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臺灣青少年與其主要照顧者對青少年自我傷害、憂鬱症狀和幸福感報告一致度

Caregiver-adolescent concordance in reporting self-harm, depressive symptoms, and psychological well-being among adolescents in Taiwan

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中文摘要

背景：家長覺察青少年心理健康狀況有助於促進其尋求幫助和早期介入。過去研究顯示，家長與青少年對青少年心理健康問題的報告之間存在差異。然而，以往關於家長覺察青少年自傷行為和心理健康狀況的研究有限。

目的：本研究主要探討青少年與其主要照顧者在報告青少年自傷行為、憂鬱症狀及心理幸福感一致性的程度，以及影響青少年與主要照顧者報告一致性之相關因素。

方法：本研究資料來自臺灣出生世代先驅研究（TBCS-P），共 1417 對青少年及其照顧者。研究使用 Kappa 評估青少年自傷行為報告的一致性，而憂鬱症狀、快樂和幸福感的報告一致性則使用組內相關係數（ICC）進行評估，並使用多重線性迴歸分析檢驗青少年與主要照顧者對青少年憂鬱症狀、快樂和幸福感報告差異的相關因素。

研究結果：結果顯示，照顧者與青少年在報告青少年自傷行為（k = 0.28）和憂鬱症狀（ICC = 0.28）的一致性較低，而在報告心理幸福感的一致性則為中等程度（ICC = 0.48 及 0.43）。總體而言，照顧者傾向低估青少年的自傷行為和憂鬱症狀，並高估其快樂和幸福感。心理健康較好的母親傾向低估青少年的憂鬱症狀和高估其快樂與幸福感。此外，男性家長照顧者傾向高估青少年的幸福感，且父母的高回應教養方式與高估青少年的幸福滿意度有關。

結論：照顧者與青少年在報告青少年自傷行為和憂鬱症狀方面的一致性較低，而在報告心理幸福感之一致性為中等程度。照顧者普遍低估青少年的自傷行為和憂鬱症狀，同時高估其快樂和幸福感。這些發現對於提高家長對青少年心理健康問題的認識具有重要意義。

關鍵字：親子報告一致性、自傷行為、憂鬱症狀、心理幸福感

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Abstract

Background: Parental detection of adolescents' mental health issues could increase help-seeking and early intervention. Past research indicated discordance between caregivers' and adolescents' reports of adolescent mental health problems. However, previous studies on caregivers' awareness of adolescent self-harm and mental well-being were limited.

Aim: This study aimed to investigate the extent of discordance between adolescents and caregivers in reporting adolescent self-harm, depressive symptoms, and psychological well-being, and identify the potential factors associated with this discordance.

Method: Data for 1,417 pairs of adolescents and their caregivers were extracted from the Taiwan Birth Cohort Pilot Study (TBCS-P). Concordance in the reports of self-harm was assessed using Kappa, while those for depressive symptoms, happiness, and well-being satisfaction were evaluated using the Intraclass Correlation Coefficient (ICC). Multiple linear regression was employed to examine the factors associated with discordance in adolescents' and caregivers' reports of adolescent depressive symptoms, happiness, and well-being satisfaction.

Result: The results showed low caregiver-adolescent concordance in reporting adolescent self-harm (k = 0.28) and depressive symptoms (ICC = 0.28), while concordance in reporting happiness and well-being satisfaction was moderate (ICC =

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0.48 and 0.43, respectively). Overall, caregivers tended to underestimate adolescent self-harm and depressive symptoms while overestimating adolescent happiness and well-being. Mothers with better mental health tended to underestimate adolescent depressive symptoms and overestimate adolescent happiness and well-being. Additionally, male caregivers tended to overestimate adolescent happiness, and parents' high responsiveness was associated with overestimating adolescent well-being satisfaction.

Conclusion: The study revealed a low concordance between caregivers and adolescents in reporting self-harm and depressive symptoms, and a moderate concordance in reporting psychological well-being. Caregivers generally underestimated adolescent self-harm and depressive symptoms while overestimating their happiness and well-being. The findings have implications for parenting education to increase parents' awareness of adolescents' mental health issues.

Keywords: caregiver-adolescent concordance, self-harm, depressive symptoms, psychological well-being

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Table of contents

doi:10.6342/NTU202401284

doi:10.6342/NTU202401284

1. Introduction

The discordance between parents' and adolescents' reports of adolescent mental health concerns is commonplace (Booth et al., 2023; Chen et al., 2017; Mojtabai & Olfson, 2008; Petot et al., 2011; Poulain et al., 2020). Several studies indicate that this discordance in the reports of adolescent emotional and behavioral problems not only complicates the medical diagnosis and treatment process (De Los Reyes & Kazdin, 2005) but may also lead to more severe mental health issues, legal problems, or suicide attempts among adolescents (Abar et al., 2015; Ferdinand et al., 2004; Makol & Polo, 2018; Pelton et al., 2001; Smokowski et al., 2015). Another study suggests that parental detection of adolescent self-harm is a significant predictor of seeking professional help (Mojtabai & Olfson, 2008). Therefore, parents must be aware of adolescent self-harm and mental health concerns at an early stage.

Most studies have focused on the concordance between parents and adolescents in adolescent emotional and behavioral problems reports (Booth et al., 2023; Poulain et al., 2020; Salbach-Andrae et al., 2009). A meta-analysis of 341 studies found low to moderate levels of correspondence among estimates of cross-informant (e.g., parents, children, teachers) reports of youths' emotional and behavioral problems (mean internalizing: $r = 0.25$; mean externalizing: $r = 0.30$) (De Los Reyes et al., 2015). Furthermore, it has been consistently found that parent-adolescent concordance on

doi:10.6342/NTU202401284

adolescent externalizing problems (e.g., aggressive behaviors) is generally higher than internalizing problems (e.g., depression) (Duhig et al., 2000). On the other hand, only one known study has been conducted specifically to examine the parent-child concordance regarding youths' self-harm in the U.K., which showed a low parent-child concordance on children's self-harm (kappa = 0.3) (Mojtabai & Olfson, 2008); moreover, this study also indicated that parents often underestimate adolescent self-harm. Overall, adolescents report higher levels of emotional problems and self-harm compared to their parents (Chen et al., 2017; Mojtabai & Olfson, 2008; Petot et al., 2011; Wang et al., 2014). Conversely, other studies have shown that parents overestimate their children's happiness and well-being (Lagattuta et al., 2012; Lopez-Perez & Wilson, 2015).

There are several common potential factors contributing to parent-adolescent discordance. First, several studies showed that female parent-adolescent pairs exhibit better concordance than their male counterparts (Mojtabai & Olfson, 2008; Petot et al., 2011; Poulain et al., 2020). Second, family characteristics such as parental marital status, number of children, socioeconomic status (SES), and whether the family receives social welfare services may also influence parent-adolescent concordance (Kazdin et al., 1983; Mojtabai & Olfson, 2008). Prior studies suggest that parent-adolescent discordance regarding adolescent's emotional problems is higher in single-parent families, families

doi:10.6342/NTU202401284

with a larger number of children, lower SES families, and families with social welfare services (De Los Reyes & Kazdin, 2005; Duhig et al., 2000; Kazdin et al., 1983). However, a study conducted in Taiwan by Chen et al. (2017) showed that parent-adolescent discordance is higher in high-SES families when reporting adolescent's emotional problems. Furthermore, this study found no correlation between parental marital status and sibship size. In contrast, Mojtabai and Olfson (2008) found that there was no association between SES and parental awareness of child self-harm. Third, past studies exploring the correlation between parent characteristics and parent-adolescent concordance have primarily focused on maternal characteristics. De Los Reyes and Kazdin (2005) highlight that mothers are typically the parents who provide information about adolescent behavior and often serve as the primary caregivers (Richters, 1992). Studies have indicated that mothers tend to have a greater concordance in reporting adolescent self-harm and emotional problems compared to fathers (Jensen et al., 1988; Mojtabai & Olfson, 2008). Additionally, parents with psychological distress have a better concordance in reporting adolescent self-harm (Mojtabai & Olfson, 2008). Chen et al. (2017) also found that parents with psychological distress and those with a better parent-child relationship were associated with higher parent-adolescent concordance in adolescent emotional and behavioral problems. However, parents who perceive themselves as happier are more likely to overestimate their children's happiness and

doi:10.6342/NTU202401284

well-being, resulting in higher parent-child discordance (Lagattuta et al., 2012; Lopez-Perez & Wilson, 2015).

Some researchers argue that Asian cultures often emphasize interdependence, contrasting with the Western focus on fostering independence (Chao & Tseng, 2002). In other words, this cultural difference may lead to higher concordance in reports between Asian parents and children. However, most studies on discordance in adolescent mental health issues between parents and adolescents are predominantly focused on European and American regions (Grills & Ollendick, 2003; Jensen et al., 1988; Mojtabai & Olfson, 2008; Salbach-Andrae et al., 2009). To our knowledge, only one study examined the discordance between parents and adolescents regarding adolescent emotional and behavioral problems in Taiwan (Chen et al., 2017). Chen et al. (2017) reported a low-to-moderate parent-adolescent concordance in the community sample (a range of Pearson's r from 0.23 to 0.40); in their study, adolescents reported greater emotional and behavioral problems than their parents, especially for emotional issues.

