



Research paper

Impact of parent–child relationship and sex on trajectories of children internalizing symptoms

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ABSTRACT

Introduction: Parenting and parental–child relationship may lead children to develop behavior disorders that can affect many aspects of their later life. This study aimed to examine the impact of parent–child relationship and sex on the development of internalizing symptoms in children.

Methods: Childhood and Adolescent Behaviors in Long-term Evolution (CABLE) is a longitudinal healthy-life-style research for which 18 elementary schools were randomly selected respectively in Taipei and Hsinchu in Taiwan. Data on sex, parent–child relations, and internalizing symptoms from four waves of follow-up were analyzed: 2003 (9 year olds), 2006 (12 year olds), 2009 (15 year olds) and 2012 (18 year olds). A latent growth model was used to examine the impact of parental–child relationship and sex on the trajectory of children's internalizing symptoms.

Results: Results show that internalizing symptoms is more severe ($\beta = 0.21, p < 0.01$) and their growth rate faster ($\beta = 0.15, p < 0.01$) in girls than in boys. Results from latent growth model show that parent–child relationship is negatively related to the internalizing symptoms intercept ($\beta = -0.59, p < 0.01$) and is positively related to the internalizing symptoms slope ($\beta = 0.18, p < 0.01$). Limitations: Self-reported measures were used. Parent–child relationship was only provided at 2003.

Conclusion: The findings suggest that girls are more susceptible to internalizing symptoms in puberty, and better parent–child relationship can have a protective influence although the protective impact reduced through time. Health professionals should be sensitive to sex, family functioning and provide positive parenting programs for children at risk for internalizing symptoms.

1. Introduction

Early childhood development can affect later life, such as happiness, health, intelligence and problem behavior (Morrison et al., 2014). A systematic review of 19 studies revealed that one in five children have mental health problems because of factors such as poverty, the family and neighborhood environment, family conflicts, parental mental health and school dysfunction, and these have the potential to increase the rate of adolescent suicide, self-mutilation and substance abuse (Bor et al., 2014). Parents is considered to have a far-reaching impact on children in areas such as mental health, social adjustment, academic performance, and even future career choices and success. Parent–child relationships during children's growth years affect not only their current relationships with peers, teachers, partners and others in their life, but also their future interpersonal relationships (Laursen and Collins,

2009; Merz and Jak, 2013). The better parent–child relationship is considered the most important protective factor because it occurs at the earliest and most prolonged stage of life (Thornton et al., 1995). One study found that a major cause of behavior disorders in children and adolescents is poor parenting, such as low participation in the child's life, indulgence, poor supervision and improper punishment (Racz and McMahon, 2011). In literature, parental support and family conflict are often studied and have been associated with children's internalizing symptoms (Wang and Liu, 2014; Yap et al., 2014) but child agency was rarely considered. Specifically, whether child would disclosed how they perceive their parents and express their true emotions is critical for the parent–child relationship. Parents may know about their children's activities through monitoring including parental control, solicitation and child disclosure. Parental knowledge represents a child or adolescent's voluntary provision of information to parents about their

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activities, and is the critical way for parents to gain knowledge about adolescents' activities (Kerr and Stattin, 2000; Kerr et al., 1999). Kerr and Stattin (2000) found that parental knowledge was associated with internalizing symptoms. In this study, parental knowledge was integrated with parental support and family conflict to the concept of parent–child relationship.

