The interplay between adolescents’ Internet addiction and family-related factors: three common patterns

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ABSTRACT
This study aimed to identify typical interactions between adolescents’ Internet addiction and family environment factors. 165 parents were surveyed about family environment and problematic Internet use for themselves and their adolescents. Three distinct clusters were identified. Cluster 1 (assertive interaction) involved non-addicted authoritative parents with adolescents at risk of addiction. These parents had occasional arguments with their adolescents. Cluster 2 (aggressive interaction) included at-risk authoritarian parents with Internet addicted adolescents. These parents often had arguments with their adolescents. Cluster 3 (lenient interaction) comprised non-addicted permissive parents with highly addicted adolescents. These parents constantly argue with their adolescents. As we have not identified a cluster where adolescents’ addiction was below minimal risk, we advocate the need to train parents along with adolescents on healthy technology use. The clusters identified can be used by professionals as a basis to produce diverse interventions that fit each of the identified family types.

Introduction
As of January 2021, the global Internet access rate increased to 59%, with 4.66 billion active Internet users (Johnson, 2021). The Internet has become an essential part of everyday lives, with work, education, and socialization shifting to virtual platforms. Whereas controlled Internet use may be beneficial, excessive Internet use can manifest maladaptive behaviour and be seen as a form of addiction (Chi et al., 2020; Li, Dang, et al., 2014). Internet addiction, also known as “compulsive Internet use,” “problematic Internet use,” and “pathological Internet use” (Zhao et al., 2022), is not officially recognized as a mental disorder by the American Psychiatric Association (APA; Kuss & Lopez-Fernandez, 2016). However, Internet gaming, a subcategory of Internet addiction, is formally included in the 11th version of the International Classification of Diseases (ICD-11) by WHO in 2018 (Poznyak, 2018). Internet addiction is defined as the excessive or uncontrollable use of the Internet leading to symptoms of withdrawal and tolerance (Young, 1998). Although there are no official diagnostic criteria for Internet addiction, Young (1998) based the diagnostic criteria for Internet addiction (IA) on the extreme gambling criteria as suggested in DSM-IV. The four characteristics of addictive behaviours: excessive use, withdrawal, tolerance, and adverse psychological consequences are often found present in Internet-addicted individuals (Fumero et al., 2018).
Adolescents are vulnerable to Internet addiction due to the sensitivity of their developing brains to signals of excitement, making it difficult for them to control their Internet usage (Zhao et al., 2022). Several studies were conducted on the estimates of Internet addiction prevalence rates in adolescents from different countries with an IA prevalence rate of 6.3% in China (Li, Zhang, et al., 2014, 20.6% in the US (Chi et al., 2020), 18% in Canada (Dufour et al., 2016), and 23.7% in Japan (Kawabe et al., 2016). The rate of adolescent Internet addiction ranged from 1.2% to 11.8% in European countries (Durkee et al., 2012). A study on the Qatari population found the IA prevalence rate to be 17.6% amongst Qatari adolescents and young adults (Bener & Bhugra, 2013). Additionally, Asian countries reported a higher rate of Internet addiction amongst adolescents than Western countries (Li, Li, et al., 2018). With the lockdown restrictions placed due to the pandemic, the risk of adolescents being Internet addicted further increased (Ozturk & Ayaz-Alkaya, 2021).

Existing mental health problems (Anderson et al., 2016; Lozano-Blasco et al., 2022), low peer support (Y. L. Y. L. Chen et al., 2015), and poor family functionality (H. C. H. C. Chen et al., 2020; Y. L. Y. L. Chen et al., 2015) have been found to increase the likelihood of IA in adolescents. A study done by Zhao et al. (2022) found that adolescents with Internet addiction experience increased depressive symptoms and exhibit aggressive behaviour. Additionally, negative peer relationships elevated Internet addiction in adolescents, whereas positive relationships with peers, helped addicted adolescents with aggressive behaviour. Similarly, the study by Peng et al. (2019) revealed a positive relationship between school disconnection and adolescents’ IA, which was mediated by low self-esteem. This relationship was stronger in individuals with higher levels of emotional intelligence. Another study found that adolescents suffering from social and school-related stress and anxiety were at a higher risk of IA, where the factor of adopting negative coping styles facilitated the increase of stress which further led to an increase in the risk of IA (Tang et al., 2014).

Sociodemographic factors such as gender and academic performances also elevate the risk of Internet addiction, with boys and low-performing students at a higher risk of Internet addiction (Chi et al., 2020; Chung et al., 2019). Another study on sociodemographic risk factors of Internet addiction found that amongst Moroccan high school students, girls and low-performing students were at a higher risk of Internet addiction (Mohamed & Bernouss, 2019). Research also shows personality and IA to have a positive relationship, with conscientiousness and neuroticism predicting the symptoms of IA in adolescents (Müller et al., 2022).

