



# Adolescent-Mother Agreements and Discrepancies in Reports of Helicopter Parenting: Associations with Perceived Conflict and Support

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## Abstract

Adolescents' and parents' similar and/or divergent perceptions of parental behaviors may be associated with youth-parent relationship quality. This study examined adolescents' and mothers' perceptions of helicopter parenting, and whether (dis)agreements between these views were associated with perceived conflict and support. Participants were 349 late adolescents ( $M_{T_{\text{age}}} = 18.20$ ; 39.8% male) and their mothers ( $M_{T_{\text{age}}} = 49.10$ ) in Hong Kong who completed four assessments over one year. Results suggested that youth-mother agreements regarding helicopter parenting were positively associated with both conflict and support. Additionally, discrepancies between their reports were positively related to adolescent-reported conflict. These findings highlight the importance of examining multiple perspectives when studying helicopter parenting dynamics, and suggest both positive and negative aspects of these practices in Chinese families.

**Keywords** Helicopter parenting · Relationship quality · Reporter discrepancies · Multilevel response surface analysis

## Introduction

Adolescence is a period in which youth typically become more autonomous, with parents promoting independence by reducing their direct involvement. In the case of *helicopter parenting*, however, parents continue to be excessively engaged by solving problems before youth encounter them (Segrin et al., 2012), constantly monitoring and arranging youth's daily experiences (Padilla-Walker & Nelson, 2012), and over-attending to youth's academic performance (Leung & Shek, 2017; Zong & Hawk, 2022). Research consistently suggests that developmentally inappropriate levels of supervision, guidance, and control interfere with youth's psychological needs (Hong & Cui, 2023; Odenweller et al., 2014; Van Petegem et al., 2020), potentially contributing to the deterioration of family relationships (Leung, 2021; Segrin et al., 2012). It is also possible that helicopter parenting practices are associated with perceptions of relationship support in cultures influenced by Confucian values (e.g., China,

Korea), as they align with prevailing norms emphasizing parental sacrifice and youth filial piety (Chan et al., 2009; Stewart & Bond, 2002). Most studies on helicopter parenting are based solely upon single-informant reports, leaving it unclear whether similar and/or divergent perceptions of adolescents and parents regarding these practices are associated with their relationship quality. Moreover, previous studies, whether using cross-sectional or longitudinal designs (Leung, 2021; Zong & Hawk, 2022), have not examined helicopter parenting dynamics within families. It remains unclear whether adolescents' and parents' perceptions of helicopter parenting differ over time and whether these changes relate to changes in their relationship quality. This longitudinal, multi-informant study aimed to investigate whether and how (dis)agreements between adolescents' and mothers' perceptions of helicopter parenting are associated with youth-mother relationship quality (i.e., conflict and support) within Chinese families.

Through the lens of the cultural normativeness theory (Deater-Deckard & Dodge, 1997; Lansford et al., 2018), helicopter parenting may be more adaptive in Chinese families. As reflected by the concept of *guan*, Chinese societies typically encourage parents to engage in high levels of direct governance over children's experiences to

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ensure achievement and social adaptation (Chao, 1994; Ng & Wang, 2019). Although Chinese helicopter parenting might be positively correlated with youth-parent conflict because it hinders youth's developmental needs, it might paradoxically also hold positive associations with youth-parent support, as it communicates parental concern in a culturally appropriate manner. Such tensions might be especially salient in Hong Kong, the context of the present research, because traditional Confucian values emphasizing interdependence are sometimes at odds with more individualistic perspectives conveyed via both a history of British colonization and contemporary globalization. Previous cross-cultural research has shown that although Chinese college students report greater psychological need frustration in association with higher levels of helicopter parenting, these links are not as strong as those reported by their USA counterparts (Hong & Cui, 2023). A recent study found positive associations between helicopter parenting and youth-mother relationship satisfaction among students from Korea, another country influenced by Confucian values, but not among students from the USA (Jung et al., 2020). Prior studies have also reported positive correlations between Chinese helicopter parenting and both problematic (e.g., conflict; Leung, 2021) and beneficial (e.g., support; Zong & Hawk, 2022) aspects of relationship quality. However, these “mixed” associations between helicopter parenting and relationship quality have not been explicitly investigated within a single study, leaving it unclear whether they are prevalent in Chinese families or merely incidental due to differences in demographics and research design.

Helicopter parenting studies have often relied solely on adolescents' self-reports, leaving it unclear whether adolescents and parents hold similar and/or different perceptions of parental overinvolvement. In comparison to adolescents' or mothers' own perceptions, youth-mother reporter agreements might provide a more objective reflection of helicopter parenting and hold less biased associations with other study constructs. Previous research has found that, beyond adolescents' and mothers' individual viewpoints, youth-mother agreements regarding overprotective parenting was positively related to adolescents' psychological need frustration (Van Petegem et al., 2020). In addition to agreements, prior multi-informant research has demonstrated that youth-parent disagreements in reports of parenting behavior are commonplace, and that these discrepant perceptions are related to youth maladjustment and family dysfunction (Hou et al., 2020; Korelitz & Garber, 2016; Van Petegem et al., 2020). Hence, this study aimed to examine whether and how adolescents' and mothers' (dis)agreements in reports of helicopter parenting be associated with youth-mother relationship quality, over and above their individual perceptions. Moreover, helicopter parenting has

been conceptualized as a multidimensional construct (Leung & Shek, 2017; Segrin et al., 2012; Zong & Hawk, 2022) with varying degrees of intrusiveness and supportiveness across dimensions. The current study therefore investigated the specific patterns of associations across several helicopter parenting dimensions.

Notably, existing research has mainly examined the associations between helicopter parenting and relationship quality at the between-family level (Zong & Hawk, 2022), or has conflated between- and within-family associations (Leung, 2021). For instance, adolescents who reported more helicopter parenting than their peers also reported more perceived emotional support than peers (Zong & Hawk, 2022). However, parenting processes occur *within* each family, and adolescents' and mothers' unique perceptions of parenting change over time (Boele et al., 2023). These changes in individual perception, as well as changes in youth-mother (dis)agreements, may be associated with fluctuations in relationship quality. For instance, when an adolescent and his/her mother agree that mothers' helicopter parenting is higher than usual, they might also perceive more conflict and more support than usual. When dyads disagree more than usual on the extent of mothers' helicopter parenting, they might also perceive more conflict and lower support than usual. This study employed a within-family design to better describe these dynamics, using longitudinal data from youth-mother dyads who reported on helicopter parenting and relationship quality (e.g., conflict and support) on a monthly basis.

