

Presentation II

The Crisis and Turning Point of Adolescents in the Post-Pandemic Era in Greater China: A Comparative Analysis of Social Care, Integration Promotion, and Mental and Physical Health

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Abstract

The research surveyed total of 10,131 adolescent, 6,166 living in mainland China, 2,478 living in Macau, and 1,487 living in Taiwan. The data analysis examined how the COVID-19 pandemic affected adolescent life regarding mental health in these three different Chinese ethnic regions.

The research compared the differences of the surveyed adolescent in living conditions, self-resilience, and mental health. It used the shotgun approach to examine the relationship among internet use behavior, social relationships, social support, self-resilience, and mental health.

The analysis results found that adolescent living in Macau showed the highest scores in terms of interpersonal distress and academic distress; tolerance for internet addiction and compulsive internet use symptoms; perception of interpersonal problems related to internet addiction.

Adolescent living in Taiwan showed the highest scores in terms of stress/anxiety; motivation for using social/consumption tools on the internet; higher perception of the intimacy and

informational aspects of real-life social interaction with friends and peers; level of instrumental and informational support from family members;

Adolescent living in China showed the highest scores in terms of perception of the intimacy and informational aspects of online social interaction with internet friends; and perception of self-resilience.

The findings suggested that tolerance to internet addiction, time management and interpersonal health issues related to internet addiction, intimacy with family members and informational aspects of real-life social interaction with peers and friends, intimacy with internet friends, family social support, and self-resilience can predict psychological health, including interpersonal distress, academic distress, stress and anxiety, and depression.

The statistical analysis concluded that the predictive power is highest for teenagers living in China, ranging from 20% to 25%, while those living in Macau and Taiwan have similar predictive power, ranging from 11% to 20%.

Introduction

I. The Youth and the Pandemic

Transiting from middle childhood into adolescence, teenagers undergo rapid changes in their physical and psychological development, including their social skill in interacting with other people. The period of adolescence, accompanied by a fast-paced developmental rhythm, can bring stress and challenges to teenagers, leading to emotional fluctuations that may even affect their academic performance, social life, and daily activities. However, from a developmental perspective, it is always a process that adolescents learn to know about themselves, develop problem-solving skills, improve their personal skills, and emotional management to deal with any incoming growing up challenges. The learned personal skills and emotional management methods would help them enhance their potential and promote their holistic development. Adolescents inevitably encounter different challenges and confusions on their path to growth, and they must learn to overcome these hurdles in order to thrive in their learning, work, and life. The teenage years are not only a transitional period from middle childhood to adulthood but also a crucial stage for individuals to define self-identity. Therefore, the values and behavior patterns formed during this period have a profound impact on future adulthood and later life development.

In the United States, approximately four million children have mental health issues, and 10% to 20% of adolescents experience psychological distress (USDHHS, 1999). Unfortunately, only half of them receive professional help (Achenbach & Edelbrock, 1981). In China, it is known that nearly 20% of children and adolescents have significant problems in their physical and mental health development. Furthermore, a sampling survey was conducted on primary and secondary school students in some critical regions, and the analysis of the survey results revealed that between 50% and 67% of students of the same age group in China suffer from varying

degrees of physical and mental health problems. The severity of psychological distress is evaluated based on behavioral manifestations. Achenbach and Edelbrock (1981) classified psychological distress into two categories:

1. Externalizers: Individuals who exhibit conflicts in their external world, such as aggressive behavior, criminal behavior, or sexual problems.
2. Internalizers: Individuals who exhibit conflicts in their internal psyche, such as depression, anxiety, phobias, obesity, and psychosomatic disorders.

The spiritual conflicts between external and internal factors are caused by the socialization of children and adolescents. For example, individuals with external spiritual conflicts are often influenced by parents with apparent behavioral problems who show little concern for their children, leading to adolescents and children expressing their aggressive impulses through external behaviors. On the other hand, individuals with internal spiritual conflicts may come from stable families. Although their parents may not have apparent behavioral problems and care deeply for their children, they may have excessive expectations and the children may not be able to meet them. As a result, these adolescents and children internalize their stress and create inner psychological conflicts (Achenbach & Edelbrock, 1981). From a perspective of health promotion, adolescence is a critical period for establishing correct health behavior patterns and the initial stage of behavior formation. Therefore, if negative behavior factors can be identified in the early age and controlled or improved, individuals can not only enjoy a healthy adolescence but also extend their physical and mental health into adulthood or old age.

In 2008, a survey was conducted in Taiwan among junior high school students, with 3,960 questionnaires distributed and 3,435 valid responses received, resulting in a response rate of 87%. The results showed the following (Health Magazine, 2008):

1. Junior high school students have low satisfaction with their own body weight.
2. They have insufficient sleep and are prone to attention problems.
3. They have worries but no one to confide in, with 30% having suicidal thoughts.
4. Poor parent-child relationship, communication and interaction.
5. Lack of sex education resources and consults.

For children and adolescents, whether they possess internal resilience to external environmental stressors becomes a protective factor for coping with stress and can help to adjust internal and external distress and conflicts.

The mental health issues of adolescents have received significant attention worldwide. According to the World Health Organization (2018), globally, 10-20% of children and adolescents are affected by mental health problems. A five-year longitudinal study conducted in Australia (Mission Australia & Bad Dog Institute, 2017) surveyed thousands of young people aged 15-19 and found that the percentage of respondents meeting the diagnostic criteria for severe mental illnesses increased from 18.7% in 2012 to 22.8% in 2016. The study in Australia indicated that the concerns of young people at risk of severe mental illnesses include stress,

school-related issues, appearance and body image, and depressive emotions.

Depression is one of the most common psychological disorders among various mental illnesses. According to the World Health Organization (WHO, 2017), as early as 2015, there were already over 300 million cases of depression worldwide, and the incidence of depression has shown a significant upward trend in the past decade. Depression is a prevalent mood disorder characterized by persistent feelings of sadness, loss of interest or pleasure, unexplained self-blame and guilt, sleep and appetite disturbances, and loss of daily functioning. In severe cases, it can lead to self-harm or suicidal thoughts and behaviors.

A study by Jha, Singh, Nirala, Kumar, Kumar & Aggrawal (2017) found that among 1,412 young students, 49.2% exhibited depressive symptoms, with 7.7% showing severe depressive symptoms. Another study with similar results was conducted by the Hong Kong Baptist Oi Kwan Social Service (2018), which found that 51.5% of interviewed secondary school students displayed depressive symptoms. Depression is one of the main causes of self-harm in adolescents, leading to poor performance in social and school contexts and serving as a maintaining factor for depression. Moreover, depression often coexists with other mental health symptoms (Rohde, Lewinsohn, & Seeley, 1991). Comorbidity refers to individuals having more than one mental disorder during a specific period (Hall, Lynskey & Teesson, 2001). Studies have shown that adolescents with severe depression also exhibit severe anxiety symptoms (Cummings, Caporino & Kendall, 2014), and Garber & Weersing (2010) found that the negative consequences of anxiety increase the risk of developing depression.

Due to the rapid spread of COVID-19 pandemic starting from early 2020, the lives of people around the world have undergone dramatic changes in every aspect. The worldwide pandemic and the landslide infected population daily and globally, not only affected industries, world economy, and public health management but has also in people's everyday life including the area shut down and limited people's travel between the countries including the quarantine regulation inside the country and from coming abroad.

The pandemic accelerated digital transformation and innovation in various sectors. The integration of intelligent production and remote interaction models into supply and demand chains has become an unstoppable trend, driven by globalization. The pressure of digital transformation, resource allocation and management, cyber security, and data management has not only affected industries but also influenced the learning process in educational institutions. For example, on line learning remotely has become a widespread alternative teaching method adopted by schools worldwide in response to the COVID-19 pandemic and social isolation. Whether remote learning can replace in class teaching and deliver effective instruction has been an ongoing debate. However, interpersonal interaction has been a crucial role on the process of psychological development of adolescent. Erikson's psychosocial development theory also emphasizes that individuals continually experience various "developmental crises" during their development. The individual's "developmental task" is to resolve these crises at different stages

to progress towards a healthy personality.

The teenage stage is the most crucial period for human physical and mental development. Therefore, the detrimental effects during the pandemic not only can lead to immediate behavioral and psychological problems but also may have significant deviations in long-term physical and mental development. During the COVID-19 pandemic, teenagers and young people have expressed worries about their academic performance and career prospects, and the result of the increasing loneliness and anxiety. With limited resources and experience, young people often hesitate to seek help for mental health issues. They may worry about privacy breaches and the fear of being ridiculed by other groups. They may also face peer pressure and prefer to solve their problems on their own or lack awareness of mental health services.

A joint research between the University of Lancaster in the UK and the University of British Columbia in Canada investigated the impact of COVID-19 on various aspects of society. Yang and Yue (2021) focused on a group of 886 teenagers aged 10-16 in the UK who had previously participated in a research study. The study examined the psychological effects during the pandemic and found that teenagers who had a healthy psychological state before the pandemic period, showed significant emotional and behavioral problems, including hyperactivity and decreased communication and social skills with peers during the pandemic. They also exhibited a noticeable decline in prosocial activities such as caring for and helping others. On the other hand, teenagers who had less stable psychological states before the pandemic showed more stable emotional and behavioral patterns during the pandemic, with reduced rates of fighting, bullying, and arguments. The research team suggested that this may be attributed to increased time spent with parents during home isolation. The study also indicated that the socio-economic conditions of families had a significant impact on teenagers' emotional changes during the pandemic. Adolescents from single-parent families who were only children experienced the greatest negative psychological impact during the pandemic, with the highest levels of loneliness. Additionally, families with higher incomes had fewer cases of hyperactivity or behavioral problems compared to families with lower incomes.

