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Parent-Adolescent Discrepancies in Perceived Parental Sacrifice and Adolescent Developmental Outcomes in Poor Chinese Families

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Abstract

Parents and adolescents perceive family processes differently. The present study examined how convergence and divergence of parent-perceived and adolescent-perceived parental sacrifice influenced adolescent developmental outcomes in a sample of 275 poor intact Chinese families in Hong Kong. The results of polynomial regression analyses indicated that the interaction of fathers' and adolescents' perceptions of paternal sacrifice negatively predicted adolescent resilience and cognitive competence. Similar findings were identified in maternal sacrifice. Cluster analysis further showed that adolescents exhibited greater resilience and cognitive competence in families with parent-adolescent convergent perceptions of high levels of parental sacrifice than did those in families with parent-adolescent divergent views. Theoretical, methodological and practical implications of the results are discussed.

Keywords: parental sacrifice, parent-child discrepancy, resilience, cognitive competence, poverty, Chinese

Introduction

Parent-child discrepancies in perceptions of family attributes have drawn the attention of family researchers and theorists in recent decades (De Los Reyes et al., 2010; De Los Reyes & Ohannessian, 2016; Reynolds et al., 2011). Welsh, Galliher and Powers (1998) identified two approaches accounting for the different perceptions between parents and adolescents: the divergent realities approach and the perceived inequalities approach. The divergent realities approach suggests that parent-adolescent discrepancies in perceptions of family attributes are due to their different developmental lenses on perceiving family attributes. Based on the "generational stake" hypothesis (Bengtson & Kuypers, 1971), parents tend to perceive family processes more positively because they devote significant time and effort to their family; they expect that their effort would contribute to a better nurturing environment for their children's development (Lerner & Knapp, 1975). On the contrary, during the stage of adolescence, adolescents seek their own identity and strive for autonomy and independence from their parents as an indication of individuation (Grotevant & Cooper, 1986). They tend to become critical of family socialization, which demonstrates a sign of maturation (Lerner & Spanier, 1980). Parent-adolescent discrepancies under the divergent realities approach are regarded as a normal developmental process. In contrast, the perceived inequalities approach suggests that parents and adolescents perceive inequalities in the hierarchical relationships of the family. Minuchin (1985) suggests that parent-adolescent discrepancies may be the consequence of maladaptive communication patterns among family members, which may lead to family disorganization. As a consequence, family conflicts and adolescent maladjustment are identified in the family.

Based on the findings of previous meta-analytic studies related to parent-adolescent discrepant views of perceived family attributes, De Los Reyes and Ohannessian (2016) suggested that the mean cross-informant correspondence between adolescents and adults

hovered in a low-to-moderate range. These authors emphasized the importance of assessing and interpreting the points of convergence and divergence between parents' and adolescents' reports of family attributes in influencing adolescent development. According to the Operations Triad Model in interpreting multi-informant assessments of family attributes (De Los Reyes & Ohannessian, 2016), convergence of high levels of protective attributes (e.g., family functioning) between parent and child informants implies higher levels of mutual acceptance. On the contrary, convergence of low levels of protective attributes between parent and child informants serves as a risk factor against healthy adolescent development. Moreover, divergence between parents' and adolescents' reports is linked to more positive adolescent development when it reflects adaptive family processes (i.e., renegotiation of family boundaries and a balance of relatedness and autonomy of adolescents; Daniels, 1990; Longmore et al., 2013). In contrast, when parent-child divergence of family attributes reflects maladaptive family processes (i.e., family miscommunication and disorganization; Minuchin, 1985), adolescents may display negative emotional and behavioral outcomes. This model provides a clear portrayal on how convergence and divergence of parents' and children's reports may influence adolescent development.

A survey of literature examining parent-adolescent discrepancies focused mainly on family functioning (e.g., Leung, Shek & Li, 2016; Ohannessian et al., 2000) and parenting behaviors (e.g., De Los Reyes et al, 2010; Lippold, Greenberg & Feinberg, 2011; Reynolds et al., 2011), with less emphasis on other culturally specific family attributes. As noted by Bornstein and Cheah (2006), culture plays "a major overarching role in shaping the ecology of parenting and childhood" (p.3). Yang (1999) also highlighted the importance of considering social, cultural and historical contexts in the contributions of knowledge development. In fact, Chinese parents focus more on the educational achievement of their children than parents in Western society (Chao, 2001; Chao & Sue, 1996), and Chinese

parents are socialized to subordinate their personal interests for the welfare and honor of the family as a whole (Yeh & Yang, 1997). Hence, there is a need to examine parent-adolescent discrepancies of family practices that are culturally specific, which may aid in the development of indigenous family concepts and practice models.