### Links between Relationship Quality and Reporter Discrepancies in Helicopter Parenting

Previous meta-analyses (Hou et al., 2020; Korelitz & Garber, 2016) have shown small-to-moderate cross-informant correlations between parents' and adolescents' reports of constructs such as parental warmth and psychological control, suggesting that adolescents and parents often have distinct perceptions of parental behaviors. Rather than merely representing reporter bias or measurement errors, these youth-parent discrepancies provide valuable information about youth development and family functioning (De Los Reyes & Ohannessian, 2016). On the one hand, adolescent-parent discrepancies can signal normative developmental processes (De Los Reyes & Ohannessian, 2016), as adolescents' developing cognitive abilities (e.g., critical thinking and perspective-taking) and increasing autonomy needs predispose them to adopt different views from their parents. On the other hand, these discrepancies can reflect poorer family adjustment (De Los Reyes & Ohannessian, 2016) such as the insufficient communication between parents and adolescents that can spark family conflicts. Regardless of the underlying reasons, youth-parent discrepancies might be

positively associated with youth and family adjustment difficulties. For instance, one recent study showed that adolescents whose perceptions of parental emotion socialization were discrepant from parents' tend to report more internalizing and externalizing problems than adolescents with similar perceptions (Fan et al., 2023).

Youth-mother discrepancies in reports of helicopter parenting, regardless of the direction, may be associated with poorer relationship quality. Prior European research found that when adolescent-reported scores of maternal overprotection were higher than their mothers' scores, youth also reported more adjustment difficulties and psychological need frustration (Van Petegem et al., 2020). Particularly in Chinese families, it might be additionally detrimental when mothers' perceptions exceed adolescents' perceptions. Chinese mothers, on average, have reported higher levels of helicopter parenting than their children in prior research (Zong & Hawk, 2022). This pattern is common for a range of positive parenting practices, such as parental warmth and autonomy support (for reviews see, Hou et al., 2020; Korelitz & Garber, 2016). Previous research has found that when parents' reports on supportive behaviors are higher than adolescents' reports, adolescents tend to show poorer adjustment (Fan et al., 2023; Janssen et al. 2021). Thus, mothers' perceptions of greater helicopter parenting, relative to adolescents', may be associated with poorer youth-mother relationships. Furthermore, relationship quality necessitates active participation from both adolescents and parents, which differs from previous research on adjustment outcomes emphasizing adolescents' own feelings and reactions (Janssen et al., 2021; Van Petegem et al., 2020). Greater discrepancies between adolescents' and parents' reports likely represent misaligned perceptions that may be correlated with poorer relationship quality in Chinese families.

Previous research has suggested that youth-parent discrepancies in Western families may decrease during late adolescence (De Los Reyes & Ohannessian, 2016; Hou et al., 2020) due to the stabilization of adolescents' autonomy needs (De Los Reyes & Ohannessian, 2016) and the establishment of a more egalitarian parent-child relationship (Branje, 2018). Chinese adolescents' autonomy expectations develop later than Euro-American youth (Feldman & Rosenthal, 1990). After a long period of compulsory education and competitive college entrance exams, entering university may be a turning point for Chinese youth to gain more independence. Driven by a strict "success frame" (Ng & Wang, 2019), Chinese parents may continue their intensive engagement to assure their children's success and to maintain family reputation. Thus, entry to college may be an important period when Chinese youth and parents hold increasingly discrepant perceptions of parental involvement.

## Dimensions of Helicopter Parenting and Their Associations with Relationship Quality

Several prior studies have identified multiple dimensions of Chinese helicopter parenting, consistently emphasizing a strong focus on youth academic outcomes as a potentially culture-specific aspect of Chinese parents' overinvolvement (Leung & Shek, 2017; Zong & Hawk, 2022). For example, Zong & Hawk, (2022) noted four distinct features of Chinese helicopter parenting, drawing upon both mothers' and adolescents' reports. Specifically, *Advice/Affect Management* refers to providing practical guidance and assistance in emotion regulation, to help youth accomplish tasks and maintain a positive mood. *Anticipatory Problem Solving* reflects removing obstacles before youth encounter them. *Information Seeking* reflects demands for personal information, and *Emphasis on Academic Performance* refers to attending to youth's school success. This study also indicated that various dimensions may have different levels of intrusiveness and supportiveness. Specifically, this research has found that Information Seeking is positively correlated with behavioral control but not associated with emotional support, suggesting this dimension might be relatively intrusive. In contrast, Advice/Affect Management is not associated with behavioral control but is positively correlated with emotional support, suggesting this dimension might be relatively supportive.

Associations between youth-mother agreements on each helicopter parenting dimension and relationship quality may vary, depending on whether a dimension is relatively intrusive or relatively supportive. Specifically, the Operation Triad Model (De Los Reyes & Ohannessian, 2016) posits that higher levels of youth-parent agreements on protective or risk factors are related to better or worse youth adjustment, respectively. Through the lens of this model, it is possible that higher levels of reporter agreement on a relatively intrusive dimension (e.g., Information Seeking) may predict more conflict and less support. In contrast, higher levels of agreement on a relatively supportive dimension (e.g., Advice/Affect Management) may predict less conflict and more support. Different from reporter agreements, greater disagreements between parents' and adolescents' reports of various helicopter parenting dimensions may consistently be associated with more conflict and less support, as these discrepancies inherently demonstrate poor communication and/or expectancy misalignments in families (De Los Reyes & Ohannessian, 2016; Eccles et al., 1993). Exploring these patterns of association across various dimensions provides a better understanding of the characteristics of these helicopter parenting dimensions.

## Current Study

Chinese helicopter parenting and adolescent-parent relationship quality might be positively associated with both problematic and beneficial family processes (i.e., conflict and support). Studies have not examined these potential culture-specific, mixed associations. By considering both youth and parent perspectives, the present study can move beyond prior research based on single-informant reports to examine (dis)agreements between different relationship partners, and whether these (dis)agreements are associated with relationship quality beyond individual viewpoints. First, this study provides information on whether respondents' perceptions of conflict and/or support are higher than usual when the dyad agrees that maternal helicopter parenting is higher than usual. It was expected that, on average, when adolescents and mothers agreed that mothers' helicopter parenting was higher than usual, they would report both more conflict (Hypothesis 1a) and more support (Hypothesis 1b) than usual. Second, because the extent of youth-mother reporter discrepancies might fluctuate, with disagreement being greater at some time points than at others, this study allows for investigation of whether greater-than-usual levels of disagreement are associated with greater perceptions of conflict and lower perceptions of support than is typical for the dyad. Based on prior work, greater disagreements than usual in adolescents' and mothers' reports of helicopter parenting (i.e., adolescents reporting more helicopter parenting than mothers, or vice-versa) were expected to be related to more conflict (Hypothesis 2a) and less support (Hypothesis 2b) than usual. Moreover, the various dimensions of helicopter parenting identified in several prior studies might vary in their relative intrusiveness and supportiveness. Thus, patterns of (dis)agreement for each dimension (i.e., Advice/Affect Management, Anticipated Problem Solving, Information Seeking, and Emphasis on Academic Performance) may, to some extent, differ from the results found when using an overall score of helicopter parenting (Research Question 1). Considering the small number of studies on which to base such hypotheses, no specific predictions were made regarding these differentiated patterns.