Since the outbreak of COVID-19 in mainland China in early 2020, the threat of virus infection to life and the inconveniences caused by various alert levels have led to feelings of panic, anxiety, and other distressing emotions among both adults and children. Children and teenagers have been significantly impacted by the pandemic in terms of their mental health, as highlighted in a survey conducted by the Kaiser Family Foundation (KFF) in the United States. According to the KFF survey, teenagers, young children, LGBTQ youth, and children from racial and ethnic minority groups are particularly susceptible to mental health issues arising from the global pandemic. Factors such as school closures, social distancing measures, and being confined at home can contribute to feelings of loneliness and isolation. Furthermore, the stress faced by parents due to job loss, financial pressures, or lack of time to care for their children can also impact parents' mental health, potentially leading to the transfer of stress onto their children and

affecting overall family dynamics and support systems (Stephenson, 2021).

Moreover, in addition to dysfunction within families, external support systems have also been unable to provide adequate support due to the pandemic. For example, in the United States, social welfare organizations providing services through the Children's Health Insurance Program saw a 50% reduction in the number of children served from February to October 2020, resulting in a significant decrease in resources available to vulnerable families. However, even before the COVID-19 pandemic, there had been a gradual worsening trend in the mental health of children and adolescents, including feelings of sadness, hopelessness, and suicidal thoughts.

After the COVID-19 pandemic, there has been a significant increase in emotional distress among teenagers, with one in four middle school students reporting a decline in their emotional and cognitive health. Additionally, two-thirds of teenagers feel unable to cope with their anxiety and the pressure from peer relationships. A survey primarily targeting parents also revealed that among parents of school-aged children (5-12 years old), one in five felt that their children's mental health or emotional state had worsened, 6.3% observed increased anxiety symptoms, and 4.4% noticed signs of depression.

These impacts on the mental health of children and adolescents during the pandemic can be attributed to factors such as being forced to stay at home (unable to go outside) and disruption of regular daily routines. In addition to the United States, the effects of the COVID-19 pandemic on Asian populations have also been demonstrated in various emotional and physiological disturbances. A large integrated analysis report covering 23 surveys conducted in China and Turkey, involving 57,927 children and adolescents, found that during the COVID-19 pandemic in 2019-2020, 29% of children and adolescents met the criteria for depression, 26% experienced anxiety, 44% had sleep disorders, and a staggering 48% exhibited symptoms of post-traumatic stress disorder (Ma, Mazidi, Li, Li, Chen, Kirwan, Zhou, Yan, Rahman, Wang, & Wang, 2021).

Additionally, it is worth noting that there has been an increasing trend in the occurrence of obsessive-compulsive symptoms and tic symptoms among children aged 6-12 in 2020, while cases seeking medical attention for attention-deficit hyperactivity disorder (ADHD) symptoms decreased. Possible reasons include children not attending school due to the pandemic, which reduces the opportunity for teachers to observe related symptoms (Moreno, Wykes, Galderisi, Nordentoft, Crossley, Jones, Cannon, Correll, Byrne, Carr, Chen, Gorwood, Johnson, Kärkkäinen, Krystal, Lee, Lieberman, López-Jaramillo, Männikkö, Phillips, Uchida, Vieta, Vita, & Arango, 2020). The impact of the COVID-19 pandemic on the mental health of children and adolescents may not disappear as the pandemic subsides. On the contrary, as life gradually returns to normal, the pressures of readjusting to school life and reconnecting with social relationships may exacerbate anxiety and depressive symptoms. It is important for governments to develop relevant public health policies to assist these students in preparing for their return to school. This could include providing resources and referrals, online counseling platforms, organizing peer support groups, and enhancing parental awareness of mental health issues.

In addressing the psychological issues of adolescents, it is necessary to focus on their unique mental and physical states, as the current social safety net is primarily based on the mental and physical states of adults. Yang and Yue (2021) pointed out that the assistance methods for maintaining mental and physical health in adults are not particularly helpful for teenagers.

Therefore, governments need to develop specific policies to assist teenagers in this regard. Since the outbreak of the COVID-19 pandemic in mainland China in early 2020, the changes in lifestyle during the "quarantine" period have posed severe mental and physical challenges to the general public. The fear caused by various pandemic-related information has intensified the occurrence of common mental health problems among adolescents, such as insomnia, depression, and anxiety. Chi et al. (2020) conducted psychological health assessments using the Youth Self-Rating Insomnia Scale (YSIS), Patient Health Questionnaire-9 (PHQ-9), and Generalized Anxiety Disorder-7 (GAD-7) among a sample of adolescents in China. The results showed that the prevalence rates of insomnia, depression, and anxiety symptoms among Chinese adolescents during the COVID-19 pandemic were 37.80%, 48.20%, and 36.70%, respectively. In other words, symptoms of mental health problems were relatively common among adolescents during the pandemic.

However, the prolonged period of remote learning caused by the COVID-19 pandemic not only deprived adolescents of valuable opportunities for diverse interpersonal interactions and identity formation in schools but also increased their reliance on internet usage. Adolescents often experience helplessness, anxiety, and unease during developmental crises, and without proper adult guidance and supervision, they may spend long periods immersed in the online world. Virtual interactions and gaming can easily become a means for adolescents to escape from the realities of identity crisis and alleviate stress. The virtual world provides adolescents with the functions of "fantasy and exploration" and role-playing, allowing them to express themselves and forget the challenges of real-life by overcoming obstacles and achieving immediate psychological feedback and self-satisfaction. This alternative avenue of self-affirmation and self-identity emerges. Consequently, various adolescent problems arise, such as withdrawal and alienation in interpersonal relationships, visual impairment from excessive screen time, diminished autonomy, difficulty in socializing and conversing with others face-to-face, and narrowed scope of life domains. Excessive internet immersion leads to weakened academic, occupational, educational, social, familial, and psychophysical functioning.

According to the report provided by the Health Line in 2022, the Centers for Disease Control and Prevention (CDC) in the United States has pointed out that the mental health of adolescents is at risk due to the pandemic, with an increase in teenagers experiencing mental health conditions and feelings of hopelessness. In the past, these situations might have been detected by teachers and parents at school, and experts urge for attention to be paid to the well-being of children at home rather than attributing everything to "the child is just adapting to the new normal caused by COVID-19". On average, 20% of children in the United States are found

to have mental health issues before graduating from high school, but only about half of them receive evaluation or treatment. Approximately 15% of children improve their condition through school, family, peer support, and physical activity. However, the pandemic has forced children to stay at home, and as time goes on, these children may not receive the help they need. While some children may be affected by the virus itself, as it can impact the brain that accounts for only a small fraction of cases. The pandemic has indeed made children's lives very different, and feelings of anxiety and sadness are normal emotional expressions. However, due to the pandemic, they lack opportunities to socialize with classmates and are not in the school environment where they can release these emotions, which may lead to anxiety and depression on a mental illness level (Health line, 2022).

Another report by Parenting (2020) also shows that young people are most concerned about the long-lasting consequences of the pandemic in the areas of "mental health," "future employment," and "education," while concerns about contracting COVID-19 or physical health rank almost last (Parenting, 2020).

As a result of the social isolation, obsessive excessive internet use can lead to addictive behaviors called "internet addiction" is similar to alcohol addiction, drug addiction, gambling addiction, and pathological gambling. As the time consuming and obsessive behavior of using the internet increases, the satisfaction derived from online activities requires more internet content and longer online time to achieve the same level of fulfillment. The virtual world provides a new space for adolescents to establish interpersonal relationships, allowing them to escape various limitations and pressures of traditional interpersonal interactions and rebuild a new social network that satisfies their self-identity. However, this also makes it easy for them to neglect or intentionally avoid real-life interpersonal interactions, excessively relying on virtual social interactions online. This can lead to exclusion and withdrawal from real social activities and excessive internet immersion. When there is a discrepancy between the desired interpersonal relationships and the reality, it can create feelings of emptiness or loneliness due to social alienation.

If we can incorporate the concept of social integration into the approach to addressing educational issues, actively implement the right to education and welfare rights, view youth crises as dynamic processes rather than static outcomes, and transform and guide the cognition and identity of young people, they will no longer be isolated from social life. Taking into account the individual learning needs and diversity of values of young people, they can smoothly integrate into society and daily living environments, which will help create a learning environment that ensures equal opportunities for comprehensive participation.

Many adolescents who recognize emotional problems may not immediately seek help. Research has shown that when adolescents have certain knowledge about mental health issues and are aware of available resources for seeking help, it enhances their willingness to seek help. However, if they have symptoms of depression, thoughts of suicide, or fear of being stigmatized

for seeking help, they are more inclined to conceal and resolve these issues on their own (Rickwood, Deane & Wilson, 2007). The mental health problems of adolescents have received significant attention in recent years. Data from the World Health Organization (2018) official website shows that 10-20% of children and adolescents worldwide are affected by mental health issues. Adolescents inevitably encounter different challenges and confusion in their growth journey. They must learn to overcome various disturbance on the path of progress in order to move forward in their learning, work, and life. Recent research has indicated a link between the mental health of adolescents and their involvement in crime, suicide, and destructive behavior.

