public health concern for a significant amount of non-Latinx black/Latinx youth in the U.S.

Multivariate regression revealed a positive association between sleep problems and problematic Internet use, particularly among non-Latinx black youth. Prior research has found that people with problematic Internet use often evidence insomnia, short sleep duration, and poor sleep quality (Lam, 2014). The association between sleep problems and problematic Internet use may be reciprocal. It is plausible that pre-existing sleep problems (e.g., insomnia, delayed sleep phase syndrome) may lead to intensive Internet use at nighttime. Additionally, intensive Internet use at nighttime may, in turn, cause high arousal and consequently disturb the sleep-cycle and exacerbate sleep problems (Farsani et al., 2016; Lam, 2014). Due to the nature of cross-

Table 2
Sample characteristics and participants' responses on standardized measures.

Variables	Total Sample (N = 235)	Non-Latinx Black Subsample (N = 164)		Latinx Subsample (N = 63)	
		Non-PIU	PIU	Non-PIU	PIU
Age: <i>M (SD)</i>	16.1 (1.8)	15.9 (1.1)	16.0 (1.2)	16.0 (1.2)	16.2 (1.2)
Gender: % (N)					
Female	63.8% (150)	61.2% (63)	75.4% (46)	59.6% (28)	62.5% (10)
Male	36.2% (85)	38.8% (40)	24.6% (15)	40.4% (19)	37.5% (6)
Online-gaming engagement: % (N)	48.5% (113)	48.5% (50)	49.2% (30)	47.8% (22)	56.3% (9)
Problematic Internet Use Scale (PIUQ-SF): <i>M (SD)</i>	21.2 (7.0)	17.4 (4.8)	28.6 (4.9)***	18.5 (4.9)	28.9 (5.7)***
Family SES: <i>M(SD)</i>	11.0 (1.7)	11.1 (1.7)	10.8 (2.0)	10.8 (1.5)	10.6 (2.3)
Parental Monitoring Scale: <i>M (SD)</i>	29.0 (8.0)	30.5 (7.8)	28.1 (6.8)**	29.3 (1.2)	26.7 (6.5)
Sleep Problems: <i>M (SD)</i>	1.8 (1.2)	1.6 (1.0)	2.2 (1.2)**	1.7 (1.0)	2.4 (0.4)
% (N) of the sample who met criteria for sleep problems	24.7% (58)	17.5% (18)	34.4% (21)	21.3% (10)	37.5% (6)
Depressive Symptoms: <i>M (SD)</i>	4.2 (2.0)	3.8 (1.9)	4.6 (2.0)*	4.1 (1.9)	5.4 (2.3)*
% (N) of the sample that met criteria for depression	57.5% (135)	49.5% (51)	65.6% (40)*	61.7% (29)	75.0% (12)
Anxiety Symptoms: <i>M (SD)</i>	5.5 (2.8)	5.3 (2.8)	5.6 (2.6)	5.3 (2.8)	6.8 (3.5)
% (N) of the sample that met criteria for anxiety	53.6% (126)	53.4% (55)	52.5% (32)	53.2% (25)	68.8% (11)
Anger Problems: <i>M (SD)</i>	2.0 (1.0)	1.9 (1.0)	2.3 (1.2)*	2.0 (0.9)	1.9 (0.9)
% (N) of the sample that met criteria for anger problems	26.8% (62)	22.3% (23)	39.3% (24)*	25.5% (12)	37.5% (6)
Problem Drinking: <i>M (SD)</i>	1.2 (0.6)	1.2 (0.6)	1.2 (0.6)	1.1 (0.4)	1.2 (0.8)
% (N) of the sample that met criteria for problem drinking	14.0% (33)	15.5% (16)	11.5% (7)	10.6% (5)	6.3% (1)
Cigarette Smoking: <i>M (SD)</i>	1.2 (0.6)	1.3 (0.8)	1.2 (0.6)	1.0 (0.2)	1.4 (0.2)
% (N) of the sample that met criteria for smoking problem	12.3% (29)	13.6% (14)	11.5% (7)	6.4% (3)	18.8% (3)
Prescription Drug Use: <i>M (SD)</i>	1.2 (0.5)	1.1 (0.5)	1.2 (0.7)	1.0 (0.1)	1.1 (0.5)
% (N) of the sample that met criteria for drug misuse	11.0% (26)	12.6% (13)	11.5% (7)	4.3% (2)	6.3% (1)

Note. PIU: Problematic Internet use. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

sectional data, however, we cannot determine the temporal order of sleep problems and problematic Internet use. The potential bi-directional relationships should be further examined by longitudinal data and cross-lagged analyses. As chronic sleep deprivation and poor sleep quality may lead to reduced alertness and concentration, poor academic performance, and feelings of sadness and irritability among youth, limiting youth's Internet use before bedtime is essential to reduce these negative consequences.

