

From dissociative experience and internet use to happiness: A Taiwan Birth Cohort Study

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Abstract

Background

Functional and excessive use of internet is hard to distinguish, and internet use can affect adolescents' development of self-identity. The aim of our study was to investigate the pathway relationship of the risk and protective factors of internet use, including mother care, absorptive dissociative trait, having been bullied, exercise, self-perceived depressive mood and happiness of 12-year-old adolescents.

Methods

The Taiwan Birth Cohort Study dataset, which used a national household probability sampling method and included 17,694 12-years-old adolescents, was used for this study.

Results

Our results showed 5.3% adolescents reported to spend more than five hours online during schooldays. Additionally, adolescents that spend more than five hours online during schooldays tended to have higher absorptive trait, perceived less care from mothers, more likely to have been bullied, expressed higher level of depressed mood, which leads to lower level of perceived happiness.

Conclusions

Adolescents that spend more than 5 hours online during schooldays, compared to those that spent less than an hour online, were more likely to have been bullied and affect their level of happiness, showing that they may be a group of higher concern. Since parental care and regular exercise are protective factors for internet addiction, it should be promoted to all adolescents, especially those in the high risk group, to prevent them from being addicted online.

Background

Internet networking has transformed how people communicate, entertain, behave, and educate. However, along with the convenience technology has brought., it has also brought growing adverse effects, such as pathological issues. Internet usage have found to affect the brain and cognitive process [1], this influence on the "digital natives" is especially important. Adolescents are at stage of development where they are on the search for their identities, and formation of self-image, along with the development of executive function [2]. Internet use could interfere with these developments [2]. However, functional and excessive use of internet is hard to distinguish, and 45% of the adolescents in the United States have reported to be "almost constantly" online, and 95% having access to a smartphone [3]. Internet addiction was proposed to be included in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders. Alongside

with this debate was whether the diagnosis should be towards generalized internet use and/or potentially addictive activities that can be engaged on the internet (e.g., gaming, social media, pornography, information seeking and shopping). The final DSM-5 introduced internet gambling disorder as a subtype of pathological gambling under the category of Substance-Related and Addictive Disorders.

Internet addiction has been reported to be a public health concern in both China and South Korea [4]. In Germany, a 1.16% prevalence was found for internet gaming disorder in adolescents [5], however, a much higher prevalence of 6% was found in Korea [6]. Internet gaming disorder has been found to be related to internalizing and externalizing problems in teenagers, including depression, anxiety, impulsivity and aggression [6]. Besides using internet for gaming, increased use of social media screen time has also been found to be a risk factor for depression and suicide [7]. Showing that excessive internet use can have damaging effect on mental health.

Besides internet use, bullying has also been found to effect the psychological well-being of adolescents [6]. Although internet use has its downside, however, other studies have found that social media use can boost well-being [8], depending on the motivation and frequency of social media use [3]. Shaw and Grant proposed that people with low self-esteem are more likely to decrease loneliness, modify their mood, and seek social support online [9]. Kurniasanti et al. also proposed that internet gaming can be used as a method of mood modification to adjustment their mood, get away from reality and overcome depression [2]. Adolescents who experience bullying in real life may seek social support online, however, over a third of children who have experienced cyberbullying also reported to have experienced bullying in real life [11]. Nevertheless, whether adolescents seek social support online because they have experienced interpersonal difficulties in real life, or vice versa, is yet to be determined.

In addition to the possibility of seeking social support, the individual's own trait may also increase their risk to becoming addicted online. A previous study found association between dissociative experiences and internet addiction [12]. Furthermore, absorptive trait within the dissociative experience have been found to be associated with smartphone addiction in adolescents [13], hence it is included in our investigation as a potential risk factor for internet addiction.

Besides the risk factor on internet addiction, we were also interested in the protective factors which may prevent internet usage from influencing the daily activity and social interaction of adolescents. Family guidance and care can prevent adolescents' involvement in problematic and hazardous behaviors. In the contrary, families with high levels of conflict and dysfunction were strong predictors for internet addiction [14]. Besides family, physical exercise can also improve psychological adjustment and well-being [15]. Exercise along with cognitive-behavioral therapy have been found to improve the symptoms of patients with depression [16]. Therefore, whether mother care and exercise are resilience factors to internet addiction will also be investigated in our study.