However, there has yet to be a study exploring the caregivers' awareness of adolescent self-harm and psychological well-being in Taiwan. Avedissian and Alayan (2021) highlight that investing in adolescent well-being is crucial for preventing the onset of risky health behaviors and avoiding negative health consequences.

doi:10.6342/NTU202401284

Furthermore, misunderstanding adolescent emotions or thoughts may negatively affect parent-adolescent relationships (Sillars et al., 2005). Little is known about the caregivers' awareness of adolescent psychological well-being in Taiwan. Furthermore, past studies on caregiver-adolescent concordance tend to examine the concordance with a single specific domain (e.g., self-harm, emotional and behavioral problems, and well-being) (Chen et al., 2017; Edelbrock et al., 1986; Grills & Ollendick, 2003; Lagattuta et al., 2012; Mojtabai & Olfson, 2008; Salbach-Andrae et al., 2009).

To fill the gaps in the literature, we (1) examine the caregiver-adolescent concordance of adolescent self-harm, depressive symptoms, and psychological well-being (i.e., happiness and well-being satisfaction) and (2) explore whether family characteristics, maternal characteristics, and parent-child relationship impact the concordance between caregivers and adolescents in their reporting.

doi:10.6342/NTU202401284

2. Materials and methods

2.1 Data

The data were extracted from the Taiwan Birth Cohort Pilot Study (TBCS-P). The TBCS-P aimed to construct a sample representative of Taiwanese children using a national household probability sampling method. The TBCS-P was conducted to ensure the quality of the large-scale field survey for the Taiwan Birth Cohort Study (TBCS). The pilot study served as a preliminary trial. These were two independently conducted studies.

The details of the TBCS-P have been published previously (Lung et al., 2011). In brief, a two-stage stratified random sampling method was utilized to select babies born in November and December 2003 without any exclusion criteria. In the first stage, townships were the primary sampling units. The 369 cities / towns were stratified into 12 strata based on urbanization level and fertility rate. Systematic random sampling was used to select 85 townships from the 369 townships; of them one-third (n=29) were randomly selected for identifying target newborns of the TBCS-P. In the second stage, newborns were proportionally selected according to the number of birth rates from the 29 selected townships. A total of 2,048 babies were finally selected for the study when they were aged 6 months. As of 2022, a total of 12 waves of surveys have been completed, conducted at ages 6 months, 18 months, 36 months, 5.5 years, 7 years, 8

doi:10.6342/NTU202401284

years, 9 years, 12 years, 13 years, 15 years, 17 years, and 18 years, respectively. The surveys were completed by the main caregivers (primarily mothers). Self-reports from adolescents were incorporated starting in 2016 (8th wave). Detailed information on survey time, participants, and measures used in the study is provided in Appendix Table 1.

In the 10th wave of the survey, information was gathered from both caregivers and adolescents regarding the adolescent experiences of self-harm, depressive symptoms, perceived happiness, and perceived well-being satisfaction. Therefore, data from the 10th wave were used. A total of 1,417 pairs of caregivers and adolescents were included in this study (Figure 1).

2.1.1 Ethics statement

This TBCS-P was approved by the National Cheng Kung University Human Research Ethics Committees (REC number: 108-036).

2.3 Measures

Self-harm

Adolescents' self-harm was assessed using one simple-item question. Adolescents (and caregivers) were asked, "Have you (your child) engaged in self-harm in the past year?" The response options were "No", "Yes, but did not require medical treatment", and "Yes, and required medical treatment." Based on the presence or absence of self-

doi:10.6342/NTU202401284

harm, participants were divided into two groups: the "No self-harm group" and the "Self-harm group".

Depressive symptoms

Adolescents' depressive symptoms were measured using 10 items from the Center for Epidemiological Studies Depression Scale (CES-D). The 10-item Brief CES-D scale (CES-D-10) is derived from the original 20-item CES-D scale and has been widely used to measure depressive symptoms in the community (Radloff, 1977). It is found to be an appropriate instrument for screening depressive symptoms among adolescent populations (Yang et al., 2004). Adolescents and caregivers were asked about the presence of ten symptoms in adolescents over the past week, including "poor appetite or not wanting to eat", "feeling depressed", "feeling everything is an effort", "difficulty sleeping", "feeling happy", "feeling lonely", "feeling disliked or unfriendly", "feeling life is good", "feeling sad", and "feeling unable to get going". A four-point scale was used, with response options ranging from "never" (0 points), "sometimes" (1 point), "often" (2 points), to "always" (3 points). For positive items (i.e., "feeling happy" and "feeling life is good"), responses were reverse-coded. The total score for the ten questions could range from 0 to 30, with higher scores indicating more severe depressive symptoms. In this study, Cronbach's Alpha was 0.869 and 0.853 for the reports by adolescents and caregivers, respectively.

doi:10.6342/NTU202401284

Happiness

The perceived happiness of adolescents was measured using a single-item question. Adolescents (their caregivers) were asked, "Overall, would you (your child) say that you are a very unhappy, unhappy, neutral, happy, or very happy child?" A five-point scale was used with response options including "very unhappy" (1 point), "unhappy" (2 points), "neutral" (3 points), "happy" (4 points), and "very happy" (5 points). Higher scores indicate a higher level of happiness.

Well-being satisfaction

The perceived well-being satisfaction of adolescents was measured using a single-item question. Adolescents (their caregivers) were asked, "Overall, would you (your child) be described as having very high well-being satisfaction, high well-being satisfaction, average well-being satisfaction, low well-being satisfaction, or very low well-being satisfaction?" A five-point scale was used with response options including "very dissatisfied" (1 point), "dissatisfied" (2 points), "neutral" (3 points), "satisfied" (4 points), and "very satisfied" (5 points). Higher scores indicate a higher level of well-being satisfaction.

doi:10.6342/NTU202401284

Covariates

Analyses controlled for the sex of adolescents and caregivers, family characteristics, maternal characteristics, and parent-child relationships.

(1) Family characteristics

a) Family structure and family socioeconomic status (SES)

Family structure was assessed based on parental marital status (married vs. not married or divorced) and sibship size (one child vs. more than one child). Family socioeconomic status was measured based on the highest level of parental educational attainment (considering both maternal and paternal education) and household annual income.

b) Family resources

Family resources were defined by whether the family received any form of government-provided benefits (i.e., medical expenses subsidies, national health insurance subsidies, low-income household subsidies, disadvantaged household subsidies, school lunch subsidies, after-school care subsidies, and high-risk family subsidies). Adolescents from households that received any form of benefits were categorized as having received government-provided benefits.

doi:10.6342/NTU202401284

(3) Maternal characteristics

Data for the following maternal characteristics were available only for adolescent-caregiver pairs in which mothers were the caregivers who completed the survey.

a) The family function reported by mothers

The APGAR was used to assess adolescents' mothers' satisfaction with five aspects of family functions: adaptation, partnership, growth, affection, and resolve, through a five-item questionnaire (Smilkstein, 1982). The total score ranges from 0 to 10 points; mothers were classified into two groups, i.e., those with low to moderate function (0-6) and those with high function (7-10) (Sprusinska, 1994).

b) Maternal mental health

The 5-item mental health subscale from the 36-item Short Form Health Survey (SF-36) was used to assess maternal mental health (Li et al., 2014). The Mental Health (MH) subscale includes the following five questions: “Have you been a very nervous person?”, “Have you felt so down in the dumps that nothing could cheer you up?”, “Have you felt calm and peaceful?”, “Have you felt downhearted and blue?”, and “Have you been a happy person?”. Participants responded based on their experiences over the past four weeks, using a six-point scale ranging from 1 (never) to 6 (all the time), three negative questions were reverse scored. The median of the total score (i.e., 24) was used

doi:10.6342/NTU202401284

as the cutoff to classify mothers into two groups, i.e., those with poorer mental health and those with better mental health.

(3) Parent-adolescent relationships

a) Parenting styles

Caregivers were asked to report their parenting styles towards the adolescents. Two parenting styles were assessed: demandingness (3 items) and responsiveness (3 items). Demandingness refers to parental expectations for societal conformity through behavior regulation, maturity demands, and activity monitoring, whereas responsiveness refers to parental support for children's individuality and self-expression through attentiveness, warmth, autonomy support, and reasoned communication (Areepattamannil, 2010). The response used a five-point scale ranging from 1 (never) to 5 (always). The median of the total score (i.e., 12) was used as the cutoff to classify caregivers into two groups, i.e., those with low demandingness and those with high demandingness. As for responsiveness, the median of the total score (i.e., 13) was used as the cutoff to classify caregivers into two groups, i.e., those with low responsiveness and those with high responsiveness.