The role of parents in IA has been researched to an extent in literature with parental monitoring (Yen et al., 2009), parenting styles (Kalaitzaki & Birtnell, 2014), interparental conflicts (Zhou et al., 2017), and parental protection (Chang et al., 2015; Zhang et al., 2019) impacting the adolescents’ risk of IA. Siomos et al. (2012) found low parental care and high parental protection were associated with increased rates of Internet addiction in a sample of Dutch adolescents. Another study found that parent-adolescent relationships impacted the risk of adolescent IA, where the decrease in the quality of mother-adolescent relationship I increased the risk of adolescent IA more than the decrease in the quality of father-adolescent relationship (Xu et al., 2014). Wang et al. (2018) also found a positive parent-adolescent relationship to have a negative association with IA. They noticed emotion regulation as a mediator in the association between the parent-adolescent relationship and IA. Furthermore, stressful life events were found to be moderating the effect of emotion regulation on IA. Research on parenting styles has also shown that each parenting style utilizes different methods when dealing with adolescent’s Internet use (Chou & Lee, 2017). According to Baumrind (1971), parenting styles can be classified into three different types that are authoritarian, authoritative, and permissive. Authoritarian parenting involves parents who are controlling and show low warmth towards their adolescents. They implement strict measures to control their adolescents’ behaviour and ensure their instructions are completely followed by their adolescents. Authoritative parenting involves parents who are controlling and show warmth towards their adolescents. The adolescents are involved in the parenting process with authoritative parenting recognizing the adolescent’s feelings and being receptive towards communication with the adolescent. Permissive parenting involves low control and low warmth. It focuses on indulging the adolescent’s every wish
and need which may lead to negative results. The permissive parenting style rarely involves correction and regulation of adolescent’s behaviours. A study by Chou and Lee (2017) found adolescents of authoritarian parents scored higher on IAT (Internet Addiction Test) as compared to adolescents of authoritative parents and lower than adolescents of permissive parents. Another study looking into Internet parenting styles and Internet addiction found individuals with authoritarian parents are more likely to be Internet addicted as compared to other Internet parenting styles due to their use of the Internet as an escape to meet their emotional needs (Sun & Wilkinson, 2020). Research related to parents’ mental health affecting adolescents’ Internet addiction is scarce in the literature. A study done by Lam (2020) found that parents’ mental health and adolescents’ Internet addiction had a complex association with both parents’ IA and adolescents’ mental health playing a mediating role.

The parent-adolescent relationship significantly impacts the risk of IA in adolescents; however, studies looking into the effectiveness of a parental-centred approach such that parents are involved and trained to help prevent adolescent IA are limited. A study on Internet addiction prevention found that adopting a parental-centred approach that focuses on training parents to be involved with their adolescents can help prevent Internet addiction in adolescents more than adolescents-centred approaches (Bağatarhan & Siyez, 2022). However, approaches to prevent IA are mostly focused on raising awareness and treating the issue in people who are susceptible to it rather than their social circle (N. Zhou & Fang, 2015). Parents may require training on how to have constructive and engaging dialogue with their adolescents on IA. Chemnad et al. (2022) went further and showed that parents’ IA score positively correlated and predicted the adolescents’ IA score suggesting the parents may need to get training on dealing with their own IA symptoms, a preliminary step to dealing with it in their own adolescents. Positive parental role models have been shown as effective intervention in other similar behaviours such as drug use prevention (Hahn, 1991), and healthy eating (Scaglioni et al., 2008). The family relationship significantly impacts the risk of Internet addiction in adolescents with research showing that parents’ Internet addiction (Lam & Wong, 2015), parent-adolescent conflict (Siomos et al., 2012), and their Internet parenting styles (Chou & Lee, 2017) are factors for adolescents’ Internet addiction. However, the typical interplays between such factors are yet to identify. Therefore, this study aims to cluster families around their adolescent Internet addiction, parents’ Internet addiction, parent-adolescent arguments frequency, and Internet parenting types. The identification of such clusters shall help to tailor interventions and education programmes for adolescent Internet addiction.

Method

Participants and procedures

An online survey was sent out to parents of adolescents (aged 10–19 years old) in County between May 2021 and September 2021. The study was approved by the Institutional Review Board (IRB) of the first author. The survey was promoted to participants through social media and mailing lists of the three policy institutes and the academic institution involved, resembling a snowball procedure since the survey may have been shared further and forwarded to more participants. Participants were informed and explicit consent was requested before starting the survey completion. Mono-parental families were not excluded from the study. Of the 216 parents who responded, 167 parents gave complete answers to the questions and were included in the study. Outliers from the dataset were removed to improve the performance of the clustering algorithm used later; the final sample had 165 participants (mean age = 44 years, SD = 6.72).

Measures

The survey consisted of 28 questions and was divided into two sections – the first section aimed at gathering information about the parent’s demographics and level of IA. The second section dealt
with the adolescent’s online activities, perceived IA, frequency of serious argument, and Internet parenting style. In the event of more than one adolescent, parents were asked to answer the second section based on the adolescent closest in age to 12 years.

**Internet Addiction Diagnostic Questionnaire (IADQ)**

Internet Addiction Diagnostic Questionnaire was developed to measure the extent of Internet addiction in an individual. Young (1998) based this questionnaire on the pathological gambling criteria since it was the closest to IA in DSM-IV. The IADQ consists of eight closed questions where the total score of the questionnaire is determined by the number of questions the participant has responded ‘yes’ to. These questions deal with different symptoms of IA ranging from preoccupation to loss of relationships caused by Internet use. Participants are asked to answer the questionnaire based on their non-essential Internet use, that is, non-business or non-academic use. The IADQ score ranges from 0 to 8, where the criteria for meeting the requirements of Internet addiction varies amongst different studies. Young (1998) suggests a score of 5 or more to classify test-takers as dependent Internet users and the rest as non-dependent Internet users. Beard and Wolf (2001) suggest that participants may be diagnosed with IA if they answer ‘yes’ to the first five questions and at least one of the last three questions representing one’s coping strategy and relationship with others. Durkee et al. (2012) suggest similar criteria to Young (1998), where participants who score 0–2 are classified as non-addicted, 3–4 are classified as at-risk, and those scoring 5–8 are classified as Internet addicted. For our study, we utilized the criteria set by Durkee et al. (2012) to further categorize our participants based on their level of Internet addiction. The Cronbach’s alpha for the IADQ data, collected through this study, was 0.70 indicating an acceptable value of reliability (Ursachi et al., 2015).

**Parental Version of Young Diagnostic Questionnaire (PYDQ)**

The Parental Version of Young Diagnostic Questionnaire is a modified version of the IADQ that assesses Internet addiction in adolescents from the perspective of their parents (Wartberg et al., 2016). The PYDQ, like the IADQ, has eight closed questions where the total score is determined by the number of questions parents have responded ‘yes’ to. Parents are also encouraged to answer the questions based on their adolescent’s non-essential Internet use. The PYDQ scale ranges from 0 to 8, where the higher the total score is, the higher is the risk of IA in adolescents. The PYDQ asks the same questions as the IADQ; however, it is reworded with respect to grammar to get an external rating instead of a self-reported rating. The Cronbach’s alpha for the PYDQ data, collected through this study, was 0.69 indicating an acceptable value of reliability (Ursachi et al., 2015).