Therefore, the aim of our study was using a national birth cohort dataset to investigate the risk and protective factors of internet use. Including the pathway relationship of the mother care, absorptive

dissociative trait, bullying, exercise, internet use, self-perceived depressive mood and happiness of 12-year-old adolescents.

Methods

Participants

This study used the Taiwan Birth Cohort Study (TBCS) 12-year-old dataset. Aimed to build a sample representative of the children in Taiwan, the TBCS used household probability sampling method. Babies born in the year 2005 were randomly selected with no exclusion criteria [17]. A two-stage stratified random sampling was used, at the first stage, the primary sampling unit was cities and town [17]. Eighty-five townships were systematic randomly selected, by grouping all 369 townships in Taiwan into 12 strata according to four levels of size of the settlement in which the subjects were resident and three levels of total fertility rate. In the second stage, newborns were proportionally selected according to the rate of births from the 85 selected settlements [17]. At when the children were 6-months, 21 248 babies and families (11.7% selection rate) were selected [17]. The 12-years-old is the fifth stage dataset, 188,14 families agreed to participate, and within these 17 694 (94.05%) adolescents completed the questionnaires. The protocol of the study was approved by the institutional review board of a teaching hospital. Written informed consent was obtained at each stage of the study after a detailed explanation of the study.

Materials

All factors analyzed in this study were of adolescents' self-report.

Absorptive trait. The TBCS included three items from the Adolescent Dissociative Experience Scale. "I get so wrapped up in watching TV, reading, or playing a video game that I don't have any idea what's going on around me." "I am so good at lying and acting that I believe it myself." "I can't figure out if things really happened or if I only dreamed or thought about them." Response choices ranged from 1 (*strongly agree*) to 4 (*strongly disagree*). After recoding the responses, with higher total score implying higher absorptive trait, the Chronbach's alpha of the three items resulted in .559.

Happiness. The self-perceived happiness of the adolescents was measured using the seven item Chinese Oxford Happiness Questionnaire, which has shown good psychometric properties in community adolescents in Taiwan [18]. Higher scores implied better perceived happiness.

Internet use. The TBCS asked two questions "How many hours do you spend online during schooldays?", and another question asking "How many hours do you spend online on days when you don't have to go to school?" In addition to the continuous variable derived from these questions, the hours adolescents spent online were further dichotomized into those who spend less than an hour, and those who spend more than 5 hours a day online. Since Twenge, Joiner, Rogers and Martin⁸ found adolescents who spent

more than 5 hours a day on social media and smartphones had 66% increased risk in suicide compared to those who spent less than an hour online.

Depressive state. The item "I felt depressed" from the Center for Epidemiological Studies-Depression was used to measure adolescents' depressive state. Response choices were *never* = 1, *once in a while* = 2, *sometimes* = 3, *often* = 4, *always* = 5.

Maternal care. Adolescents' self-perceived level of maternal care was measured by asking the adolescents three questions: 1) "Does your mother (or the person who mainly takes care of you) know what you do on your free time?" 2) "Does your mother (or the person who mainly takes care of you) know who you normally hang out with (Eg. When you go out to play, exercise, shopping or do homework etc.?" 3) "Does your mother (or the person who mainly takes care of you) know when you go to bed?". These items were answered in a five-point Likert scale of "always", "often", "sometimes", "once in a while", or "never". The ratings of these items were combined to form the mother care factor, which has a Cronbach's alpha of .702.

Statistical analysis

The demographic distribution of the adolescents and parents were analyzed using Statistical Package for the Social Sciences (SPSS) 20.0 for Windows software (SPSS Inc., Chicago, USA). Bayesian analysis, a multiple imputation method based on item response theory, accounts for multiple sources of correlation was used to replace missing data.

Structural equation model (SEM) was used to investigate the pathway relationship of internet use, dissociative absorption experiences, being bullied, and perceived level of happiness of these adolescents. The SEM was analyzed using the Analysis of a MOment Structures 7.0 statistical software package (SPSS Inc., Chicago, USA). SEM models with a p value greater than .5, adjusted goodness-of-fit index (AGFI) greater than .9, root mean square error of approximation (RMSEA) less than .08 implies that the null model approximates the real structure.