Parental punishment was assessed using two items (physical punishment and violence), rated on a five-point scale from 1 to 5 (never). The median of the total score

doi:10.6342/NTU202401284

(i.e., 8) was used as the cutoff to classify caregivers into two groups, i.e., those with low punishment and those with high punishment.

b) Parent-child interaction

Parent-child interaction was measured by asking the caregivers the following three questions: "Do you chat with your child? (including phone or online video calls)", "Do you have meals with your child? (any meal counts)", and "Do you do activities with your child? (such as exercising, watching TV, shopping, etc.)". A four-point scale was used, ranging from 1 (never) to 4 (every day). The median of the total score (i.e., 12) was used as the cutoff to classify caregivers into two groups, i.e., those with low parent-child interaction and those with high parent-child interaction.

2.4 Statistical analyses

For categorical variables, the inter-rater reliability kappa was used to assess the concordance in reporting adolescent self-harm. According to McHugh (2012), kappa (κ) values are interpreted across several categories to assess the level of agreement between two raters or methods of classifying categorical items. A kappa value below zero suggests agreement is no better than chance. Values ranging from 0.01 to 0.20 indicate slight agreement, while those between 0.21 and 0.40 suggest fair agreement. Kappa values falling between 0.41 and 0.60 signify moderate agreement, whereas those from 0.61 to 0.80 denote substantial agreement. Finally, kappa values ranging from 0.81

doi:10.6342/NTU202401284

to 1.00 indicate nearly perfect agreement. The sensitivity, specificity, and positive and negative predictive values of caregivers detecting adolescent self-harm according to adolescent self-reports were also calculated. The Receiver Operating Characteristic (ROC) analysis was used to evaluate the accuracy of caregiver reports (Murphy et al., 1987). Accuracy refers to the caregivers' ability to distinguish an adolescent with self-harm from one without correctly in this study. The accuracy of caregivers' reports across strata was compared based on the areas under the curves (AUCs) (DeLong, 1988). The Area Under the Curve (AUC) is a widely used metric for assessing the accuracy of diagnostic tests. AUC values range from 0 to 1, with different ranges indicating varying levels of model performance. An AUC of 0.5 implies no discriminatory ability, equivalent to random chance. AUC values between 0.5 and 0.7 indicate poor to acceptable discrimination, reflecting limited effectiveness. Values from 0.7 to 0.8 represent fair discrimination, indicating moderate model performance. AUC values between 0.8 and 0.9 demonstrate good discrimination, signifying robust predictive power. An AUC of 0.9 or higher is considered excellent, indicating a highly effective model with superior discriminatory capability (Nahm, 2022).

Regarding continuous variables, the Intraclass Correlation Coefficient (ICC) was used to assess the concordance in reports of adolescent depressive symptoms, happiness, and well-being satisfaction between caregivers and adolescents. ICC values are

doi:10.6342/NTU202401284

interpreted within specific ranges to determine the reliability of measurements. An ICC value less than 0.5 indicates poor reliability, signifying considerable inconsistency in the measurements or ratings. Values ranging from 0.5 to less than 0.75 denote moderate reliability, reflecting fair consistency but still some degree of variability. ICC values between 0.75 and less than 0.9 represent good reliability, indicating that the measurements or ratings are generally consistent with limited variability. An ICC value of 0.9 or higher signifies excellent reliability, demonstrating very high consistency and reproducibility of the measurements or ratings. These guidelines provide a structured approach for assessing the reliability of quantitative measurements in research (Koo & Li, 2016).

Multiple linear regression analyses were conducted to determine whether caregivers' family characteristics, maternal characteristics, and parent-child relationship were associated with discrepancies in caregiver-adolescent reporting of depression, happiness, and well-being satisfaction.

The dependent variable was the difference between the caregiver's score and the adolescent's score. Discrepancies in caregiver-adolescent reporting of depressive symptoms, happiness, and well-being satisfaction were analyzed in separate models. Except the AUC analysis, which was conducted using R programming, all other analyses were performed using SPSS for Mac (version 22.0).

doi:10.6342/NTU202401284

3. Result

3.1 Participant characteristics

More than half of the adolescents were male (54.8%), while 91% of the caregivers were female. The majority of adolescents had parents who were married (77.5%), were from families that had two or more children at home (87%), and over half of the parents had a college education or higher (58.5%). 36.5% of the families had an annual income of over 1 million (NTD), and approximately two-thirds (68.7%) did not receive any form of government-provided benefits (Table 1).

3.2 Concordance of caregivers' and adolescents' reports of adolescent self-harm

Table 2 presents the caregiver-adolescent concordance of adolescent self-harm by the sex of the adolescent and caregiver, family characteristics, maternal characteristics, and parent-child relationships. A total of 62 adolescents (4.4%) reported a history of self-harm in the past year, whereas only 14 caregivers (1.0%) were aware of it. Concordance was observed in only 11 caregiver-adolescent pairs. This concordance was low, with a kappa coefficient of 0.28 (95% CI 0.14-0.41). Female adolescents (6.1%) reported higher rates of self-harm compared to male adolescents (3.0%).

Overall, caregivers' reports had low sensitivity regarding the awareness of adolescent self-harm (sensitivity = 18%). Although the accuracy of caregivers' reports did not vary based on maternal characteristics or parent-child relationships, it appeared to be higher in female

doi:10.6342/NTU202401284

adolescents (χ^2 = -1.59 (1), p = 0.11) and those with lower parental education (χ^2 = - 0.22 (1), p = 0.10).

3.3 Concordance of caregivers' and adolescents' reports of depressive symptoms, happiness, and well-being satisfaction

Tables 3, 4, and 5 present the concordances between caregivers' and adolescents' reports of adolescent depressive symptoms, happiness, and well-being satisfaction by the sex of the adolescent and caregiver, family characteristics, maternal characteristics, and parent-child relationships.

Adolescent depressive symptoms showed a low caregiver-adolescent concordance (ICC = 0.28), whereas adolescent happiness and well-being satisfaction showed moderate caregiver-adolescent concordance (ICC = 0.48 for both happiness and well-being satisfaction). Overall, adolescents reported higher scores of depressive symptoms compared to their caregivers while they reported lower scores of happiness and well-being satisfaction than their caregivers.

Mothers who perceived low-to-moderate family function or experienced poorer mental health tended to report higher scores of adolescent depressive symptoms than their counterparts, leading to greater concordance in these groups (Table 3). Furthermore, parents characterized by low demandingness and low responsiveness also reported higher scores of adolescent depressive symptoms (Table 3).

doi:10.6342/NTU202401284

Mothers who perceived low-to-moderate family function or experienced poorer mental health tended to provide lower ratings of adolescent happiness than their counterparts, leading to greater concordance in these groups (Table 4). Similar findings were also found for adolescent well-being satisfaction (Table 5).

3.4 The association of caregiver-adolescent concordance in the reports of depressive symptoms, happiness, and well-being satisfaction with covariates

Tables 6, 7, and 8 show the results of regression analysis assessing caregiver-adolescent discordance in depressive symptoms, happiness, and well-being satisfaction concerning their associations with covariates.

After controlling for all variables, a higher level of the mother's mental health was associated with caregivers' underestimation of adolescent depressive symptoms (β = -0.086, 95% CI -1.32 to -0.19) (Table 6). Male caregivers and mother's better mental health were associated with overestimating adolescents' happiness (Male caregiver: β = 0.002, 95% CI 0.08 to 0.29; maternal mental health: β = 0.099, 95% CI 0.07 to 0.30) (Table 7). Mother's better mental health and parents' high responsiveness were associated with overestimating adolescent well-being satisfaction (maternal mental health: β = 0.097, 95% CI 0.06 to 0.29; high responsiveness: β = 0.073, 95% 0.01 to 0.25) (Table 8).

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4. Discussion

4.1 Main findings

The study found a low caregiver-adolescent concordance in their reports of adolescent self-harm (kappa = 0.28) and depressive symptoms (ICC = 0.28), whereas the concordance on happiness and well-being satisfaction was moderate (ICC = 0.48 and 0.43, respectively). Caregivers underestimated adolescent self-harm and depressive symptoms; by contrast, they tended to overestimate adolescent happiness and well-being. Mothers with better mental health tended to underestimate adolescent depressive symptoms and overestimate adolescent happiness and well-being. Additionally, female caregivers tended to overestimate adolescent happiness, and parents' high responsiveness was associated with overestimating adolescent well-being satisfaction.

4.2 Comparison with previous studies

Caregiver-adolescent concordance in the various domains

Self-harm

Our results found low caregiver-adolescent concordance, with only 1% of caregivers aware of adolescent self-harm, similar to findings from a previous UK study. First, consistent with the findings from the study by Mojtabai & Olfson (2008), adolescents reported higher levels of self-harm than caregivers across different strata (i.e., sex of the caregiver and adolescent, family characteristics, maternal characteristics, and parent-child relationships),

doi:10.6342/NTU202401284

particularly female adolescents who reported more self-harm compared to male adolescents. Second, the accuracy of caregiver-reported data was slightly lower than in the previous study, ranging between 50% and 60%. In the present study, parents with lower educational attainment were better aware of adolescents' self-harm. A possible reason was that higher parental education believed their children were less likely to engage in self-harm. However, contrary to the previous study, maternal mental health was not significantly related to caregivers' awareness of adolescents' self-harm. It is possible that differences in the understanding of self-harm between caregivers and adolescents, or the presence of stigma associated with self-harm, may contribute to this discordance. Future studies need to explore the association between maternal or parental mental health and caregivers' awareness of adolescent self-harm. Third, the results showed that the single-parent family, sibship size, household income, perceived social welfare services, and parent-child relationship were not associated with caregiver-adolescent concordance. Similarly, Mojtabai & Olfson (2008) found that single-parent families and family income were not related to parents' awareness of children's self-harm.