**Serious argument and parental style**

Parents were asked about the frequency of serious arguments they had with their adolescents regarding their Internet addiction. This was measured on a 5-point Likert scale that is 1: never, 2: seldom, 3: sometimes, 4: often, 5: very often. Qualitative data regarding parents’ response to their adolescent’s Internet addiction and the steps parents take to help reduce adolescent Internet addiction was collected through open-ended questions. Using the parenting styles theory of Baumrind (1971) and the parents’ responses to how they dealt with their adolescent’s Internet addiction, we classified them into these three different Internet parenting styles. Parents who dealt with the situation by taking strict measures without warning or involving their adolescent were classified as authoritarian parents. These include parents who would punish their adolescents for excessive use or switch off the routers to reduce their Internet usage. Parents who involved their adolescent in the problem by setting time limits, setting times in which they can use technology or directing their adolescent’s attention towards different activities were classified as authoritative. We classified parents as permissive if their answer to dealing with the problem was to just advise their adolescents without taking any further actions or excuse their behaviour due to lack of alternative activities. The participants were asked to report on the typical behaviour whether for themselves or
for their adolescents. They were not referred to a specific time period for that behaviour, e.g. during the last week or last month.

**Clustering strategy**

The analysis for this study was performed using Python 3.0 (Python, n.d.). The sample size for this study was 165 participants. While there is no set standard on the minimum sample size, a review of 243 published studies found over one-fifth of the studies utilized a sample size of less than 100 (Dolnicar, 2002). The identification of the clusters present in the data was performed using the two-phase divide and recursive merge technique. According to this technique, the maximum number of clusters are created and merged recursively to identify the distinct clusters in the dataset (Rehman & Belhaouari, 2022). The features used in the clustering analysis were the parent’s IADQ score, the adolescent’s PYDQ score, the frequency of serious arguments, and the parental types. Due to the categorical nature of the features, the k-modes clustering algorithm was used.

The first phase of the divide and merge technique involves selecting the maximum number of clusters using the elbow plot. The elbow plot method is the most common method to determine the optimal number of clusters. It requires minimal background information regarding the dataset and its features (Saha et al., 2019). In the elbow method, the k-modes algorithm is run for different clusters, and the cost is calculated for each number of clusters. To counter the instability of the k-modes algorithm, we ran the algorithm ten times on the different number of clusters ranging from 1 to 20. The cost, which is the sum of all dissimilarities between the clusters, is averaged and plotted. **Figure 1** shows the resulting elbow plot from the divide phase. From the elbow plot, the maximum number of clusters is chosen when the plot follows a linear path and hence, in this case fifteen clusters were chosen as the maximum.

The second phase of the divide and merge technique involves recursively merging the clusters until considerably distinct clusters are found. The t-test analysis was used to merge the clusters in the recursive merging phase. We used the t-statistic instead of the p-value to determine whether the merge would occur or not. The p-value helps identify whether the cluster centroids are significantly different but does not provide enough evidence on whether the centroids are similar. The clusters’ centroids were taken as the average of the mean and mode of the clusters to get the best representation of the cluster’s centre. The t-statistic value,
the distance between two cluster centroids, is plotted against the cluster pairs to get an elbow plot based on the distances between the clusters. The threshold value is determined based on the ‘elbow’ of the plot. Distances between the cluster centroids below the threshold value are merged, and then the t-statistic is recalculated, and the clusters are merged until distinct clusters are found. Figure 2 shows the t-statistic between the centroids of clusters, where we can see two possible threshold values for clustering. Taking a higher threshold of approximately 2.8 results in the clusters merging into one; hence we choose the second threshold value of 1. Clusters with a t-statistic below the threshold are merged.

Results
Descriptive statistics
Table 1 summarizes the descriptive statistics of the sample for this study. Amongst the 165 participants, around 67% were mothers, and about 78% were employed. The participants were all residents of County X (anonymized for peer review), with 83% from Eastern countries (mainly Middle East and South Asia) and 17% from Western countries. Almost all participants had an education level above high school. Additionally, the mean age of adolescents was 13 years old ($SD = 1.91$), and around 39% of the adolescents were girls.

| Internet parenting styles | Frequency | Percent |
|---------------------------|-----------|---------|
| Authoritarian             | 56        | 33.94   |
| Authoritative             | 65        | 39.39   |
| Permissive                | 44        | 26.67   |

| Frequency of serious argument | Frequency | Percent |
|------------------------------|-----------|---------|
| Never                        | 0         | 0.0     |
| Seldom                       | 18        | 10.91   |
| Sometimes                    | 58        | 35.15   |
| Often                        | 51        | 30.91   |
| Very often                   | 38        | 23.03   |

| IA                           | Mean      | Std. dev. |
|------------------------------|-----------|-----------|
| Parent IA (IADQ score)       | 2.90      | 1.97      |
| Adolescent IA (PYDQ score)   | 4.68      | 2.03      |

Figure 2. Distance between each cluster pair.
Clusters

Based on the analysis, five clusters were identified that are Cluster 1 \( (n = 87, 52.7\%) \), Cluster 2 \( (n = 48, 29\%) \), Cluster 3 \( (n = 20, 12\%) \), Cluster 4 \( (n = 8, 0.048\%) \) and Cluster 5 \( (n = 2, 0.012\%) \). Cluster 4 and Cluster 5 had comparatively small sizes, indicating that they may be outliers in the dataset and, therefore, both clusters were discarded from the results. Figure 3 shows the boxplots of the features of the final clusters.

