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ARTICLE

Being young and feeling blue in Taiwan: examining adolescent depressive mood and online and offline activities

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Abstract

This study investigates the relationship between Taiwanese adolescents' depressive mood and their self-reported online and offline activities. The results indicate that adolescents who reported higher depressive mood were more likely to use the internet to make friends and express feelings compared to those who were lower in depressive mood. Teens higher in depressive mood reported to have fewer individuals in their immediate social network to speak with, either online or offline, when feeling blue. Hierarchical linear regression analysis shows that adolescents higher in depressive mood reported to engage in more online activities in the areas of communication, entertainment and information seeking. Further, a positive relationship between depressive mood and participation in risk behaviors is identified. These findings shed light on earlier studies that focus predominantly on US internet users,

suggesting that the role that the internet plays for youths with depressive mood may vary by cultural context.

Key words

adolescence • culture • depressive mood • internet use • risk behaviors • stigma • Taiwan

According to the World Health Organization (WHO) (2007), mental and neurological illnesses affect 450 million people worldwide and these illnesses do not discriminate in terms of social class, gender, race, age or ethnicity. A recent survey by Mental Health America (2007) indicates that one in five adolescents suffers from clinical depression, and about 15 to 20 percent of American teenagers have experienced a serious episode of depression, which is similar to the proportion of adults suffering from depression (American Academy of Child and Adolescent Psychiatry, 2007; MedlinePlus Medical Encyclopedia, 2005). Understanding what influences adolescent depression is critical, since early detection and treatment may control and potentially cure people of this disease and prevent it from becoming a life-long disorder (Ainsworth, 2000; Frank et al., 1990).

Several studies show that internet use may improve communication among depression patients and providers (Taylor et al., 2002), facilitate self-help movements among patients (Norcross, 2000) and increase awareness about the severity and impact of mental illness (Patten, 2003). The current study examines the relationship between depressive mood and online and offline behaviors among adolescents, as few studies have focused specifically on youth and depression. Moreover, since many studies have concentrated on American internet users (e.g. Bargh and McKenna, 2004; Kraut et al., 1998, 2002), this research studies adolescents in the Republic of China (Taiwan), a country whose strong collectivistic culture differs from the individualistic culture of the US (Hofstede, 2001).

LITERATURE REVIEW

Adolescence and depression

According to Beck (1970: 6), depression – also known as affective disorder, mood disorder, destructive emotion disorder, dysthymic disorder or melancholia – can be defined in terms of the following attributes:

- 1 mood alteration;
- 2 self-reproach and self-blame;
- 3 regressive and self-punitive wishes (desire to escape, hide or die);
- 4 vegetative changes (anorexia, insomnia, loss of libido); and
- 5 change in activity level (retardation or agitation).

The bulk of early depression research has focused on adults (between 18 and 44 years) and seniors (65 years and above). However, depression among adolescents is recognized increasingly as a serious disorder (Mental Health America, 2007; Weissman et al., 1993). Studies also show that adult depression may be traced back to depressive episodes in childhood and adolescence (Burke et al., 1990; Wals and Verhulst, 2005). Growing up implies having to deal with constant reality checks, which often brings on a state of sadness (Bemporad, 1994). In addition, stressful life events, such as failure in academic tasks, interpersonal rejection, criticism, parent–child conflict, death of loved ones, parental divorce or lack of social support, appear to be involved in the onset of depression during adolescence (Goodyer and Altham, 1991; Lewinsohn and Essau, 2002; Reynolds and Johnston, 1994). Moreover, studies have shown that depressed adolescents use fewer effective coping strategies for dealing with stressful and negative life events, while their non-depressed counterparts use more effective strategies (Adams and Adams, 1991). Consequently, it is important to consider adolescents' level of depression as well as their social and informational resources for coping with depressive mood. Particularly important in this regard is the potential relationship between depression and interpersonal communication (Ainsworth, 2000), because deficits in interpersonal communication skills can be possible precursors of depression, or because depression may cause one to disengage from social interaction (Joiner, 2002).