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Depressive symptoms

Our study found that the caregiver-adolescent concordance of adolescents' depressive symptoms was also relatively low. This finding was consistent with previous studies (Booth et al., 2023; Chen et al., 2017; Poulain et al., 2020; Salbach-Andrae et al., 2009), which suggest that adolescents tend to report greater levels of emotional problems than caregivers. However, in contrast to previous studies, there was no significant difference in depressive symptoms reported by female and male adolescents. In previous studies on community samples, male adolescents have been found to report greater externalizing problems while female adolescents tend to report more internalizing problems (Chen et al., 2017; Poulain et al., 2020; Wang et al., 2014). Whereas contrary results were observed in clinical samples, Salbach-Andrae et al. (2009) found that male adolescents reported higher scores than female adolescents on both internalizing and externalizing problems.

On the other hand, mothers with better mental health tend to underestimate adolescents' depressive symptoms, leading to higher caregiver-adolescent discordance. Chen et al. (2017) suggested that mothers with mental health issues are more sensitive to the emotions of adolescents, thus providing more accurate reports of their emotional problems. Another study indicated that better family relationships (e.g., support and acceptance) and stronger maternal bonding may increase the possibility of adolescents expressing their feelings (Wang et al., 2014). However, our findings did not reveal an association between parent-child relationships

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and improved concordance. The discrepancy between the current study and previous studies could be attributed to differences in the respondents evaluating parent-child relationships. Specifically, the parent-child relationships in this survey were assessed based on caregiver responses, whereas previous studies relied on adolescents' self-reports, potentially leading to divergent results.

Regarding family characteristics such as SES, sibship size, and perceived social welfare service, no significant difference in caregiver-adolescent concordance in adolescents' depressive symptoms was observed.

Psychological well-being

In contrast to the previously mentioned domains, our study found moderate caregiver-adolescent concordance of adolescents' psychological well-being. Consistent with previous studies by Lopez-Perez and Wilson (2015) and Lagattuta et al. (2012), adolescents reported lower psychological well-being levels than caregivers. Notably, male caregivers overestimated adolescents' happiness, and parents' high responsiveness also overestimated adolescents' well-being. Overall, mothers with better mental health overestimated adolescents' psychological well-being. This phenomenon may be attributed to mothers with better mental health and family support perceiving their children as more optimistic, thus, overestimating adolescents' psychological well-being and leading to higher caregiver-adolescent discordance (Lagattuta et al., 2012).

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4.3 Strengths and limitations

This study is the first to examine caregiver-adolescent concordance regarding adolescent self-harm, depressive symptoms, and psychological well-being in Taiwan. The study found low caregiver-adolescent concordance in reporting adolescent self-harm and depressive symptoms, while concordance in adolescent psychological well-being was moderate. Furthermore, the impact of family characteristics, maternal characteristics, and parent-child relationships on this concordance was examined. However, the study has its limitations. First, self-harm is a relatively rare event, resulting in an insufficient sample size that may affect the statistical stability of our models. Second, since the secondary database used in this study contains only assessments of maternal mental health, and less than one in four caregivers were male, our research focuses solely on maternal mental health. This limitation prevents us from evaluating the mental health impacts of other family members, particularly fathers.

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5. Conclusion

The caregiver-adolescent concordance in adolescents' self-harm, depressive symptoms, and psychological well-being was examined. The findings suggest that caregivers underestimate adolescent self-harm and depressive symptoms while overestimating psychological well-being. This misunderstanding of adolescent emotions and behaviors could potentially prevent adolescents with underlying mental health issues from seeking professional help early, leading to more severe mental health issues.

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Table 1: Distribution of demographic features

Characteristic	n (%)
Total sample	1417 (100%)
Sex of adolescent	
Female	641 (45.2%)
Male	776 (54.8%)
Sex of caregiver	
Female	1290 (91.0%)
Male	127 (9.0%)
Sex of caregiver / adolescent	
Female caregiver / female adolescent	597 (42.1%)
Female caregiver / male adolescent	693 (48.9%)
Male caregiver / female adolescent	44 (3.1%)
Male caregiver / male adolescent	83 (5.9%)
Parental marital status	
Married	1098 (77.5%)
Others: not married or divorced	319 (22.5%)
Sibship size	
Single child	203 (13.0%)
Two or more	1356 (87.0%)
Paternal educational attainment	
Some high school or lower	488 (41.5%)
Some college or higher	687 (58.5%)
Household annual gross income (n=1393)	
Below one million	884 (63.5%)
More than one million	509 (36.5%)
Government-provided benefits	
No	974 (68.7%)
Yes	443 (31.3%)

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Table 2: Concordance between caregivers' and adolescents' reports of self-harm (N=1415)

Characteristic	n (%)	Prevalence of self-harm		Kappa	95% CI	Sens.[a]	Spec.[a]	PPV[a]	NPV[a]	AUC[a]	χ^2 (df) for comparing groups	*p*
		Caregiver report	Adolescent report									
Total sample	1415 (100%)	1.0%	4.4%	0.28	(0.14 to 0.41)	18%	100%	79%	96%	0.59	-	
Sex of adolescent											-1.59 (1)	0.11
Female	641 (45%)	1.6%	6.1%	0.35	(0.18 to 0.53)	23%	100%	90%	95%	0.62		
Male	774 (55%)	0.5%	3.0%	0.14	(-0.01 to 0.34)	9%	100%	50%	97%	0.54		
Sex of caregiver											-0.13 (1)	0.90
Female	1288 (91%)	1.0%	4.4%	0.27	(0.14 to 0.41)	18%	100%	77%	96%	0.59		
Male	127 (9%)	0.8%	3.9%	0.32	(0.00 to 0.80)	20%	100%	100%	97%	0.60		
Sex of caregiver / adolescent											1.21 (3)	0.23
Female caregiver / female adolescent	597 (42%)	1.5%	6.2%	0.33	(0.14 to 0.50)	22%	100%	89%	97%	0.61		
Female caregiver / male adolescent	691 (49%)	0.6%	2.9%	0.16	(-0.01 to 0.37)	10%	100%	50%	97%	0.55		
Male caregiver / female adolescent[b]	44 (3%)	2.3%	4.5%	0.66	(0.00 to 1.00)	50%	100%	100%	98%	0.75		
Male caregiver / male adolescent[b]	83 (6%)	0%	3.6%	-	-	0%	100%	-	96%	0.50		
Parental marital status											-0.53 (1)	0.60
Married	1097 (78%)	1.0%	4.5%	0.25	(0.11 to 0.40)	16%	100%	73%	96%	0.58		
Others: not married or divorced	318 (22%)	0.9%	4.1%	0.37	(0.00 to 0.66)	23%	100%	100%	97%	0.62		
Sibship size (n=1388)[d]											0.68 (1)	0.50
Single child	161 (12%)	1.9%	4.3%	0.38	(-0.02 to 0.74)	29%	99%	67%	96%	0.64		
Two or more	1227 (88%)	0.8%	4.3%	0.24	(0.11 to 0.38)	15%	100%	80%	96%	0.58		
Parental educational attainment (n=1175)[c,d]											1.64 (1)	0.10
Some high school or lower	488 (42%)	2.0%	4.9%	0.39	(0.16 to 0.59)	29%	99%	70%	96%	0.64		
Some college or higher	687 (58%)	0.4%	4.2%	0.18	(0.00 to 0.36)	10%	100%	100%	96%	0.55		
Household annual income (n=1391)[d]											-0.22 (1)	0.83
Below one million	883 (63%)	1.1%	4.6%	0.26	(0.10 to 0.42)	17%	100%	70%	96%	0.58		
More than one million	508 (37%)	0.8%	4.1%	0.31	(0.08 to 0.55)	19%	100%	100%	97%	0.60		

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Table 2 (continued)