Cluster 1 (**assertive interaction**) has authoritative parents who are non-dependent Internet users, while their adolescents are at-risk of IA. These parents sometimes argue over Internet addiction with their adolescents. Cluster 2 (**aggressive interaction**) comprises authoritarian parents who are at risk of Internet addiction and perceive their adolescents as Internet addicted. Additionally, they often have serious arguments with their adolescents over their Internet use. Cluster 3 (**lenient interaction**) consists of permissive parents who are non-dependent Internet users and perceive their adolescents as highly addicted, and they argue very often about their adolescent’s Internet addiction.

Discussion

Internet addiction in adolescents is a rising problem, with parental control and monitoring shown to help protect adolescents against it. The main objective of this study was to explore the patterns describing the interplay between parents’ Internet addiction, adolescents’ Internet addiction, parental conflict, and Internet parenting types. Through the analysis, three different interactions were evident between parents and adolescents namely assertive interaction, aggressive interaction, and...
lenient interaction. In all three clusters identified, adolescents were either at-risk or addicted while for parents only one cluster identified was at-risk while the other two were non-addictive. All three Internet parenting styles were covered in the clusters identified. The three clusters covered almost 94% of the sample.

The assertive interaction has mostly authoritative parents who are non-dependent Internet users. The authoritative Internet parenting types involves parents setting time limits and trying to distract their adolescents from the Internet using different activities. Regardless, these parents have at-risk adolescents, and they occasionally argue with their adolescents about their Internet addiction. The assertive interaction is the only interaction where the adolescents were at-risk of IA and not highly addicted to it hence, this interaction may be more effective than other interactions. The assertive interaction cluster is the only cluster where adolescents were not highly addicted but rather at risk of becoming addicted. Understanding the parenting style in this cluster, which was an authoritative one, and other parameters, such as the authoritative dialogues and techniques used, may also help us in understanding what could be a more effective familial setting and parenting strategy to limit IA in adolescents. Examples of strategies used by authoritative parents include setting limit for use upon agreeing it with adolescents and agreeing on alternative activities to distract adolescents from Internet use. Limit setting and commitment have been shown to be effective in other problematic behaviours such as unhealthy eating behaviours (Balantekin et al., 2020) and sleeping patterns (Peltz et al., 2020) and seem to also have a potential for success in the case of IA in adolescents. According to Van den Eijnden et al. (2010), parental rules regarding setting time limits on Internet use stimulate IA in adolescents, whereas monitoring Internet use content helps prevent it. Since the assertive interaction involves parents mostly setting time limits, this may explain why adolescents may be at risk of IA rather than non-addicted.

The aggressive interaction represents authoritarian parents who are at risk of Internet addiction while their adolescents are addicted. The authoritarian parents use aggressive techniques of locking devices away and switching off routers to limit their adolescent’s Internet use. The aggressive interaction also represents parents who frequently had serious arguments with their adolescents on excessive Internet use. The frequency of serious argument and the Internet parenting style along with the high IA in adolescents, may suggest that this interaction is ineffective in countering an adolescent’s Internet addiction. Strong parental disapproval of Internet use is directly associated with Internet addiction in adolescents (Xu et al., 2014). Negative control of parents, such as adopting strict techniques to counter IA, is shown to escalate IA in adolescents further (C. Li et al., 2014). A study by Chou and Lee (2017) found parental warmth negatively associated with Internet addiction in adolescents with authoritarian parents. The authoritarian Internet parenting style involves parents who do not have strong and open communication with their adolescents (Matejevic et al., 2014). However, strong family communication can help in reducing the risk of IA in adolescents (Fumero et al., 2018). Furthermore, adolescents tend to be influenced more by parental behaviour than parental rules; if parents restrict their adolescent’s Internet use, yet they are using it excessively themselves, adolescents tend to adopt the same behavioural pattern of excessive usage (Liu et al., 2012).

The lenient interaction involves permissive parents who are non-dependent Internet users, but their adolescents are highly dependent on the Internet. The permissive Internet parenting style involves parents advising their adolescents on their Internet usage or excusing their behaviour due to lockdown restrictions for the pandemic. The parents in the lenient interaction mostly responded that they often argued with their adolescents on their Internet usage. Research on adolescent Internet addiction found that low parental control positively correlates with adolescent Internet addiction (Martins et al., 2020). The lenient interaction may be ineffective in countering adolescent Internet addiction because parents end up having frequent serious arguments with their adolescents about Internet usage, whereas higher parent-adolescent conflicts tend to increase the risk of IA in adolescents (Siomos et al., 2012). Lenient interaction had the highest frequency of serious arguments
between parent and adolescent amongst all three styles, which may explain the ineffectiveness of this interaction.

The findings from this study have both theoretical and practical implications. On theoretical grounds, three different clusters were identified. Using these clusters, the dynamics of the parent-adolescent relationship regarding digital overuse can be better understood. Furthermore, the three different interactions found comprised either at-risk adolescents or dependent adolescents showing the need to educate parents as the current Internet parenting styles and argument quality adopted by parents is ineffective in preventing or treating adolescent IA. Practically, the findings help provide suggestions for future prevention and intervention studies aimed at adolescent IA. The role of parents in adolescents’ Internet addiction is core to its prevention and treatment. Training parents and raising awareness of the adverse effects of adolescent IA is essential in helping them manage their adolescent’s Internet addiction (Soh et al., 2018). Liu et al. (2015) found interventions involving both parent and adolescent were effective in reducing adolescent’s IA with positive parent-adolescent relationship helping the effectiveness of the intervention. This aligns with the finding of this study where parent-adolescent conflict interacts with adolescent’s IA. The aggressive and lenient interactions had adolescents with high IA and parents who often had serious arguments with their adolescents. Additionally, Valcke et al. (2010) found permissive Internet parenting style associated with the highest levels of IA in adolescents and authoritarian Internet parenting style associated with lowest levels of IA in adolescents. The findings of this study are in line with the permissive Internet parenting style; however, they differ when it comes to authoritarian Internet parenting style. The difference may be due to the different populations and also the consideration of the other two variables of parent’s IA and frequency of serious arguments suggesting that being authoritarian by itself is not a condition for lower IA in adolescents. Counselling programmes and policies for adolescents’ IA may need to consider training parents regarding the relationship of their IA, digital parenting style, and parent-adolescent conflict with their adolescent’s Internet addiction. Our results suggest that parents, in aggressive interaction cluster, need to act as positive role-model for their parenting to be effective. This is in line with other problematic behaviour such as smoking (Leonardi-Bee et al., 2011) where parental behaviour may normalize the behaviour in their adolescents.