The same applies from a health promotion perspective. The adolescent stage is a critical period for establishing correct health behavior patterns and the initial stage of behavior formation. Therefore, if we can identify and control factors that trigger negative behaviors and intervene early to control or improve them, individuals can not only enjoy a healthy adolescence but also extend their physical and mental well-being into adulthood or old age. Our research team conducted studies on the relationship between adolescent family functioning, self-efficacy, and mental health in Macau and New Taipei City, Taiwan in 2019. The data was published in Macau and Taiwan in 2020. In 2020, due to the rapid spread and ongoing impact of the COVID-19 pandemic, the research topic focuses on the crises and turning points for adolescents in the post-pandemic era: social care, integrative promotion, and physical and mental health. The research focuses on four areas: (1) What are the impacts on adolescent mental health under the social trends of the COVID-19 pandemic? (2) What is the relationship between adolescent internet use behavior, interpersonal relationships, self-efficacy, social support, and mental health? (3) The study is conducted through sampling surveys in Macau, Mainland China, and Taiwan, enabling cross-cultural comparisons. (4) A trend comparison is made between the data from 2019 and 2022.

II. Motivation and Objectives of the Study

Facing the heavy academic achievement pressure and a cramming study culture, Taiwanese adolescents are overwhelmed with school exam preparation and after school work and assignments every day. Schools and cram schools constitute the majority of their lives. While dealing with various exams, what do these children do in their limited after-school or vacation time? According to a survey conducted by the Children's Welfare League Foundation (2013) on the current state of leisure activities among adolescents, their leisure activities are not diverse enough. More than half of their daily time is spent on the internet, watching TV, or getting extra sleep. One out of every five adolescents is dissatisfied with their leisure life, and the main reason is a lack of suitable leisure venues. 80% of adolescents spend their free time at home.

The survey revealed three major problems in the leisure lives of adolescents: (1) high academic pressure and a lack of outdoor activities, leading to 72% of adolescents experiencing depressive emotions, (2) a loss of playfulness among adolescents, with over 60% feeling bored

during holidays, and (3) a lack of government attention to the leisure lives of adolescents, with 70% having never used or participated in relevant activities.

Adolescents go through specific stages of development, each with its own developmental tasks (Havighurst, 1972). The successful accomplishment or resolution of these tasks depends on many factors, including individual and environmental factors, many of which adolescents have no control over. Therefore, while adolescence is a time filled with hope and opportunities for growth, it is not without its pressures and risks. Adolescents may face harm, exploitation, deviant behavior, and various problems. If the risks related to adolescent development can be anticipated and understood, it may help mitigate adverse consequences for their development. Many studies attempt to identify risk factors associated with adolescent development, including individual traits, family, school, and community factors.

The adolescent stage is the most important period for human physical and mental development. Therefore, the harmful effects during the pandemic may not only lead to immediate behavioral and psychological problems but also significant deviations in long-term physical and mental development. During the COVID-19 pandemic, adolescents and young people are concerned about their academic and career prospects, leading to increased feelings of loneliness and anxiety. Compared to adults, young people often do not seek help for mental health issues. They may worry about privacy breaches and being ridiculed, face peer pressure, or lack knowledge about mental health services.

A collaborative study conducted by the University of Lancaster in the UK and the University of British Columbia in Canada investigated the impact of COVID-19 on various aspects of society. Yang and Yue (2021) focused on 886 adolescents aged 10 to 16 in the UK who were part of a pre-pandemic research project. The study examined the psychological effects during the pandemic and found that adolescents who had good psychological well-being before the pandemic showed significant emotional and behavioral problems, including hyperactivity and decreased communication and social skills with peers after a year of lockdown. There was also a noticeable decline in "prosocial activities" such as caring for and helping others. On the other hand, adolescents with less stable psychological well-being before the pandemic exhibited more stable emotional and behavioral patterns during the pandemic, with a significant decrease in fighting, bullying, and arguing. The research team speculated that this might be due to increased time spent with parents during home isolation. The study also indicated that the socioeconomic conditions of families had a significant impact on adolescents' emotional changes during the pandemic. Adolescents from single-parent and only-child families experienced the greatest negative psychological impact and reported the highest levels of loneliness. In families with higher incomes, adolescents had fewer hyperactivity or behavioral problems compared to those from lower-income families.

In contrast, since the outbreak of the COVID-19 pandemic in mainland China in early 2020, the changes in lifestyle during the "lockdown" period have brought severe physical and mental

challenges to the general population. The fear brought about by various COVID-19-related information has intensified common mental health problems among adolescents, such as insomnia, depression, and anxiety. Chi et al. (2020) used the Youth Insomnia Self-assessment Scale (YSIS), the Patient Health Questionnaire-9 (PHQ-9), and the Generalized Anxiety Disorder-7 (GAD-7) to assess the mental health of adolescent samples. The results showed that the occurrence rates of insomnia, depression, and anxiety symptoms among Chinese adolescents during the COVID-19 pandemic were 37.80%, 48.20%, and 36.70%, respectively. In other words, the symptoms of mental health problems were relatively common among adolescents during the pandemic.

This study's questionnaire refers to the 2019 New Taipei City Living Conditions Survey and scales related to adolescent internet use behavior, interpersonal relationships, self-resilience, social support, and emotional well-being. It aims to explore the living conditions, physical and mental health status, utilization, and expectations of adolescents in the three regions (Taiwan, Mainland China as well as Macao and Hong Kong) during the COVID-19 period, particularly focusing on the predictive role of internet use behavior and interpersonal relationships in adolescent mental health. The results will serve as a reference for the government in formulating social welfare policies and developing policies and services for adolescent health maintenance.

Based on the above motivations, this research objectives are as follows:

1. To compare the differences in living conditions, self-resilience, and mental health among adolescents in Taiwan, Mainland China as well as Macao and Hong Kong .
2. To use a shotgun approach to examine the relationship among internet use behavior, social relationships, social support, self-resilience, and mental health among adolescents in Taiwan, Mainland China, as well as Macao and Hong Kong .
3. To propose recommendations for government policies and related services for adolescent physical and mental health based on the research findings.

Findings and Results

I. Descriptive Analysis of Basic Information

This study focuses on the physical and mental health of adolescents in Taiwan, Mainland China as well as Macao and Hong Kong. Based on 10,131 (6166 in China, 2478 in Taiwan and 1487 in Macao and Hong Kong) valid questionnaires collected, statistical analysis and discussion were conducted. The researchers described the total background characteristics of the 10,131 participating adolescents: 2478 from Taiwan, 6166 from Mainland China as well as 1487 from Macao and Hong Kong to understand the sample's characteristics. The basic variables surveyed in this study included gender, age, grade, place of residence, educational level, parents' marital status, and living conditions. The questionnaire responses and statistical results were analyzed and compared using percentages and frequency distribution. Descriptive statistical analysis was performed on each research variable (as shown in Table 1).

1. Gender

Among the 10131 adolescents surveyed in this study from Taiwan, Mainland China as well as Macao and Hong Kong, there were more females, with a total of 5,418 individuals, accounting for 53.5% of all participants. The total number of males was 4,713, accounting for 46.5% of all participants.

2. Age

Regarding the age distribution of the surveyed adolescents from Taiwan, Mainland China as well as Macao and Hong Kong, the highest proportion was in the "below 15 years" category, with a total of 3,618 individuals, accounting for 35.7% of all participants. The next highest category was "16-18 years," with a total of 3,476 individuals, accounting for 34.3% of all participants. The category "above 18 years" had a total of 3,037 individuals, accounting for 30.0% of all participants.

3. Grade

Regarding the grade distribution of the surveyed adolescents from Taiwan, Mainland China as well as Macao and Hong Kong, the highest proportion was in the "freshman year of college" category, with a total of 2,220 individuals, accounting for 21.9% of all participants. The next highest category was "first year of high school," with a total of 1,454 individuals, accounting for 14.4% of all participants. The following categories were "second year of junior high school" with 1,366 individuals (13.5%), "sophomore year of college" with 1,072 individuals (10.6%), "second year of high school" with 1,028 individuals (10.1%), "third year of junior high school " with 1,019 individuals (10.1%), "first year of junior high school " with 1,003 individuals (9.9%), "third year of high school" with 566 individuals (5.6%), "junior year of college" with 259 individuals (2.6%), and finally, "senior year of college" with 144 individuals (1.4%).

4. Place of Residence

Regarding the current place of residence of the surveyed adolescents from Taiwan, Mainland China as well as Macao and Hong Kong, the highest proportion was in "China," with a total of 6,166 individuals, accounting for 60.9% of all participants. The next highest category was "Macau," with a total of 2,478 individuals, accounting for 24.5% of all participants. The last category was "Taiwan," with a total of 1,478 individuals, accounting for 14.7% of all participants.

5. Educational Level

Regarding the educational level of the surveyed adolescents from Taiwan, Mainland China as well as Macao and Hong Kong, the highest proportion was among "middle school students," with a total of 3,537 individuals, accounting for 34.9% of all participants. The next highest category was "college students," with an unspecified number of individuals, accounting for 25.9% of all participants. The following categories were "junior high school students" with 1,537 individuals (24.9%), "middle school

dropouts" with 8 individuals (0.1%), and finally, "high school dropouts" with 4 individuals (0.1%).

6. Parents' Marital Status

Regarding the marital status of the parents of the surveyed adolescents from Taiwan, Mainland China as well as Macao and Hong Kong, the highest proportion was "living together," with a total of 8,133 individuals, accounting for 80.2% of all participants. The next highest category was "divorced," with a total of 827 individuals, accounting for 8.2% of all participants. The following categories were "living separately due to work" with 632 individuals (6.2%), "death of father or mother" with 235 individuals (2.3%), "separated" with 216 individuals (2.1%), and finally, "other" with 88 individuals (0.9%).