Characteristic	n (%)	Prevalence of self-harm		Kappa	95% CI	Sens.[a]	Spec.[a]	PPV[a]	NPV[a]	AUC[a]	χ^2 (df) for comparing groups	*p*
		Caregiver report	Adolescent report									
Government-provided benefits											-0.67 (1)	0.51
No	972 (69%)	0.9%	4.6%	0.25	(0.10 to 0.39)	16%	100%	78%	96%	0.58		
Yes	443 (31%)	1.1%	3.8%	0.35	(0.09 to 0.57)	24%	100%	80%	97%	0.62		
Family function (n=1248)[d]											-0.54 (1)	0.59
Low to moderate function	406 (33%)	1.5%	6.4%	0.23	(0.05 to 0.42)	15%	99%	67%	95%	0.57		
High function	842 (67%)	0.8%	3.4%	0.32	(0.11 to 0.51)	21%	100%	86%	97%	0.60		
Maternal mental health (n=1241)[d]											-0.03 (1)	0.97
Poorer mental health	600 (48%)	1.3%	5.5%	0.28	(0.11 to 0.45)	18%	100%	75%	95%	0.59		
Better mental health	641 (52%)	0.6%	3.4%	0.30	(0.08 to 0.52)	18%	100%	100%	97%	0.59		
Parenting style												
Demandingness											0.22 (1)	0.82
Low demandingness	665 (47%)	1.1%	4.8%	0.30	(0.10 to 0.48)	19%	100%	86%	96%	0.59		
High demandingness	750 (53%)	0.9%	4.0%	0.26	(0.07 to 0.45)	17%	100%	71%	97%	0.58		
Responsiveness (n=1413)[d]											0.22 (1)	0.82
Low responsiveness	658 (47%)	1.1%	4.9%	0.30	(0.10 to 0.49)	19%	100%	86%	96%	0.59		
High responsiveness	755 (53%)	0.9%	4.0%	0.26	(0.07 to 0.44)	17%	100%	71%	97%	0.58		
Punishment											0.57 (1)	0.57
Less punishment	939 (66%)	0.7%	4.2%	0.25	(0.08 to 0.42)	22%	100%	71%	96%	0.58		
High punishment	476 (34%)	1.5%	4.8%	0.32	(0.09 to 0.52)	15%	100%	86%	96%	0.61		
Parent-child interaction											0.08 (1)	0.94
Low parent-child interaction	643 (45%)	1.2%	5.1%	0.28	(0.10 to 0.46)	18%	100%	75%	96%	0.59		
High parent-child interaction	772 (55%)	0.8%	3.8%	0.28	(0.07 to 0.47)	17%	100%	83%	97%	0.59		

[a] Abbreviation: CI = confidence interval; Sens. = sensitivity; Spec. = specificity; PPV = positive predictive value; NPV = negative predictive value; AUC = Area under curve

[b] Male caregiver with adolescent (kappa = 0.32, 95% CI = 0.00-0.80, AUC = 0.60)

[c] The highest from maternal and paternal educational attainment.

[d] The percentage of participants with missing data differed by variable, resulting in varying sample sizes across variables.

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Table 3: Concordance between caregivers' and adolescents' reports of depressive symptoms (N=1388)

		Caregiver report		Adolescent report		ICC	95% CI
	N (%)	mean	(SD)	mean	(SD)		
Total sample	1388 (100%)	7.24	(3.07)	9.52	(4.31)	0.28	(0.20 to 0.35)
Sex of adolescent							
Female	627 (45%)	7.60	(3.17)	9.96	(4.37)	0.30	(0.18 to 0.40)
Male	761 (55%)	6.94	(2.96)	9.16	(4.23)	0.24	(0.13 to 0.34)
Sex of caregiver							
Female	1265 (91%)	7.25	(3.05)	9.51	(4.59)	0.27	(0.19 to 0.35)
Male	123 (9%)	7.07	(3.35)	9.58	(4.28)	0.36	(0.08 to 0.55)
Sex of caregiver / adolescent							
Female caregiver / female adolescent	585 (42%)	7.58	(3.16)	9.94	(4.36)	0.32	(0.20 to 0.42)
Female caregiver / male adolescent	680 (49%)	6.97	(2.91)	9.14	(4.18)	0.20	(0.07 to 0.31)
Male caregiver / female adolescent	42 (3%)	7.82	(3.24)	10.17	(4.59)	-0.09	(-1.03 to 0.41)
Male caregiver / male adolescent	81 (6%)	6.67	(3.36)	9.27	(4.58)	0.50	(0.23 to 0.68)
Parental marital status							
Married	1075 (77%)	7.30	(3.09)	9.45	(4.22)	0.30	(0.21 to 0.37)
Others: not married or divorced	313 (23%)	7.02	(3.02)	9.75	(4.60)	0.23	(0.04 to 0.39)
Sibship size (n=1362)[a]							
Single child	157 (12%)	7.63	(3.31)	10.15	(4.47)	0.39	(0.17 to 0.55)
Two or more	1205 (88%)	7.21	(3.04)	9.46	(4.28)	0.23	(0.14 to 0.31)
Parental educational attainment (n=1150)[a,b]							
Some high school or lower	478 (42%)	7.33	(3.30)	9.20	(4.15)	0.33	(0.20 to 0.44)
Some college or higher	672 (58%)	7.26	(2.94)	9.56	(4.19)	0.26	(0.14 to 0.37)
Household annual income (n=1365)[a]							
Below one million	865 (63%)	7.28	(3.20)	9.41	(4.23)	0.31	(0.21 to 0.40)
More than one million	500 (37%)	7.24	(2.84)	9.70	(4.40)	0.24	(0.09 to 0.36)
Government-provided benefits							
No	954 (69%)	7.28	(2.95)	9.57	(4.20)	0.25	(0.15 to 0.34)
Yes	434 (31%)	7.15	(3.34)	9.40	(4.55)	0.33	(0.19 to 0.44)
Family function (n=1226)[a]							
Low to moderate function	396 (32%)	7.94	(3.70)	10.2	(4.54)	0.41	(0.28 to 0.52)
High function	830 (68%)	7.04	(2.72)	9.24	(4.06)	0.19	(0.07 to 0.30)
Maternal mental health (n=1219)[a]							
Poorer mental health	588 (48%)	8.16	(3.61)	9.96	(4.35)	0.42	(0.32 to 0.51)
Better mental health	631 (52%)	6.55	(2.28)	9.13	(4.09)	0.04	(-0.13 to 0.18)
Parenting style							
Demandingness							
Low demandingness	648 (47%)	7.42	(3.38)	9.58	(4.51)	0.36	(0.25 to 0.45)
High demandingness	740 (53%)	7.07	(2.76)	9.47	(4.13)	0.18	(0.06 to 0.29)
Responsiveness							
Low responsiveness	643 (46%)	7.52	(3.49)	9.87	(4.40)	0.34	(0.23 to 0.43)
High responsiveness	743 (54%)	6.99	(2.61)	9.20	(4.18)	0.17	(0.05 to 0.28)

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Table 3 (continued)

		Caregiver report		Adolescent report		ICC	95% CI
	N (%)	mean	(SD)	mean	(SD)		
Punishment							
Less punishment	922 (66%)	6.97	(2.90)	9.43	(4.36)	0.22	(0.11 to 0.31)
High punishment	466 (34%)	7.76	(3.34)	9.68	(4.20)	0.38	(0.26 to 0.48)
Parent-child interaction							
Low parent-child interaction	627 (45%)	7.61	(3.47)	9.74	(4.34)	0.34	(0.23 to 0.43)
High parent-child interaction	761 (55%)	6.93	(2.67)	9.34	(4.27)	0.21	(0.09 to 0.31)

[a] The percentage of participants with missing data differed by variable, resulting in varying sample sizes across variables.

[b] The highest from maternal and paternal educational attainment.

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Table 4: Concordance between caregivers' and adolescents' reports of happiness (N=1411)

		Caregiver report		Adolescent report		ICC	95% CI
	N (%)	mean	(SD)	mean	(SD)		
Total sample	1411 (100%)	4.06	(0.72)	3.92	(0.88)	0.48	(0.42 to 0.53)
Sex of the adolescent							
Female	638 (45%)	4.07	(0.71)	3.84	(0.88)	0.45	(0.36 to 0.53)
Male	773 (55%)	4.05	(0.72)	3.99	(0.87)	0.50	(0.42 to 0.56)
Sex of the caregiver							
Female	1284 (91%)	4.07	(0.70)	3.98	(0.70)	0.46	(0.40 to 0.52)
Male	127 (9%)	3.98	(0.85)	3.90	(1.00)	0.56	(0.37 to 0.69)
Sex of caregiver / adolescent							
Female caregiver / female adolescent	594 (42%)	4.08	(0.70)	3.83	(0.88)	0.45	(0.35 to 0.53)
Female caregiver / male adolescent	690 (49%)	4.05	(0.70)	4.01	(0.85)	0.48	(0.39 to 0.55)
Male caregiver / female adolescent	44 (3%)	3.91	(0.74)	3.95	(0.89)	0.48	(0.05 to 0.72)
Male caregiver / male adolescent	83 (6%)	4.02	(0.90)	3.87	(1.06)	0.59	(0.37 to 0.73)
Parental marital status							
Married	1093 (77%)	4.07	(0.71)	3.94	(0.87)	0.47	(0.40 to 0.53)
Others: not married or divorced	318 (23%)	4.00	(0.75)	3.85	(0.92)	0.49	(0.37 to 0.59)
Sibship size (n=1384)[a]							
Single child	162 (12%)	4.07	(0.70)	3.85	(0.91)	0.56	(0.40 to 0.68)
Two or more	1222 (88%)	4.05	(0.72)	3.93	(0.87)	0.47	(0.41 to 0.53)
Parental educational attainment (n=1170)[a,b]							
Some high school or lower	486 (42%)	4.09	(0.73)	3.92	(0.90)	0.42	(0.30 to 0.51)
Some college or higher	684 (58%)	4.04	(0.70)	3.94	(0.85)	0.50	(0.42 to 0.57)
Household annual income (n=1387)[a]							
Below one million	879 (63%)	4.06	(0.72)	3.91	(0.89)	0.46	(0.38 to 0.53)
More than one million	508 (37%)	4.05	(0.70)	3.97	(0.86)	0.51	(0.42 to 0.59)
Government-provided benefits							
No	970 (69%)	4.04	(0.70)	3.93	(0.88)	0.44	(0.36 to 0.50)
Yes	441 (31%)	4.09	(0.74)	3.91	(0.89)	0.55	(0.46 to 0.63)
Family function (n=1244)[a]							
Low to moderate function	405 (33%)	3.87	(0.75)	3.78	(0.95)	0.60	(0.51 to 0.67)
High function	839 (67%)	4.15	(0.66)	4.00	(0.82)	0.35	(0.25 to 0.43)
Maternal mental health (n=1237)[a]							
Poorer mental health	598 (48%)	3.89	(0.72)	3.86	(0.91)	0.53	(0.45 to 0.60)
Better mental health	639 (52%)	4.22	(0.65)	3.99	(0.83)	0.37	(0.26 to 0.46)
Parenting style							
Demandingness							
Low demandingness	662 (47%)	3.98	(0.73)	3.89	(0.87)	0.50	(0.42 to 0.57)
High demandingness	749 (53%)	4.12	(0.70)	3.96	(0.89)	0.45	(0.36 to 0.52)
Responsiveness (n=1409)[a]							
Low responsiveness	656 (47%)	3.88	(0.74)	3.81	(0.92)	0.50	(0.42 to 0.57)
High responsiveness	753 (53%)	4.22	(0.66)	4.02	(0.83)	0.40	(0.31 to 0.48)