This study has some limitations. Self-reported responses of IADQ and the external-reported responses of PYDQ might be inaccurate and biased. With IADQ, parents may be biased in how they see their own usage where denial is a common symptom of people with problematic behaviour (Thompson et al., 2009). A study done by Yazdi et al. (2021) investigated the parental perception of their adolescent’s IA with expert evaluations of IA and the adolescent’s perception of their IA with expert evaluations of IA. Their results found parents to overestimate their adolescents’ level of Internet addiction, whereas the adolescents’ perception of their Internet addiction underestimated it yet closer to expert evaluations. Asian parents, in general, tend to view online activities that are not educational, or family related as irrational (Griffiths et al., 2016). Since the survey was from parents’ perspective and the sample had a majority of Asian parents, this could explain why most adolescents scored high in Internet addiction. Additionally, with the pandemic, the lockdown restrictions had increased adolescents’ use of digital technology for school activities, games, and socializing while also increasing parents’ attempt to regulate their adolescent’s Internet practices (Sciacca et al., 2022). This may have also contributed to the parent’s perception of their adolescent’s Internet addiction. Another limitation of the study may be the inclusion of only one parent’s perspective. Due to the pandemic, the survey was distributed using social media and mailing lists of the institutes involved in this study and the announcement has highlighted it as a study on the excessive use of technology, particularly in adolescents. This could lead to sampling bias as parents who do not perceive their adolescents to have problematic Internet usage may have seen the survey as irrelevant. Hence, our study is better described as one that focuses on parents who have adolescents with IA or at risk of having it.
Future studies for interactions of adolescent Internet addiction may investigate the relationship of the three interactions (assertive, aggressive, and lenient interactions) with other risk factors of IA as possible mediators or moderators. For example, Chi et al. (2020) found sociodemographic factors such as gender, parent-adolescent living conditions, and academic performance tend to impact adolescent Internet addiction. Studying the relationship of such sociodemographic factors with the three interactions could help to understand whether the risk of Internet addiction is more pronounced in individuals with certain interaction and certain sociodemographic groups. Additionally, since the survey was distributed randomly through online media and may have only been responded to by parents with perceived Internet-addicted adolescents, a larger sample size may be taken to ensure the inclusion of parents with non-addicted adolescents and enable knowledge of success in managing technology usage in adolescence. Furthermore, self-reported surveys have a bias of users not reporting their smartphone usage accurately (McAlaney et al., 2020). Hence, future studies may adopt the use of objective data to measure the actual use of Internet of both parent and adolescent, e.g. data captured through automated means measuring time and frequency of checking digital devices. This would help get an accurate measure of the non-essential Internet usage that may otherwise have a bias when using self-reports from the perspective of the parents or the adolescents themselves. Parents’ Internet parenting style in dealing with IA in their adolescents may also indicate their personality and perception of the behaviour. This may have influenced how they view IA in their adolescents. The IA in adolescents in this study is better interpreted as the parents’ perception of their adolescents’ IA which can be biased by what parents are in terms of personality and views. For example, authoritarian parents may hold high expectations from their adolescents and view their Internet use as excessive. On the other hand, permissive parents tend to be very easy-going and may not have accurately scored the extent of Internet addiction in their adolescents. Future studies could look into classifying Internet parenting styles from the adolescents’ perspective which may eliminate the bias that rises from the parents’ perspective of their children.

The findings from this study help to understand the interactions between parents’ and adolescents’ Internet addiction with Internet parenting types and parent-adolescent conflict. The study identified three different interactions: assertive, aggressive, and lenient interactions. Assertive interaction mostly involved non-dependent authoritative parents with at-risk adolescents who had occasional arguments with their adolescents on their Internet use. Aggressive interaction mostly has at-risk authoritarian parents with addicted adolescents and frequently argued with their adolescents on their Internet use. Lenient interactions mostly involved non-dependent permissive parents with highly addicted adolescents who frequently argued with their adolescents on their Internet use. These findings help to understand the parent-adolescent relationship when it comes to Internet use, and it also helps to realize the need to educate and train parents on adolescent IA and provides suggestions for implementing effective strategies to help prevent and treat adolescent IA.

Note

1. Familial patterns built on the similarity between the four factors we consider in this paper: parent IA, adolescent IA, parent-adolescent conflict and internet parenting styles.

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MA analyzed the data and wrote the first draft of the paper. SB advised on the clustering and statistical analysis. AA, SA and AB participated in the study design. AE and RA revised the paper and supervised the research. All authors reviewed the papers and approved it.

**Disclosure statement**

No potential conflict of interest was reported by the author(s).

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Data availability statement

Derived data supporting the findings of this study are available from the corresponding author on request.