Table 1 Frequency and Percentage of Demographic Variables from Taiwan, Mainland China as well as Macao and Hong Kong Adolescents

n=10,131			
Demographic Variable	Category	Frequency	Percentage (%)
Gender	Male	4713	46.5
	Female	5418	53.5
Age	below 15 years	3618	35.7
	16-18 years	3476	34.3
	above 18 years	3037	30.0
Grade	First year of junior high school,	1003	9.9
	Second year of junior high school	1366	13.5
	Third year of junior high school	1019	10.1
	First year of senior high school	1454	14.4
	Second year of senior high school	1028	10.1
	Third year of senior high school	566	5.6
	Freshman year of college	2220	21.9
	Sophomore year of college	1072	10.6
	Junior year of college	259	2.6
	Senior year of college	144	1.4
Place of Residence	Mainland China	6166	60.9
	Macao and Hong Kong	2478	24.5
	Taiwan	1487	14.7
Educational Level	Junior high school	3537	34.9
	Senior high school	2904	28.7
	college	3690	36.4
Parents' Marital Status	Living together	8133	80.2
	Living separately due to work	632	6.2
	death of father or mother	235	2.3
	Separated	216	2.1
	Divorced	827	8.2
	Others	88	0.9

7. Living Condition

(1) Leisure Activities Frequently Engaged in the Weekdays and during Holidays

Regarding the leisure activities that the surveyed adolescents from Taiwan, Mainland China as well as Macao and Hong Kong frequently engage in the weekdays (non-holidays), the most common activity is "playing mobile games," with a total of 2,369 individuals, accounting for 23.4%. The next most common activity is also "playing mobile games," with 1,455 individuals, accounting for 14.4%. The third most common activity is "chatting/talking on the phone," with 1,185 individuals, accounting for 11.7%.

Regarding the leisure activities that the surveyed adolescents from Taiwan, Mainland China as well as Macao and Hong Kong frequently engage in during holidays, the most common activity is "playing mobile games," with a total of 2,120 individuals, accounting for 20.9%. The next most common activity is also "playing mobile games," with 1,392 individuals, accounting for 13.7%. The third most common activity is also "playing mobile games," with 1,115 individuals, accounting for 11.0% (refer to Table 2).

(2) The Most Frequently Used Online Activity

The most frequently used online activities by the surveyed adolescents from Taiwan, Mainland China as well as Macao and Hong Kong (refer to Table 3) are as follows: "online communication" is the highest, with 7,121 individuals, accounting for 70.3%. The next most common activity is "online streaming/video," with 6,384 individuals, accounting for 63.1%. Following that, "online gaming" has 4,849 individuals, accounting for 47.9%. "Browsing news/magazines" has 2,269 individuals, accounting for 22.4%. "Browsing social media websites" has 2,045 individuals, accounting for 20.2%. "Online shopping" has 1,699 individuals, accounting for 16.8%. "Digital learning" has 1,193 individuals, accounting for 11.8%. "Editing/browsing blogs" has 607 individuals, accounting for 6.0%. "Searching/downloading data" has 517 individuals, accounting for 5.1%. "Sending/receiving emails" has 342 individuals, accounting for 3.4%. "Live streaming platforms" have 287 individuals, accounting for 2.8%. "Visiting adult content websites" has 157 individuals, accounting for 1.6%. "Other" activities have 139 individuals, accounting for 1.4%. Finally, "visiting electronic bulletin boards/forums" has 109 individuals, accounting for 1.1%.

(3) Participation in Volunteer or Public Services

a. Participation in Volunteer Service Activities

Regarding participation in volunteer service activities, the surveyed adolescents from Taiwan, Mainland China as well as Macao and Hong Kong responded as follows: "never participated" is the highest, with 3,281 individuals, accounting for 32.4%. The next category is "less than 8 hours," with 2,990 individuals, accounting for 29.5%. Following that, "8 to less than 24 hours" has 2,211 individuals, accounting for 21.8%. "24 to less than 48 hours" has 691 individuals, accounting for 6.8%. "72 hours" has 585

Table 2 Leisure Activities Frequently Engaged in During Holidays from Taiwan, Mainland China as well as Macao and Hong Kong Adolescents

n=10,131

	the most common (%)	The next most common (%)	The third most common (%)
Watch TV, and digital platform.	1352 (13.3%)	1021 (10.1%)	956 (9.4%)
Playing sports and physical activities	1371 (13.5%)	1008 (9.9%)	742 (7.3%)
Playing instruments	245 (2.4%)	334 (3.3%)	438 (4.3%)
Reading newspaper and magazine	751 (7.4%)	830 (8.2%)	796 (7.9%)
Shopping and browsing	274 (2.4%)	550 (5.4%)	729 (7.2%)
Watching movies	309 (3.1%)	652 (6.4%)	897 (8.9%)
Musics and art performance	45 (0.4%)	90 (0.9%)	138 (1.4%)
Karaoke	23 (0.2%)	48 (0.5%)	75 (0.7%)
Hiking, picnicking, camping or outdoor activities	81 (0.8%)	142 (1.4%)	222 (2.2%)
Leisure Activities in the Weekdays chatting/talking on the phone	763 (7.5%)	1293 (12.8%)	1185 (11.7%)
Internet at net store	39 (0.4%)	49 (0.5%)	56 (0.6%)
Internet at home	1384 (13.7%)	1181 (11.7%)	979 (9.7%)
Social group activities	137 (1.4%)	251 (2.5%)	280 (2.8%)
Hip hop street dance	77 (0.8%)	84 (0.8%)	65 (0.6%)
Playing table tennis	36 (0.4%)	74 (0.7%)	107 (1.1%)
Riding bicycle	57 (0.6%)	95 (0.9%)	141 (1.4%)
playing mobile games	2369 (23.4%)	1455 (14.4%)	1159 (11.4%)
Sports (Running, swimming, etc.)	482 (4.8%)	707 (7.0%)	785 (7.7%)
Playing skateboard	43 (0.4%)	52 (0.5%)	80 (0.8%)
Cosplay	37 (0.4%)	36 (0.4%)	46 (0.5%)
others	283 (2.8%)	179 (1.8%)	255 (2.5%)

	the most common (%)	The next most common (%)	The third most common (%)
Watch TV, and digital platform.	977 (9.6%)	901 (8.9%)	911 (9.0%)
Playing sports and physical activities	1079 (10.7%)	919 (9.1%)	743 (7.3%)
Playing instruments	234 (2.3%)	305 (3.0%)	410 (4.0%)
Reading newspaper and magazine	463 (4.6%)	613 (6.1%)	668 (6.6%)
Shopping and browsing	896 (8.8%)	1039 (10.3%)	990 (9.8%)
Watching movies	522 (5.2%)	904 (8.9%)	1031 (10.2%)
Musics and art performance	78 (0.8%)	130 (1.3%)	124 (1.2%)
Karaoke	75 (0.7%)	112 (1.1%)	150 (1.5%)
Hiking, picnicking, camping or outdoor activities	370 (3.7%)	333 (3.3%)	369 (3.6%)
Leisure Activities during Holidays chatting/talking on the phone	589 (5.8%)	949 (9.4%)	909 (9.0%)
Internet at net store	42 (0.4%)	74 (0.7%)	50 (0.5%)
Internet at home	1469 (14.5%)	1086 (10.7%)	889 (8.8%)
Social group activities	143 (1.4%)	160 (1.6%)	200 (2.0%)
Hip hop street dance	78 (0.8%)	72 (0.7%)	75 (0.7%)
Playing table tennis	93 (0.9%)	86 (0.8%)	122 (1.2%)
Riding bicycle	109 (1.1%)	176 (1.7%)	205 (2.0%)
playing mobile games	2120 (20.9%)	1392 (13.7%)	1115 (11.0%)
Sports (Running, swimming, etc.)	463 (4.6%)	589 (5.9%)	750 (7.4%)
Playing skateboard	57 (0.6%)	63 (0.6%)	90 (0.9%)
Cosplay	44 (0.4%)	45 (0.4%)	87 (0.9%)
others	230 (2.3%)	174 (1.7%)	243 (2.4%)

individuals, accounting for 5.8%. Lastly, "48 to less than 72 hours" has 373 individuals, accounting for 3.7%.

b. Types of Volunteer Service Activities

Regarding the types of volunteer service activities, the surveyed adolescents from Taiwan, Mainland China as well as Macao and Hong Kong responded as follows: "community service" is the highest, with 4,855 individuals, accounting for 58.0%. The next category is "environmental protection," with 2,459 individuals, accounting for 29.4%. Following that, "social welfare services" has 1,943 individuals, accounting for 23.2%. "Cultural activities" has 1,928 individuals, accounting for 23.0%. "Educational activities" has 1,483 individuals, accounting for 17.7%. "Other" activities have 731 individuals, accounting for 8.7%. Lastly, "religious activities" has 408 individuals, accounting for 4.9%.