Consistent with the literature, we found that a lack of parental monitoring was significantly associated with increased severity of problematic Internet use among both non-Latinx black and Latinx youth (Bleakley et al., 2016; Li et al., 2014; Lin et al., 2009). Examining the role of parental monitoring in problematic Internet use may generate implications for the development of early interventions that target youth's Internet use. For youth at risk of developing problematic Internet use, an increase in parental monitoring is probably necessary to avert further behavioral health problems. Our finding suggested that non-Latinx black/Latinx youth at risk of developing problematic Internet use may refrain from excessive Internet use if their parents have a better awareness of their child's activities and whereabouts. In addition to parents' awareness and knowledge of youth's overall activities and whereabouts, parents may also want to monitor their children's Internet use and facilitate regulation of youth's Internet use by using specific software and applications to aid in setting limits.

Table. 3
Effects of sociodemographics, parental monitoring, and mental distress symptoms on the level of problematic internet use.

Variables	Total Sample (N = 235)		Non-Latinx Black Subsample (N = 164)		Latinx Subsample (N = 63)	
	Coef. (S.E.)	p-value	Coef. (S.E.)	p-value	Coef. (S.E.)	p-value
Age	-0.52 (0.37)	0.160	-0.88 (0.46)	0.058	0.30 (0.74)	0.683
Gender (ref: female)	-3.54 (1.00)	0.001	-3.77 (1.28)	0.004	-1.55 (1.95)	0.431
Online-Gaming Engagement	1.48 (0.97)	0.130	1.64 (1.21)	0.177	-0.16 (1.92)	0.932
Family SES	-0.16 (0.25)	0.518	-0.15 (0.30)	0.625	-0.88 (0.51)	0.090
Parental Monitoring	-0.15 (0.05)	0.005	-0.20 (0.07)	0.004	-0.33 (0.11)	0.005
Sleep Problems	1.15 (0.42)	0.005	1.69 (0.54)	0.002	-0.61 (0.87)	0.490
Depressive Symptoms	0.61 (0.27)	0.024	0.49 (0.34)	0.155	1.17 (0.53)	0.032
Anger Problems	0.57 (0.48)	0.236	0.58 (0.59)	0.328	0.15 (1.04)	0.887
Anxiety Symptoms	-0.41 (0.20)	0.045	-0.64 (0.25)	0.013	-0.02 (0.40)	0.959
R ²	.205		.212		.232	

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Adding to the literature (Anderson et al., 2017; Dlodlo, 2015), we found that non-Latinx black females were more likely to have problematic Internet use compared to their male counterparts. Studies have suggested that girls have more intensive social media use, while boys play online games and view online pornography more intensively (Dufour et al., 2016; Lenhart, 2015). Evidence also indicates that social media use has been associated with problematic Internet use among girls (Rehbein and Mößle, 2013). A survey study among European young adults reported that female social media users were more likely to evidence problematic Internet use via smartphones (Lopez-Fernandez et al., 2018). However, we did not control for other Internet activities (i.e. social media use) aside for online gaming in the regression analysis. Future studies that examine gender differences in problematic Internet use should consider varying online activities.

Findings of this study are subject to several limitations. First, the use of cross-sectional data precluded any causal relationships between problematic Internet use and youth's psychosocial problems and parental monitoring. Second, as the data were based on participants' self-report, recall bias may exist. Third, as the study was conducted with a convenient sample of non-Latinx black/Latinx youth in a Southeastern Florida high school, one should be cautious in generalizing findings of the measure validation to other populations. Lastly, due to the nature of this explorative study using a small sample, findings regarding the measurement validation and relationship

between problematic Internet use and psychosocial problems need to be cautiously interpreted. The multivariate regression with the Latinx subsample might have lacked power due to the small sample size. Further studies are needed with larger, representative samples. In addition, criterion validity of the PIUQ in the non-Latinx black and Latinx populations should be further examined.

Despite its limitations, the current study is the first attempt to assess and characterize problematic Internet use among non-Latinx black and Latinx youth. Our findings have important implications vis-à-vis problematic Internet use measures for future research on Internet-related behavioral problems among these racial and ethnic minority youth. Further, intervention and prevention programs that integrate gender-responsive, culturally-sensitive components and increased parental monitoring may be essential to prevent problematic Internet use among non-Latinx black/Latinx youth.