Results

The demographic distribution of the adolescents and parents is shown in Table 1. Results showed 75.7% teens reported to have never been bullied, which means approximately a quarter of the children have ever experienced bullying. Adolescents reports to go online on average of 1.55 (standard deviation=1.87) hours during schooldays, and 3.62 on days without school. Additionally, 5.3% of the teens reports to go online more than 5 hours on schooldays and 25.9% on days without school. The majority of the teens reported to exercise on a regular basis (82.1%).

Two SEMs were analyzed to investigate the pathway relationship of internet use, absorptive trait, bullying, depressive state and level of happiness in teenagers, with maternal care and exercise being the resilience factors within the model. The first model included internet use as a continuous variable, and in

the second model internet use was dichotomized into those who were online less than 1 hour or more than 5 hours a day (those who reported to go online between 1 and 5 hours were excluded in this model).

The first SEM of the pathway relationship of internet use (during schooldays and on off schooldays), absorptive trait, bullying, depressive state, maternal care, exercise and level of happiness in teenagers is shown in figure 1. The model resulted in a good fit, with p value of .217 (greater than .05), AGFI of .999 (greater than .9), and RMSEA of .004 (less than .08). Factors which were associated with the teenagers' time spent online included the teenagers' sex, perceived mother care, and the level of absorptive trait. Those who perceived lower maternal care and/or higher absorptive trait were associated with more hours of internet use during schooldays ($\beta=.05, p<.001$; $\beta=-.09, p<.001$; $\beta=.11, p<.001$). In a similar line, those who spent more hours online during school days, perceived lower maternal care, and/or higher absorptive trait were associated with more hours of internet use on days they don't have to go to school ($\beta=.56, p<.001$; $\beta=-.06, p<.001$; $\beta=.09, p<.001$). Teenagers who spent more time online (both during schooldays and off schooldays), perceived less mother care, higher absorptive trait, have been bullied, and/or were female reported to be more depressed ($\beta=.02, p=.010$; $\beta=.02, p=.012$; $\beta=-.06, p<.001$; $\beta=.17, p<.001$; $\beta=.18, p<.001$; $\beta=.05, p<.001$). Factors associated with level of happiness included maternal care, absorptive trait, exercise, internet use during schooldays and on days without school, being bullied and depressive state. Teens that perceived higher maternal care, exercised more, had never been bullied, had lower absorptive trait and depressive level had better overall level of happiness ($\beta=.32, p<.001$; $\beta=.12, p<.001$; $\beta=-.07, p<.001$; $\beta=-.16, p<.001$; $\beta=-.20, p<.001$). Teens that spent more time online on days without school perceived lower level of happiness ($\beta=-.02, p=.003$).

The second SEM investigated the pathway differences of sex, maternal care, absorptive trait, exercise, internet use during schooldays and depressive state in teens that spent more than five hours and less than an hour online during schooldays, as shown in figure 2. The model resulted in a good fit, with a p value of .862, AGFI of 1.000, and RMSEA of less than .001. Similar to the results of the first figure, females, those who perceived lower maternal care, have been bullied and/or higher absorptive trait were more likely to spend more than five hours online per day during schooldays ($\beta=.05, p<.001$; $\beta=.03, p=.011$; $\beta=-.10, p<.001$; $\beta=.09, p<.001$). This model further found, teens who spend more than five hours online schooldays were less likely to exercise, and more likely to be depressed ($\beta=-.05, p<.001$; $\beta=.05, p<.001$). Those who perceived higher maternal care, lower absorptive trait, less frequency of being bullied, exercised more, and less depressed reported to have higher level of happiness ($\beta=.33, p<.001$; $\beta=-.18, p<.001$; $\beta=-.06, p<.001$; $\beta=.11, p<.001$; $\beta=-.19, p<.001$).

The third SEM investigated the pathway differences of sex, maternal care, absorptive trait, exercise, internet use in teens that spent more than five hours and less than an hour online during off schooldays. However, since the finding of this model was similar to that of the continuous internet use model (figure 1), the result of this model was not presented.

Discussion

Our national birth cohort study found among the 17,694 adolescents that participated, 5.3% reported to spend more than five hours online during schooldays. Adolescents that spend more than five hours online during schooldays reported to have higher absorptive trait, perceived less care from mothers, more likely to have been bullied, expressed higher depressed mood, which leads to lower level of perceived happiness. Adolescents that spend more than 5 hours online during schooldays, compared to those that spent less than an hour online, were more likely to have been bullied and affect their level of happiness, showing that they may be a more pathologic group effecting their occupational function (which for this group of students is being in school).