## Methods

### Participants and Procedure

The current research utilized data from the “Competitive Advantages in a Threatening World” project, a larger longitudinal study of first-year college students' and mothers' wellness conducted at a major university in Hong Kong. At the first measurement, 354 dyads volunteered and

**Table 1** Sample demographics

Variables	N	
Adolescents		
Gender, % Female, (n)	349	39.8 (139)
Age (years), <i>M</i> ( <i>SD</i> ) <sup>a</sup>	349	18.2 (1.10)
Major, % (n)	349	
Arts		16.9 (59)
Business		12.6 (44)
Engineering		9.7 (34)
Medicine		20.6 (72)
Science		11.5 (40)
Social Science		16.0 (56)
Others		12.6 (44)
Mothers		
Age (years), <i>M</i> ( <i>SD</i> ) <sup>a</sup>	349	49.10 (4.82)
Highest level of education, % (n)	349	
Primary school or below		12.3 (43)
Secondary school (high school)		61.6 (215)
High-diploma or associated degree		14.3 (50)
Bachelor		7.7 (27)
Master		4.0 (14)
Employment status	349	
Full-time		49.9 (174)
Part-time		12.9 (45)
Unemployed		4.9 (17)
Housemaker		32.4 (113)
Family Monthly Income	349	
~< \$1900 USD		23.2 (81)
~\$1900 to \$3200 USD		28.9 (101)
~\$3201 to \$5700 USD		23.8 (83)
~\$5700 USD		24.2 (84)

<sup>a</sup>Age at the first data collection

provided informed consent. Over the project, four dyads and one mother formally withdrew, resulting in a final sample of 349 students (39.8% male,  $M_{T1age} = 18.20$ ,  $SD = 1.10$ ) and their mothers ( $M_{T1age} = 49.10$ ,  $SD = 4.82$ ). Students came from diverse academic majors. The sample held a relatively low level of household monthly income, with 52.1% earning less than HK\$25,000 (US\$3,186). Sample demographics are presented in Table 1.

Prior to the first measurement, research assistants contacted prospective participants through orientation activities, college social media, and university mass mail. Data were collected from September 2020 to April 2021 through four online surveys, administered at the beginning and the end of each semester. All respondents received HK\$50 for participation at each measurement and a HK\$100 bonus at project completion. The survey completion rate was high, with 96.27% of adolescent reports and 96.63% of mother

reports completed across four measurements. Results of Missing Completely at Random test (Little, 1988) yielded a normed  $\chi^2$ s ( $\chi^2/df$ ) of 1.20 for students and 1.27 for mothers, suggesting that data were missing at random.

## Measures

Bilingual speakers conducted translation and back translation of scales for which no Chinese version existed previously. All items are provided in Appendix 1 of the supplemental materials.

### Helicopter Parenting

Participants reported on maternal helicopter parenting using four subscales of the Chinese Helicopter Parenting Scale (Zong & Hawk, 2022). Each subscale consisted of three to five items, with 16 items in total. The subscales assessed Advice/Affect Management (e.g., “I say or do things to cheer my child up” for mothers), Anticipatory Problem Solving (e.g., “My mother tries to solve problems for me before I even experience them” for adolescents), Information Seeking (e.g., “I like to know the details of my child’s daily schedule” for mothers), and Emphasis on Academic Performance (e.g., “My mother pays great attention to my examinations” for adolescents). Items were rated on a 6-point Likert-type scale, ranging from 1 (*Strongly disagree*) to 6 (*Strongly agree*). Higher scores indicated higher perceptions of maternal helicopter parenting. Multi-informant validity has been previously demonstrated in Chinese adolescent-mother dyads (Zong & Hawk, 2022). Reliability was estimated separately at the within-person and between-person levels via a multilevel extension of McDonald’s  $\omega$  (Geldhof et al., 2014). Internal consistencies were satisfactory for the total score of helicopter parenting ( $\omega_{\text{Between}} = 0.74/\omega_{\text{Within}} = 0.91$  for adolescent report,  $\omega_{\text{Between}} = 0.83/\omega_{\text{Within}} = 0.91$  for mother report) and each subscale ( $0.89 \leq \omega_{\text{Between}} \leq 0.99$  /  $0.69 \leq \omega_{\text{Within}} \leq 0.82$  for adolescent report,  $0.93 \leq \omega_{\text{Between}} \leq 0.97$  /  $0.67 \leq \omega_{\text{Within}} \leq 0.81$  for mother report).

### Relationship Quality

Dyad members completed items from the Network of Relationship Inventory (Furman & Buhrmester, 1985, 1992), assessing conflict (4 items; e.g., “How much do you and your mother argue with each other?”) and support (4 items; e.g., “How much does your child/mother treat you like you’re admired and respected?”). Answers were on a 5-point Likert-type scale ranging from 1 (*Not at all*) to 5 (*The most*). Higher scores reflected more conflict and support. Internal consistencies were satisfactory,  $\omega_{\text{Between}} = 0.96/\omega_{\text{Within}} = 0.75$  for adolescent-reported

conflict,  $\omega_{\text{Between}} = 0.60/\omega_{\text{Within}} = 0.92$  for mother-reported conflict,  $\omega_{\text{Between}} = 0.89/\omega_{\text{Within}} = 0.61$  for adolescent-reported support, and  $\omega_{\text{Between}} = 0.74/\omega_{\text{Within}} = 0.96$  for mother-reported support.

## Plan of Analysis

Multilevel polynomial regression and Response Surface Analysis (RSA; Nestler et al., 2019) were applied to examine associations between (dis)agreements on mother- and adolescent-reported helicopter parenting and relationship quality. Data were analyzed using the lme4-package (Bates et al., 2014) and RSA-package (Schönbrodt & Humberg, 2021) in R 4.1.2 (R Development Core Team, 2021), in accordance with the steps outlined by Nestler et al., (2019). A total of 20 models were analyzed, with separate models for each subscale and total score of helicopter parenting, as well as adolescents’ and mothers’ individual reports of conflict and support. First, in line with the steps proposed by Nestler et al., (2019), adolescents’ and mothers’ reports of helicopter parenting were each centered on their grand mean, meaning that the two predictors had the same scale midpoint to allow accurate interpretation (Edwards, 2002). Next, the centered predictors were squared (adolescent report<sup>2</sup> and mother report<sup>2</sup>) and their multiplicative interactions were computed (adolescent  $\times$  mother report). Then, multilevel polynomial regression models were specified by regressing the outcome variables onto the main effects of adolescent-reported and mother-reported helicopter parenting, their squared terms, and their interaction term. Considering that the number of observations ( $n = 1315$ ) was lower than the number of full random effects ( $n = 2094$ ), covariance parameters involving higher-order terms (i.e., adolescent report<sup>2</sup>, mother report<sup>2</sup>, and adolescent  $\times$  mother report) were removed, as suggested by Nestler et al., (2019) and Bates et al., (2015).