Adolescence, depression and internet use

Internet use is pervasive among adolescents in industrialized countries. Terms such as 'digital generation' or 'instant/text-message generation' suggest that online communication has become an important way for adolescents to express themselves and develop their self-identities (Turkle, 1995, 2005). To date, varying effects of internet use on adolescent well-being have been found. For example, Gross (2004) found that adolescents use the internet to strengthen their existing friendships, seek information, obtain news for schoolwork and engage in online gaming and other leisurely activities. Yet a number of studies suggest that adolescent internet use may lead to alienation (Mendels, 1999), deindividuation (McKenna and Bargh, 1998; Postmes et al., 1999), addiction (e.g. Beard, 2005; Greenfield, 2004; Young and Roger, 1998), conflicting social identities (McKenna and Bargh, 1998; Turkle, 1995, 2005) and strained psychological well-being (Gross et al., 2002; Kraut et al., 1998).

Variations in the relationships between internet use and depression have been explained in several ways. For example, in a pioneering longitudinal study of internet use in 73 households, Kraut et al. (1998) investigated the phenomenon of the 'internet paradox', suggesting that online communication

is associated with loneliness and social anxiety. Their study showed that the more time people spent online, the smaller the size of their social network and the less they communicated face-to-face with family members. A follow-up study (Kraut et al., 2002) indicated that the 'paradox' effect dissipated when individual personality factors were controlled for. The results showed that extroverts used the internet to gain more social support, while introverts' internet use was associated with less community involvement, lower self-esteem and an increase in loneliness and stress. Hence the internet may serve as a communication medium that is associated with social augmentation, where internet use enlarges the social network and allows extroverts to express themselves through additional communication channels. Alternatively, a social displacement explanation suggests that internet use serves to displace face-to-face social interaction with family and friends, with potentially negative implications for the psychological well-being of introverts.

Several scholars have called Kraut et al.'s (1998) study into question, critiquing the measurement of depressive symptoms (Rierdan, 1999), the study design and negligible effect sizes (Shapiro, 1999). Different factors may be related to a broadened notion of internet use rather than simply concentrating on the number of hours spent online (Franzen, 2000). In addition, the impact of internet use may vary depending on how it supplements real-world relationships (Cummings et al., 2002), since Silverman (1999) argues that Kraut et al.'s study overlooked the potential social support gained from online mental health community participation. Moreover, as people become expert users, their self-efficacy may help to reverse the negative effects of extensive internet use (LaRose et al., 2001).

Today, more experienced internet users may not experience the same level of stress as early users and may employ the medium to reduce feelings of depression by seeking social support via email or other web-based applications. Indeed, some recent research highlights a process of social compensation, where the internet provides social and psychological support for those who have various psychological problems or suffer from a stigmatized illness (Bargh and McKenna, 2004). For example, Campbell et al. (2006) found that internet use by the socially timid may enhance their self-confidence, social abilities and social support, indicating that internet use is a form of low-risk social interaction compared to face-to-face communication. Another study by Ybarra et al. (2005) investigated online communication and the self-disclosure practices of adolescents with depressive symptomatology, and found that depressed teens are more likely to talk with strangers online, email more frequently with others and spend more time online compared to those who are not depressed. In addition, studies on internet use and stigmatized illness have shown that the internet is a useful

form of health education (Berger et al., 2005; Sirey et al., 2001), and that online support may assist individuals coping with depression (Gould et al., 2002; Houston et al., 2002; Shaw and Gant, 2002). Thus, based on recent studies that highlight social compensation and augmentation as opposed to social displacement, it may be expected that for depressed adolescents, the internet can function as a valuable communicative resource. In the light of recent internet research, which emphasizes the importance of examining internet use in the context of everyday lives (Bakardjieva and Smith, 2001; Wellman and Haythornthwaite, 2002), the current study examines both online and offline activities in a sample of Taiwanese adolescents.

Depression, collectivistic culture and stigma

Cultures that differ from the North American culture, which conventionally is held as the *de facto* context for the majority of internet and health communication research, may engender a different pattern of results with regard to adolescent depression and internet use. In the words of Teuting and Koslow, symptoms of depression are 'clearly a function of culture, since all behaviors, including depressive behaviors, are expressed in the context of a set of rules governing what is normal for the group' (1982: 4). Specifically, the way depression is understood varies between cultures. For example, in the USA, depression is conceived predominantly as an egocentric problem: an independent, autonomous individual is assumed to suffer from depression solely due to internal disturbances. However, in countries with a collectivistic culture, emphasizing interdependency and interconnectivity with others, depression may be interpreted in terms of interpersonal disturbances, as the self is primarily seen in relation to significant others (Tsai and Chentsova-Dutton, 2002).