In Chinese culture, parental sacrifice is a distinctive feature of children's socialization (Chao & Kaeochinda, 2010). Parenthood, in the Chinese connotation, involves a strong sense of responsibility for fostering one's children and making sacrifices for their development (Lam, 2005). Parental sacrifice is defined as a family process by which parents fulfill the needs and development of their offspring at the expense of their personal needs and interests (Leung & Shek, 2016). This process involves three steps. First, there are educational and developmental needs of adolescents that require family resources in terms of money, time and effort. Second, owing to the limitations of resources, parents have to juggle the allocation of family resources. Finally, parents prioritize their children's developmental needs over their own personal needs and desires (Leung & Shek, 2011a). At this point, it is noteworthy to differentiate parental sacrifice from family investment. While family investment emphasizes the allocation of family resources to their offspring, parental sacrifice focuses on the submission of parents' interests for their children's development. Family investment puts an emphasis on "what is given out to the children", whereas parental sacrifice concerns "what is given up by the parents" (Leung & Shek, 2016). Based on the qualitative data of Chinese parents and adolescents, Leung and Shek (2011a) identified five dimensions of parental sacrifice in Chinese families: struggling for financial resources, time allocated to the child's study, rearrangement of the daily schedule, personal sacrifice and veiling of one's worries. In fact, parental sacrifice is particularly important to families experiencing economic disadvantage, as family resources are scarce.

Parental sacrifice serves as a positive family attribute in enhancing adolescent psychosocial development in Chinese families. Based on Chinese socialization, which is deeply rooted in Confucian philosophy (Yeh & Yang, 1997), Chinese parents are socialized to forego their needs for the interest and welfare of their children, and reciprocally, adolescents should follow the expectations of their parents and behave well (Fuligni & Yoshikawa, 2003). There is empirical evidence to suggest that parental sacrifice positively predicts the achievement motivation and psychological competence of poor Chinese adolescents (Leung & Shek, 2013a, 2013b).

Based on the Operations Triad Model (De Los Reyes & Ohannessian, 2016), which poses that parent-child convergence of high levels of perceived protective attributes implies higher levels of mutual acceptance while parent-child convergence of low levels of perceived protective attributes is detrimental to adolescent development, it is expected that parent-child convergence of higher levels of perceived parental sacrifice may enhance adolescent developmental outcomes. On the contrary, parent-child convergence of low levels of perceived parental sacrifice may be risky for adolescent development. Furthermore, based on the "generational stake" hypothesis (Bengtson & Kuypers, 1971) and individuation theory of adolescence (Grotevant & Cooper, 1986), it is normal when parents tend to perceive family protective attributes more positively than do their adolescent children (i.e., divergent realities approach; Welsh, Galliher & Powers, 1998). Hence, parent-child divergence of perceived parental sacrifice may have less impact on adolescent developmental outcomes under this proposition. In contrast, parent-adolescent divergence of perceived parental sacrifice may be due to the disagreements of the allocation of family resources among parents and adolescents (Leung & Shek, 2016). Such disagreement is especially crucial in poor families because the family resources are sparse. For instance, adolescents may expect that resources be allocated for the fulfilment of their immediate educational needs, such as extracurricular activities.

However, parents may expect to save money for future educational expenses, such as university fees. The differential needs and roles between parents and adolescents may result in different expectations on the distribution of limited family resources. According to the Operations Triad Model (De Los Reyes & Ohannessian, 2016), parent-child divergence on perceived parental attributes may reflect family conflicts and miscommunication (Minuchin, 1985), which is harmful for adolescent development. Hence, it is insightful to examine whether parental-child divergence of perceived parental sacrifice in poor Chinese families may be linked to family conflicts that are detrimental to adolescent development.

Moreover, it is possible that some adolescents may perceive more parental sacrifice than do their parents in poor families. Some parents experiencing economic disadvantage may perceive that they fail to provide adequate resources for their children's development, which may generate feelings of guilt and shame (Chase & Walker, 2013) and thus reduce their positive perceptions of parental sacrifice. However, adolescents who are more understanding may realize their parents' sacrifice for their development (Leung & Shek, 2011a) and thus behave well and strive to excel as gratitude for their parents' sacrifice (Yeh & Yang, 1997), despite the low levels of parental sacrifice that parents perceive.