Many of the studies of internalizing symptoms have focused on anxiety and depression (Galambos et al., 2003; Hopwood and Grilo, 2010; Kovacs and Devlin, 1998). Previous studies have shown that when young people have anxiety or depression, the symptoms are very likely to extend into adulthood (Pine et al., 1998; Rao et al., 1995; Thapar et al., 2012). Social anxiety usually begins in childhood or adolescence and lasts for many years (Essau et al., 1999; Lieb et al., 2000). Adolescents (aged 10–20) often face problems with their family or school or peer relationships, which create a sense of social anxiety or loneliness, which can develop into depression, suicidal ideation, violence and other serious problems (McWhirter et al., 2002). Studies have found that behavioral and emotional problems in childhood and adolescence are susceptible to sex regulation (Leadbeater et al., 1999; Moylan et al., 2010). Girls are more likely to have more internalizing symptoms, and boys are more often than girls exposed to externalizing problems (Bor et al., 2014). One explanation for the sex difference in internalizing symptom investigated is that girls are more likely than boys to engage in negative events, chronic strains, and greater tendency to ruminate when distressed (Nolen-Hoeksema et al., 1999). Rumination means focusing inward on feelings of distress and personal concerns rather than taking action to relieve their distress (Piccinelli and Wilkinson, 2000).

Depression, anxiety and social loneliness are serious issues faced by children and adolescents worldwide, and the prevalence rates of depression were between 0.4% and 2.8% under 12-year-olds and between 4% and 8.3% in adolescents in Western societies (Costello et al., 2006; Thapar et al., 2012). The prevalence rates of any anxiety disorder were ranged from 6.1% to 9.5% in preschoolers and 8.3% to 27.0% in adolescents in Western societies (Costello et al., 2005) and no evidence for an increased prevalence of child or adolescent depression over the past 30 years (Costello et al., 2006). A recent systematic and meta-analysis showed that the prevalence of major depressive disorder in Chinese children and adolescents is 1.3% (Xu et al., 2018). In Taiwan, little data is available with two studies revealed that the prevalence of major depression among ages of 12–16 was 0.5%–4.4% (Yang et al., 2004) and the prevalence of any anxiety disorder was 3.1%–9.2% in adolescents (Gau et al., 2005). Overall, prevalence rates of major depression and anxiety amongst adolescents were lower in Chinese compared to results in Western societies.

Societal and parenting culture may contribute to the differences in rates of depression. Previous studies documented that Chinese parents tend to endorse the use of coercive and high-power parenting and emphasize child obedience compared with their Western counterparts (Chao, 1994; Chen et al., 2000; Wang and Liu, 2014) and this interference with children's age-normative autonomy is defined as over involvement which is associated with children's depression (Yap et al., 2014). Another study of maternal socialization goal-oriented behaviors showed that Chinese mothers had higher scores than Canadian mothers on encouragement of connectedness while Western parents emphasize on autonomy (Liu et al., 2005). Chinese mothers who had stronger Chinese values such as benevolence, righteousness, propriety, wisdom, and trustworthiness would adopted authoritative and authoritarian parenting styles, thus lead higher mother–child dysfunctional interaction (Xu et al., 2005). In Taiwan, one study showed that female, high family conflict, high mother caring and high family involvement were the most significant variables to predict the depression disposition in adolescents (Lin et al., 2006). Data indicated that proper discipline and monitoring are positively correlated with adolescents' anxiety and depression (Chen and Hsu, 2011).

In literature, there were limited longitudinal studies focused on

trajectory of internalizing symptoms in children in relation to their sex and the relationship between parental–child relationships, especially in Chinese and Asians. Moreover, there is little evidence showing whether the parent–child relationship in childhood influences the future development of internalizing symptoms. The main purpose of the present study is to examine the impact of the parent–child relationship on the development of internalizing symptoms as well as to explore sex differences in Taiwanese children.

2. Methods

2.1. Procedures and participants

Childhood and Adolescent Behaviors in Long-term Evolution (CABLE) is a long-term follow-up program in Taiwan. The study procedures were described in details in a prior article (Yen et al., 2002). The purposes are to collect data on development of health and lifestyle in children and to examine correlates of developmental problems at all stages of growth. CABLE has adopted the ecological model to collect data at the individual, interpersonal, family, school and societal levels. First-grade and fourth-grade elementary school students and their parents from 18 schools respectively in the City of Taipei and Hsin-Chu County were randomly selected. These were the initial cohorts of the CABLE, which has been tracked since 2001. Because the participants were underage, their parents or legal guardians were debriefed about CABLE and signed a consent form for their children. This consent form covers the CABLE project profile, the way in which children and parents participate in the program, how the data are processed and how personal privacy is maintained. The study protocol was reviewed and approved by the Human Body Medicine Medical Ethics Committee of National Health Research Institutes in Taiwan.