References

Anderson, E. L., Steen, E., & Stavropoulos, V. (2016). Internet use and problematic Internet use: A systematic review of longitudinal research trends in adolescence and emergent adulthood. International Journal of Adolescence and Youth, 22(4), 430–454. https://doi.org/10.1080/02673843.2016.1227716

Bağatarhan, T., & Siyez, D. M. (2022). The effectiveness of a cognitive-behavioral prevention program for Internet addiction. Journal of Rational-Emotive & Cognitive-Behavior Therapy, 2021, 1–26. https://doi.org/10.1007/S10942-021-00439-7

Balantekin, K. N., Anzman-Frasca, S., Francis, L. A., Ventura, A. K., Fisher, J. O., & Johnson, S. L. (2020). Positive parenting approaches and their association with child eating and weight: A narrative review from infancy to adolescence. Pediatric Obesity, 15(10), e12722. https://doi.org/10.1111/JOPO.12722

Baumrind, D. (1971). Current patterns of parental authority. Developmental Psychology, 4(1, Pt.2), 1–103. https://doi.org/10.1037/H0030372

Beard, K. W., & Wolf, E. M. (2001). Modification in the proposed diagnostic criteria for Internet addiction. Cyberpsychology and Behavior, 4(3), 377–383. https://doi.org/10.1094/109493101300210286

Bener, A., & Bhugra, D. (2013). Lifestyle and depressive risk factors associated with problematic internet use in adolescents in an Arabian Gulf culture. Journal of Addiction Medicine, 7(4), 236–242. https://doi.org/10.1097/ADM.0B013E318292681F

Chang, F. C., Chiu, C. H., Miao, N. F., Chen, P. H., Lee, C. M., Chiang, J. T., & Pan, Y. C. (2015). The relationship between parental mediation and Internet addiction among adolescents, and the association with cyberbullying and depression. Comprehensive Psychiatry, 57, 21–28. https://doi.org/10.1016/J.COMPPSYCH.2014.11.013

Chennad, K., Alshakhsi, S., Al-Harahsheh, S., Abdelmoneim, A. O., Al-Khalaf, M. S., Baghdady, A., & Ali, R. (2022). Is it contagious? Does parents’ internet addiction impact their adolescents’ Internet addiction? Social Science Computer Review, 089443932211174. https://doi.org/10.1177/08944393221174708

Chen, Y. L., Chen, S. H., & Gau, S. S. F. (2015). ADHD and autistic traits, family function, parenting style, and social adjustment for Internet addiction among children and adolescents in Taiwan: A longitudinal study. Research in Developmental Disabilities, 39, 20–31. https://doi.org/10.1016/J.RIDD.2014.12.025

Chen, H. C., Wang, J. Y., Lin, Y. L., & Yang, S. Y. (2020). Association of Internet addiction with family functionality, depression, self-efficacy and self-esteem among early adolescents. International Journal of Environmental Research and Public Health, 17(23), 8820. https://doi.org/10.3390/IJERPH17238820

Chi, X., Hong, X., & Chen, X. (2020). Profiles and sociodemographic correlates of Internet addiction in early adolescents in southern China. Addictive Behaviors, 106, 106385. https://doi.org/10.1016/J.ADDBEH.2020.106385

Chou, C., & Lee, Y. H. (2017). The moderating effects of Internet parenting styles on the relationship between Internet parenting behavior, Internet expectancy, and Internet addiction tendency. Asia-Pacific Education Researcher, 26(3–4), 137–146. https://doi.org/10.1007/S40299-017-0334-5/TABLES/3

Chung, T. W. H., Sum, S. M. Y., & Chan, M. W. L. (2019). Adolescent Internet addiction in Hong Kong: Prevalence, psychosocial correlates, and prevention. Journal of Adolescent Health, 64(6), S34–S43. https://doi.org/10.1016/J.JADOHEALTH.2018.12.016

Dolnicar, S. (2002). A review of unquestioned standards in using cluster analysis for data-driven market segmentation. Proceedings of the Australian and New Zealand Marketing Academy Conference. https://ro.uow.edu.au/commpapers/273/

Dufour, M., Brunelle, N., Tremblay, J., Leclerc, D., Cousineau, M. M., Khazaal, Y., Légaré, A. A., Rousseau, M., & Berbiche, D. (2016). Gender difference in Internet use and Internet problems among Quebec high school students. Canadian Journal of Psychiatry, 61(10), 663–668. https://doi.org/10.1177/0706743716404755

Durkee, T., Kaess, M., Carli, V., Parzer, P., Wasserman, C., Floderus, B., Apter, A., Balazs, J., Barzilay, S., Bobes, J., Brunner, R., Corcoran, P., Cosman, D., Cotter, P., Desplains, R., Graber, N., Guillemin, F., Haring, C., Kahn, J. P., & Wasserman, D. (2012). Prevalence of pathological internet use among adolescents in Europe: Demographic and social factors. Addiction, 107(12), 2210–2222. https://doi.org/10.1111/J.1360-0443.2012.03946.X

Fumero, A., Marrero, R. J., Voltes, D., & Peñate, W. (2018). Personal and social factors involved in internet addiction among adolescents: A meta-analysis. Computers in Human Behavior, 86, 387–400. https://doi.org/10.1016/J.CHB.2018.05.005

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

Hahn, E. J. (1991). Parent participation and preschool drug prevention programs. Journal of Addictions Nursing, 3(4), 115–120. https://doi.org/10.3109/10884609109078326

Johnson, J. (2021, September 10). • Internet users in the world 2021 | Statista. Statista Research Department. https://www.statista.com/statistics/617136/digital-population-worldwide/
Kalaitzaki, A. E., & Birtchnell, J. (2014). The impact of early parenting bonding on young adults' Internet addiction, through the mediation effects of negative relating to others and sadness. Addictive Behaviors, 39(3), 733–736. https://doi.org/10.1016/J.ADDBEH.2013.12.002

Kawabe, K., Horiiuchi, F., Ochi, M., Oka, Y., & Ueno, S. I. (2016). Internet addiction: Prevalence and relation with mental states in adolescents. Psychiatry and Clinical Neurosciences, 70(9), 405–412. https://doi.org/10.1111/PCN.12402

Kuss, D. J., & Lopez-Fernandez, O. (2016). Internet addiction and problematic Internet use: A systematic review of clinical research. World Journal of Psychiatry, 6(1), 143. https://doi.org/10.5498/WJP.V6I1.143

Lam, L. T. (2020). The roles of parent-and-child mental health and parental Internet addiction in adolescent Internet addiction: Does a parent-and-child gender match matter? Frontiers in Public Health, 8, 142. https://doi.org/10.3389/fpubh.2020.00142