It is noteworthy that the majority of related studies selected caregivers (mostly mothers) and adolescents as the respondents (Abar et al., 2015; De Los Reyes et al., 2010; Lippold, Greenberg & Feinberg, 2011; Reynolds et al., 2011), with father-child discrepancies on perceived family attributes neglected in the literature. However, there are theoretical accounts and empirical support indicating that fathers and mothers have different socialization roles in the family. Theoretically, according to the social role theory (Eagly, Wood & Diekman, 2000), fathers take a more prominent role in feeding families, whereas mothers are mainly responsible for child caring and household management. This responsibility divide is more salient in Chinese culture, as reflected by the Chinese saying of

"*nan zhu wai, nu zhu nei*" ("men work outside the family; women work inside the family"; Leung & Shek, 2012). Empirically, there is evidence that mother-adolescent discrepancies, rather than father-adolescent discrepancies, of perceptions of parental sacrifice negatively predict adolescents' achievement motivation (Leung & Shek, 2016). Hence, it is reasonable to suggest that father-adolescent and mother-adolescent discrepancies may imply different impacts on adolescent development. As such, there is a need to involve fathers as respondents in the investigation of how father-adolescent convergence and divergence of perceived paternal sacrifice influences adolescent developmental outcomes.

In addition, the majority of related studies have examined adolescents' pathological outcomes (e.g., internalizing and externalizing developmental outcomes; Laird & De Los Reyes, 2013; Lippold, Greenberg & Feinberg, 2011), while fewer studies have addressed the positive developmental attributes of adolescents. Resilience literature suggests that positive developmental attributes (such as intrapersonal and interpersonal competencies) are important for adolescents in facing developmental and ecological challenges across their lifespans (Catalano et al., 2002; Lerner et al., 2009). In this study, two important components of adolescent developmental outcomes, resilience and cognitive competence, were explored. Resilience is defined as "a dynamic process encompassing positive adaptation within the context of significant adversity" (Luthar, 2000, p. 543). Catalano et al. (2002) indicated that resilience is important for an individual to adapt to changes and stressful events in positive and healthy ways. Cognitive competence is one's ability to process information, perform reasoning and conduct analyses, which is the cornerstone of goal formation and problem resolution (Sun & Hui, 2012). Both resilience and cognitive competence are essential developmental attributes for adolescents experiencing economic disadvantage to overcome daily challenges and adversity.

Methodologically, a high proportion of related studies have adopted the discrepancy scores calculation approach in examining the effects of parent-child discrepancies of perceived family attributes on adolescent behavioral outcomes (De Los Reyes et al., 2010; Guion, Mrug & Windle, 2009). However, this approach was criticized by De Los Reyes, Ohannessian and Laird (2016) as "statistically redundant" because it ignored the main effects of each informant report on the interpretations of the results. In this study, polynomial multiple regression analyses (Edwards, 1994) were used to examine how parent-child discrepancies of perceived parental sacrifice influenced adolescent development. This method advances from the discrepancy scores calculation approach because it examines the interaction effects of parent reports and adolescent reports of perceived parental sacrifice in influencing adolescent development, over-and-beyond the main effect of each individual informant attribute (Laird & De Los Reyes, 2013). Moreover, this method provides a more direct analysis of how parent-adolescent discrepancies of perceived family sacrifice contribute to adolescents' cognitive competence and resilience. This analytical approach was extensively used in recent research examining parent-child discrepancies on family attributes and adolescent behaviors (e.g., Laird & De Los Reyes, 2013; Leung, Shek & Li, 2016).

Apart from understanding how convergence and divergence of perceived parental sacrifice within each dyad influence adolescents' developmental outcomes, it is interesting to examine the effects at the family level. Based on the family systems perspectives (Minuchin, 1985), fathers, mothers and adolescents interact with each other to form different family patterns (Cox & Paley, 1997). There is evidence showing that higher adolescent substance use expectancies and delinquency were found in families with parent-child congruence of low levels of parental knowledge than in families with low levels of adolescent-perceived maternal knowledge but high levels of mother-perceived maternal knowledge (Lippold, Greenberg & Feinberg, 2011). Hence, cluster analysis was also performed to examine the

difference in adolescent developmental outcomes among different family patterns of parent-adolescent convergence and divergence of perceived parental sacrifice. This approach provides an integral picture for understanding different parent-adolescent convergent and divergent patterns of perceived family attributes, as well as the adolescent developmental outcomes among these patterns.