(4)The Most Important Public Issues

Regarding the most important public issues for the surveyed adolescents from Taiwan, Mainland China as well as Macao and Hong Kong, "eliminating discrimination" is rated as the highest, with 3,552 individuals, accounting for 35.2%. The next categories are "education," with 3,194 individuals, accounting for 31.6%, and "social security," with 3,144 individuals, accounting for 31.1%. Following that, "rule of law and justice" has 1,834 individuals, accounting for 18.2%, "national health and healthcare" has 1,787 individuals, accounting for 17.7%, "environmental protection" has 1,758 individuals, accounting for 17.4%, "employment" has 1,608 individuals, accounting for 15.9%, "social welfare" has 1,591 individuals, accounting for 15.7%, "citizens' participation in politics" has 1,500 individuals, accounting for 14.8%, "diplomacy and international relations" has 1,418 individuals, accounting for 14.0%, "economy and livelihood resources" has 1,327 individuals, accounting for 13.1%, "leisure and entertainment" has 1,237 individuals, accounting for 12.2%, "technological development" has 1,163 individuals, accounting for 11.5%, "national defense and military service" has 1,121 individuals, accounting for 11.1%, "culture and heritage development" has 705 individuals, accounting for 7.0%, "transportation and safety" has 506 individuals, accounting for 5.0%, "public spaces" has 332 individuals, accounting for 3.3%, and finally, "other" has 75 individuals, accounting for 0.7%.

II. Analysis of Differences in Internet Use Behaviors, Mental Health, Social Support, Interpersonal Relationships, and Resilience Among Adolescents in Different Residential Areas of Taiwan, Mainland China, as well as Macao and Hong Kong

1. Life disturbance

The differences in life disturbance variables among the "current place of residence" background variables were analyzed using independent samples one-way ANOVA. The

Table 3 The most frequently used online activities from Taiwan, Mainland China as well as Macao and Hong Kong Adolescents

n=10,131

Variable	Category	Frequency	Percentage (%)	
The most frequently used online activities(multiple choices, up to 3)	online gaming	4849	47.9%	
	Sending/receiving emails	342	3.4%	
	online communication	7121	70.3%	
	Browsing news/magazines	2269	22.4%	
	online streaming/video	6384	63.1%	
	Editing/browsing blogs	607	6.0%	
	Browsing social media websites	2045	20.2%	
	Searching/downloading data	517	5.1%	
	visiting electronic bulletin boards/forums	109	1.1%	
	Visiting adult content websites	157	1.6%	
	Live streaming platforms	287	2.8%	
	Online shopping	1699	16.8%	
	Digital learning	1193	11.8%	
	others	139	1.4%	
	Participating in volunteer service or public service	never participated	3281	32.4%
less than 8 hours		2990	29.5%	
8 hours to less than 24 hours		2211	21.8%	
24 hours to less than 48 hours		691	6.8%	
48 hours to less than 72 hours		373	3.7%	
more than 72 hours		585	5.8%	
community service		4855	58.0%	
Education		1483	17.7%	
Religion		408	4.9%	
Culture		1928	23.0%	
Environmental protection		2459	29.4%	
social welfare services		1943	23.2%	
others		731	8.7%	
The most important public issues (multiple choices, up to 3)		Citizenship	1500	14.8%
		Prohibition of discrimination	3552	35.2%
	law and justice	1834	18.2%	
	Social Security	3144	31.1%	
	Economic and civil resources	1327	13.1%	
	National Defense and Military Service	1121	11.1%	
	Diplomacy and International Relations	1418	14.0%	
	National Health and Sanitation	1787	17.7%	
	Social Welfare	1591	15.7%	

n=10,131

Variable	Category	Frequency	Percentage (%)
	educate	3194	31.6%
	employment	1608	15.9%
	Culture and Preservation Development	705	7.0%
	Public places	332	3.3%
	Transportation and Safety	506	5.0%
	Leisure and entertainment	1237	12.2%
	technological development	1163	11.5%
	environmental protection	1758	17.4%
	others	75	.7%

results showed significant differences in interpersonal disturbance with $F_{(2,10,128)} = 220.319$, $p = .000 < .001$, indicating significant differences in interpersonal disturbance based on the current place of residence. Post-hoc comparisons using Scheffe's method revealed that adolescents residing in Macau perceived higher levels of interpersonal disturbance compared to those residing in China and Taiwan. Similarly, adolescents residing in Macau perceived higher levels of academic disturbance compared to those residing in Taiwan and China. These findings are supported by the significant differences found in academic disturbance with $F_{(2,10,128)} = 292.145$, $p = .000 < .001$. Post-hoc comparisons using Scheffe's method revealed that adolescents residing in Macau perceived higher levels of academic disturbance compared to those residing in Taiwan and China, while adolescents in Taiwan perceived higher levels of academic disturbance compared to those in China. (Noted as Table 4).

Table 4 Anova of Life Disturbance by residential area from Taiwan, Mainland China as well as Macao and Hong Kong Adolescents

n=10,131

Variable	Residential Area	n	Mean	Standard Deviation	F	P	Scheffe Post Hoc Comparison
Interpersonal Disturbance	Mainland China	6166	2.6756	3.59362	220.319	.000	Macao > Mainland China ; Macao > Taiwan
	Macao	2478	4.4048	3.45553			
	Taiwan	1487	2.8810	3.14948			
Academic Disturbance	Mainland China	6166	2.9054	3.07832	292.145	.000	Macao > Mainland China > Taiwan
	Macao	2478	4.6546	2.99955			
	Taiwan	1487	3.3578	2.96749			

2. Emotional State

The differences in emotional state variables among the "current place of residence" background variables were analyzed using independent samples one-way ANOVA. The results showed significant differences in stress/anxiety with $F_{(2,10,128)} = 1116.882$, $p = .000 < .001$, indicating significant differences in stress/anxiety based on the current place of residence. Post-hoc comparisons using Scheffe's method revealed that adolescents residing in Taiwan perceived higher levels of stress/anxiety compared to those residing in China and Macau. Similarly, adolescents residing in China perceived higher levels of stress/anxiety compared to those residing in Macau. Regarding differences in anxiety based on the current place of residence, the results showed significant differences with $F_{(2,10,128)} = 1771.225$, $p = .000 < .001$. Post-hoc comparisons using Scheffe's method revealed that adolescents residing in China perceived higher levels of anxiety compared to those residing in Macau, while adolescents in Taiwan perceived higher levels of anxiety compared to those in Macau. Furthermore, significant differences in depression based on the current place of residence were found with $F_{(2,10,128)} = 1490.607$, $p = .000 < .001$. Post-hoc comparisons using Scheffe's method revealed that adolescents residing in China perceived higher levels of depression compared to those residing in Macau, while adolescents in Taiwan perceived higher levels of depression compared to those in Macau. (noted as Table 5).

Table 5 Anova of Emotional State by Residential Area from Taiwan, Mainland China as well as Macao and Hong Kong Adolescents

							n = 10,131
Variable	Residential Area	n	Mean	Standard Deviation	F	P	Scheffe Post Hoc Comparison
Stress	Mainland China	6166	10.7713	4.46766	1116.822	.000	Taiwan > Mainland China > Macao
	Macao	2478	6.0004	4.56298			
	Taiwan	1487	11.3127	4.40035			
Anxiety	Mainland China	6166	9.7953	3.88884	1771.225	.000	Taiwan > Macao ; Taiwan > Mainland China
	Macao	2478	4.3313	4.23469			
	Taiwan	1487	9.6785	3.74582			
Depression	Mainland China	6166	9.2746	3.80264	1490.607	.000	Mainland China > Macao ; Taiwan > Macao
	Macao	2478	4.1877	4.65273			
	Taiwan	1487	9.4492	4.02866			

3. Internet Use Motives

The differences in internet use motive variables among the "current place of residence" background variables were analyzed using independent samples one-way ANOVA. The results showed significant differences in social/consumption motives with $F_{(2,10,128)} = 541.367$, $p = .000 < .001$, indicating significant differences in social/consumption motives based on the current place of residence. Post-hoc comparisons using Scheffe's method revealed that adolescents residing in Taiwan had higher social/consumption motives for internet use compared to those residing in Macau and China. Similarly, adolescents residing in Macau had higher social/consumption motives for internet use compared to those residing in China. Regarding differences in instrumental motives based on the current place of residence, the results showed significant differences with $F_{(2,10,128)} = 818.548$, $p = .000 < .001$. Post-hoc comparisons using Scheffe's method revealed that adolescents residing in Taiwan had higher instrumental motives for internet use compared to those residing in Macau and China, while adolescents in Macau had higher instrumental motives for internet use compared to those residing in China. (noted as Table 6).

Table 6 Anova of Internet Use Motives by Residential Area from Taiwan, Mainland China as well as Macao and Hong Kong Adolescents

n = 10,131

Variable	Residential Area	n	Mean	Standard Deviation	F	P	Scheffe Post Hoc Comparison
Social/consumption Motives	Mainland China	6166	24.1958	9.29661	541.367	.000	Taiwan>Macao >Mainland China
	Macao	2478	29.3604	6.92707			
	Taiwan	1487	30.6106	7.25917			
Instrumental Motives	Mainland China	6166	11.9609	5.06960	818.548	.000	Taiwan>Macao >Mainland China
	Macao	2478	15.4653	4.11956			
	Taiwan	1487	16.4291	4.33865			

4. Core Components of Internet Addiction

The differences in core components of internet addiction variables among the "current place of residence" background variables were analyzed using independent samples one-way ANOVA. The results showed significant differences in tolerance with $F_{(2,10,128)} = 492.221$, $p = .000 < .001$, indicating significant differences in tolerance based on the current place of residence. Post-hoc comparisons using Scheffe's method revealed that adolescents residing in Macau had higher tolerance for internet addiction compared to those residing in Taiwan and China. Similarly, adolescents residing in Taiwan had higher tolerance for internet addiction compared to those residing in China. Regarding

differences in withdrawal symptoms based on the current place of residence, the results showed significant differences with $F_{(2,10,128)} = 303.755$, $p = .000 < .001$. Post-hoc comparisons using Scheffe's method revealed that adolescents residing in Macao had higher withdrawal symptoms for internet addiction compared to those residing in China, while adolescents in Taiwan had higher withdrawal symptoms for internet addiction compared to those residing in China. For differences in compulsive internet use symptoms based on the current place of residence, the results showed significant differences with $F_{(2,10,128)} = 282.082$, $p = .000 < .001$. Post-hoc comparisons using Scheffe's method revealed that adolescents residing in Macao had higher compulsive internet use symptoms for internet addiction compared to those residing in Taiwan and China, while adolescents in Taiwan had higher compulsive internet use symptoms for internet addiction compared to those residing in China. (noted as Table 7).