Initially, the CABLE research team established both the student and parental questionnaires included parts about basic personal and family information, inter-family relationships, and school life, as well as rating scales for biological, mental, and social health. Ten persons with expertise in psychology, sociology, behavioral science, health education, and policy management were requested to review and comment on the questionnaires, as were several primary school teachers. Also, a pilot test was conducted in kindergarten kids and their parents from June to July 2001, and performed of the validity and reliability of the tests with great results.

This paper presents analyses of partial data from the CABLE project. Specifically, the first cohort of students in CABLE was employed in four waves: 2003 (9 year olds), 2006 (12 year olds), 2009 (15 year olds) and 2012 (18 year olds). At baseline the total sample consisted of 2,855 pupils. Participants were excluded from analysis if they missed the 2012 follow-up. Moreover, participants with missing data both on 2006 and 2009 were excluded from the analysis due to missing data, reducing the sample to 1,997 pupils (70% of the original 2003 cohort).

3. Measures

3.1. Parent–child relationship

Data on parent–child relationships in 2003 were chosen for analysis since previous studies found that early parent–child relationship impacted child adjustment (Berg et al., 2017; Merz and Jak, 2013). Based on prior studies, the parent–child relationship was measured with parental support, parental knowledge, and family conflict (Aquilino, 1997; Stattin et al., 2010; Yap et al., 2014). A total of 19 items were included in the CABLE study and score ranged from 0 to 57. A series of confirmatory factor analyses (CFA) was performed in this paper on the data from all participants to evaluate the fit of the 3 construct-driven factors (parental support, parental knowledge and family conflict). Higher score indicated better parent–child relationship. The CFA results are shown in Table 1. Composite reliabilities of these three scales are

Table 1
CFA results and reliabilities of parent–child relationship.

Scale	Item	Factor loading	Composition reliability	Cronbach's alpha		
Parental support	Does your father or mother encourage you when you encounter any problem?	0.76	0.92	0.84		
	Does your father or mother praise you when you have good performance?	0.80				
	Does your father or mother comfort you when you are upset?	0.84				
	Does your father or mother take care of you when you are uncomfortable?	0.73				
	Does your father or mother listen to you when you talk to them?	0.72				
	Does your father or mother care about your situation at school actively?	0.76				
	Does your father or mother help you when you can't solve the problem?	0.79				
	Does your father or mother explain to you when they ask you to do something?	0.64				
	Parent knowledge	Does your father or mother know what you are doing when you have free time?			0.74	0.77
		Does your father or mother know what you are doing after school?			0.65	
Does your father or mother know who you play with?		0.67				
Family conflict	Does your father or mother know how you use your pocket money?	0.64	0.80			
	In the last one month, did your father and mother have a quarrel?	0.56				
	In the last one month, did your father and mother fight?	0.60				
	In the last one month, did you have a quarrel with your father, mother or other adult?	0.58				
	When your father or mother blame you, does he or she also blame you for the mistakes you made before?	0.58				
	Does your father or mother interrupt you when you are talking?	0.66				
	Does your father or mother blame you for the mistakes other family members made?	0.67				
	When your opinions are different from your father's or mother's, are they mean to you?	0.60				

0.92, 0.77 and 0.8 respectively. Cronbach's alpha for the whole scale is 0.84.

3.2. Internalizing symptoms

In this research, three dimensions with 20 items were included in internalizing symptoms based on prior studies: depression (7 items), social anxiety (7 items) and social loneliness (6 items) (Tandon et al., 2009; Wilkinson, 2009). Items are rated on a 3-point scale ranging from 1 (never) to 3 (many times) and score ranged from 20 to 60. The internalizing symptoms scale and its three subscales have adequate composite reliability ($\alpha = 0.78\text{--}0.84$) and the scale has adequate construct validity (Yu et al., 2009).