The present study

The present study sought to investigate how convergence and divergence of perceived parental sacrifice between parents and adolescents influence developmental outcomes of Chinese adolescents living in poverty. This study addressed two research questions:

Research Question 1: Do fathers' (mothers') perceptions of paternal (maternal) sacrifice moderate the influence of adolescents' perceptions of paternal (maternal) sacrifice on resilience and cognitive competence in poor Chinese adolescents? Based on the Operations Triad Model (De Los Reyes & Ohannessian, 2016) and Chinese socialization model (Yeh & Yang, 1997), it was hypothesized that the positive influence of adolescents' perceptions of paternal (maternal) sacrifice on adolescent resilience (Hypotheses 1a and 1b) and cognitive competence (Hypotheses 1c and 1d) would be stronger when fathers (mothers) perceive lower levels of paternal (maternal) sacrifice.

Research Question 2: Do families with parent-adolescent convergent perceptions of parental sacrifice differ in adolescent resilience and cognitive competence compared to families with parent-adolescent divergent perceptions of parental sacrifice? Based on the Operations Triad Model (De Los Reyes & Ohannessian, 2016), it was hypothesized that adolescent resilience and cognitive competence would be stronger in families with parent-adolescent convergence of high levels of paternal and maternal sacrifice than in families with parent-adolescent convergence of low levels of paternal and maternal sacrifice and families

with parent-adolescent divergence on perceived paternal and maternal sacrifice (Hypothesis 2).

Method

Participants and procedures

The data were collected from intact Chinese families living in poverty in Hong Kong. Because a complete list of poor intact families was not available in Hong Kong, purposeful sampling was adopted in the present research. Different non-government organizations were invited, and 24 social service units across Hong Kong eventually joined the study. Social workers from the service units were given training on participant identification and data collection. Intact Chinese families experiencing economic hardship with at least one child aged between 11 and 17 years were invited to participate in the study. The median 50% monthly domestic household income was regarded as the poverty threshold in accordance with the official poverty line set by the Hong Kong Government. Ultimately, 275 intact Chinese families experiencing economic hardship participated in the research.

Data were collected either in the social service centers or at participants' homes, depending on the preference of the respondent families. Written informed consent was obtained from each family member. Fathers and mothers were invited to complete an identical measure of paternal and maternal sacrifice, respectively, and to provide demographic information (such as age, educational level, occupation, duration of stay in Hong Kong, number of children, family income, Comprehensive Social Security Assistance (CSSA) recipients, etc.). Adolescents were invited to complete measures of perceived paternal and maternal sacrifice, resilience, cognitive competence, and questions on demographic background (adolescent gender, age, educational level and duration of stay in Hong Kong). Each participant filled out the measures in a self-administered format separately

to safeguard confidentiality. Researchers or trained social workers read out the items in case the respondents had problems in comprehending the measures. The study was approved and monitored by the Human Subjects Ethics Sub-Committee of an internationally recognized university.

The mean ages of the fathers and mothers were 49.94 years (*SD* = 9.28) and 42.18 years (*SD* = 4.97), respectively. A high proportion of parents were of a low educational level, with 205 fathers (74.5%) and 204 mothers (74.2%) possessing a junior secondary education or lower. There were 211 (76.7%) working fathers, and 199 (72.4%) mothers were housewives. The average number of children in the families was 2.34 (*SD* = 0.90). The majority of fathers were born in Hong Kong (*n* = 98, 35.6%) or had resided in Hong Kong for more than 20 years (*n* = 115, 41.8%), whereas nearly half of the mother sample consisted of immigrants from mainland China and had resided in Hong Kong for less than 10 years (*n* = 137, 49.9%). There were 96 families receiving CSSA from the Government, representing 34.8% of the sample.

Regarding the adolescents, 134 boys (48.7%) and 141 girls (51.3%) participated in the study. The mean age of the adolescents was 13.56 years (*SD* = 1.54), with the mean ages of boys and girls being 13.40 years (*SD* = 1.60) and 13.71 years (*SD* = 1.47), respectively. There were 65 adolescents (23.6%) studying in primary school (grade 6 or below), 151 (54.9%) in the junior secondary level (grade 7 to grade 9), and 57 (20.7%) in the senior secondary level (grade 9 and above). In general, the demographic characteristics reflected the general statistics of the poor population in Hong Kong.