Table 7 Anova of Core Components of Internet Addiction by Residential Area from Taiwan, Mainland China as well as Macao and Hong Kong Adolescents

n=10,131

Variable	Residential Area	n	Mean	Standard Deviation	F	P	Scheffe Post Hoc Comparison
Tolerance	Mainland China	6166	9.4058	4.14589	492.221	.000	Macao>Taiwan>Mainland China
	Macao	2478	12.1529	3.97697			
	Taiwan	1487	11.6907	3.79183			
Withdrawal Symptoms	Mainland China	6166	11.4102	5.06800	303.755	.000	Macao>Mainland China ; Taiwan>Mainland China
	Macao	2478	14.0504	5.04508			
	Taiwan	1487	13.6812	4.67899			
Compulsive Internet use Symptoms	Mainland China	6166	11.1810	5.16454	282.082	.000	Macao>Taiwan>Mainland China
	Macao	2478	13.8410	4.98894			
	Taiwan	1487	13.1675	4.68103			

5. Internet Addiction-Related Issues

The differences in variables related to internet addiction-related issues among the "current place of residence" background variables were analyzed using independent samples one-way ANOVA. The results showed significant differences in time management with $F_{(2,10,128)} = 159.950$, $p = .000 < .001$, indicating significant differences in time management based on the current place of residence. Post-hoc comparisons using Scheffe's method revealed that adolescents residing in Macao had higher time management problems related to internet addiction compared to those residing in China, while adolescents in Taiwan had higher time management problems related to internet addiction compared to those residing in China. Regarding differences in interpersonal health based on the current place of residence, the results showed significant differences

with $F_{(2,10,128)} = 124.847$, $p = .000 < .001$. Post-hoc comparisons using Scheffe's method revealed that adolescents residing in Macao had higher interpersonal health problems related to internet addiction compared to those residing in Taiwan and China, while adolescents in Taiwan had higher interpersonal health problems related to internet addiction compared to those residing in China. (noted as Table 8).

Table 8 Anova of Internet Addiction-Related Issues by Residential Area from Taiwan, Mainland China as well as Macao and Hong Kong Adolescents

n = 10,131

Variable	Residential Area	n	Mean	Standard Deviation	F	P	Scheffe Post Hoc Comparison
Time Management	Mainland China	6166	10.2063	4.73454	159.950	.000	Macao>Mainland China ; Taiwan>Mainland China
	Macao	2478	12.0291	4.92650			
	Taiwan	1487	11.7915	4.71141			
Interpersonal Health	Mainland China	6166	14.4444	6.66017	124.847	.000	Macao>Taiwan>Mainland China
	Macao	2478	16.7817	6.36930			
	Taiwan	1487	15.9670	6.09179			

6. Real-Life Interpersonal Interaction

The differences in variables related to real-life interpersonal interaction among the "current place of residence" background variables were analyzed using independent samples one-way ANOVA. The results showed significant differences in intimacy with family members with $F_{(2,10,128)} = 110.193$, $p = .000 < .001$, indicating significant differences in intimacy with family members based on the current place of residence. Post-hoc comparisons using Scheffe's method revealed that adolescents residing in China had higher intimacy with family members in real-life interpersonal interaction compared to those residing in Macao, while adolescents in Taiwan had higher intimacy with family members in real-life interpersonal interaction compared to those residing in Macao. Regarding differences in intimacy with peer friends based on the current place of residence, the results showed significant differences with $F_{(2,10,128)} = 84.364$, $p = .000 < .001$. Post-hoc comparisons using Scheffe's method revealed that adolescents residing in Taiwan had higher intimacy with peer friends in real-life interpersonal interaction compared to those residing in China and Macao, while adolescents in China had higher intimacy with peer friends in real-life interpersonal interaction compared to those residing in Macao. Additionally, regarding differences in informational communication with peer friends based on the current place of residence, the results showed significant differences with $F_{(2,10,128)} = 84.277$, $p = .000 < .001$. Post-hoc comparisons using Scheffe's method revealed that adolescents residing in Taiwan had higher informational communication with peer friends in real-life interpersonal interaction compared to those

residing in China and Macau, while adolescents in China had higher informational communication with peer friends in real-life interpersonal interaction compared to those residing in Macau. (noted as Table 9).

Table 9 Anova of Real-Life Interpersonal Interaction by Residential Area from Taiwan, Mainland China as well as Macao and Hong Kong Adolescents

n =10,131

Variable	Residential Area	n	Mean	Standard Deviation	F	P	Scheffe Post Hoc Comparison
Intimacy with Family Members	Mainland China	6166	26.3086	9.08071	110.193	.000	Mainland China>Macao ; Taiwan>Macao
	Macao	2478	23.2861	7.76081			
	Taiwan	1487	25.8736	8.01270			
Intimacy with Peer Friends	Mainland China	6166	20.0929	6.46781	84.364	.000	Taiwan>Mainland China>Macao
	Macao	2478	19.1715	5.86988			
	Taiwan	1487	21.8050	5.45737			
Informational Communication with Peer Friends	Mainland China	6166	17.9020	5.52016	84.277	.000	Taiwan>Mainland China>Macao
	Macao	2478	16.9564	4.69365			
	Taiwan	1487	19.1258	3.92472			

7. Online Interpersonal Interaction

The differences in variables related to online interpersonal interaction among the "current place of residence" background variables were analyzed using independent samples one-way ANOVA. The results showed significant differences in intimacy with online friends with $F_{(2,10,128)} = 70.177$, $p = .000 < .001$, indicating significant differences in intimacy with online friends based on the current place of residence. Post-hoc comparisons using Scheffe's method revealed that adolescents residing in China had higher intimacy with online friends in online interpersonal interaction compared to those residing in Taiwan and Macau, while adolescents in Taiwan had higher intimacy with online friends in online interpersonal interaction compared to those residing in Macau. Regarding differences in informational communication with online friends based on the current place of residence, the results showed significant differences with $F_{(2,10,128)} = 57.007$, $p = .000 < .001$. Post-hoc comparisons using Scheffe's method revealed that adolescents residing in China had higher informational communication with online friends in online interpersonal interaction compared to those residing in Taiwan and Macau, while adolescents in Taiwan had higher informational communication with online friends in online interpersonal interaction compared to those residing in Macau. (noted as Table 10).

Table 10 Anova of Online Interpersonal Interaction by Residential Area from Taiwan, Mainland China as well as Macao and Hong Kong Adolescents

n = 10,131

Variable	Residential Area	n	Mean	Standard Deviation	F	P	Scheffe Post Hoc Comparison
Intimacy with Online Friends	Mainland China	6166	15.1776	6.85827	70.177	.000	Mainland China>Taiwan>Macao
	Macao	2478	13.2902	6.39484			
	Taiwan	1487	14.3040	7.02086			
Informational Communication with Online Friends	Mainland China	6166	13.2423	6.06916	57.007	.000	Mainland China>Taiwan>Macao
	Macao	2478	11.8010	5.55666			
	Taiwan	1487	12.3033	6.01469			

8. Social Support

(1) Family Social Support

The differences in variables related to family social support among the "current place of residence" background variables were analyzed using independent samples one-way ANOVA. The results showed significant differences in emotional support with $F_{(2,10,128)} = 49.314$, $p = .000 < .001$, indicating significant differences in emotional support based on the current place of residence. Post-hoc comparisons using Scheffe's method revealed that adolescents residing in Taiwan had higher levels of emotional support from their family compared to those residing in Macau. Regarding differences in instrumental support based on the current place of residence, the results showed significant differences with $F_{(2,10,128)} = 29.871$, $p = .000 < .001$. Post-hoc comparisons using Scheffe's method revealed that adolescents residing in Taiwan received higher levels of instrumental support from their family compared to those residing in China and Macau, while adolescents residing in China had a higher perception of instrumental support from their family compared to those residing in Macau. Regarding differences in informational support based on the current place of residence, the results showed significant differences with $F_{(2,10,128)} = 35.922$, $p = .000 < .001$. Post-hoc comparisons using Scheffe's method revealed that adolescents residing in Taiwan perceived higher levels of informational support from their family compared to those residing in China and Macau, while adolescents residing in China had a higher perception of informational support from their family compared to those residing in Macau. (noted as Table 11).