3.3. Data analyses

SAS 9.4 was used to analyze the data to obtain descriptive statistics (Insititute, 2012). MPlus 5.1 was used to analyze the trajectory of children's internalizing symptoms (Muthén and Muthén, 2008), and a latent growth model (LGM) was used to examine the impact of parental–child relationship and sex on the trajectory of children's internalizing symptoms. In order to examine whether children with poorer condition, such as more internalizing symptoms or poorer parent–child relationship were more likely to drop out of a cohort or nonresponse during the follow up, the Little's MCAR test of the missing data was performed and the results was non-significant ($p \geq 0.05$), indicating that the attrition was at random.

4. Results

4.1. Demographic variables

The differences between the study sample and all those in the CABLE program sub-cohort in 2003 were analyzed. The results are shown in Table 2. No significant difference was found on demographics (sex, father's education, mother's education and economic status).

4.2. Trajectory of children's internalizing symptoms

4.2.1. Impact of sex on the trajectory of children's internalizing symptoms

The results on the relationships between sex and the trajectory of 1,997 children's internalizing symptoms are shown in Table 3. The mean of the initial status of boys' internalizing symptoms (intercept) is

Table 2
Demographic differences between study sample and original data

	Study sample (n = 1997) n (%)	2003 original data (n = 2855) n (%)	χ^2 (df)	p
Sex			1.47 (1)	0.23
Male	991 (49.62)	1455 (50.98)		
Female	940 (50.81)	1399 (49.02)		
Father's education			5.45 (2)	0.07
Junior high or below	195 (11.80)	229 (10.85)		
Senior high	588 (35.57)	711 (33.70)		
University or above	870 (52.63)	1170 (55.45)		
Mother's education			4.14 (2)	0.13
Junior high or below	178 (10.45)	219 (9.93)		
Senior high	805 (47.24)	999 (45.31)		
University or above	721 (42.31)	987 (44.76)		
Economic status ^a			9.84 (4)	0.08
Below 39,999	256 (14.21)	318 (13.78)		
40,000 ~ 59,999	355 (19.70)	437 (18.93)		
60,000 ~ 79,999	402 (22.31)	475 (20.58)		
80,000 ~ 99,999	256 (14.21)	321 (13.91)		
100,000 ~ 119,999	190 (10.54)	257 (11.14)		
Above 120,000	343 (19.03)	500 (21.66)		

^a Values are in Taiwanese dollars.

27.36 and the variance is 12.36. The mean growth rate for boys (slope) is 0.05 and the variance is 0.34. The mean of the initial status of internalizing symptoms for girls (intercept) is 28.19 and the variance is 17.02. The mean of the growth rate for girls (slope) is 0.3 and the variance is 0.42. The relationships between the latent growth model's intercept and the slope for 3rd grade girls is significant. The results show that in the 3rd grade internalizing symptoms are worse and their growth rate faster for girls than for boys.

4.2.2. Impact of parent–child relationship on the trajectory of children's internalizing symptoms

As shown in Fig. 1, the proposed model yields an acceptable fit with the data: $\chi^2 = 2340.72$, $df = 454$, $p < 0.01$; CFI = 0.90; TLI = 0.90; RMSEA = 0.05; SRMR = 0.05. Sex is significantly related to parent–child relationship, as well as to the initial status and the growth rate of internalizing symptoms ($\beta = 0.21$ and 0.15 , respectively, all $p < 0.01$). Girls' internalizing symptoms were worse than boys' at the beginning and developed more quickly than boys'. Parent–child relationship is negatively related to the internalizing symptoms intercept ($\beta = -0.59$, $p < 0.01$) and is positively related to the internalizing symptoms slope

Table 3
Parameter estimates from a growth model on internalizing symptoms by sex

	Sex	Intercept		Slope		Relationship between intercept and slope		Covariance
		Mean	Variance	Mean	Variance	Mean	Variance	
Internalizing symptoms	Boys	27.36**	12.36**	0.05	0.34**	-0.37		
	Girls	28.19**	17.02**	0.30**	0.42**		-0.52*	

* $p < 0.05$.
** $p < 0.01$.