Instruments

Parental sacrifice

Paternal/Maternal Sacrifice Scale (PSA/MSA). Based on the family investment model (Conger & Donnellan, 2007), social capital of the family (Coleman, 1990), parental involvement (Grolnick et al., 1997), and qualitative results from Chinese focus groups conducted on parents and adolescents, an indigenous 23-item PSA/MSA was constructed (Leung & Shek, 2011a) with five dimensions: financial resources, time allocated to children's study, rearrangement of daily schedule, personal sacrifice, and veiling of one's worries. Respondents are requested to rate each statement on a 6-point Likert scale ranging from "1 = strongly disagree" to "6 = strongly agree". An example of an item is "Even when I am tired, I try my best to understand the school life of my child". The adolescent version (APSA/AMSA) was modelled after the parent's version (PSA/MSA). Both the parent version and adolescent version of the measurement showed good reliability, construct validity and factorial validity in various validation studies (Leung & Shek, 2011b; Leung, Shek & Ma, 2016). Higher scores imply greater perceptions of parental sacrifice. The PSA, MSA, APSA and AMSA all showed excellent reliability in this study (PSA: $\alpha = 0.932$; MSA: $\alpha = 0.922$; APSA: $\alpha = 0.938$; AMSA: $\alpha = 0.942$).

Adolescent developmental outcomes

Chinese Positive Youth Development Scale (CPYDS). The CPYDS is a composite measurement tool with fifteen dimensions of positive developmental attributes (Shek et al., 2007). Two subscales, the Resilience Subscale (RE) and the Cognitive Competence Subscale (CC), were adopted in this study. 1) *Resilience Subscale (RE)*: Based on the literature on resilience (Cataleno et al., 2002; Luthar, 2000), three items modified from the items of the Chinese Beliefs about Adversity Scale (Shek, 2004) were used to assess resilience. A sample item is "When I face difficulty, I will not give up easily". 2) *Cognitive Competence Subscale (CC)*: Three items modelled after the statements of the Chinese version of the Social

Problem-Solving Inventory (Siu & Shek, 2005) were adopted. A sample item is "I will try new ways to solve problems". Respondents are requested to rate each item on a 6-point Likert scale ranging from "1 = strongly disagree" to "6 = strongly agree". Both the RE and CC showed good reliability in this study (RE: $\alpha = 0.824$; CC: $\alpha = 0.826$).

Data analyses

Correlational analyses were performed to examine the relationships among paternal (maternal) sacrifice as perceived by fathers (mothers) and adolescents, adolescent developmental outcomes (resilience and cognitive competence) and socio-demographic characteristics of the family members. There is evidence showing that adolescents' age and education may influence their perceptions of parenting attributes (Taber, 2010). Furthermore, maternal migration status was also shown to influence mothers' perception on maternal sacrifice (Dreby & Stutz, 2012; Leung & Shek, 2016). Hence, adolescents' age and educational level and mothers' duration of stay in Hong Kong were considered covariates to be controlled for. Polynomial multiple regression analyses (Edwards, 1994) were used to examine the moderation effects of father- (mother-) perceived paternal (maternal) sacrifice on the relationship between adolescent-perceived paternal (maternal) sacrifice and adolescent resilience and cognitive competence in poor Chinese families. Four steps were involved in the analyses. First, the covariates (i.e., adolescents' age and educational level) was put into the multiple regression model. Next, the main linear terms (i.e., father-perceived and adolescent-perceived paternal sacrifice), were added into the multiple regression model. Third, the interaction term of father-perceived and adolescent-perceived paternal sacrifice and the quadratic terms of father-perceived paternal sacrifice and adolescent-perceived paternal sacrifice were added to the regression model. The inclusion of quadratic terms helped minimize any misinterpretations of the interaction term by the quadratic effect of each

informant attribute (Ganzach, 1997). Finally, because the interactions between father reports and adolescent reports could be complex, the cubic term of each informant-perceived paternal sacrifice and the quadratic interaction terms (i.e., the interaction term between adolescent reports and the quadratic effects of father reports and the interaction term between father reports and the quadratic effects of adolescent reports) were added to the regression model.