(2) Peer Social Support

The differences in variables related to peer social support among the "current place of residence" background variables were analyzed using independent samples one-way ANOVA. The results showed significant differences in emotional support with $F_{(2,10,128)} = 69.986$, $p = .000 < .001$, indicating significant differences in emotional support based on the current place of residence. Post-hoc comparisons using Scheffe's method revealed

Table 11 Anova of Social Support by Residential Area from Taiwan, Mainland China as well as Macao and Hong Kong Adolescents

n=10,131

Variable	Residential Area	n	Mean	Standard Deviation	F	P	Scheffe Post Hoc Comparison
Emotional Support	Mainland China	6166	14.8323	4.40932	49.314	.000	Taiwan>Macao
	Macao	2478	13.9395	3.63987			
	Taiwan	1487	15.0397	3.66760			
Instrumental Support	Mainland China	6166	18.6959	5.31577	29.871	.000	Taiwan>Mainland China>Macao
	Macao	2478	18.3204	4.04444			
	Taiwan	1487	19.5474	4.13406			
Informational Support	Mainland China	6166	15.0131	4.36594	35.922	.000	Taiwan>Mainland China>Macao
	Macao	2478	14.3144	3.75416			
	Taiwan	1487	15.3484	3.71816			

that adolescents residing in Taiwan had higher levels of emotional support from their peers compared to those residing in China and Macau. Adolescents residing in China also had a higher perception of emotional support from their peers compared to those residing in Macau. Regarding differences in instrumental support based on the current place of residence, the results showed significant differences with $F_{(2,10,128)} = 43.977$, $p = .000 < .001$. Post-hoc comparisons using Scheffe's method revealed that adolescents residing in Taiwan had higher levels of instrumental support from their peers compared to those residing in China and Macau. Adolescents residing in China also had a higher perception of instrumental support from their peers compared to those residing in Macau. Regarding differences in informational support based on the current place of residence, the results showed significant differences with $F_{(2,10,128)} = 128.769$, $p = .000 < .001$. Post-hoc comparisons using Scheffe's method revealed that adolescents residing in Taiwan had higher levels of informational support from their peers compared to those residing in China and Macau. Adolescents residing in China also had a higher perception of informational support from their peers compared to those residing in Macau. (See Table 12)

(3) Teacher or Government Agency Social Support

The differences in variables related to social support from teachers or government agencies among the "current place of residence" background variables were analyzed using independent samples one-way ANOVA. The results showed significant differences in emotional support with $F_{(2,10,128)} = 113.760$, $p = .000 < .01$, indicating significant differences in emotional support based on the current place of residence. Post-hoc comparisons using Scheffe's method revealed that adolescents residing in China perceived higher levels of emotional support from teachers or government agencies

Table 12 Anova of Peer Social Support by Residential Area from Taiwan, Mainland China as well as Macao and Hong Kong Adolescents

n = 10,131

Variable	Residential Area	n	Mean	Standard Deviation	F	P	Scheffe Post Hoc Comparison
Emotional Support	Mainland China	6166	14.9092	4.08123	69.986	.000	Taiwan>Mainland China>Macao
	Macao	2478	14.0101	3.45399			
	Taiwan	1487	15.3497	3.27232			
Instrumental Support	Mainland China	6166	14.7738	4.06487	43.977	.000	Taiwan>Mainland China>Macao
	Macao	2478	14.0896	3.54327			
	Taiwan	1487	15.1876	3.35000			
Informational Support	Mainland China	6166	17.3871	5.07371	128.769	.000	Taiwan>Mainland China>Macao
	Macao	2478	15.5690	4.16212			
	Taiwan	1487	16.9254	4.36744			

compared to those residing in Taiwan and Macau. Adolescents residing in Taiwan also perceived higher levels of emotional support from teachers or government agencies compared to those residing in Macau. Regarding differences in instrumental support based on the current place of residence, the results showed significant differences with $F_{(2,10,128)} = 308.099$, $p = .000 < .01$. Post-hoc comparisons using Scheffe's method revealed that adolescents residing in China had a higher perception of instrumental support from teachers or government agencies compared to those residing in Taiwan and Macau. Adolescents residing in Taiwan also had a higher perception of instrumental support from teachers or government agencies compared to those residing in Macau. Regarding differences in informational support based on the current place of residence, the results showed significant differences with $F_{(2,10,128)} = 57.579$, $p = .000 < .001$. Post-hoc comparisons using Scheffe's method revealed that adolescents residing in China had a higher perception of informational support from teachers or government agencies compared to those residing in Taiwan and Macau. Adolescents residing in Taiwan also had a higher perception of informational support from teachers or government agencies compared to those residing in Macau. (See Table 13).

9. Self-Resilience

The differences in variables related to self-resilience among the "current place of residence" background variables were analyzed using independent samples one-way ANOVA. The results revealed significant differences in self-resilience with $F_{(2,10,128)} = 103.094$, $p = .000 < .001$, indicating significant differences in self-resilience based on the current place of residence. Post-hoc comparisons using Scheffe's method showed that adolescents residing in China had higher levels of self-resilience compared to those

Table 13 Anova of Teacher or Government Agency Social Support by Residential Area from Taiwan, Mainland China as well as Macao and Hong Kong Adolescents

n =10,131

Variable	Residential Area	n	Mean	Standard Deviation	F	P	Scheffe Post Hoc Comparison
Emotional Support	Mainland China	6166	14.2824	4.03973	113.760	.000	Mainland China>Taiwan>Macao
	Macao	2478	12.9310	3.53546			
	Taiwan	1487	13.5736	3.47590			
Instrumental Support	Mainland China	6166	16.8153	5.03307	308.099	.000	Mainland China>Taiwan>Macao
	Macao	2478	14.1275	4.04774			
	Taiwan	1487	15.2582	4.18506			
Informational Support	Mainland China	6166	14.6575	4.02938	57.579	.000	Mainland China>Taiwan>Macao
	Macao	2478	13.6687	3.81586			
	Taiwan	1487	14.5407	3.56947			

residing in Taiwan and Macau. Adolescents residing in Taiwan also had higher levels of self-resilience compared to those residing in Macau (See Table 14).

Table 14 Anova of Self-resilience T by Residential Area from Taiwan, Mainland China as well as Macao and Hong Kong Adolescents

n =10,131

Variable	Residential Area	n	Mean	Standard Deviation	F	P	Scheffe Post Hoc Comparison
Self-resilience	Mainland China	6166	38.9377	9.84590	103.094	.000	Mainland China>Taiwan>Macao
	Macao	2478	35.7938	8.02171			
	Taiwan	1487	38.0256	8.25221			

III. Hierarchical Analysis of Internet Behavior, Interpersonal Relationships, Social Support, Self-Resilience, and Psychological Well-being among Adolescents in Mainland China, Taiwan, and Macau

1. Mainland China

(1) Prediction of Interpersonal Distress on Psychological Well-being Social/consumer motivation for internet use, instrumental motivation, time management and interpersonal health related to internet addiction issues, intimacy with family and peers in real-life interactions, intimacy with online friends in internet interpersonal interactions, family support, and support from teachers or government institutions can predict 24.1% of interpersonal distress. The results indicate that higher levels of social/consumer motivation for internet use, instrumental motivation, time management and interpersonal health related to internet addiction, intimacy with peers in real-life interactions, and

intimacy with online friends are associated with higher levels of interpersonal distress. Conversely, higher levels of intimacy with family in real-life interactions, family support, and support from teachers or government institutions are associated with lower levels of interpersonal distress.

- (2) Prediction of Academic Distress on Psychological Well-being Social/consumer motivation for internet use, tolerance and symptoms of internet addiction, intimacy with family, informational intimacy with peers, intimacy with online friends, family social support, peer social support, and self-resilience can predict 25.5% of academic distress. The results indicate that higher levels of social/consumer motivation for internet use, tolerance and symptoms of internet addiction, informational intimacy with peers, intimacy with online friends, and family social support are associated with higher levels of academic distress. Conversely, higher levels of intimacy with family, intimacy with online friends, peer social support, and self-resilience are associated with lower levels of academic distress.
- (3) Prediction of Stress and Anxiety on Psychological Well-being Social/consumer motivation for internet use, tolerance and symptoms of internet addiction, interpersonal health related to internet addiction issues, intimacy with family, informational intimacy with peers, peer social support, and self-resilience can predict 26.3% of stress and anxiety. The results indicate that higher levels of social/consumer motivation for internet use, tolerance and symptoms of internet addiction, interpersonal health related to internet addiction, and informational intimacy with peers are associated with higher levels of perceived stress and anxiety. Conversely, higher levels of intimacy with family, peer social support, and self-resilience are associated with lower levels of perceived stress and anxiety.
- (4) Prediction of Anxiety on Psychological Well-being Social/consumer motivation for internet use, tolerance and symptoms of internet addiction, time management and interpersonal health related to internet addiction, intimacy with family, informational intimacy with peers, and support from teachers or government institutions can predict 23.2% of anxiety. The results indicate that higher levels of social/consumer motivation for internet use, tolerance and symptoms of internet addiction, time management and interpersonal health related to internet addiction, informational intimacy with peers, and support from teachers or government institutions are associated with higher levels of perceived anxiety. Conversely, higher levels of intimacy with family are associated with lower levels of perceived anxiety.
- (5) Prediction of Depression on Psychological Well-being Social/consumer motivation for internet use, tolerance and symptoms of internet addiction, time management and interpersonal health related to internet addiction, intimacy with family, informational intimacy with peers, intimacy with online friends, family social support, peer social

support, and self-resilience can predict 22.4% of depression. Higher levels of social/consumer motivation for internet use, tolerance and symptoms of internet addiction, time management and interpersonal health related to internet addiction, informational intimacy with peers, intimacy with online friends, family social support, and peer social support are associated with higher levels of perceived depression. Conversely, higher levels of intimacy with family and support from family and peers are associated with lower levels of perceived depression.