($\beta = 0.18, p < 0.01$). In addition, the initial status of internalizing symptoms is negatively related to their growth rate ($\beta = -0.14, p < 0.05$), indicating that the worse internalizing symptoms are at the beginning, the slower their growth. The results suggest that a good parent-child relationship (strong parental support, strong parental knowledge and lower family conflict) have protective effects with regard to internalizing symptoms although the protective impact reduced through time.

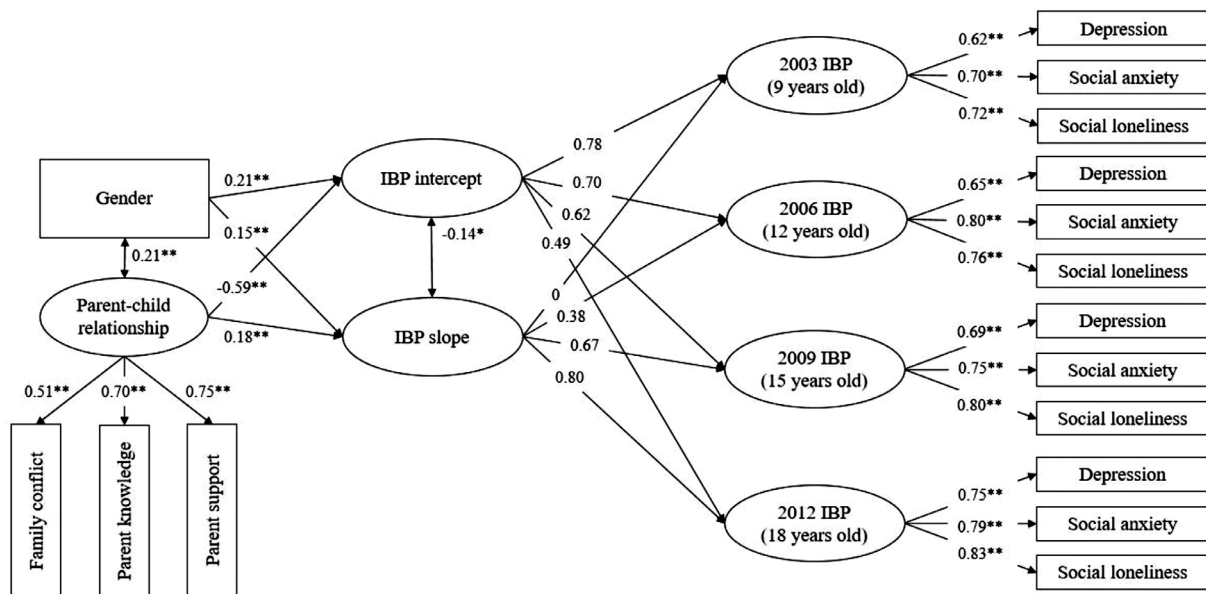
5. Discussion

The results indicate that girls' internalizing symptoms are more severe than boys' in the 3rd grade and develop faster over time. The symptoms of depression, social anxiety and social loneliness gradually increase from 9 to 18 years. These results are similar to those of previous studies in western countries (Bongers et al., 2003; Chaplin et al., 2009; Leadbeater et al., 1999). A few studies suggest possible explanations for why sex influences internalizing symptoms. One perspective is that sex socialization affects the development of behavioral disposition (Piccinelli and Wilkinson, 2000), girls have been found to be less assertive and have slightly lower self-esteem than boys (Feingold, 1994). Unassertiveness may cause depression and thus is more common in girls than boys in early adolescence (Nolen-Hoeksema and Girgus, 1994). Girls are more prone to be shy and inhibited than boys. This proneness to experience internalized distress creates a constellation of factors that could heighten the risk of developing anxiety and social disorders (Zahn-Waxler et al., 2000). The second view has to do with physiological changes during puberty. Girls