Simple slope analyses and plotting of predicted outcome values at high (+1 *SD*) and low (-1 *SD*) levels of father-perceived paternal sacrifice were preformed to interpret the significant interaction findings (Cohen et al., 2003). In polynomial multiple regression analyses, father-adolescent convergence of perceived paternal sacrifice was defined as the agreement between fathers and adolescents in their perceptions of paternal sacrifice, i.e., when both fathers and adolescents perceived high levels (+1 *SD*) of paternal sacrifice, and when both fathers and adolescents perceived low levels (-1 *SD*) of paternal sacrifice. Father-adolescent divergence of perceived paternal sacrifice was defined as the disagreement of fathers and adolescents in their perceptions of paternal sacrifice, i.e., when fathers perceived high levels (+1 *SD*) but adolescents perceived low levels (-1 *SD*) of paternal sacrifice, and when fathers perceived low levels (-1 *SD*) but adolescents perceived high levels (+1 *SD*) of paternal sacrifice. Identical analytic procedures were performed to test the interaction effects of mother-perceived and adolescent-perceived maternal sacrifice on adolescent developmental outcomes, with adolescents' age and educational level and mothers' duration of stay in Hong Kong considered as covariates.

In addition, based on the standardized mean scores of father-perceived paternal sacrifice, mother-perceived maternal sacrifice, and adolescent-perceived paternal and maternal sacrifice, hierarchical cluster analysis was performed to identify different groups of perceived parental sacrifice. This strategy is suitable for a relatively small sample size (Henry, Tolan & Gorman-Smith, 2005). The squared Euclidean distance adopting Ward's

method was used to form different clusters. The dendrogram and the agglomeration schedule were employed to determine the number of clusters. Analysis of covariance (ANCOVA) was used to compute adjusted means of adolescent resilience and cognitive competence in each cluster, after controlling for adolescents' age and educational level and mothers' duration of stay in Hong Kong. Analysis of variance (ANOVA) and post-hoc tests (Scheffe's difference comparison test) were performed to reveal the differences of adolescent resilience and cognitive competence among clusters.

Results

Correlations among the variables

Descriptive statistics of the variables are shown in Table 1. Correlational analyses indicated that the age and educational level of adolescents were negatively related to adolescent-perceived paternal and maternal sacrifice (Table 1). Moreover, mothers' duration of stay in Hong Kong was negatively related to mother-perceived maternal sacrifice. Hence, age and educational level of adolescents were controlled for in the multiple regression model regarding paternal sacrifice, whereas mothers' duration of stay in Hong Kong and the age and educational level of adolescents were controlled for in the multiple regression model concerning maternal sacrifice.

Father-perceived and adolescent-perceived paternal sacrifice were correlated, with $r = 0.263$ ($p < 0.001$). Mother-perceived maternal sacrifice was also associated with adolescent-perceived maternal sacrifice, with $r = 0.197$ ($p < 0.001$). Both strengths of relationships ranged from small to medium according to Cohen's (1988) suggestion. Except for mother-perceived maternal sacrifice, which was not significantly correlated with adolescent resilience, all other scores of perceived paternal and maternal sacrifice were positively related to adolescent resilience and cognitive competence (Table 1).

[Table 1 to be inserted around here]

Interaction effects between parent-perceived and adolescent-perceived parental sacrifice on adolescent developmental outcomes

The results of the polynomial regression analyses showed similar patterns in the father-adolescent interaction effect of paternal sacrifice and the mother-adolescent interaction effect of maternal sacrifice on adolescent resilience. Regarding paternal sacrifice, the interaction term of father-perceived and adolescent-perceived paternal sacrifice negatively predicted adolescent resilience (b = -0.535, SE = 0.156, $p < 0.01$; Table 2). Thus, hypothesis 1a was supported. The relationship between the linear term of adolescent-perceived paternal sacrifice and resilience was positive when fathers had low levels of perceptions of paternal sacrifice (b = 1.383, SE = 0.230, $p < 0.001$; Table 3). However, the relationship became non-significant when fathers had high levels of perceptions of paternal sacrifice (b = 0.314, SE = 0.212, $p > 0.05$; Table 3). When adolescents had poor perceptions of paternal sacrifice, their resilience scores were at the lowest level when fathers also perceived paternal sacrifice to be poor. However, adolescents expressed greater resilience when fathers perceived higher levels of paternal sacrifice. On the contrary, when adolescents perceived higher levels of paternal sacrifice, the resilience scores were quite stable regardless of the levels of father-perceived paternal sacrifice (Figure 1). A higher-order model did not indicate significant interaction effects.