Regression coefficients of these models were then used to generate the Response Surface Analysis (RSA) parameters, their standard errors, and the variance of the RSA parameters across adolescent-mother dyads, and to generate the average surface plot representing the three-dimensional relations between two predictors (e.g., helicopter parenting reports) and the outcome variables (e.g., adolescent-reported conflict) using the RSA package (Nestler et al., 2019). The graphical plot represents effects for the average dyads, including the line of congruence (LOC; where the values of the two predictors perfectly match) and the line of incongruence (LOIC; where the values of one predictor are the opposite of the other predictor). Finally, four response surface parameters ( $a^1$ – $a^4$ ) were calculated based on the results of multilevel polynomial regression. Specifically, the first two coefficients evaluate whether the slope of the LOC is linear ( $a^1$ ), which would indicate a linear additive

relationship between the two predictors and the outcome, or curvilinear ( $a^2$ ). The other two coefficients evaluate whether the slope of the LOIC is linear ( $a^3$ ), which would indicate that there is a discrepancy effect on the outcome in one specific direction, or curvilinear ( $a^4$ ), which would indicate that there is a discrepancy effect on the outcome, regardless of the direction.

## Results

### Descriptive Statistics

Table 2 provides descriptive statistics, intra-class correlations, and between-/within-family bivariate correlations of study variables. At the between level, correlations for each study variable (e.g., adolescent and mother reports of conflict) were all significant, ranging from  $r = 0.29$  to  $0.48$  ( $ps < 0.001$ ). Adolescent-reported helicopter parenting was positively correlated with adolescent- and mother-reported support ( $ps \leq 0.001$ ), but not correlated with conflict ( $ps \geq 0.445$ ). In contrast, mother-reported helicopter parenting was positively correlated with adolescent- and mother-reported conflict ( $ps \leq 0.001$ ), but not correlated with support ( $ps \geq 0.362$ ). At the within level, correlations for each study variable (e.g., deviation from the person-mean of adolescent and mother reports of helicopter parenting) were all significant, ranging from  $r = 0.07$  to  $0.19$  ( $ps \leq 0.008$ ). Adolescent- and mother-reported helicopter parenting was positively correlated with their own reports of conflict and support ( $ps < 0.001$ ), as well as their counterparts' reports of conflict ( $ps \leq 0.014$ ), but not counterparts' reports of support ( $ps \geq 0.096$ ).

Results of paired  $t$ -tests suggested that mothers reported significantly higher person-mean levels than adolescents for Advice/Affect Management, Anticipatory Problem Solving, and Emphasis on Academic Performance ( $ps \leq 0.024$ ), as well as significantly lower levels of Information Seeking, conflict, and support ( $ps \leq 0.009$ ). There was no significant difference between mothers' and adolescents' overall reports of helicopter parenting ( $p = 0.283$ ). To describe the occurrence of these discrepant reports between adolescents and mothers of helicopter parenting across different time points, adolescents' and mothers' reports of helicopter parenting were compared per time point and an aggregated mean difference score was calculated per dyad. A difference of more than half a standard deviation between reports was used as a cut-off (Shanock et al., 2010). As shown in Table S1, substantial between-dyad variation existed. Adolescents indeed reported more helicopter parenting in some dyads (28.1%), while in other dyads adolescent-mother reports were relatively similar (44.1%) or adolescents reported less helicopter parenting (27.8%) than their mothers. There was

also within-dyad variation representing fluctuations across time points. That is, even though a youth-mother dyad may have relatively similar scores averaged across four time points, there are also time points on which they differed more substantially.

### Main Analyses

Multilevel polynomial regression and RSA were used to examine Hypotheses 1a, b and Hypotheses 2a, b, examining the within-family associations between adolescents' and mothers' (dis)agreements in reports of helicopter parenting and youth-mother relationship quality. Multilevel models including adolescents' reports, mothers' reports, and the squared and interaction term between adolescents' and mothers' reports were specified. Unstandardized regression coefficients of these multilevel polynomial regression models were used to calculate the RSA parameters, and these parameters were subsequently used to generate response surface plots to graphically depict the results for interpretation. In the current study, the linear ( $a^1$ ) and curvilinear ( $a^2$ ) coefficient of LOC ( $x = y$ ) represented within-family associations between youth-mother agreements in reports of helicopter parenting and relationship quality, and the linear ( $a^3$ ) and curvilinear ( $a^4$ ) coefficient of LOC ( $x = -y$ ) represented within-family associations between youth-mother disagreements in reports of helicopter parenting and their relationship quality.

### Agreements/Discrepancies on Helicopter Parenting Total Scores and Relationship Quality

Results of the multilevel polynomial regression analyses and response surface parameters are presented in Table 3. The results supported Hypothesis 1a and Hypothesis 1b. Regarding *conflict* (see Fig. 1A, B), slope coefficients related to LOC were significant, indicating that adolescents and mothers reported higher levels of conflict than usual when they agreed that maternal helicopter parenting was higher than usual. Regarding *support* (see Fig. 1C, D), slope coefficients related to LOC were also significant, indicating that adolescents and mothers reported higher levels of support than usual when they agreed that levels of helicopter parenting were higher than usual.