Lam, L. T., & Wong, E. M. Y. (2015). Stress moderates the relationship between problematic Internet use by parents and problematic Internet use by adolescents. Journal of Adolescent Health, 56(3), 300–306. https://doi.org/10.1016/J.JADOHEALTH.2014.10.263

Leonardi-Bee, J., Jere, M. L., & Britton, J. (2011). Exposure to parental and sibling smoking and the risk of smoking uptake in childhood and adolescence: A systematic review and meta-analysis. Thorax, 66(10), 847–855. https://doi.org/10.1136/THX.2010.153379

Li, C., Dang, J., Zhang, X., Zhang, Q., & Guo, J. (2014). Internet addiction among Chinese adolescents: The effect of parental behavior and self-control. Computers in Human Behavior, 41, 1–7. https://doi.org/10.1016/J.CHB.2014.09.001

Li, J., Li, D., Jia, J., Li, X., Wang, Y., & Li, Y. (2018). Family functioning and Internet addiction among adolescent males and females: A moderated mediation analysis. Children and Youth Services Review, 91, 289–297. https://doi.org/10.1016/J.CHILDYOUTH.2018.06.032

Li, Y., Zhang, X., Lu, F., Zhang, Q., & Wang, Y. (2014). Internet addiction among elementary and middle school students in China: A nationally representative sample study. Cyberpsychology, Behavior, and Social Networking, 17(2), 111–116. https://doi.org/10.1089/CYBER.2012.0482

Liu, Q. X., Fang, X. Y., Deng, L. Y., & Zhang, J. T. (2012). Parent–adolescent communication, parental Internet use and Internet-specific norms and pathological Internet use among Chinese adolescents. Computers in Human Behavior, 28(4), 1269–1275. https://doi.org/10.1016/J.CHB.2012.02.010

Liu, Q. X., Fang, X. Y., Yan, N., Zhou, Z. K., Yuan, X. J., Lan, J., & Liu, C. Y. (2015). Multi-family group therapy for adolescent Internet addiction: Exploring the underlying mechanisms. Addictive Behaviors, 42, 1–8. https://doi.org/10.1016/J.ADDBEH.2014.10.021

Lozano-Blasco, R., Latorre-Martínez, M., & Cortés-Pascual, A. (2022). Screen addicts: A meta-analysis of internet addiction in adolescence. Children and Youth Services Review, 135, 106373. https://doi.org/10.1016/J.CHILDYOUTH.2022.106373

Martins, M. V., Formiga, A., Santos, C., Sousa, D., Resende, C., Campos, R., Nogueira, N., Carvalho, P., & Ferreira, S. (2020). Adolescent internet addiction – Role of parental control and adolescent behaviours. International Journal of Pediatrics and Adolescent Medicine, 7(3), 116–120. https://doi.org/10.1016/J.IJPAM.2019.12.003

Matejevic, M., Todorovic, J., & Jovanovic, A. D. (2014). Patterns of family functioning and dimensions of parenting style. Procedia - Social and Behavioral Sciences, 141, 431–437. https://doi.org/10.1016/J.SBSPRO.2014.05.075

McAlaney, J., Almourad, M. B., Powell, G., & Ali, R. (2020). Perceptions and misperceptions of smartphone use: Applying the social norms approach. Information, 11(1), 513,11. https://doi.org/10.3390/INFO11110513 513

Mohamed, G., & Bernouss, R. (2019). A cross-sectional study on Internet addiction among Moroccan high school students, its prevalence and association with poor scholastic performance. International Journal of Adolescence and Youth, 25(1), 479–490. https://doi.org/10.1080/02673843.2019.1674165

Müller, K. W., Beutel, M. E., Reinecke, L., Dreier, M., Schemer, C., Weber, M., Schnauber-Stockmann, A., Stark, B., Quiiring, O., & Wölfing, K. (2022). Internet-related disorders and their effects on personality development in adolescents from Germany-results from a prospective study. International Journal of Environmental Research and Public Health, 19(1), 529,19. https://doi.org/10.3390/IJERPH19010529 529

Ozturk, F. O., & Ayaz-Alkaya, S. (2021). Internet addiction and psychosocial problems among adolescents during the COVID-19 pandemic: A cross-sectional study. Archives of Psychiatric Nursing, 35(6), 595–601. https://doi.org/10.1016/J.JAPNU.2021.08.007

Peltz, J. S., Rogge, R. D., & Connolly, H. (2020). Parents still matter: The influence of parental enforcement of bedtime on adolescents’ depressive symptoms. Sleep, 43(5), 1–11. https://doi.org/10.1093/SLEEP/ZSZ287

Peng, W., Li, D., Li, D., Jia, J., Wang, Y., & Sun, W. (2019). School disconnectioned and adolescent Internet addiction: Mediatiion by self-esteem and moderation by emotional intelligence. Computers in Human Behavior, 98, 111–121. https://doi.org/10.1016/J.CHB.2019.04.011

Poznyak, V. (2018, September 14). Inclusion of “gaming disorder” in ICD-11. World Health Organization. https://www.who.int/news/item/14-09-2018-inclusion-of-gaming-disorder-in-icd-11

Python. (n.d.). Welcome to Python.org. Retrieved November 29, 2021, from https://www.python.org/

Rehman, A. U., & Belhaouari, S. B. (2022). Divide well to merge better: A novel clustering algorithm. Pattern Recognition, 122, 108305. https://doi.org/10.1016/J.PATCOG.2021.108305
Saha, R., Tariq, M. T., Hadi, M., & Xiao, Y. (2019). Pattern recognition using clustering analysis to support transportation system management, operations, and modeling. Journal of Advanced Transportation, 2019. https://doi.org/10.1155/2019/1628417

Scaglioni, S., Salvioni, M., & Galimberti, C. (2008). Influence of parental attitudes in the development of children eating behaviour. British Journal of Nutrition, 99(S1), S22–S25. https://doi.org/10.1017/S000711450882471