For maternal sacrifice, polynomial regression analyses of a higher model (i.e., with cubic terms and quadratic interactions) indicated that the interaction term of mothers' perceptions and adolescents' perceptions of maternal sacrifice negatively influenced adolescent resilience (b = -0.463, SE = 0.182, $p < 0.05$; Table 2). Thus, hypothesis 1b was supported. Similarly, the relationship between the linear term of adolescent-perceived

maternal sacrifice and resilience was positive when mothers had low levels of perceptions of maternal sacrifice (b = 1.502, SE = 0.301, $p < 0.001$; Table 3). However, the relationship became non-significant when mothers perceived high levels of maternal sacrifice (b = 0.576, SE = 0.313, $p > 0.05$; Table 3). When adolescents had poor perceptions of maternal sacrifice, their resilience scores were at the lowest level when mothers also perceived poor maternal sacrifice. On the contrary, when adolescents perceived higher levels of maternal sacrifice, higher resilience scores were indicated when mothers had poorer perceptions of maternal sacrifice (Figure 2).

[Tables 2 and 3 to be inserted around here]

[Figure 1 and Figure 2 to be inserted around here]

Similar observations were found for adolescent cognitive competence. The interaction term of father-perceived and adolescent-perceived paternal sacrifice negatively predicted adolescent cognitive competence (b = -0.424, SE = 0.163, p = 0.010; Table 2). Thus, hypothesis 1c was supported. The relationship between the linear term of adolescent-perceived paternal sacrifice and cognitive competence was positive when fathers had low perceptions of paternal sacrifice (b = 1.142, SE = 0.239, $p < 0.001$; Table 3), while the relationship was non-significant when fathers had high levels of paternal sacrifice (b = 0.295, SE = 0.221, $p > 0.05$; Table 3). Adolescents expressed the lowest level of cognitive competence when both fathers and adolescents perceived low levels of paternal sacrifice. The cognitive competence scores were relatively higher when fathers perceived higher levels of paternal sacrifice. In contrast, when adolescents perceived high levels of paternal sacrifice, cognitive competence scores were quite stable despite the different levels of father-perceived paternal sacrifice (Figure 3). When a higher-order model was added to the tested model, the higher-order interaction effects were non-significant.

Similarly, the interaction term of mother-perceived and adolescent-perceived maternal sacrifice negatively influenced adolescent cognitive competence (b = -0.405, SE = 0.153, p < 0.01; Table 2). Thus, hypothesis 1d was supported. The relationship between the linear term of adolescent-perceived maternal sacrifice and cognitive competence was positive when mothers had low perceptions of maternal sacrifice (b = 0.741, SE = 0.218, p < 0.01; Table 3), but the relationship was non-significant when mothers perceived high levels of maternal sacrifice (b = -0.070, SE = 0.233, p > 0.05; Table 3). When adolescents perceived low levels of maternal sacrifice, adolescents expressed the lowest level of cognitive competence when mothers also perceived low levels of maternal sacrifice. The cognitive competence scores were higher when mothers perceived higher levels of maternal sacrifice. In contrast, when adolescents perceived high levels of maternal sacrifice, cognitive competence scores were quite stable regardless of different levels of maternal sacrifice (Figure 4). A higher-order model did not indicate significant interaction effects.

[Figure 3 and Figure 4 to be inserted around here]

Cluster analysis among different groups of perceived parental sacrifice

Based on the results of hierarchical cluster analysis, a 4-cluster solution was identified. Figure 5 shows the standardized cluster profiles of standardized mean scores of perceived parental sacrifice measures among different family members. Cluster 1 (convergent-high group) (n = 55, 20.0%) represents high levels of paternal sacrifice perceived by fathers and adolescents and high levels of maternal sacrifice perceived by mothers and adolescents. Cluster 2 (convergent-low group) (n = 53, 19.3%) represents low levels of paternal sacrifice perceived by fathers and adolescents and low levels of maternal sacrifice perceived by mothers and adolescents. Cluster 3 (divergent-medium-low-parent/medium-high-adolescent group) (n = 75, 27.3%) represents families with moderately high levels of

paternal and maternal sacrifice perceived by adolescents, but moderately low levels of paternal and maternal sacrifice perceived by fathers and mothers, respectively. Cluster 4 (divergent-medium-high-parent/medium-low-adolescent group) (n = 92, 33.5%) represents families with moderately low levels of paternal and maternal sacrifice perceived by adolescents, but moderately high levels of paternal and maternal sacrifice perceived by fathers and mothers, respectively.