For youth-mother disagreements on helicopter parenting, as expected (Hypothesis 2a), there was a significant curvilinear coefficient of LOIC for adolescent-reported *conflict* (see Fig. 1A). This suggested that adolescents reported more conflict than usual when youth-mother dyads had greater discrepancies than usual in reports of helicopter parenting, regardless of the directions of discrepancies. There was a significant slope coefficient of LOIC for adolescent-reported *support* (see Fig. 1C), suggesting that adolescents

**Table 2** Descriptive analysis of study variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. HP (A)	–	0.78***	0.78***	0.68***	0.66***	0.04	0.39***	0.29***	0.29***	0.26***	0.21***	0.15**	0.00	0.18**
2. AA (A)	0.71***	–	0.56***	0.33***	0.31***	–0.20	0.60***	0.14**	0.33***	0.12*	0.04	–0.05	–0.15**	0.32***
3. AP (A)	0.72***	0.38***	–	0.25***	0.42***	0.03	0.18**	0.26***	0.22***	0.36***	0.12*	0.11*	0.03	0.06
4. IS (A)	0.61***	0.25***	0.20***	–	0.30***	0.11*	0.21***	0.20**	0.14**	0.09	0.30***	0.07	0.04	0.07
5. EA (A)	0.53***	0.13***	0.24***	0.15***	–	0.22***	0.08	0.25***	0.13*	0.17**	0.13*	0.37***	0.10	0.05
6. Conflict (A)	0.18***	0.07*	0.07**	0.12***	0.25***	–	–0.36***	0.15*	–0.01	0.12*	0.12*	0.18*	0.48***	–0.25***
7. Support (A)	0.21***	0.24***	0.13***	0.10***	0.06*	0.05	–	–0.03	0.14**	–0.07	–0.04	–0.13*	–0.26***	0.43***
8. HP (M)	0.13***	0.14***	0.00	0.09**	0.11***	0.10***	0.05	–	0.69***	0.81***	0.77***	0.72**	0.18**	0.05
9. AA (M)	0.10***	0.11***	0.00	0.08**	0.08**	0.13***	0.07**	0.76***	–	0.60***	0.46***	0.40***	0.00	0.23***
10. AP (M)	0.11***	0.09**	0.07**	0.06*	0.05	0.01	–0.01	0.69***	0.38***	–	0.44***	0.45***	0.21***	–0.05
11. IS (M)	0.09**	0.13***	–0.03	0.10***	0.03	0.07*	0.01	0.74***	0.39***	0.29***	–	0.43***	0.17**	0.05
12. EA (M)	0.07**	0.06*	–0.04	0.00	0.18***	0.09**	0.06*	0.64***	0.31***	0.29***	0.35***	–	0.18**	–0.08
13. Conflict (M)	0.07*	0.04	–0.03	0.12***	0.06*	0.19***	0.02	0.10***	0.06*	0.01	0.10***	0.12***	–	–0.35***
14. Support (M)	0.01	0.02	–0.02	0.00	0.03	0.05	0.11***	0.12***	0.11***	0.08**	0.04	0.12***	0.03	–
M (SD)	3.47 (0.53)	3.79 (0.69)	3.15 (0.85)	3.81 (0.92)	2.66 (0.88)	2.51 (0.62)	3.59 (0.62)	3.42 (0.59)	3.90 (0.59)	3.27 (0.70)	3.49 (0.78)	2.99 (0.88)	2.14 (0.50)	3.40 (0.54)
ICC	0.680	0.606	0.603	0.689	0.608	0.626	0.673	0.609	0.466	0.563	0.571	0.656	0.582	0.622

Between-level correlations were presented above the diagonal, within-level correlations were presented below the diagonal. HP helicopter parenting, AA advice/affect management, AP anticipatory problem-solving, IS information seeking, EA emphasis on academic performance. A adolescent, M mother. ICC intra-class correlation

The means represent the average scores across all assessments per individual

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

**Table 3** Results of multilevel polynomial regression analyses and response surface parameters

Conflict	Helicopter Parenting		Advice/Affect Management		Anticipatory Problem Solving		Information Seeking		Emphasis on Academic Performance	
	A	M	A	M	A	M	A	M	A	M
Regression coefficient										
$b^1$ - A report	0.145***	0.030	-0.009	0.007	0.053*	-0.001	0.073***	0.045*	0.142***	0.026
$b^2$ - M report	0.097***	0.099**	0.088**	0.007	-0.006	0.024	0.045	0.043	0.035	0.084***
$b^3$ - A report <sup>2</sup>	0.077**	0.052*	0.009	0.044**	0.023	0.017	0.016	0.009	0.031	0.004
$b^4$ - A*M report	-0.099*	-0.028	-0.065*	-0.040	-0.063**	-0.043*	-0.024	0.031	-0.032	0.007
$b^5$ - M report <sup>2</sup>	0.083*	-0.017	0.053*	-0.012	0.037*	0.026	0.025	-0.025	0.014	-0.036*
RSA parameters										
$a^1$ - slope (LOC)	0.242***	0.130**	0.079*	0.014	0.047	0.023	0.118***	0.088**	0.177***	0.110***
$a^2$ - curvature (LOC)	0.061	0.008	-0.003	-0.008	-0.003	-0.001	0.016	0.015	0.013	-0.025
$a^3$ - slope (LOIC)	0.048	-0.069	-0.097*	<-0.001	0.058	-0.025	0.029	0.001	0.107***	-0.058
$a^4$ - curvature (LOIC)	0.258***	0.063	0.127*	0.072	0.122***	0.086*	0.065	-0.048	0.076*	-0.039
Support										
Regression coefficient										
$b^1$ - A report	0.269***	0.037	0.277***	0.055*	0.098***	-0.004	0.095	0.007	0.026	0.005
$b^2$ - M report	-0.018	0.107***	0.029	0.115***	-0.027	0.030	-0.001	0.038	0.024	0.042
$b^3$ - A report <sup>2</sup>	-0.013	-0.026	-0.008	-0.009	0.017	-0.020	0.015	0.007	0.001	-0.013
$b^4$ - A*M report	0.056	-0.007	-0.007	-0.018	0.005	0.008	-0.009	-0.016	0.038*	0.021
$b^5$ - M report <sup>2</sup>	-0.036	-0.006	-0.026	-0.011	-0.012	0.011	0.015	0.024	-0.030*	0.012
RSA parameters										
$a^1$ - slope (LOC)	0.251***	0.145***	0.306***	0.170*	0.071*	0.026	0.095**	0.044	0.050*	0.047
$a^2$ - curvature (LOC)	0.006	-0.039	-0.041	-0.037	0.010	-0.001	0.021	0.015	0.010	0.020
$a^3$ - slope (LOIC)	0.288***	-0.070	0.247***	-0.060	0.125***	-0.035	0.096**	-0.031	0.002	-0.036
$a^4$ - curvature (LOIC)	-0.105	-0.024	-0.027	-0.002	<0.001	-0.017	0.040	0.047	-0.067*	-0.022

Non-standardized coefficients are presented. A adolescent, M mother. LOC:  $x = y$ ; LOIC:  $x = -y$

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

reported more support when their reports of helicopter parenting exceeded their mothers', rejecting Hypothesis 2b.