Previous research in Asia on the influence of culture on individuals' self-perceptions (i.e. the discrepancies between actual and ideal self) and self-satisfaction (Cheung, 1997; Heine and Lehman, 1999) suggests that depression in collectivist cultures is related to specific cultural aspects. The dynamics between individual traits, group identity and behavioral norms affect one's cognition, emotion and motivation (Markus and Kitayama, 1991), as well as one's attributional style, depression and loneliness (Anderson, 1999). As such, in a collectivistic culture, depression is often highly stigmatized (Goffman, 1963). According to Gilmore and Somerville (1994), a stigma can be seen as an attribute that separates a particular individual from the normalized social order. While people who suffer from a mental disorder are stigmatized at least to some extent in almost any culture, the degree to which depressed people are stigmatized seems to differ from one culture to another (Weiss et al., 2006). In the USA, for example, depression seems to have become normalized to such a degree that many people take it for granted

(see e.g. *Listening to Prozac* by Kramer, 1997). In contrast, relatively few studies have investigated directly the stigmatization of depression in collectivist cultures and some research hints that the mental illness is stigmatized more strongly in such contexts (Bender, 2004). Hence it is important to gain insight into the way that cultural setting influences the perception and experience of a stigmatized mental illness such as depression, including the way people who suffer from such a disease communicate and express themselves online and offline, and the levels of available social and familial support to them. The current study investigates this by looking at adolescents in Taiwan, a culture which ranks very high in terms of collectivistic values in Hofstede's (2001) research.

THE CURRENT STUDY

In Taiwan's rapidly changing society, adolescents face multiple pressures that put a strain on their psychological well-being. Recently, the term 'strawberry generation' was invented to signify a new generation of Taiwanese adolescents born in the late 1990s, who are unable to cope with the stresses of everyday life (Chou, 2001; Dumont, 2000). The findings of the Taiwanese Adolescent Depression Survey, conducted by the John Tung Foundation (2002), indicated that about 15 to 25 percent of teenagers in Taiwan display severe depressive symptomatology and are in need of professional assistance. Several factors seem to affect this high prevalence of adolescent depression. Many Taiwanese adolescents grow up in highly populated metropolitan areas such as Taipei where life is fast, crowded and stressful. Young Taiwanese students face mounting pressures as they are pushed to excel academically and compete for scarce positions in reputable colleges and universities. Consequently, Taiwanese adolescents' identities are put to the test continuously through family, academic and career expectations, often to the detriment of their well-being (Yi and Wu, 2004).

In Taiwan and other industrialized Asian countries, internet use has increasingly become part and parcel of adolescent life (Cheong, 2008; Jung et al., 2005). Several studies on adolescent internet use in Taiwan have been conducted (Chou, 2001; Tsai and Lin, 2003; Wu and Cheng, 2007), yet these focus narrowly on the effects of internet addiction. Therefore, in light of previous research pointing to the differing relationships between adolescent depression, internet use and social involvement, as well as the relative scarcity of research on Asian adolescents, the present study explores how Taiwanese adolescents with varying levels of depressive mood use the internet for communication, entertainment and information retrieval, and their reasons for so doing. In addition, this research explores how these adolescents use their social networks to communicate feelings of depressive mood.

METHOD

Sample and data collection

The data were collected through the 2004 Taiwanese *Adolescent Internet Use, Daily Life and Depressive Mood Survey* (ADMSS), targeting adolescent students (aged 12–17) in Taiwan. To obtain a representative sample of adolescents, a multi-stage cluster sampling method was used based on the four main geographic areas of Taiwan (north, central, south and east), the number of students within each area and the type of school within each area (public and private). In each area, 15 schools were selected randomly for a total of 60 schools. In Taiwan, students follow six years of high school education (aged 12–17) after completing six years of elementary school. For this study, the school counselor randomly selected one class of each high school year of each sampled school. The average class size was 40 students. School counselors administered the questionnaire, which was written in Chinese (Mandarin). The respondents completed the questionnaire anonymously and voluntarily during a regular class period. The students and schools were assured that their responses would be kept confidential. In total, 6848 respondents completed the questionnaire during May and June 2004. The final valid sample was 6341 respondents.