Approximately five percent of the teenagers in our study reported to spend more than five hours online during school days. Although currently there is still no consistent set of criteria to define internet addiction, our study used the cutoff point of spending more than five hours online during schoolday, and a 5.3% prevalence was found, which is within the range of 1.5–8.2% found in a review study [19].

With regards to bullying, approximately a quarter (24.7%) of the adolescents in our study reported to have been bullied, however, within teenagers who goes online more than 5 hours a day, 31.15% reported to have been bullied in school. The reported rate of bullying is similar to the 25.3% found in the Taiwan Birth Cohort pilot Study [20], which is similar to the 16.9% found in the United States [21]. Furthermore, our study found teenagers that were bullied in school were more likely to be in this high risk group for excessive internet use. Lam, Peng, Mai and Jing found recent stressful event as a risk factor for internet addiction [22], and Young proposed that excessive use of internet as a coping mechanism to avoid negative emotions and problems [23]. Therefore, being bullied in school maybe one of the stressful events adolescents experience which increases their risk of being addicted online.

In addition to the stressful event of being bullied, the personal characteristics of high absorptive dissociative trait also increases their risk of becoming addicted online. This is in line with previous studies which found dissociative experiences to be associated with internet addiction [12]. Furthermore, absorptive trait within the dissociative experience have been found to be associated with smartphone addiction [13]. A meta-analysis also found “escape from self” to be an important intrapersonal risk factor for internet addiction [24]. Adolescents may experience great distress in the process of identify formation, those who are unable to overcome the stress in reality may turn to the internet for transient escape from real life and satisfaction from the virtual self, leading to internet addiction [24].

Besides the risk factor of absorptive trait and being bullied, we found maternal care and regular exercise were protective factors to being addicted online. Parental care and protection can decrease the adolescents’ motivation of to participate in social networking and becoming addicted online [25]. It also serves as a protective factor preventing teenagers from participating in problematic and harmful behaviors [26]. In contrast, a previous study found teens with internet addiction had a higher rate of conflict with parents compared to non-addicts [27]. For those who experience conflict at home or bullying in school may seek interpersonal connection and a sense of belonging online. Besides care from family, regular exercise was another protective factor. Exercise itself can boost mood and the psychological well-

being of an individual, and a previous study also found those not addicted online more frequently attended stress-releasing leisure activities compared to those who were addicted online [28].

As for the consequences of being addicted online. Our study found, those who spent more time online were more likely to experience depressed mood and perceived lower level of happiness. The association between internet addiction and depressed mood have also been found in a previous study [7]. Twenge, Joiner, Rogers and Martin found adolescents who spent more time on new media screen activities (such as smartphone devices and social media) were more likely to report mental health issues, and those who reported to have spent more time on nonscreen activities (such as exercise or in-person interaction) were less likely to report mental health issues [28]. The negative relationship between internet use and exercise was also found in our study, adolescents that spent more time online, were less likely to exercise regularly. Furthermore, those that exercised regularly perceived higher level of happiness, and those who spent more time online perceived lower level of happiness.

A limitation of our study was that only the hours adolescents spent online were collected, and no information regarding the behavioral consequences of internet addiction was collected. The current proposed diagnostic criteria for internet addiction includes the four components of: 1) excessive use, 2) withdrawal, including feelings of anger, anxiety, or depression when the access to a computer or smartphone is limited, 3) tolerance, including the need for more hours of use, and 4) adverse consequences, including fatigue, social isolation, or poor academic or occupational performances [4]. However, since there are still no official diagnostic criteria for internet addiction, therefore no diagnostic consensus has been reached. Furthermore, the general use of internet was collected, and no information regarding the habit of use was collected. Young and Cristiano has proposed internet usage to be separated into four categories of gaming, social media, pornography, and information seeking [29]. Further information regarding the purpose of internet use may provide us with more information regarding the different subtype of internet addiction and its effects.