## Patterns for Each Helicopter Parenting Subscale

### Youth-mother agreements

To further explore associations between helicopter parenting and relationship quality, all analyses were repeated using each helicopter parenting dimension, separately (see Table 3 and Fig. S1–S4). In line with the results for *conflict* when using the total score of helicopter parenting, agreements on higher levels of Information Seeking and Emphasis on Academic Performance were related to higher levels of both adolescent- and mother-reported conflict at the within-family level. Somewhat differently, youth-mother agreement on higher levels of Advice/Affect Management was only related to adolescents' (but not mothers') reports of greater conflict. No significant associations were found for Anticipatory Problem Solving. Consistent with

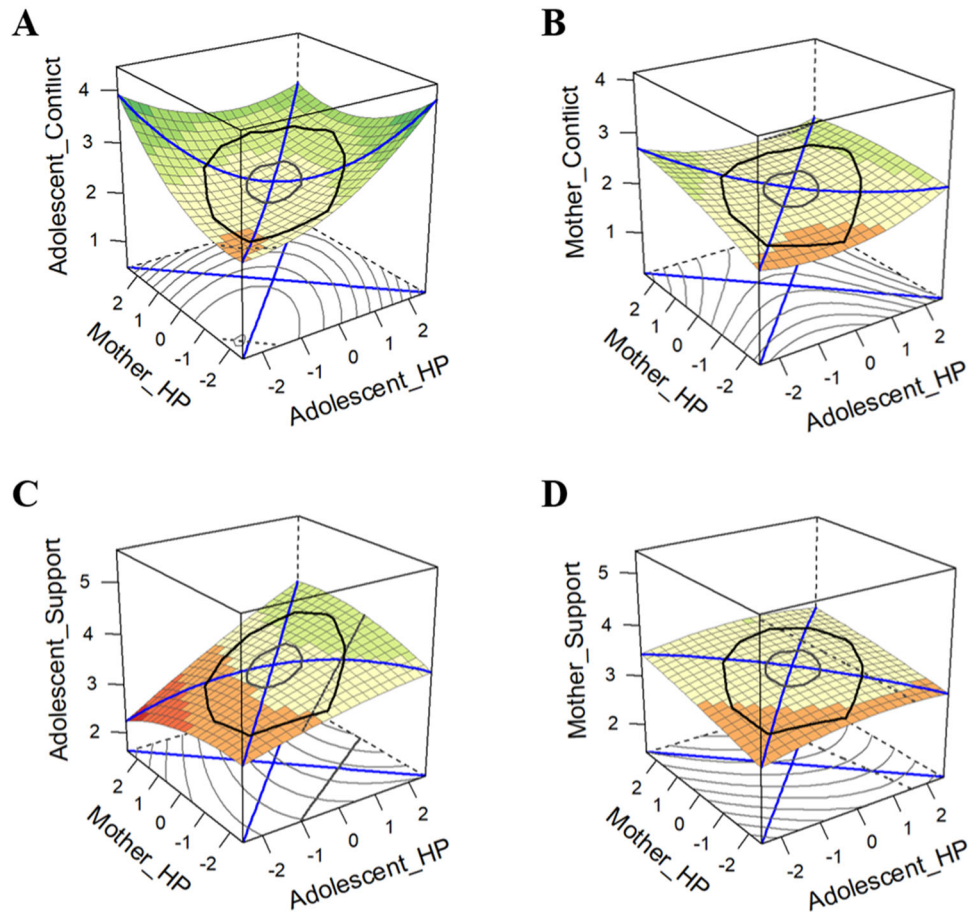
the results for *support* when using the total score of helicopter parenting, agreement on higher levels of Advice/Affect Management was associated with higher levels of both adolescent- and mother-reported support. Somewhat differently, youth-mother agreements on higher levels of Anticipatory Problem Solving, Information Seeking, and Emphasis on Academic Performance were only related to adolescents' (but not mothers') reports of greater support. Thus, particularly for adolescent reports of conflict and support, the evidence for "mixed associations" with helicopter parenting extended to youth-mother agreements on multiple dimensions (i.e., Advice/Affect Management, Information-Seeking, and Emphasis on Academic Performance).

### Youth-mother discrepancies

Regarding *conflict*, the pattern for Anticipatory Problem Solving converged with the overall findings using the total score of helicopter parenting. Specifically, the significant



**Fig. 1** Response surface plots illustrating the association between adolescents' and mothers' reports of helicopter parenting and relationship quality (conflict: (A, B); support (C, D))



curvilinear coefficients of LOIC showed that both mothers and youth reported more conflict than usual when they had greater disagreements than usual in their reports of Anticipatory Problem Solving (see Fig. S2A, B). Inconsistent with the overall pattern when using the total score, adolescent-mother discrepancies in reports of Advice/Affect Management and Emphasis on Academic Performance had significant slope and curvilinear coefficients of LOIC for adolescent-reported conflict. The slope coefficients were negative for Advice/Affect Management and positive for Emphasis on Academic Performance, indicating that adolescents perceived more conflict than usual when they reported less Advice/Affect Management (see Fig. S1A) than their mothers, as well as when they reported more Emphasis on Academic Performance (see Fig. S4A) than their mothers.

In line with the results based on the total score, a significant slope of LOIC (Figs. S1C, S2C, and S3C) showed that adolescents reported more *support* when their scores of Advice/Affect Management, Anticipatory Problem Solving, and Information Seeking were higher than mothers'. Notably, a significant negative curvilinear coefficient of LOIC (Fig. S4C) showed that youth reported less support than usual when adolescents and mothers disagreed more than

usual on the extent of Emphasis on Academic Performance, regardless of whether adolescents' scores were higher than mothers' or vice-versa.

## Discussion

The cultural normativeness theory posits that when specific parental behaviors align with prevailing norms in a particular culture, such practices can be more adaptive (or less detrimental) than in other cultures (Deater-Deckard & Dodge, 1997). Even though many previous studies have emphasized potential negative outcomes of helicopter parenting (e.g., Odenweller et al., 2014; Padilla-Walker & Nelson, 2012), these behaviors may hold mixed associations with relationship quality in China, where heavy parental engagement and sacrifice are considered more normative (Chan et al., 2009; Stewart & Bond, 2002). In addition, the majority of studies on helicopter parenting have relied on adolescents' reports, without accounting for parental perspectives or the overlap and divergence between youth-parent perceptions. It remains unclear whether and how these agreements and/or discrepancies explain variance in youth-parent relationship outcomes, over and above

individual perceptions. Further, existing multi-informant studies on helicopter parenting and related constructs have primarily relied on cross-sectional designs (Van Petegem et al., 2020; Zong & Hawk, 2022), while parenting behaviors and relationship quality are dynamic processes that can change within families over time. Accordingly, the present multi-informant, longitudinal study investigated Hong Kong adolescents' and mothers' (dis)agreements in reports of helicopter parenting and their within-family associations with relationship quality. Finally, the current study explored whether the patterns for several distinct helicopter parenting dimensions aligned with the findings obtained when using the overall score.