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Table 4 (continued)

		Caregiver report		Adolescent report		ICC	95% CI
	N (%)	mean	(SD)	mean	(SD)		
Punishment							
Less punishment	938 (66%)	4.10	(0.70)	3.92	(0.87)	0.44	(0.36 to 0.50)
High punishment	473 (34%)	3.98	(0.75)	3.92	(0.90)	0.54	(0.45 to 0.62)
Parent-child interaction							
Low parent-child interaction	642 (45%)	3.89	(0.73)	3.85	(0.90)	0.49	(0.41 to 0.57)
High parent-child interaction	769 (55%)	4.20	(0.68)	3.99	(0.86)	0.43	(0.34 to 0.50)

[a] The percentage of participants with missing data differed by variable, resulting in varying sample sizes across variables.

[b] The highest from maternal and paternal educational attainment.

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Table 5: Concordance between caregivers' and adolescents' reports of well-being satisfaction (N=1412)

	N (%)		Caregiver report		Adolescent report		ICC	95% CI
			mean	(SD)	mean	(SD)		
Total sample	1412	(100%)	4.17	(0.67)	4.07	(0.82)	0.43	(0.37 to 0.49)
Sex of the adolescent								
Female	639	(45%)	4.21	(0.67)	4.06	(0.80)	0.38	(0.27 to 0.47)
Male	773	(55%)	4.14	(0.68)	4.14	(0.83)	0.48	(0.40 to 0.55)
Sex of the caregiver								
Female	1285	(91%)	4.19	(0.66)	4.08	(0.81)	0.43	(0.36 to 0.49)
Male	127	(9%)	4.00	(0.78)	3.97	(0.92)	0.47	(0.25 to 0.63)
Sex of caregiver / adolescent								
Female caregiver / female adolescent	595	(42%)	4.22	(0.66)	4.06	(0.81)	0.45	(0.35 to 0.53)
Female caregiver / male adolescent	690	(49%)	4.15	(0.66)	4.09	(0.81)	0.48	(0.39 to 0.55)
Male caregiver / female adolescent	44	(3%)	3.98	(0.76)	4.09	(0.74)	0.48	(0.05 to 0.72)
Male caregiver / male adolescent	83	(6%)	4.01	(0.79)	3.90	(1.00)	0.59	(0.37 to 0.73)
Parental marital status								
Married	1093	(77%)	4.21	(0.65)	4.09	(0.81)	0.41	(0.34 to 0.48)
Others: not married or divorced	319	(23%)	4.02	(0.72)	3.98	(0.85)	0.48	(0.35 to 0.58)
Sibship size (n=1385)								
Single child	161	(12%)	4.12	(0.67)	3.97	(0.86)	0.54	(0.37 to 0.66)
Two or more	1224	(88%)	4.17	(0.67)	4.07	(0.81)	0.42	(0.35 to 0.48)
Paternal educational attainment(n=1170)								
Some high school or lower	486	(42%)	4.19	(0.69)	4.04	(0.84)	0.35	(0.23 to 0.46)
Some college or higher	684	(58%)	4.21	(0.64)	3.94	(0.80)	0.46	(0.37 to 0.53)
Household annual gross income (n=1388)								
Below one million	881	(63%)	4.13	(0.69)	3.79	(0.82)	0.39	(0.30 to 0.47)
More than one million	507	(37%)	4.25	(0.63)	4.17	(0.80)	0.49	(0.39 to 0.57)
Government-provided benefits								
No	969	(69%)	4.17	(0.65)	4.09	(0.81)	0.42	(0.34 to 0.49)
Yes	443	(31%)	4.16	(0.72)	4.01	(0.83)	0.46	(0.35 to 0.56)
Family function (n=1244)								
Low to moderate function	406	(33%)	3.98	(0.73)	3.93	(0.87)	0.38	(0.24 to 0.49)
High function	838	(67%)	4.29	(0.60)	4.16	(0.77)	0.42	(0.33 to 0.49)
Maternal mental health (n=1237)								
Poor mental health	599	(48%)	4.01	(0.68)	4.00	(0.85)	0.49	(0.40 to 0.56)
Better mental health	638	(52%)	4.35	(0.60)	4.16	(0.76)	0.30	(0.18 to 0.40)
Parenting style								
Demandingness								
Low demandingness	664	(47%)	4.09	(0.68)	4.00	(0.83)	0.45	(0.36 to 0.53)
High demandingness	748	(53%)	4.24	(0.66)	4.12	(0.80)	0.40	(0.31 to 0.48)
Responsiveness (n=1410)								
Low responsiveness	656	(47%)	3.98	(0.69)	3.96	(0.85)	0.42	(0.32 to 0.50)
High responsiveness	754	(53%)	4.33	(0.61)	4.16	(0.78)	0.39	(0.29 to 0.47)

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Table 5 (continued)

			Caregiver report		Adolescent report		ICC	95% CI
Punishment								
Less punishment	938	(66%)	4.21	(0.66)	4.08	(0.81)	0.52	(0.42 to 0.60)
High punishment	474	(34%)	4.08	(0.69)	4.04	(0.83)	0.38	(0.30 to 0.46)
Parent-child interaction								
Low parent-child interaction	641	(45%)	4.02	(0.69)	3.98	(0.84)	0.47	(0.38 to 0.55)
High parent-child interaction	771	(55%)	4.29	(0.63)	4.14	(0.80)	0.36	(0.26 to 0.45)

[a] The percentage of participants with missing data differed by variable, resulting in varying sample sizes across variables.

[b] The highest from maternal and paternal educational attainment.

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Table 6: Regression model analysis to assess the association of caregiver-adolescent concordance in the reports of adolescent depressive symptoms with covariates.

	Adjusted for the sex of adolescent and caregiver		Fully adjusted for all variables	
	β	95% CI	*β*	95% CI
Sex of adolescent				
Male	1		1	
Female	-0.013	(-0.60 to 0.36)	-0.004	(-0.56 to 0.50)
Sex of caregiver				
Female	1		1	
Male	-0.013	(-1.04 to 0.64)	0.051	(-0.56 to 0.50)
Parental marital status				
Married	1		1	
Others: not married or divorced	-0.059	(-1.28 to -0.01)	0.017	(-0.86 to 1.55)
Sibship size (n=1362)[b]				
Single child	1			
Two or more	0.018	(-0.50 to 1.01)	0.004	(-0.83 to 0.94)
Parental educational attainment (n=1150)[a,b]				
Some high school or lower	1		1	
Some college or higher	-0.045	(-0.93 to 0.11)	-0.031	(-0.87 to 0.31)
Household annual income (n=1365)[b]				
Below one million	1		1	
More than one million	-0.04	(-0.88 to 0.13)	-0.038	(-0.93 to 0.24)
Government-provided benefits				
No	1		1	
Yes	0.01	(-0.43 to 0.62)	0.013	(-0.50 to 0.77)
Family function (n=1266)[b]				
Low to moderate function	1		1	
High function	0.00	(-0.54 to 0.53)	0.023	(-0.39 to 0.84)
Maternal mental health (n=1219)[b]				
Poor mental health	1		1	
Better mental health	-0.087	(-1.28 to -0.28)	-0.086	(-1.32 to -0.19)
Parenting style				
Demandingness				
Low demandingness	1		1	
High demandingness	-0.034	(-0.79 to 0.17)	-0.032	(-0.86 to 0.28)
Responsiveness				
Low responsiveness	1		1	
High responsiveness	0.009	(-0.40 to 0.56)	0.032	(-0.31 to 0.87)
Punishment				
Less punishment	1		1	
High punishment	-0.054	(-1.02 to -0.01)	-0.027	(-0.81 to 0.32)
Parent-child interaction				
Low parent-child interaction	1		1	
High parent-child interaction	-0.037	(-0.82 to 0.15)	-0.024	(-0.79 to 0.35)

[a] The highest from maternal and paternal educational attainment.