in puberty have significant bodily changes due to hormones (Piccinelli and Wilkinson, 2000). Hormones also affect mood and behavior in puberty. Estrogen and progesterone can have a protective effect on female stress response, and these hormones also dampen the negative feedback effects of cortisol in earlier stages of adolescence. This may delay the ability of females to recover from stress compared to males and hence heighten the risk of depression (Zahn-Waxler et al., 2008). A third perspective is that girls tend to have depression because they are more likely to suffer sexual harassment or other harmful events in childhood (Piccinelli and Wilkinson, 2000). Maltreatment in childhood predicts more symptoms of social anxiety and depression in adulthood. The later the onset of the maltreatment, the greater the internalizing symptoms in adulthood (Kaplow and Widom, 2007).

Parenting is considered to be influenced by cultural differences. Chinese mothers are more protective and more directive with their children than US mothers. Also, Chinese mothers have reported significantly more physical punishment, and less warmth/acceptance and democratic participation, than US mothers (Wu et al., 2002). Moreover, the Confucian principle of filial piety, patriarchal, patrilineal families still has much influence in many traditional East Asian cultures. Thus, sons are more highly valued and occupy a higher status than daughters in many families. On the other hand, daughters are usually raised to be good wives and mothers (Kim and Wong, 2002). Due to these different expectations, the psychological pressure experienced by girls and the parent-child relationship generally cause harm, including internalizing symptoms.

The finding that parent-child relationship has a protective impact on the intercept of children's internalizing symptoms is similar to those



Model fit indexes: $\chi^2 = 2340.72, df = 454, p < 0.01$; CFI = 0.90; TLI = 0.90; RMSEA = 0.05; SRMR = 0.05
* $p < 0.05$, ** $p < 0.01$

Fig. 1. Latent growth model on effects of parent-child relationship and sex on internalizing symptoms.

of previous studies in Western country (Hamza and Willoughby, 2011; Yap et al., 2014). A few Western studies have found that greater parental support, more parental knowledge and lower family conflict reduced internalizing symptoms in adolescence (Herrenkohl et al., 2012; Kerr and Stattin, 2000; Paradis et al., 2011; Shek, 1998; Zimmerman et al., 2000).

In this study, both adolescent boys and girls with more severe internalizing symptoms at the beginning had slower growth rates of internalizing symptoms, but the growth rate was faster in girls. One possible explanation is that children got attention and professional services during the years of follow-ups in this study. A child with serious internalizing and/or externalizing symptoms in the CABLE study was reported to the school psychologist and referred to a child psychiatrist if necessary due to the ethical consideration. Another possibility is that parents, teachers and other people may change the ways of interaction such as more warmth and encouragement with the child who reported internalizing symptoms along the years of study. The result of sex difference is the same as in past studies in Western countries (Bongers et al., 2003; Chaplin et al., 2009; Leadbeater et al., 1999). In puberty, girls lead a group life and spend a lot of time in social activities. They start to find new dependency relationships, such as with peers and boyfriends. If these relationships become unstable or the girls feel insecure, this can easily generate negative emotions (Cyranowski et al., 2000).

It is interesting in this study to find that the parent–child relationship at age 9 affects the trajectories of internalizing symptoms up to age 18. An explanation is in line with the life course chain of risk model (Kuh et al., 2003) which proposes that poor parent–child relationship at the earlier age could act as a risk factor for many subsequent disadvantaged development in early adolescence. Emotional insecurity and discomfort were built up based on prior experience in parent–child interactions in which children receive answers and reactions either rejecting or ignoring their wishes and needs. A study showed that poor family relationships compromise the development of social competencies and social skills of the adolescent, which further increases the risk of internalizing symptoms (Luecken et al., 2013). Another study found that family conflict during early childhood predicted behavior problems in adolescence via emotional insecurity (Cummings et al., 2012).