Study factors

Two main dependent variables were used: ‘adolescent online activities’ and ‘adolescent offline activities’. The first variable, adolescent online activities, was studied by examining time spent online and types of online activities. Using six-point scales, four items measured a respondent’s time spent online, including their daily average (ranging from ‘five hours or more’ to ‘less than one hour’) and weekly average (ranging from ‘every day’ to ‘never’) of using the internet for communication or information-seeking. Based on a reliability analysis, three of these items were combined and transformed into a new index, termed ‘internet use frequency’ ($\alpha = .86$), while the daily average of using the internet to communicate was excluded. Sixteen types of online activities (e.g. online gaming, searching for school or generic information, making friends, downloading, instant messaging or participating in online communities) were measured using five-point scales (ranging from ‘always’ to ‘never’). Principal components factor analysis revealed three factors: communication (five items with 19.4% of variance explained, $\alpha = .79$), entertainment (five items with 21.6% of variance explained, $\alpha = .79$) and information-seeking (five items with 12.7% of variance explained, $\alpha = .67$).

The second dependent variable, ‘adolescent offline activities’, was measured by asking the respondents to report their ways of relieving tension when they had felt depressed in the last month. A total of 27 items (e.g. talking to

friends, watching television, smoking cigarettes, working out) were used, employing four-point scales (ranging from 'never' to 'always'). A principal components factor analysis revealed two factors: friend activities (five items with 10.5% of variance explained, $\alpha = .73$) and risk behaviors (five items with 14.6% of variance explained, $\alpha = .77$).

Adolescent depressive mood was studied by using the ADMSS, a self-report rating inventory developed for screening Taiwanese adolescents' depressive mood, with a Cronbach's alpha of .91. The ADMSS includes 20 items (e.g. 'I found myself getting irritated rather easily', 'I did not feel like going to school', 'I felt like I had nothing to look forward to', 'I was pessimistic' and 'I felt like disappearing from the world') that measure symptoms of depressive mood over a two-week period. The respondents were asked to report their experience of each symptom by means of a checklist (via 'yes' or 'no' answers). A respondent's total score on the ADMSS was calculated to determine their level of depressive mood. The scale was found to discriminate effectively between low and high depressive mood by summing up the responses to the questions (ranging from 1 to 20; see Huang and Hsu, 2003). The standard cut-off points for determining the level of depressive mood are as follows: a score of 5 and below indicates low depressive mood; between 6 and 11 indicates mild to moderate depressive mood; and 12 and above indicates moderate to severe depressive mood. A respondent with a score of 12 or above is considered to display a high level of depressive mood – according to the instrument guidelines, such a person should be referred to a psychiatric professional for appropriate clinical diagnosis.

In addition, the respondents' age, sex, parental marital status, parental occupation and family conditions (i.e. the quality of the relationship between parents and the composition of a household in terms of parents, grandparents, siblings, etc.) were measured. These variables were assessed based on previous research findings indicating that family factors (e.g. parental psychopathology, parent-child conflict or marital separation and divorce) may serve as stressors that initiate, maintain and/or exacerbate depression in children and adolescents, as well as impair interpersonal relationships (see Joiner, 2002; Reynolds and Johnston, 1994).

Finally, two additional variables were studied: 'reasons for using the internet' (i.e. staying in touch, making friends, finding people who care about you, relieving tension, finding joy and expressing thoughts you cannot express otherwise) were examined by employing four-point Likert-type scales (ranging from 'strongly agree' to 'strongly disagree'); and 'person first talked with when feeling down or blue' was investigated by a checklist of the following people: friends or classmates, mother, father, boyfriend/girlfriend, older siblings, younger siblings, other relatives, nobody or others.

Data analysis

Hierarchical linear regression analysis was used to study the association between Taiwanese adolescent depressive mood and online and offline activities. The predictor variables included age, sex, parental marital status, parental occupation and family conditions and depressive mood. Separate regression equations were examined for each of the dependent factors of online and offline activities. In addition, Chi-square analyses were conducted to examine the degree of association between depressive mood and the control variables as well as the reasons for using the internet and person talked to first when feeling down.