Conclusions

Our large national birth cohort study showed those with higher absorptive dissociative trait, perceived less care from mothers and have been bullied in school were more likely to spend more than five hours online during schooldays, expressed higher depressed mood and lower level of perceived happiness. Since parental care is a protective factor for internet addiction, parents should provide care and guidance, while respecting the autonomy of the adolescents, reducing the motivation of adolescents to become involved with social networking and risk of internet addiction [13, 24]. Furthermore, adolescents who do not have an adequate coping strategy when faced with stressful situation are more likely to choose avoidant methods, which increases their risk of becoming addicted. Exercise rehabilitation has been promoted by Kim to increase physical and mental health condition of those with internet addiction [30]. Therefore, it should be promoted to all adolescents, especially those in the high risk group such as those who have experienced bullying or with absorptive trait, to prevent them from being addicted online.

List Of Abbreviations

AGFI
adjusted goodness-of-fit index
DSM-5
Diagnostic and Statistical Manual of Mental Disorders fifth edition
RMSEA
root mean square error of approximation
SEM
Structural equation model
SPSS
Statistical Package for the Social Sciences
TBCS
Taiwan Birth Cohort Study

Declarations

Ethics approval and consent to participate: The protocol of this study was approved by the institutional review board of the Research Ethics Committee of National Taiwan University Hospital, in Taipei, Taiwan. After detailed explanation of the study, informed consent was obtained from the parents of all participants at each stage of the study.

Consent for publication: Not applicable.

Availability of data and materials: Taiwan Birth Cohort Study datasets can be applied from the Taiwan Ministry of Health and Welfare, Bureau of Health Promotion, Taiwan. <https://dep.mohw.gov.tw/DOS/np-2500-113.html>

Competing interests: The authors declare that they have no conflict of interest.

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Authors' contributions: All authors designed the study. T.L. Chiang and S.J. Lin overlooked the sampling and experimental procedures. F.W. Lung and B.C. Shu undertook the statistical analysis and interpreted the analysis. F.W. Lung wrote the first draft of the manuscript. All authors contributed to and have approved the final manuscript.

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References

1. Firth J, Torous J, Stubbs B, Firth JA, Steiner GZ, Smith L, et al. The “online brain”: how the Internet may be changing our cognition. *World Psychiatry*. 2019;18:119–29.
2. Kurniasanti S, Assandi P, Ismail RI, Nasrun MWS, Wiguna T. Internet addiction: a new addiction? *Med J Indones*. 2019;28:82.
3. Rosenberg KP, Feder LC. Behavioral addictions: criteria, evidence, and treatment. London: Elsevier Academic Press; 2014.
4. Anderson M, Jiang J. Teens, social media & technology 2018. <https://www.pewinternet.org/2018/05/31/teens-social-media-technology-2018/> Accessed May 29 2020.
5. Block JJ. Issues for DSM-V: Internet addiction. *Am J Psychiatry*. 2008;165:306–7.
6. Rehbein F, Kliem S, Baier D, Mößle T, Petry NM. Prevalence of internet gaming disorder in German adolescents: diagnostic contribution of the nine DSM-5 criteria in a state-wide representative sample. *Addiction*. 2015;110:842–51.
7. Korean National Information Society Agency. A survey on internet addiction; Korean National Information Society Agency Report: Seoul, Korea; 2015.
8. Young KS, Rogers RC. The relationship between depression and internet addiction. *Cyberpsychol Behav*. 1998;1:25–8.
9. Dienlin T, Masur PK, Trepte S. Reinforcement or displacement? The reciprocity of FtF, IM, and SNS communication and their effects on loneliness and life satisfaction. *J Comput Mediat Commun*. 2017;22:71–87.
10. Shaw LH, Grant LM. In defense of the internet: the relationship between internet communication and depression, loneliness, self-esteem, and perceived social support. *Cyberpsychol Behav*. 2002;5:157–71.
11. Beran T, Li Q. The Relationship between Cyberbullying and School Bullying. *The Journal of Student Wellbeing*. 2007;1:15–33.
12. De Berardis D, D'Albenzio A, Gambi F, Sepede G, Valchera A, Conti CM, et al. Alexithymia and its relationships with dissociative experiences and Internet addiction in a nonclinical sample. *Cyberpsychol Behav*. 2009;12:67–9.
13. De Pasquale C, Sciacca F, Hichy Z. Smartphone Addiction and Dissociative Experience: An investigation in Italian adolescents aged between 14 and 19 years. *Int J Psychol Behav Anal*. 2015;1:109.
14. Wu CST, Wong HT, Yu KF, Fok KW, Yeung SM, Lam CH, et al. Parenting approaches, family functionality, and internet addiction among Hong Kong adolescents. *BMC Pediatr*. 2016;16:130.
15. Shamus E, Cohen G. Depressed, low self-esteem: What can exercise do for you? *Internet J Allied Health Sci Pract*. 2009;7:7.