2. Macao, China

- (1) Prediction of Interpersonal Distress on Psychological Well-being Social/consumer motivation for internet use, core withdrawal symptoms of internet addiction, time management and interpersonal health related to internet addiction, intimacy with family in real-life interactions, intimacy with peers in real-life interactions, family social support, and social support from teachers or government institutions can predict 21.9% of interpersonal distress. The results indicate that higher levels of social/consumer motivation for internet use, core withdrawal symptoms of internet addiction, time management and interpersonal health related to internet addiction, intimacy with peers in real-life interactions are associated with higher levels of interpersonal distress. Conversely, higher levels of intimacy with family in real-life interactions, family social support, and social support from teachers or government institutions are associated with lower levels of interpersonal distress.
- (2) Prediction of Academic Distress on Psychological Well-being Instrumental motivation for internet use, tolerance of internet addiction, interpersonal health related to internet addiction, intimacy with family in real-life interactions, intimacy with online friends, informational intimacy with online friends, and self-resilience can predict 11.2% of academic distress. The results indicate that higher levels of instrumental motivation for internet use, tolerance of internet addiction, interpersonal health related to internet addiction, and informational intimacy with online friends are associated with higher levels of academic distress. Conversely, higher levels of intimacy with family in real-life interactions, intimacy with online friends, peer social support, and self-resilience are associated with lower levels of academic distress.
- (3) Prediction of Stress and Anxiety on Psychological Well-being Instrumental motivation for internet use, tolerance of internet addiction, interpersonal health related to internet addiction, intimacy with family in real-life interactions, and family social support can predict 17.4% of stress and anxiety. The results indicate that higher levels of instrumental motivation for internet use, tolerance of internet addiction, interpersonal health related to internet addiction, and intimacy with family in real-life interactions are associated with higher levels of perceived stress and anxiety. Conversely, higher levels of intimacy with

family in real-life interactions, intimacy with online friends, and family social support are associated with lower levels of perceived stress and anxiety.

- (4) Prediction of Anxiety on Psychological Well-being Social/consumer motivation for internet use, tolerance of internet addiction, interpersonal health related to internet addiction, intimacy with family in real-life interactions, intimacy with peers in real-life interactions, family social support, and self-resilience can predict 14.4% of anxiety. The results indicate that higher levels of social/consumer motivation for internet use, tolerance of internet addiction, interpersonal health related to internet addiction, intimacy with peers in real-life interactions are associated with higher levels of perceived anxiety. Conversely, higher levels of intimacy with family in real-life interactions, family social support, and self-resilience are associated with lower levels of perceived anxiety.
- (5) Prediction of Depression on Psychological Well-being Tolerance of internet addiction, time management and interpersonal health related to internet addiction, intimacy with family in real-life interactions, intimacy with peers in real-life interactions, intimacy with online friends, family social support, and self-resilience can predict 20.9% of depression. The results indicate that higher levels of tolerance of internet addiction, time management and interpersonal health related to internet addiction, intimacy with peers in real-life interactions, and intimacy with online friends are associated with higher levels of perceived depression. Conversely, higher levels of intimacy with family in real-life interactions, family social support, and self-resilience are associated with lower levels of perceived depression.

3. Taipei/New Taipei City, Taiwan

- (1) Predicting Interpersonal Distress in Psychological Health Motives for internet use such as social/consumption motives, intimacy with family members and peers in real-life interactions, informational intimacy with online friends, and peer support can predict interpersonal distress by 16.2%. The results indicate that higher levels of social/consumption motives for internet use, intimacy with peers in real-life interactions, and informational intimacy with online friends are associated with higher levels of interpersonal distress. Conversely, higher levels of intimacy with family members and peer support are associated with lower levels of interpersonal distress.
- (2) Predicting Academic Distress in Psychological Health Motives for internet use such as instrumental motives, tolerance for internet addiction, interpersonal health problems related to internet addiction, intimacy with family members in real-life interactions, informational intimacy with online friends, and self-resilience can predict academic distress by 11.2%. The results suggest that higher levels of instrumental motives for internet use, tolerance for internet addiction, interpersonal health problems related to internet addiction, and informational intimacy with online friends are associated with

higher levels of academic distress. Conversely, higher levels of intimacy with family members and peer support, as well as self-resilience, are associated with lower levels of perceived academic distress.

- (3) Predicting Stress and Anxiety in Psychological Health Motives for internet use such as instrumental motives, tolerance for internet addiction, interpersonal health problems related to internet addiction, intimacy with family members in real-life interactions, and family support can predict stress and anxiety by 17.4%. The results indicate that higher levels of instrumental motives for internet use, tolerance for internet addiction, and interpersonal health problems related to internet addiction are associated with higher levels of stress and anxiety. Conversely, lower levels of intimacy with family members, intimacy with online friends, and family support are associated with higher levels of perceived stress and anxiety.
- (4) Predicting Anxiety in Psychological Health Motives for internet use such as social/consumption motives, tolerance for internet addiction, interpersonal health problems related to internet addiction, intimacy with family members and peers in real-life interactions, family support, and self-resilience can predict anxiety by 14.4%. The results suggest that higher levels of social/consumption motives for internet use, tolerance for internet addiction, interpersonal health problems related to internet addiction, and intimacy with peers in real-life interactions are associated with higher levels of anxiety. Conversely, higher levels of intimacy with family members, family support, and self-resilience are associated with lower levels of perceived anxiety.
- (5) Predicting Depression in Psychological Health Tolerance for internet addiction, time management and interpersonal health problems related to internet addiction, intimacy with family members and peers in real-life interactions, intimacy with online friends, family support, and self-resilience can predict depression by 20.9%. The results indicate that higher levels of tolerance for internet addiction, time management and interpersonal health problems related to internet addiction, intimacy with peers in real-life interactions, and intimacy with online friends are associated with higher levels of depression. Conversely, higher levels of intimacy with family members, family support, and self-resilience are associated with lower levels of perceived depression.

Conclusions

Under the Covid pandemic, the perceptions of mental health among teenagers in different regions and under different administrative and support systems vary slightly. The findings are as follows:

1. Teenagers living in Macau have a higher perception of interpersonal distress compared to those living in China and Taiwan. Teenagers living in Macau also have a higher perception of academic distress compared to those living in Taiwan and China.

Additionally, teenagers living in Taiwan have a higher perception of academic distress compared to those living in China.

2. Teenagers living in Taiwan have a higher perception of stress/anxiety compared to those living in China and Macau. Teenagers living in China also have a higher perception of stress/anxiety compared to those living in Macau. Teenagers living in China and Taiwan have a higher perception of anxiety symptoms compared to those living in Macau. Teenagers living in China and Taiwan have a higher perception of depression symptoms compared to those living in Macau.
3. Teenagers living in Taiwan have a higher motivation for using social/consumption tools on the internet compared to those living in Macau and China. Additionally, teenagers living in Macau have a higher motivation for using instrumental tools on the internet compared to those living in China.
4. Teenagers living in Macau have a higher tolerance for internet addiction and compulsive internet use symptoms compared to those living in Taiwan and China. Additionally, teenagers living in Taiwan have a higher tolerance for internet addiction and compulsive internet use symptoms compared to those living in China. However, teenagers living in Macau and Taiwan have a higher perception of withdrawal symptoms related to internet addiction compared to those living in China. Teenagers living in have a higher perception of withdrawal symptoms related to internet addiction compared to those living in China.
5. Teenagers living in Macau have a higher perception of interpersonal problems related to internet addiction compared to those living in Taiwan and China. Additionally, teenagers living in Taiwan have a higher perception of interpersonal problems related to internet addiction compared to those living in China. However, teenagers living in Macau and Taiwan have a higher perception of time management issues related to internet addiction compared to those living in China.
6. Teenagers living in Taiwan have a higher perception of the intimacy and informational aspects of real-life social interaction with friends and peers compared to those living in Macau and China. Additionally, teenagers living in China have a higher perception of the intimacy and informational aspects of real-life social interaction with friends and peers compared to those living in Macau. However, teenagers living in China and Taiwan have a higher perception of the intimacy with family members in real-life social interaction compared to those living in Macau.
7. Teenagers living in China have a higher perception of the intimacy and informational aspects of online social interaction with internet friends compared to those living in Taiwan and Macau. Additionally, teenagers living in Taiwan have a higher perception of the informational aspects of online social interaction with internet friends compared to those living in Macau.
8. Teenagers living in Taiwan perceive higher levels of instrumental and informational

support from family members compared to those living in China and Macau. Additionally, teenagers living in China have a higher perception of instrumental and informational support from family members compared to those living in Macau. However, teenagers living in Taiwan perceive higher levels of emotional support from family members compared to those living in Macau.

9. Teenagers living in China have a higher perception of self-resilience compared to those living in Taiwan and Macau. Additionally, teenagers living in Taiwan have a higher perception of self-resilience compared to those living in Macau.
10. Tolerance to internet addiction, time management and interpersonal health issues related to internet addiction, intimacy with family members and informational aspects of real-life social interaction with peers and friends, intimacy with internet friends, family social support, and self-resilience can predict psychological health, including interpersonal distress, academic distress, stress and anxiety, and depression. The predictive power is highest for teenagers living in China, ranging from 20% to 25%, while those living in Macau and Taiwan have similar predictive power, ranging from 11% to 20%.

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