[b] The percentage of participants with missing data differed by variable, resulting in varying sample sizes across variables.

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Table 7: Regression model analysis to assess the association of caregiver-adolescent concordance in the reports of adolescent happiness with covariates.

	Adjusted for the sex of adolescent and caregiver		Fully adjusted for all variables	
	β	95% C.I	*β*	95% C.I
Sex of adolescent				
Male	1		1	
Female	0.093	(0.08 to 0.27)	0.100	(-0.84 to 0.29)
Sex of caregiver				
Female	1		1	
Male	-0.01	(-0.20 to 0.14)	0.002	(0.08 to 0.29)
Parental marital status				
Married	1		1	
Others: not married or divorced	0.016	(-0.09 to 0.17)	-0.025	(-0.36 to 0.14)
Sibship size (n=1384)[b]				
Single child	1			
Two or more	-0.04	(-0.27 to 0.04)	-0.027	(-0.26 to 0.10)
Parental educational attainment (n= 1170)[a,b]				
Some high school or lower	1		1	
Some college or higher	-0.039	(-0.18 to 0.03)	0.062	(-0.18 to 0.07)
Household annual income (n=1387)[b]				
Below one million	1		1	
More than one million	-0.043	(-0.19 to 0.02)	-0.033	(-0.18 to 0.00)
Government-provided benefits				
No	1		1	
Yes	0.031	(-0.04 to 0.17)	0.017	(-0.10 to 0.17)
Family function (n=1244)[b]				
Low to moderate function	1		1	
High function	0.028	(-0.05 to 0.17)	0.001	(-0.12 to 0.13)
Maternal mental health (n=1237)[b]				
Poorer mental health	1		1	
Better mental health	0.109	(0.10 to 0.30)	0.099	(0.07 to 0.30)
Parenting style				
Demandingness				
Low demandingness	1		1	
High demandingness	0.035	(-0.03 to 0.16)	0.019	(-0.08 to 0.15)
Responsiveness (n=1409)[b]				
Low responsiveness	1		1	
High responsiveness	0.071	0.04 to 0.23)	0.046	(-0.04 to 0.21)
Punishment				
Less punishment	1		1	
High punishment	0.049	(-0.01 to 0.20)	0.011	(-0.09 to 0.14)
Parent-child interaction				
Low parent-child interaction	1		1	
High parent-child interaction	0.081	(0.05 to 0.25)	0.034	(-0.05 to 0.18)

[a] The highest from maternal and paternal educational attainment.

[b] The percentage of participants with missing data differed by variable, resulting in varying sample sizes across variables.

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Table 8: Regression model analysis to assess the association of caregiver-adolescent concordance in the reports of adolescent well-being satisfaction with covariates.

	Adjusted for the sex of adolescent and caregiver		Fully adjusted for all variables	
	β	95% C.I	*β*	95% C.I
Sex of adolescent				
Male	1		1	
Female	0.043	(-0.02 to 0.17)	0.055	(-0.80 to 0.20)
Sex of caregiver				
Female	1		1	
Male	-0.022	(-0.23 to 0.09)	0.013	(-0.01 to 0.20)
Parental marital status				
Married	1		1	
Others: not married or divorced	-0.038	(-0.21 to 0.04)	-0.021	(-0.32 to 0.16)
Sibship size (n=1385)[b]				
Single child	1			
Two or more	-0.023	(-0.21 to 0.08)	-0.026	(-0.26 to 0.10)
Parental educational attainment (n=1170)[a,b]				
Some high school or lower	1		1	
Some college or higher	-0.021	(-0.14 to 0.07)	0.06	(-0.13 to 0.10)
Household annual income (n=1388)[b]				
Below one million	1		1	
More than one million	-0.023	(-0.14 to 0.06)	-0.035	(-0.18 to 0.00)
Government-provided benefits				
No	1		1	
Yes	0.039	(-0.03 to 0.18)	0.052	(-0.02 to 0.23)
Family function (n=1244)[b]				
Low to moderate function	1		1	
High function	0.043	(-0.03 to 0.19)	0.007	(-0.11 to 0.13)
Maternal mental health (n=1237)[b]				
Poorer mental health	1		1	
Better mental health	0.105	(0.09 to 0.29)	0.097	(0.06 to 0.29)
Parenting style				
Demandingness				
Low demandingness	1		1	
High demandingness	0.02	(-0.06 to 0.13)	0.015	(-0.09 to 0.14)
Responsiveness (n=1410)[b]				
Low responsiveness	1		1	
High responsiveness	0.082	(0.05 to 0.24)	0.073	(0.01 to 0.25)
Punishment				
Less punishment	1		1	
High punishment	0.047	(-0.01 to 0.19)	0.017	(-0.08 to 0.14)
Parent-child interaction				
Low parent-child interaction	1		1	
High parent-child interaction	0.054	(0.00 to 0.19)	-0.023	(-0.16 to 0.07)

[a] The highest from maternal and paternal educational attainment.

[b] The percentage of participants with missing data differed by variable, resulting in varying sample sizes across variables.

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Appendix

Appendix Table 1: Overview of the data used in this study from the Taiwan Birth Cohort Pilot Study (TBCS-P) Surveys on adolescent self-harm, depressive symptoms, happiness, well-being satisfaction, and maternal SF-36.

Wave	Age	Data collection period	Data collection method	Participants		Measures used in this study
				Caregivers	Adolescent	
8	12 years	2017-2018	Face to face interview	V	V	Sibship size
10	15 years	2019	Face to face interview	V	V	Adolescents' self-harm[a,b] Adolescents' depressive symptoms[a,b] Adolescents' happiness[a,b] Adolescents' well-being satisfaction[a,b] Maternal SF-36[c]

[a] Respondent was an adolescent.

[b] Respondent was a caregiver.

[c] Respondent was an adolescent's mother.

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Appendix Table 2: The total variables used in the study

Variables	Respondent	Question use in survey	Question used in survey (in Chinese)	Respond category
Self-harm[a]	Caregiver / adolescent	Have you (or your child) engaged in self-harm in the past year?	「在過去一年當年中，你(他)曾經自己傷害過自己嗎?」	0 = Never 1 = Self-harm history
Depressive symptoms[b]	Caregiver / adolescent	How often you (or your child) have felt this way during the past week?	F3.以下是情緒的描述，請依【過去一星期】的情形，勾選最符合你（您孩子）的情形。	
		I did not feel like eating; my appetite was poor.	1.不太想吃東西，胃口很差	0 = Never 1 = Sometimes 2 = Often 3 = Always
		I felt depressed.	2.覺得心情很不好	
		I felt that everything I did was an effort.	3.覺得做每一件事情都很吃力	
		My sleep was restless.	4.睡不好覺	
		I was happy.	5.覺得很快樂	
		I felt lonely.	6.覺得很寂寞（孤單、沒伴）	
		People were unfriendly (to my child).	7.覺得身邊的人不友善(不和您的孩子好)	
		I enjoy life.	8.覺得日子（生活）過得不錯	
		I felt sad.	9.覺得很傷心	
		I could not get "going".	10.提不起勁來做事（沒精神做事）	
Happiness[b]	Caregiver / adolescent	Overall, would you (your child) be described as very happy, happy, average, unhappy, or very unhappy?	整體而言，你（您的孩子）是個很快樂、快樂、普通、不快樂，還是很不快樂的孩子？	1 =Very unhappy 2 = Unhappy 3 = Neutral 4 = Happy 5 = Very happy

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Variables	Respondent	Question use in survey	Question used in survey (in Chinese)	Respond category
Well-being satisfaction[b]	Caregiver / adolescent	Overall, would you (your child) be described as having very high well-being satisfaction, high well-being satisfaction, average well-being satisfaction, low well-being satisfaction, or very low well-being satisfaction?	整體而言，你（您的孩子）是個很幸福、幸福、普通、不幸福，還是很不幸福的孩子？	1 =Very dissatisfied 2 = Dissatisfied 3 = Neutral 4 = Satisfied 5 = Very satisfied
Parental marital	Caregiver	Could you please provide your current marital status?	請問您們（孩子父母）目前的婚姻狀況是：	0 = Married 1 = Others (not married or divorced)
Sibship size	Caregiver	How many children do you (the child's parents) currently have, including this child? (Excluding any fetus currently in pregnancy)	這個孩子也算在內，請問您們(孩子父母)現在一共有幾個孩子?【不包括目前懷孕中的胎兒】	1 = An only child 2 = The child has siblings
Parental educational attainment	Caregiver	What is the highest level of education you have completed?	最高學歷教育程度	0 = Some high school or lower 1= Some college or higher
Household annual gross income	Caregiver	What is the approximate combined annual income of both parents (the child's parents) in the past year?	請問您們夫妻倆人（孩子的父母）最近一年的年收入，大約有多少？	0 = Below one million 1= More than one million
Government-provided benefits	Caregiver	Are you currently receiving any government-provided welfare services or subsidies for this child, including education, healthcare, or livelihood assistance? Please answer each aspect separately.	您們目前有沒有接受政府提供給這個孩子任何的福利服務或補助，包括教育、醫療、或生活等方面？【請逐一探問】	0 = Never 1 = Yes
		Are you receiving any medical assistance for the child based on low-income household or disadvantaged family status?	1.醫療補助（低收入戶或弱勢家庭孩子才能領）	
		Are you receiving any subsidies for the National Health Insurance premiums?	2.全民健康保險保費補助	
		Are you receiving any subsidies based on low-income status?	3.中低收入補助	