The results showed that, beyond adolescents' and mothers' own perceptions of helicopter parenting, overlaps and differences between their perceptions were of importance for their relationship quality. As in other studies, the results showed that adolescents' and mothers' helicopter parenting reports were typically more strongly related to their own perceived conflict and support perceptions than those of their dyad partner (Janssen et al., 2021; Van Petegem et al., 2020). Beyond these individual perceptions, mothers' and adolescents' *agreements* on overall helicopter parenting were positively associated with mother- and adolescent-reported conflict and support at the within-family level. Adolescent-mother *disagreements* in reports of helicopter parenting were positively associated with adolescent-reported conflict, regardless of the direction of differences. Finally, distinct patterns existed across different helicopter parenting dimensions, indicating the need to consider the multifaceted nature of this construct.

### Associations between Agreements on Helicopter Parenting and Relationship Quality

Previous research with both American and Hong Kong participants has consistently shown that helicopter parenting is associated with adolescent-parent conflict (Kelly et al., 2017; Leung, 2021). Helicopter parenting can also be an expression of parental concern in Chinese families and be positively correlated with perceptions of supportive youth-parent relationships. The present study found that, across the first collegiate year, adolescent-mother agreement on higher-than-usual levels of helicopter parenting were correlated with more adolescent- and mother-reported conflict (Hypothesis 1a) and support (Hypothesis 1b) than usual. In line with previous research, mothers' perceptions of helicopter parenting were only associated with adolescent-reported relationship quality when combined with adolescents' perceptions (Janssen et al., 2021). In the case of *conflict*, results are in line with previous research on Belgian families showing that adolescent-mother agreements regarding overprotection were positively linked to

adolescents' psychological need frustration (Van Petegem et al., 2020). In the case of *support*, the pattern of results is consistent with prior results on associations between parental warmth and adolescents' daily positive affect (Janssen et al., 2021), indicating that youth-parent agreements on beneficial parental practices are positively related to healthy family functioning and youth adjustment. Overall, the present results suggest that helicopter parenting can be a "double-edged sword" for relationship quality in Chinese families, as it might be both associated with more conflictual interactions and convey support and concern in a culturally appropriate manner.

### Associations between Discrepant Reports of Helicopter Parenting and Relationship Quality

Although the results showed no significant differences between mothers' and adolescents' overall reports of helicopter parenting, there was considerable between-dyad variation. That is, some adolescents (28.1%) reported more helicopter parenting than their mothers, while other adolescents (27.8%) reported less helicopter parenting than their mothers. In line with previous research indicating that dyads differ in the specific patterns of divergence at a micro-level (i.e., days; Janssen et al., 2021), the current study suggests that this is also the case in a relatively macro-level sense (i.e., months). There was also substantial within-dyad variation, indicating that an adolescent may have had relatively similar perceptions to his/her mother at one time point, but at other point, their perspectives may have diverged.

Consistent with Hypothesis 2a, greater adolescent-mother disagreements than usual in their reports of helicopter parenting were related to more adolescent-reported *conflict* than usual, regardless of the direction of incongruence. These findings are somewhat inconsistent with previous findings that adolescents who reported higher levels of maternal overprotection than their mothers, and not vice versa, also tended to report greater adjustment difficulties (Van Petegem et al., 2020). This difference across studies might arise because, unlike adolescents' adjustment problems that are primarily dependent on adolescents' own feelings and actions, youth-mother conflicts stem from the actions of both parties. Moreover, the scale utilized in this study primarily assessed perceptions of whether specific helicopter parenting behaviors occurred, without considering participants' subjective feelings or interpretations of whether mothers were excessively involved (cf. Van Petegem et al., 2020). Hence, the current study mainly suggested that discrepancies between family members' perceptions regarding the occurrence of parental involvement in China may be associated with increased conflict. Contrary to Hypothesis 2b, discrepancies in

reported helicopter parenting did not negatively correlate with perceived support. The curvilinear coefficients of the LOIC were negative but did not reach statistical significance, suggesting that dyads did not report less support when they held discrepant perceptions.

In contrast to previous studies that only examined adolescent-reported outcomes (Janssen et al., 2021; Van Petegem et al., 2020), the present study collected both adolescent and mother reports, as relationship quality naturally involves the viewpoints of multiple partners. Adolescent-mother disagreements on helicopter parenting were consistently associated with adolescent-reported outcomes, but only sometimes linked with mother-reported outcomes. These differences might derive from the hierarchical structure in Chinese families, in which adolescents occupy a lower status relative to their parents. As the recipients of unequal relationships, adolescents may be more attuned to, and reactive toward, conflictual interactions than are parents. Indeed, consistent with previous research (Mastrotheodoros et al., 2020), adolescents reported more conflict than mothers, overall. Adolescents also perceived higher levels of relationship support than their mothers did, perhaps reflecting that youth are typically the focus of support in Chinese families. This may be due, in part, to the cultural emphasis on maternal sacrifices in terms of financial, time, and energy investments (Leung, 2017).

### Distinct Patterns across Helicopter Parenting Dimensions

The current study also explored associations between distinct facets of helicopter parenting and youth-mother relationship quality. Results across these different dimensions partially aligned with the findings when using overall scores. In terms of *support*, the Advice/Affect Management subscale yielded the strongest similarities with the overall results. Specifically, mothers and adolescents both reported higher support than usual when they also agreed that mothers' Advice/Affect Management was higher than usual. Considering that youth-mother agreements on other dimensions were only positively correlated with youth-reported support, Advice/Affect Management might be a relatively beneficial dimension of Chinese helicopter parenting; both adolescents and mothers may recognize that it includes elements of support, though youth might still at times find such behavior to be overbearing. Inconsistent with the overall pattern, adolescents reported less *conflict* when they reported more Advice/Affect Management than mothers, further suggesting the relatively positive features of this dimension.

Results for the Anticipatory Problem Solving and Information Seeking subscales were consistent with the total helicopter parenting score results for support, but not for

conflict. The relationship between adolescent-mother (dis)agreement and *conflict* was quite different for Anticipatory Problem Solving, as compared to Information Seeking. Specifically, agreement regarding Anticipatory Problem Solving held no significant association with conflict, but disagreement was positively associated with conflict. In contrast, agreement regarding Information Seeking was positively related to conflict, but disagreement was not related to conflict. These differences might partly derive from the observability of these behaviors; it might be difficult to hold the same perceptions of anticipatory problem solving if parents are removing potential obstacles before their children notice. In contrast to Anticipatory Problem Solving, both mothers and adolescents are witnesses to mothers' information-seeking behaviors, allowing for greater accuracy in their perceptions. These results suggest that Anticipatory Problem Solving is a dimension of helicopter parenting with a particularly high likelihood for youth-mother discrepancies to occur, and that youth-mother conflict can arise when dyad members have different perceptions of these parental practices. In contrast, youth-mother agreement on higher levels of Information Seeking might reflect mothers' frequent intrusions into their children's personal lives, and thus potentially be linked to more conflict. The results supported the Operation Triad Model (De Los Reyes & Ohannessian, 2016), in that youth-mother agreements on higher levels of relatively intrusive dimensions (i.e., Information Seeking) might be a risk marker of maladaptive family functioning.