16. Hallgren M, Kraepelien M, øjehagen A, Lindefors N, Zeebari Z, Kaldo V, et al. Physical exercise and internet-based cognitive–behavioural therapy in the treatment of depression: Randomised controlled trial. *Br J Psychiatry*. 2015;207:227–34.
17. Lung FW, Chiang TL, Lin SJ, Shu BC, Lee MC. Developing and refining the Taiwan Birth Cohort Study (TBCS): Five years of experience. *Res Dev Disabil*. 2011;32:2697–703.
18. Lung FW, Shu BC. The psychometric properties of the Chinese Oxford Happiness Questionnaire in Taiwanese adolescents: Taiwan Birth Cohort Study. *Community Ment Health J*. 2020;56:135–8.
19. Cheng C, Li AY. Internet addiction prevalence and quality of (real) life: a meta-analysis of 31 nations across seven world regions. *Cyberpsychol Behav Soc Netw*. 2014;17:755–60.
20. Lung FW, Shu BC, Chiang TL, Lin SJ. Prevalence of bullying and perceived happiness in adolescents with learning disability, intellectual disability, ADHD and autism spectrum disorder: in the Taiwan Birth Cohort Pilot Study. *Medicine*. 2019;98:e14483.
21. Nansel TR, Overpeck M, Pilla RS, Ruan WJ, Simons-Morton B, Scheidt P. Bullying behaviors among US youth: prevalence and association with psychosocial adjustment. *JAMA*. 2001;285:2094–100.
22. Lam LT, Peng ZW, Mai JC, Jing J. Factors associated with Internet addiction among adolescents. *Cyberpsychol Behav*. 2009;12:551–5.
23. Young KS. The evolution of internet addiction. *Addict Behav*. 2017;64:229–30.
24. Koo HJ, Kwon JH. Risk and protective factors of internet addiction: a meta-analysis of empirical studies in Korea. *Yonsei Med J*. 2014;55:1691–711.
25. Floros G, Siomos K. The relationship between optimal parenting, Internet addiction and motives for social networking in adolescence. *Psychiatry Res*. 2013;209:529–34.
26. Miller P, Plant M. Parental guidance about drinking: Relationship with teenage psychoactive substance use. *J Adolesc*. 2010;33:55–68.
27. Yen JY, Yen CF, Chen CC, Chen SH, Ko CH. Family factors of internet addiction and substance use experience in Taiwanese adolescents. *Cyberpsychol Behav*. 2007;10:323–9.
28. Lin CH, Lin SL, Wu CP. The effects of parental monitoring and leisure boredom on adolescents' Internet addiction. *Adolescence*. 2009;44:993–1004.
29. Twenge JM, Joiner TE, Rogers ML, Martin GN. Increases in depressive symptoms, suicide-related outcomes, and suicide rates among U.S. adolescents after 2010 and links to increased new media screen time. *Clin Psychol Sci*. 2018;6:3–17.
30. Young KS, Cristiano NDA. Internet addiction in children and adolescents: risk factors, assessment, and treatment. New York: Springer Publishing Company; 2017.
31. Kim H. Exercise rehabilitation for smartphone addiction. *J Exerc Rehabil*. 2013;9:500–5.

Table

Table 1. Demographic distribution of the adolescents and parents (N=17 694)

Variable	n (%)
Child sex	
Boy	9246 (52.3)
Girl	8448 (47.7)
Have been bullied	
Always	171 (1.0)
Often	217 (1.2)
Sometimes	818 (4.6)
Once in a while	3087 (17.4)
Never	13401 (75.7)
Online time on school days	
≤ 1	11295 (63.8)
≥ 5	943 (5.3)
Online time on off schooldays	
≤ 1	5416 (30.6)
≥ 5	4576 (25.9)
Exercise regularly	14518 (82.1)
Maternal education	
Illiterate	13 (0.1)
Elementary school	509 (2.9)
Middle school	1433 (8.1)
High school	6322 (35.7)
University/college	8391 (47.4)
Graduate school	1026 (5.8)
Paternal education:	
Illiterate	5 (0.0)
Elementary school	214 (1.2)
Middle school	1788 (10.1)
High school	6349 (35.9)
University/college	7473 (42.2)