RESULTS

Descriptive statistics of the sample are presented in Table 1. The average age was 15 years ($N = 6300$, $SD = 1.52$ years). Gender-wise, 51 percent of the sampled population was female. In terms of the marital status of the respondents' parents, 85 percent were married, 9.8 percent were divorced and 5.1 percent were widowed. In terms of the father's occupation, 5.4 percent had a labor-related job, 12.6 percent had a government job, 69.1 percent worked in the private sector and 12.8 percent were unemployed. For the mother's occupation, 2.6 percent were labor workers, 8.5 percent were government employees, 48.8 percent were private sector workers and 40 percent were unemployed. Approximately 92 percent of the respondents lived with their parents and reported that the quality of the relationship between their parents was 'good' ($M = 3.72$, $SD = 1.08$). The respondents' average reported level of depressive mood was 8.19 ($SD = 5.42$).

Adolescent depressive mood and online activities

The relationship between Taiwanese adolescents' online activities and their level of depressive mood was examined using three hierarchical regression models with regard to internet use for communication, entertainment and information-seeking. First, the results showed that age and living with parents were related significantly to using the internet to communicate (see Table 2). Over and above the effects of the respondents' demographic characteristics, level of depressive mood was related independently to online communication activities ($b = .02$, $p < .001$). Moreover, the results showed that the respondents who were older and not living with their parents were more likely to use the internet for communication than those who were younger and lived with their parents ($R^2 = .02$, $F(1, 4974) = 77.18$, $p < .001$).

Second, the results showed that the respondents' gender and their mother's occupation were significantly associated with online entertainment (see Table 2). Further, depressive mood was independently related to online entertainment ($b = .02$, $p < .001$). Specifically, male respondents were more

• Table 1 Descriptive statistics and zero-order correlations among study variables

No.	VARIABLES	M	SD	<i>a</i>	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Age	15.36	1.52														
2	Gender (female = 1)	.51	.50		-.01												
3	Parents' marital status	1.20	.51		-.02	.01											
4	Father's job	2.89	.68		-.05**	.02	.16**										
5	Mother's job	3.26	.72		-.02	.02	.02	.28**									
6	Live with parents	.92	.27		.06**	.03*	-.26**	-.07**	-.03*								
7	Parents' relationship quality	3.72	1.08		.01	.00	-.28**	-.14**	-.01	.19**							
8	Depressive mood	8.19	5.42	.91	.04**	.08**	.04**	.04**	.00	-.04**	-.22**						
9	Internet use frequency	2.69	1.31	.85	.16**	-.06**	-.03*	-.01	-.03	.06**	.02	.00					
<i>Online activities</i>																	
10	Entertainment	2.60	.93	.79	.04**	-.22**	-.03	.02	-.01	.02	-.03	.08**	.45**				
11	Communication	1.65	.93	.79	.05**	.03*	.03*	.01	-.02	-.02	-.04**	.13**	.37**	.55**			
12	Information-seeking	2.32	.85	.67	.20**	.13**	-.05**	-.02	-.02	.08**	.08**	.04**	.48**	.53**	.56**		
<i>Offline activities</i>																	
13	Risk behavior	.14	.37	.77	.05**	-.10**	.07**	-.01	-.02	-.11**	-.09**	.13**	.03*	.07**	.16**	.01	
14	Interactions with friends	1.04	.65	.73	.07**	.06**	.01	.00	.00	-.02	.05**	-.04**	.20*	.28**	.39**	.36**	.21**

Note: **p* < .05, ***p* < .01

• Table 2 Effects of depressive mood on adolescents' online and offline activities

PREDICTOR VARIABLES	ONLINE ACTIVITIES			OFFLINE ACTIVITIES	
	COMMUNI- CATION	ENTERTAIN- MENT	INFORMATION SEEKING	FRIENDS ACTIVITIES	RISK BEHAVIORS
Block 1: Demographics					
Age	.027**	.011	.099***	.035***	.013***
Female (1)	.044	-.426***	.212***	.080***	-.070***
Parents' marital status					
Married	-.023	.125	.054	.046	.023
Divorced	.048	.150	.087	.136*	.062
Widowed (Ref)					
Father's occupation					
Labor	-.044	.036	-.105	.020	.048
Government	-.067	-.015	.147**	-.026	-.031
Private sector	-.024	.053	.102**	.009	-.041**
Unemployed (Ref)					
Mother's occupation					
Labor	.126	-.041	-.064	-.038	.077*
Government	-.036	-.043	.093*	-.025	-.032
Private sector	.029	.075**	.009	.020	.007
Unemployed (Ref)					
Live with parents (1)	-.109*	.000	.084	-.079*	-.100***
Parents' relationship quality (Block 1 ΔR^2)	-.002 (.006***)	-.010 (.053***)	.053*** (.065***)	.044*** (.014***)	-.010* (.033***)
Block 2: Depressive mood					
Depressive mood (Block 2 ΔR^2)	.022*** (.015)	.017*** (.009)	.007** (.002)	-.004* (.001)	.007*** (.012)
Total adjusted R^2	.021***	.062***	.066**	.015*	.045***