Sciaccia, B., Laffan, D. A., O’Higgins Norman, J., & Milosevic, T. (2022). Parental mediation in pandemic: Predictors and relationship with children’s digital skills and time spent online in Ireland. Computers in Human Behavior, 127, 107081. https://doi.org/10.1016/J.CHB.2021.107081

Siomos, K., Floros, G., Fisoun, V., Evaggelia, D., Farkonas, N., Sergentani, E., Lamprou, M., & Geroukalis, D. (2012). Evolution of Internet addiction in Greek Adolescent students over a two-year period: The impact of parental bonding. European Child and Adolescent Psychiatry, 21(4), 211–219. https://doi.org/10.1007/S00787-012-0254-0/TABLES/5

Soh, P. C. H., Chew, K. W., Koay, K. Y., & Ang, P. H. (2018). Parents vs peers’ influence on teenagers’ Internet addiction and risky online activities. Telematics and Informatics, 35(1), 225–236. https://doi.org/10.1016/J.TELE.2017.11.003

Sun, Y., & Wilkinson, J. S. (2020). Parenting style, personality traits, and interpersonal relationships: A model of prediction of Internet addiction. International Journal of Communication, 14, 23. https://ijoc.org/index.php/ijoc/article/view/11226

Tang, J., Yu, Y., Du, Y., Ma, Y., Zhang, D., & Wang, J. (2014). Prevalence of Internet addiction and its association with stressful life events and psychological symptoms among adolescent Internet users. Addictive Behaviors, 39(3), 744–747. https://doi.org/10.1016/J.ADBEH.2013.12.010

Thompson, L. E., Barnett, J. R., & Pearce, J. R. (2009). Scared straight? Fear-appeal anti-smoking campaigns, risk, self-efficacy and addiction. Health, Risk & Society, 11(2), 181–196. https://doi.org/10.1080/13698570902784281

Ursachi, G., Horodnic, I. A., & Zait, A. (2015). How reliable are measurement scales? External factors with indirect influence on reliability estimators. Procedia Economics and Finance, 20, 679–686. https://doi.org/10.1016/S2212-5671(15)00123-9

Valcke, M., Bonte, S., de Wever, B., & Rots, I. (2010). Internet parenting styles and the impact on Internet use of primary school children. Computers and Education, 55(2), 454–464. https://doi.org/10.1016/J.COMPEU.2010.02.009

van den Eijnden, R. J. J. M., Spijkerman, R., Vermulst, A. A., van Rooij, T. J., & Engels, R. C. M. E. (2010). Compulsive internet use among adolescents: Bidirectional parent-child relationships. Journal of Abnormal Child Psychology, 38(1), 77–89. https://doi.org/10.1007/S10802-009-9347-8/FIGURES/2

Wang, W., Li, D., Li, X., Wang, Y., Sun, W., Zhao, L., & Qiu, L. (2018). Parent-adolescent relationship and adolescent Internet addiction: A moderated mediation model. Addictive Behaviors, 84, 171–177. https://doi.org/10.1016/J.ADBEH.2018.04.015

Wartberg, L., Kriston, L., Kegel, K., & Thomasius, R. (2016). Adaptation and Psychometric Evaluation of the Young Diagnostic Questionnaire (YDQ) for parental assessment of adolescent problematic Internet use. Journal of Behavioral Addictions, 5(2), 311–317. https://doi.org/10.1556/2006.5.2016.049

Xu, J., Shen, L. X., Yan, C. H., Hu, H., Yang, F., Wang, L., Kotha, S. R., Ouyang, F., Zhang, L. N., Liao, X. P., Zhang, J., Zhang, J. S., & Shen, X. M. (2014). Parent-adolescent interaction and risk of adolescent Internet addiction: A population-based study in Shanghai. BMC Psychiatry, 14(1), 1–11. https://doi.org/10.1186/1471-244X-14-112/TABLES/4

Yazdi, K., Bilous, C., Mittermaier, M., Staudinger, K., & Fuchs-Leitner, I. (2021). Self-reported and parental assessments of Internet gaming disorder, and their accordance with DSM-5 criteria in a clinical relevant population. Cyberpsychology, Behavior, and Social Networking, 24(6), 407–413. https://doi.org/10.1089/CYBER.2020.0335

Yen, C. F., Ko, C. H., Yen, J. Y., Chang, Y. P., & Cheng, C. P. (2009). Multi-dimensional discriminative factors for Internet addiction among adolescents regarding gender and age. Psychiatry and Clinical Neurosciences, 63(3), 357–364. https://doi.org/10.1111/j.1440-1819.2009.01969.X

Young, K. S. (1998). Internet addiction: The emergence of a new clinical disorder. CyberPsychology & Behavior, 1(3), 237–244. https://doi.org/10.1089/CPB.1998.1.237

Zhang, R. P., Bai, B. Y., Jiang, S., Yang, S., & Zhou, Q. (2019). Parenting styles and Internet addiction in Chinese adolescents: Conscientiousness as a mediator and teacher support as a moderator. Computers in Human Behavior, 101, 144–150. https://doi.org/10.1016/J.CHB.2019.07.019

Zhao, Q., Huang, Y., & Li, C. (2022). Does adolescents’ Internet addiction trigger depressive symptoms and aggressive behavior, or vice versa? The moderating roles of peer relationships and gender. Computers in Human Behavior, 129, 107143. https://doi.org/10.1016/J.CHB.2021.107143

Zhou, N., & Fang, X. Y. (2015). Beyond peer contagion: Unique and interactive effects of multiple peer influences on Internet addiction among Chinese adolescents. Computers in Human Behavior, 50, 231–238. https://doi.org/10.1016/J.CHB.2015.03.083

Zhou, Y., Li, D., Jia, J., Li, X., Zhao, L., Sun, W., & Wang, Y. (2017). Intergenerational conflict and adolescent internet addiction: The mediating role of emotional insecurity and the moderating role of big five personality traits. Computers in Human Behavior, 73, 470–478. https://doi.org/10.1016/J.CHB.2017.04.012