Variable (range)	Mean (SD)
Graduate school	1865 (10.5)
Hours spend online	
School days	1.55 (1.87)
Days without school	3.62 (3.38)

Figures

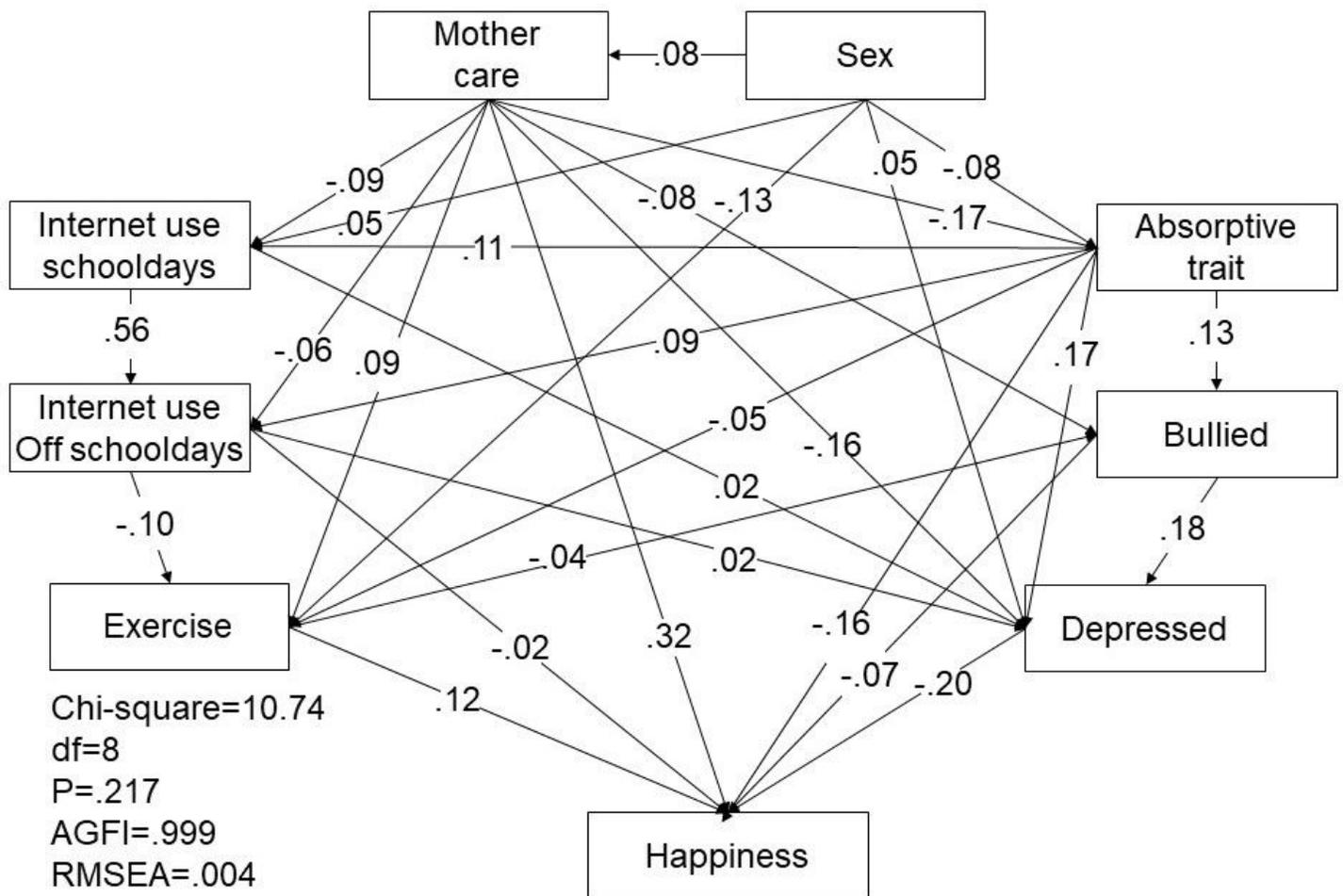


Figure 1

The path relationships among dissociative trait, bullying, internet use, depressive mood and happiness in 12-year-olds AGFI: adjusted goodness-of-fit; RMSEA: root mean square error of approximation