Note: Cell entries are unstandardized regression coefficients (and in parentheses, increments in variance explained) from the final equations of five hierarchical regression analyses. Parents' relational quality was measured on a single item, 5-point scale (1 = very bad; 5 = very good). Depressive mood was measured in a checklist manner using the ADMSS with a range of 1 to 20. * $p < .05$, ** $p < .01$, *** $p < .001$.

likely than female respondents to go online for entertainment. In addition, those whose mother was a private sector employee tended to use the internet for entertainment more than those whose mother was unemployed ($R^2 = .06$, $F(1, 4963) = 46.21$, $p < .001$).

Finally, a statistically significant relationship was found between depressive mood and online information-seeking ($R^2 = .07$, $F(1, 4976) = 9.95$, $p < .01$). Demographic characteristics such as age, gender, parents' occupations and parents' relationship quality were all related significantly to online information-seeking, while level of depressive mood was related independently to internet information-seeking ($b = .01$, $p < .01$) (see Table 2). The analysis showed that older females with a reported better

parental relationship were more likely to go online to find information than younger male respondents who reported a bad parental relationship. Those whose father had a governmental or private sector job tended to seek information online more than those with an unemployed father. In addition, the respondents whose mother was a government worker were more likely to use the internet for information-seeking than those whose mother was unemployed.

Adolescent depressive mood and offline activities

Two models examined the relationship between Taiwanese adolescents' offline activities and their level of depressive mood, using hierarchical regression analysis. First, the outcomes showed that in addition to depressive mood, the respondents' age, gender, parent's marital status, living with parents and parents' relationship quality were related significantly to adolescents' interpersonal activities with friends (see Table 2). The total model accounted for 2 percent of the variance ($R^2 = .02$, $F(1, 4914) = 6.06$, $p < .05$). Level of depressive mood was related independently to offline friend activities ($b = -.004$, $p < .05$). Further, older female respondents with divorced parents and currently not living with their parents were more likely to interact with offline friends than younger male ones living with a widowed parent. However, the data showed that those with a better parental relationship were more likely to engage in offline activities with friends than those who reported a bad parental relationship.

Second, the regression model indicated that engaging in risk behaviors was statistically significant ($R^2 = .05$, $F(1, 4923) = 61.49$, $p < .001$). The results showed that age, gender, a father with a private sector job, a mother with a labor-intensive occupation, living with parents, as well as the quality of parents' relationship were all related significantly to teenagers' risk behaviors. Over and above the effects of the respondents' demographic characteristics, level of depressive mood was uniquely related to risk behaviors ($b = .01$, $p < .001$). The analysis showed that older male respondents who did not live with their parents and reported a bad parental relationship were more likely to engage in offline risk behaviors than younger females who lived with their parents and reported a good parental relationship. Finally, compared to unemployed parents, those whose father was not a private sector employee but whose mother had a labor job were more likely to engage in risk behaviors (see Table 2).

Reasons for using the internet

Another section of the analysis concerned the extent to which adolescents' depressive mood is related to reasons for using the internet. Chi-square

analysis showed significant differences for making friends ($\chi^2(6, N = 5845) = 49.36, p < .000$), finding people who care about you ($\chi^2(6, N = 5833) = 73.42, p < .000$), relieving tension ($\chi^2(6, N = 5839) = 72.31, p < .000$), finding joy ($\chi^2(6, N = 5831) = 21.33, p < .002$) and expressing thoughts you cannot express otherwise ($\chi^2(6, N = 5822) = 105.55, p < .000$) (see Table 3). Staying in touch was not found to be significantly different. In particular, almost 40 percent of the respondents with high self-reported depressive mood strongly agreed to using the internet for expressing thoughts and feelings they could not express otherwise, compared with 33 percent who reported medium depressive mood, and 25 percent who reported low or no depressive mood.