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Variables	Respondent	Question use in survey	Question used in survey (in Chinese)	Respond category
		Are you receiving any subsidies for families facing special circumstances?	4.特殊境遇家庭補助	
		Are you receiving any subsidies for school lunches expenses?	5.營養午餐費用補助	
		Are you receiving any fee reductions or free afterschool care assistance?	6.課後照顧費用減免或免費課後扶助	
		Are you receiving any high-risk family care services?	7.高風險家庭關懷服務	
		Are you receiving any other types of assistance? If so, could you please specify?	8.其他(請說明)_____	
Maternal perceived family function	Adolescent's mother	I will ask about the relationship between you (the child's mother) and your family members (the child's household). Please respond based on the actual situation. (Family refers to those living with you.)	我會問到一些您(孩子母親)和家人(孩子家庭) 的相處情形，請您就實際情況來回答。【「家人」是指與您住在一起的家人】	0 = Low to moderate function 1 = High function
		When you encounter difficulties, are you satisfied with the help you receive from your family members?	1.當您遭遇困難時，可以從家人得到滿意的幫忙。	
		Are you satisfied with the way your family members discuss various matters with you and share problems?	2.您很滿意家人與您討論各種事情，以及分擔問題的方式。	
		Do your family members accept and support you when you wish to engage in new activities or pursue development opportunities?	3.當您希望從事新的活動或發展時，家人都能接受且給予支持。	
		Are you satisfied with the way your family members express emotions towards you and respond to your emotions (such as anger, sadness, or love)?	4.您很滿意家人對您表達情感的方式，以及對您的情緒（如憤怒、悲傷、愛）的反應。	
		Are you satisfied with the way your family spends time with you?	5.您很滿意家人與您共度時光的方式。	
Maternal mental health	Adolescent's mother	These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling.	下列各項問題是關於過去一個月內您的感覺及您對周遭生活的感受，請針對每一問題選一最接近您感覺的答案。在過去一個月中有多少時候…….	0 = poor MH 1 = better MH

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Variables	Respondent	Question use in survey	Question used in survey (in Chinese)	Respond category
		1. Have you been a very nervous person?	1.您是一個非常緊張的人？	
		2. Have you felt so down in the dumps that nothing could cheer you up?	2.您覺得非常沮喪，沒有任何事情可以讓您高興起來？	
		3. Have you felt downhearted and blue?	3.您覺得悶悶不樂和憂慮？	
		4. Have you been a happy person? (Reverse scored)	4.您是一個快樂的人？（反向題）	
		5. Have you felt clam and peaceful? (Reverse scored)	5.您覺得心情平靜？（反向題）	
Demandingness	Caregiver	1. When making decisions related to your child, do you ask for his/her opinion?	1.在做跟孩子有關的決定時，您會詢問他/她的意見。	0 = Low demandingness / responsiveness 1 = High demandingness / responsiveness
		2. Do you explain to your child why you're asking them to do something?	2.在要求孩子時，您會跟他/她解釋為什麼要這樣子做。	
		3. When your child's thoughts differ from yours, do you expect them to comply (listen to you)?	3.當孩子跟您的想法不一樣時，您會要他/她服從（聽您的話）。	
Responsiveness		1. When your child is feeling down, do you comfort them?	1.當孩子心情不好時，您會安慰他/她。	
		2. Do you proactively praise or reward your child when they behave well?	2.當孩子表現好的時候，您會主動稱讚或獎勵他/她。	
		3. Do you listen attentively when your child wants to discuss or share something?	3.孩子有事想要商量或分享時，您會專心聽他/她講。	
Punishment		1. Do you scold or punish your child when they misbehave?	1.當孩子做錯事的時候，您會罵他/她或處罰他/她。	0 = Less punishment 1 = More punishment
		2. Do you physically discipline your child when they misbehave?	2.當孩子做錯事的時候，您會動手打他/她。	
Parent-child interaction		1. In the past week, have you engaged in conversations with your child? (Phone or online video calls included)	1.最近一星期，您有和孩子聊天嗎？（電話或網路視訊也算）	0 = Low parent-child interaction 1 = High parent-child interaction
		2. In the past week, have you eaten meals together with your child? (Any meal during the day counts)	2.最近一星期，您有和孩子一起吃飯嗎？（一天之中只要任何一餐有就算）	
		3. In the past week, have you engaged in activities with your child (such as exercising, watching TV, shopping, etc.)?	3.最近一星期，您有和孩子一起做些事嗎（如運動、看電視、買東西等）？	

[a] Analyzed as a categorical variable in the analysis.

[b] Analyzed as a continuous variable in the analysis.

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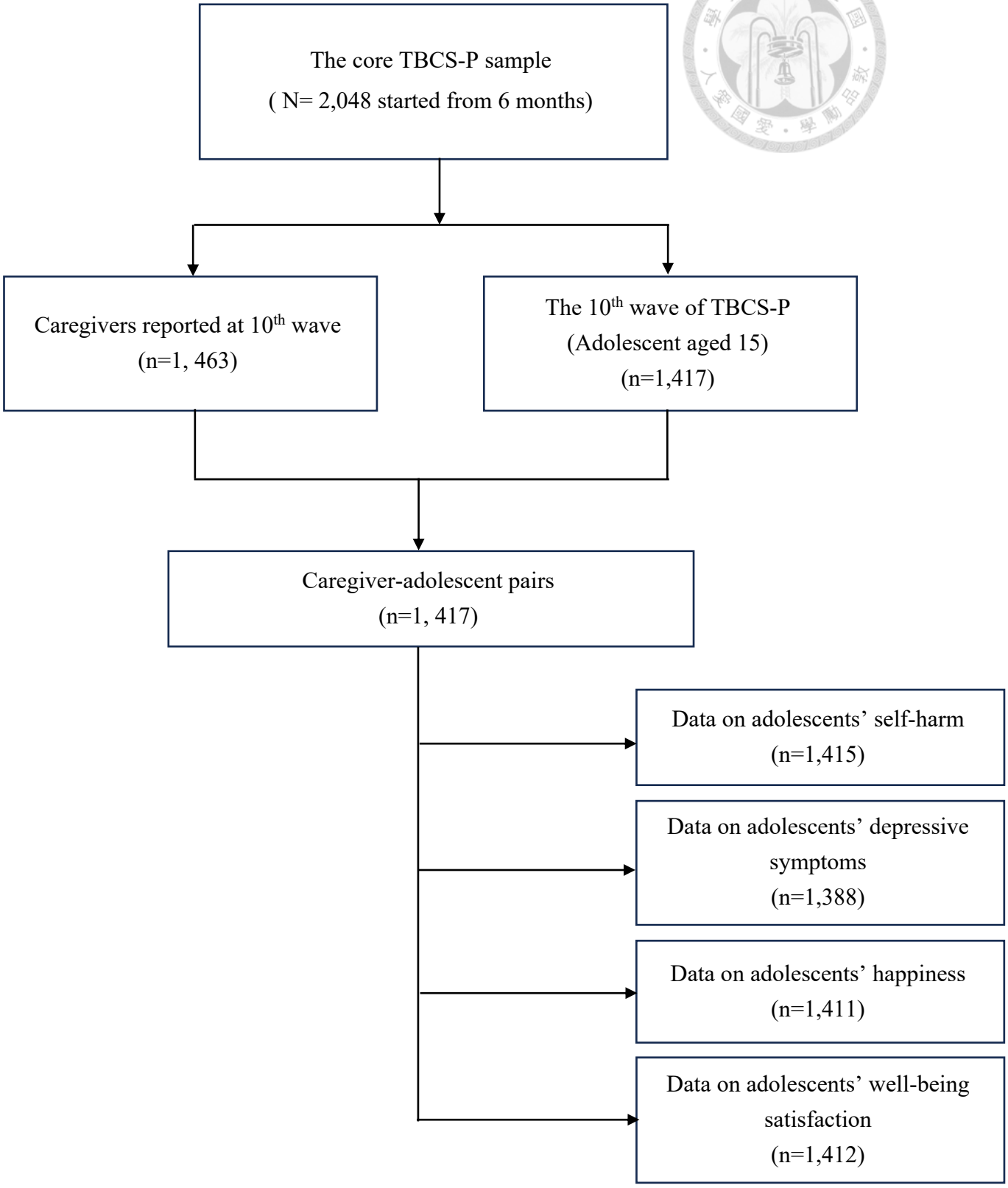
Figures

Figure 1: Flow chart of the TBCS-P participant



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