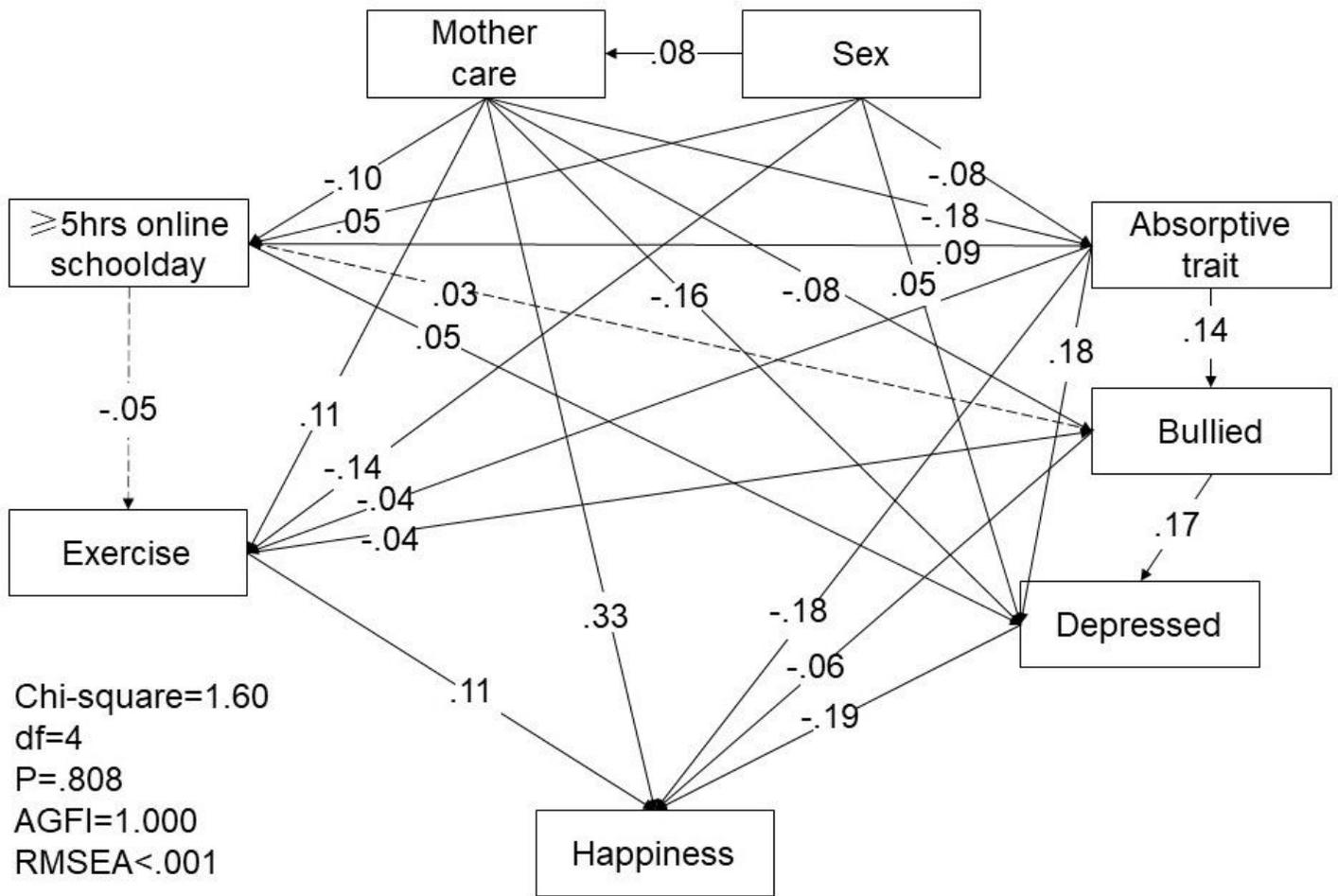


Figure 2

The path relationships of risk and protective factors on five hours of internet use on mood and happiness in 12-year-olds AGFI: adjusted goodness-of-fit; RMSEA: root mean square error of approximation; ≥ 5 hrs online schoolday dummy variable: 1=spend ≥ 5 hrs online during schooldays, 0=spend ≤ 1 hr online during schooldays