Adolescent depressive mood and social network

As shown in Table 3, Chi-square analysis indicated a significant association between level of depressive mood (i.e. low, moderate and high) and particular people whom respondents preferred to talk to when feeling down

• Table 3 Chi-square analyses of relationship between level of depressive mood and study variables

VARIABLES	TEST STATISTICS		
	χ^2	df	p
Demographic variables			
Age	29.149	16	.023
Gender (female = 1)	30.579	2	.000
Parents' marital status (married = 1)	15.325	4	.004
Reasons for using internet			
Staying in touch	8.247	6	.221
Making friends	49.364	6	.000
Finding people who care about you	73.421	6	.000
Relieving tension	72.314	6	.000
Finding joy	21.331	6	.002
Expressing thoughts you cannot express otherwise	105.551	6	.000
Persons first talked to when feeling down			
Friends or classmates	7.115	2	.029
Mother	26.891	2	.000
Father	15.338	2	.000
Boy/girlfriend	14.386	2	.001
Older siblings	4.448	2	.108
Younger siblings	1.900	2	.387
Other relatives	.264	2	.876
Nobody	63.658	2	.000
Others	9.229	2	.010

Note: Level of depressive mood (ADMSS) was used in the Chi-square analysis: a score (1) of 5 and below indicates low depressive mood; (2) between 6 and 11 indicates mild to moderate depressive mood; and (3) of 12 and above indicates moderate to severe depressive mood.

($\chi^2(2, N = 5866) = 63.66, p < .05$). Specifically, 18 percent of adolescents who reported high depressive mood indicated that they had no one to talk to when feeling down, compared to 13 percent of respondents reporting medium depressive mood and 9 percent indicating low or no depressive mood.

DISCUSSION

This study found that Taiwanese adolescents' level of depressive mood was significantly related to their online and offline activities. The most interesting outcomes of the Chi-square analyses were that those with high depressive mood reported that they had no one to talk to. In turn, those with high depressive mood reported using the internet to make friends and express thoughts and feelings that they could not express otherwise. In line with these outcomes, regression analysis showed that adolescents who were high in depressive mood were more likely to go online to communicate. Furthermore, using the internet to communicate explained more variance (in addition to baseline variables) compared to other purposes (entertainment or information-seeking), although the effect size was relatively small. In addition, the regression analysis showed positive relationships between depressive mood and adolescents' online entertainment and information-seeking activities. In terms of online entertainment, the results echo Bessière et al.'s 'mood enhancement' argument, implying that 'people with high depressive mood are more likely than others to use the internet for non-utilitarian, leisure activities that, in turn, elevates their mood' (2004: 9). These results are consistent with findings on mass media uses and gratifications (Blumler and Katz, 1974), particularly recent studies on audience needs for emotional release, pleasure and escapism sought and fulfilled via internet adoption (Ruggiero, 2000). Thus the respondents, particularly males, with a high level of depressive mood were more likely to use the internet for entertainment purposes, including gaming and downloading, relieving tension and killing time.

Overall, this study revealed important differences in terms of age and gender. With regard to Taiwanese adolescents' online information-seeking, girls with higher depressive mood were more likely to use the internet for information purposes than boys. This was particularly the case for older adolescents. Boys high in depressive mood were more likely than girls to use the internet for entertainment. Previous research conducted in the USA has shown that generally, women are more interested than men in online health information and put more effort into obtaining it (Barnett and Hwang, 2006). While this study examined the use of the internet to search for school and generic information instead of health information, these findings suggest that the same might be true for Taiwanese adolescents.