Our results also show that when the parent–child relationship was better in childhood, the growth rate of internalizing symptoms were severer in adolescence. The Confucian tradition of social order emphasizes developing harmonious interpersonal relationships. As a result, Chinese tend to constrain themselves emotionally, restrain themselves behaviorally and obey their parents. To suppress emotions in Taiwanese may explain the faster development of internalizing symptoms for children with better parent–child relationship. Western parents want their children to be autonomous and think independently, while Chinese parents want their children to respect elders, follow regulations and focus only on group achievement, which often causes adolescent depression (Yeh et al., 2006).

5.1. Clinical implications

The present study provides longitudinal data on the impact of parent–child relationship and sex on the development of children's internalizing symptoms. Based on our findings, parents should put effort into establishing good parent–child relationships, such as through implementing positive parenting programs and learning about normative developmental changes from childhood to adolescence (Steinberg, 2001). Furthermore, mental health screening should be included in routine health examinations in schools in order to detect internalizing symptoms early, leading to further follow-up or treatment (Burns et al., 2004). The present findings indicate that a good parent–child relationship may protect against internalizing symptoms in the earlier years. Thus, pediatricians and health professionals need to educate

parents' on how to develop positive parenting skills and provide appropriate parenting strategies. Early intervention in the parent–child relationship will reduce the risk of internalizing symptoms.

6. Limitations

The main strength of this study is a long term prospective study which allows us to examine the trajectory of internalizing symptoms from childhood to adolescence. Additionally, there is no difference between the analyzed data and those excluded due to attrition or nonresponse. However, when interpreting the results, some methodological issues should be taken into account. The measurements of parent–child relationship was not separated by respondents. Children's perceptions of interactions with father or mother might be different. Additionally, data of parent–child relationship was provided at 2003, but the relationship may change over years. Although there are studies that documented the long-term effect of earlier parenting on the development of children to adolescence (Berg et al., 2017; Merz and Jak, 2013; Pinquart, 2017; Yu et al., 2019), the way children interact with their parents and the parent–child relationship could differ considerably and substantially from childhood to adolescence. It is suggested that future study should consider collect the parent–child relationship at each follow-up.

Second, there were some important variables related to internalizing symptoms such as parental psychopathology, attachment and aversiveness should be considered into the study (Wesseldijk et al., 2018; Yap et al., 2014). Furthermore, future study may have to address the possibility that child difficulties such as disability, depression and withdrawal might influence a reduction in positive parental behavior (i.e., child-driven effects). Child-driven effects may at least partly account for the negative relationship between parent–child relations and the intercept of internalizing problems. Finally, all the measures were self-reports and thus are prone to the general problems of reporting bias. Especially, with respect to parent–child relationships it is a limitation that information was collected from children and not from parents or other family members although a prior study showed that there is only moderate variation in the parent's and adolescent's report of interactions (Rote and Smetana, 2016). However, it is still worth of noting that children with more internalizing symptoms may be biased in the perception of their surroundings and could be more negatively consider the world around him/her, including parent–child relationship.

7. Conclusion

Parents care about children's well-being but sometimes neglect or do not know how to support psychological development of their child. This study provides evidence that better parent–child relationship protects children from internalizing symptoms, indicating that it is important for parents to get involved or understand how they think and communicate with them accordingly, especially during childhood and adolescence. Our study results are also consistent with prior studies that girls are more emotionally sensitive than boys. It is suggested that psychiatric health services for children should consider their sex and aim at helping parents address issues of resilience of their children.

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CRediT authorship contribution statement

Wu Chia Yun: Writing - original draft, Validation, Formal analysis.
Lee Tony Szu-Hsien: Writing - original draft, Supervision, Validation.

Declaration of Competing Interest

The authors have no conflicts of interest relevant to this article to disclose.

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Supplementary materials

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