In contrast to the results using the overall scores of helicopter parenting, Emphasis on Academic Performance was the only dimension in which reporter disagreement was related to lower support. Adolescents might feel unsupported either when they perceive mothers as not sufficiently invested in their education or, conversely, when they experience excessive pressure from their mothers' focus on achievement. Chinese societies hold a belief that academic success reflects not only the child's ability but also the parents' efforts and dedication (Leung & Shek, 2017). Compared to other dimensions, differing views of Emphasis on Academic Performance might have relatively complex effects on Chinese adolescents' perceptions of both positive and negative aspects of family relationships. Overall, findings suggest that youth-mother disagreements across various helicopter parenting dimensions might be differently correlated with perceptions of relationship quality.

### Theoretical and Practical Implications

While the possibility of Chinese helicopter parenting holding positive links with both beneficial and problematic aspects of relationship quality has been reflected in the results of separate studies (Leung, 2021; Segrin et al., 2012; Zong & Hawk, 2022), these "mixed" associations have

rarely been explicitly examined within the same sample. This study provided preliminary evidence for the co-existence of positive and negative implications of helicopter parenting at the within-family level, suggesting that these practices might be somewhat more adaptive in the Chinese context. Results showed that adolescents reported more support than usual when adolescents and mothers agreed on higher-than-usual levels of helicopter parenting. Inconsistencies with the largely negative associations between overinvolved or overprotective parenting and youth adjustment in North American and Western European studies highlight the importance of considering cultural differences when discussing the implications of specific parenting behaviors. Overall, Chinese adolescents' and mothers' agreement and disagreement on helicopter parenting were positively associated with their conflictual interaction. Thus, efforts to mitigate youth-mother conflicts might focus on reducing over-involvement to meet adolescents' autonomy needs, particularly regarding relatively intrusive behaviors (i.e., Information Seeking). Additionally, it could be useful to promote communication between family members to align views of parental behavior, with a particular emphasis on dimensions where consensus might be more difficult to reach (i.e., Anticipatory Problem Solving).

In the current study, adolescents reported lower levels of support when they perceived less helicopter parenting, particularly with respect to Advice/Affect Management. Therefore, professionals should seek to strike a balance between reducing helicopter parenting behaviors and ensuring that parents continue to provide adequate support. Professionals should avoid encouraging reductions in these behaviors to a point that falls below youth's expectations or social norms, which may lead to other problematic impacts such as increased feelings of disconnection. The results further suggest that, even in late adolescence, youth-parent discrepancies in perceptions of family processes can be potential markers of risk that deserve attention from practitioners.

### Strengths, Limitations, and Future Directions

The current research holds several methodological strengths over previous studies. First, the longitudinal design allowed for an examination of associations between helicopter parenting and adolescent-parent relationship quality at the within-family level. Moreover, this study included both adolescents' and mothers' reports, enabling a novel exploration of agreements and disagreements about helicopter parenting and their links with both problematic (i.e., conflict) and beneficial (i.e., support) aspects of relationship quality. Furthermore, we considered multiple dimensions of helicopter parenting, contributing more details regarding the multifaceted nature of this construct and the extent to which

certain dimensions might be relatively adaptive or maladaptive in the adolescent-parent relationship.

This study also has limitations to address in future research. First, the number of observations collected across four waves were insufficient for fully random multilevel models, and may also not be sufficiently powered to provide replicable results for 20 different models. Although the 349 dyads and over 1300 observations should be sufficient for multilevel modeling (Nestler et al., 2019) and detecting small effect sizes in RSA (Barranti et al., 2017), further studies should consider recruiting a larger sample size and collecting data over more time points to ensure adequate statistical power when running numerous, fully random multilevel models. Moreover, because parenting is a dynamic concept that can change in a relatively short period (i.e., weekly, daily; Janssen et al., 2021), other approaches should be used to capture short-term fluctuations, such as daily diaries and experience sampling methods.

Based on prior studies and theoretical assumptions, we examined whether (dis)agreements in helicopter parenting predicted adolescent-parent relationship quality. It is also possible that these relationships are bi-directional. One approach to examining this issue would be to combine dynamic structural equation modeling with multilevel, multi-trait, multi-method confirmatory factor analysis (Xu & Zheng, 2022). Although this method has high demands for data collection, it would enable testing of the over-time reciprocity between parents' and adolescents' shared versus unique perceptions of helicopter parenting and relationship quality.

A final limitation involves the sole focus on maternal helicopter parenting, excluding adolescents' perceptions of paternal helicopter parenting and fathers' own reports. Recent multi-informant studies have found that the relationships between daily parenting (i.e., parental warmth and parental criticism) and adolescents' daily affect were different in adolescent-mother and adolescent-father dyads (Janssen et al., 2021). As adolescent-father discrepancies in this prior research only predicted maladjustment, while adolescent-mother discrepancies predicted both positive adjustment and maladjustment (Janssen et al., 2021), youth-father incongruence might consistently predict conflict across various helicopter parenting dimensions. It would be interesting for future research to include paternal perspectives to examine whether the associations are consistent or inconsistent in different youth-parent dyads.

### Conclusion

Helicopter parenting may be positively associated with both problematic (i.e., conflict) and beneficial (i.e., support) aspects of Chinese youth-mother relationship quality, as it represents both impediments to adolescents' developmental

needs and conformity to dominant cultural norms. Few studies have used the multi-informant, longitudinal design to examine this notion. In addition to adolescents' and mothers' own perceptions, the agreements and disagreements between their reports showed additional associations with youth-mother relationship quality. This study found that adolescent-mother agreements about helicopter parenting were positively associated with both perceived conflict and support at the within-family level. Moreover, adolescents' and parents' discrepant perceptions of helicopter parenting were also positively related to adolescent-reported conflict. By including both dyad members' perspectives on their relationship, the results allow for a deeper understanding of how both agreements and discrepancies between adolescents' and mothers' perceptions of helicopter parenting are related to perceptions of support and conflict over time. Further, exploration of patterns across several dimensions of helicopter parenting provides valuable insights into the multi-faceted nature of this construct.

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## Compliance with Ethical Standards

**Conflict of interest** The authors declare no competing interests.

**Ethical approval** Ethical approval for this study was obtained from the institutional review board of the corresponding author's university (SBRE-18-366).

**Informed consent** Written informed consent was obtained from both adolescents and their parents prior to the first assessment wave.

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