In addition, this study indicated that Taiwanese adolescents with high depressive mood were less likely to interact with friends offline and had a higher tendency to engage in risk behaviors, in line with the observation that people who suffer from depression tend to disengage from social life (Joiner, 2002). The current study showed that this was particularly true for older girls with divorced parents, suggesting that online communication allows Taiwanese adolescents to locate the social support that they cannot find through offline communication. In turn, adolescents lower in depressive mood were found to be more likely to engage in offline interpersonal activities with friends, such as talking, watching movies, playing sport, shopping and doing karaoke. Older boys with higher depressive mood were more likely to engage in high-risk behaviors, such as smoking cigarettes, drinking alcohol, nightclubbing, reckless driving and taking drugs. These boys were not living with their parents and reported that the quality of their parents' relationship was poor. The finding that male adolescents are less likely to use the internet to educate themselves and, on top of that, engage in risk behaviors corresponds with finding in the USA (Lewinsohn and Essau, 2002; Mental Health America, 2007; Shrier et al., 2003), which show that especially boys' ways of coping with depression are problematic.

In line with previous research on the importance of family relationships in a collectivistic culture such as China (e.g. Gao and Ting-Toomey, 1998; Pan, 2000), this study showed that factors such as quality of parental relationship and the father or mother's occupation significantly influenced many of the studied relationships. In turn, these outcomes suggest that Taiwanese adolescents (especially boys) whose parents are not on good terms with each other, and/or who are unemployed, may be the ones who turn most easily to the internet to escape or engage in offline risk behaviors.

No relationship was found between level of depressive mood and hours spent online, indicating the relative importance of what depressed Taiwanese adolescents do online over how long they do it. Further, the regression models only accounted for a small part of the variance. One possible explanation for the modest fit could be that the large, randomly sampled group of adolescents simply did not suffer from much depressive mood (the mean of the respondents' total score on the ADMSS was 8.19, $SD = 5.42$, $N = 5877$, signifying a medium level of depressive mood). Thus, demographic and family situation variables were statistically more influential on youths' online or offline activities. However, it is important to consider these findings in the light of previous research on the Taiwanese 'strawberry generation' (Chou, 2001; Dumont, 2000). Another plausible explanation concerns the way in which depression is perceived in Taiwanese culture, something that has not been investigated extensively and merits

future research. It is likely that young people in Taiwan are hesitant to report their true feelings of depression, because depression seems to be highly stigmatized in Taiwan and the depressed are seen as ill, insane or abnormal (e.g. see Tzeng and Lipson, 2004 on the perception of attempted suicide). Since Taiwanese culture is highly collectivistic (Hofstede, 2001), people (especially younger ones) are expected to be particularly vulnerable to societal judgments as they seek interdependency and community consensus. Therefore, it is likely that some Taiwanese youths may under-report their depressive mood. In addition, Taiwan is considered to be a high-context rather than low-context culture (Hall, 1976) in which people tend to rely on implicit, nonverbal and contextual signs for communication cues rather than explicit, verbalized messages. Measuring depression in such a culture by asking people to verbalize their feelings may naturally result in moderate responses, as people are not used to, or comfortable with, expressing themselves through words.

CONCLUSION

As this study was based on a secondary data, inevitably the analysis was limited by the measures used in the original survey. Future research could include additional variables to account for Taiwanese adolescents' depressive moods and internet use, for example, personality variables such as introversion or extraversion, adolescents' degree of self-disclosure (particularly in relation to a collectivistic high-context culture) and their familial context variables, including parents' income and employment. Additionally, future research could refine operationalizations of respondents' internet access, efficacy and expertise, for more in-depth analyses of internet use.

In view of the notion that mental illness is highly stigmatized (see Bender, 2004) and that generally depression is seen in a negative way in Asia (Tsai and Chentsova-Dutton, 2002), this study intimates that using the internet may benefit young people in Taiwan who are suffering from depression because online communication allows them to establish new relationships, find people who care about them and express feelings that they cannot express otherwise (or are even forbidden to express), in support of the social compensation hypothesis (McKenna and Bargh, 1998, 2000). Perhaps the most important conclusion of this exploratory cross-sectional study is how little is known, even nowadays, about depression in a non-western culture such as Taiwan, its perception and people's ways of dealing with it, especially from a communicative point of view. Future studies could triangulate data collection and analysis methods to gain more insight into this complex phenomenon, as well as examine it longitudinally. In so doing, scholars may develop more sensitive methods for detecting depression and reasons for internet use in a collectivistic cultural context. Deepening insight into the phenomenon investigated in this study may, in turn, help people in cultures

that do not readily recognize depression as a treatable condition (as well as in those who do) to express themselves more freely and therefore lead a more accepted (and acceptable) life.

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