Acknowledgment

This work was supported by the National Institute on Minority Health and Health Disparities (grant number P20MD002288). The content of this report is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute on Minority Health and Health Disparities, or the National Institutes of Health.

The authors would like to acknowledge Mr. Arnaldo Gonzalez for his editing support and thank Noelle Granda of Reboot & Recover, Inc. who helped to collect and input the data and all those who provided support to or participated in this survey.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.psychres.2019.02.048](https://doi.org/10.1016/j.psychres.2019.02.048).

Appendix A. Problematic Internet Use Questionnaire-short form (PIUQ-SF)

Obsession subscale

PIUQ 1: How often do you feel tense, irritated, or stressed if you cannot use the Internet for as long as you want to?

PIUQ 2: How often do you feel tense, irritated, or stressed if you cannot use the Internet for several days?

PIUQ 3: How often does it happen to you that you feel depressed, moody, or nervous when you are not on the Internet and these feelings stop one you are back online?

Neglect subscale

PIUQ 4: How often do you neglect household chores to spend more time online?

PIUQ 5: How often do you spend time online when you'd rather sleep?

PIUQ 6: How often do you lose sleep due to late-night log-ins?

Control disorder subscale

PIUQ 7: How often do you feel that you should decrease the amount of time spent on line?

PIUQ 8: How often does it happen to you that you wish to decrease the amount of time spent online but you do not succeed?

PIUQ 9: How often do you try to conceal the amount of time spent online?

Note: The PIUQ-SF items are rated on a five-point Likert scale, ranging from 1 = *never* to 5 = *always*. The composite score of the PIUQ-

SF (range: 9–45) indicates the levels of problematic Internet use. The composite scores of the subscales indicate the levels of underlying symptoms of problematic Internet use: Obsession with Internet use, Neglect of daily obligations due to Internet use, and a Loss of control over Internet use.

We recommend to use 29 as a cutoff score for the identification of problematic Internet use. In the current sample, Mean PIUQ score = 28.6 for non-Latinx black youth who were identified as having problematic Internet use; Mean PIUQ score = 28.8 for Latinx youth who were identified as having problematic Internet use.

Appendix B. Measurement variance test of PIUQ-SF

To assess the measurement variance of the PIUQ-SF between the non-Latinx black and Latinx subsamples, a multi-group CFA was performed in which four progressively more restricted models were compared: 1) multi-group model without constraining any parameters; 2) multi-group model with the factor loadings of the PIUQ-SF constrained to be equal between groups; 3) multi-group model with the variance matrix of the construct variables (Obsession, Neglect, and Control Disorder subscales) constrained to be equal between groups; and 4) multi-group model with the matrix of residual variances constrained to be equal between groups. Model fits of all four models were compared using the chi-square difference test [$\Delta\chi^2 = \chi^2(\text{Model}) - \chi^2(\text{Nested Model})$ and $\Delta df = df(\text{Model}) - df(\text{Nested Model})$], as these models were nested within each other. If the change in χ^2 per change in degree of freedom (df) is not statistically significant, the more restricted model is retained.

Before testing the measurement variance, differences in the PIUQ scores between the non-Latinx black and Latinx youth were examined. No significant differences were observed between these two subsamples in their average scores on the PIUQ-SF, and the Obsession, Neglect, and Control disorder subscales (see Supplementary Table).

First, the unconstrained multi-group model had an acceptable fit [$\chi^2(54) = 56.82$, RMSEA = 0.021, CFI = 1.00, TLI = 0.99]. Then the progressively restricted models were computed and compared. The model with factor loadings restricted to be equal between the groups did not yield a worse fit compared to the unconstrained model [$\Delta\chi^2 = 11.81$, $\Delta df = 6$, $p = 0.07$], suggesting the two subsamples had invariant factor loadings. Next, the model with equal factor loadings and the construct variables (i.e., Obsession, Neglect, and Control disorder subscales) did not yield a worse fit compared to the previous model with only restricted factor loadings [$\Delta\chi^2 = 2.90$, $\Delta df = 3$, $p = 0.41$], suggesting invariant factor loadings and construct variables between the two subsamples. At last, the model with equal factor loadings, construct variables and residuals did not yield a worse fit [$\Delta\chi^2 = 6.77$, $\Delta df = 9$, $p = 0.66$]. Results of the measurement variance test revealed equivalence in the factor structure of the PIUQ-SF between the non-Latinx black and Latinx subsamples.

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