[Figure 5 to be inserted around here]

The adjusted mean values of adolescent resilience and cognitive competence were computed, with the age and educational levels of adolescents and the mother's duration of stay in Hong Kong as covariates (Table 4). Using the adjusted mean of adolescent resilience, the ANOVA results indicated a significant difference in adolescent resilience among the four groups, with $F(3, 271) = 5950.12$ ($p < 0.001$). Scheffe's difference comparison test suggested that the mean values of adolescent resilience of the convergent-high group were significantly higher than those of the other groups. The divergent-medium-low-parent/medium-high-adolescent group also reported higher mean values of adolescent resilience than did the convergent-low group and the divergent-medium-high-parent/medium-low-adolescent group. Finally, the divergent-medium-high-parent/medium-low-adolescent group reported higher mean values of adolescent resilience than did the convergent-low group. Similar results were identified in adolescent cognitive competence. The ANOVA results further indicated a significant difference in adolescent cognitive competence among the four groups, with $F(3, 271) = 967.24$ ($p < 0.001$) (Table 4). Scheffe's difference comparison test suggested that the convergent-high group reported significantly higher mean values of adolescent cognitive competence than the other groups. The divergent-medium-low-parent/high-adolescent group reported higher mean values of adolescent cognitive competence than did the convergent-low group and the divergent-medium-high-parent/medium-low-adolescent group, and the

divergent-medium-high-parent/medium-low-adolescent group reported higher mean values of adolescent cognitive competence than did the convergent-low group (Table 4). Thus, hypothesis 2 was supported.

[Table 4 to be inserted around here]

Discussion

This study sought to examine how convergence and divergence of parent-perceived and adolescent-perceived parental sacrifice influenced adolescent developmental outcomes in poor intact Chinese families in Hong Kong. In summary, the current findings indicated that father- (mother-) perceived paternal (maternal) sacrifice moderated the prediction of adolescent-perceived paternal (maternal) sacrifice on adolescent resilience and cognitive competence in poor Chinese families. When adolescents perceived low levels of parental sacrifice, adolescents expressed the lowest levels of resilience and cognitive competence when parents also perceived low levels of parental sacrifice. Greater resilience and cognitive competence were indicated when parents perceived higher levels of parental sacrifice. Interestingly, when adolescents perceived high levels of paternal sacrifice, resilience and cognitive competence scores were stable regardless of the levels of father-perceived paternal sacrifice. When adolescents perceived high levels of maternal sacrifice, resilience scores were lower when mothers perceived higher levels of maternal sacrifice, and cognitive competence scores were stable regardless of the level of mother-perceived maternal sacrifice. Furthermore, the results of the cluster analysis indicated that adolescents exhibited greater resilience and cognitive competence when parents and adolescents had convergent perceptions of high levels of paternal and maternal sacrifice than did adolescents in families with parent-adolescent convergent low levels of perceptions. Among families with divergent perceptions of paternal and maternal sacrifice, adolescents expressed greater resilience and

cognitive competence when they perceived paternal and maternal sacrifice more positively than did adolescents with poorer perceptions as compared with their parents'.

There were some important significant findings in this study. First, the results of polynomial regression analyses and cluster analysis showed some support for the Operations Triad Model in interpreting the convergent and divergent perceptions of parental sacrifice between parents and adolescents (De Los Reyes & Ohannessian, 2016). The findings echoed the Operations Triad Model by showing that parent-child convergence of low levels of parental sacrifice obstructed adolescent development in poor Chinese families. When both parents and adolescents perceived low levels of parental sacrifice, the resilience and cognitive competence of the adolescents were at their lowest levels. It is obvious that low levels of parental sacrifice perceived from both parents and adolescents imply a lack of social capital and family resources offered to the adolescents, which restricts positive adolescent development. On the contrary, parent-child convergence of higher levels of parental sacrifice reflects a mutual consensus of parental care, support and commitment in nurturing adolescents, which may be linked to positive adolescent development (Leung & Shek, 2013a, 2013b).

Furthermore, the findings provided some evidence for the Operations Triad Model by interpreting how parent-child divergence of perceived parental sacrifice influenced adolescent resilience and cognitive competence. Based on the adolescent individuation theory (Grotevant & Cooper, 1986), it is a normal developmental process for adolescents to search for self-identity, autonomy and independence and to renegotiate the family boundaries with their parents (i.e., divergent realities approach; Welsh, Galliher & Powers, 1998). This process contributes to the divergent perceptions between parents and adolescents. Under this view, parent-child divergence on perceived parental sacrifice may not always be harmful to adolescent development. In reality, when adolescents perceive lower levels but parents

perceive higher levels of parental sacrifice, adolescents may try out different strategies to resolve their problems, which helps enhance their resilience and cognitive competence in tackling the challenges of adversity. As long as parents continue to take up their roles of child nurturance through sacrificing their own interests (when parents perceive higher levels of parental sacrifice), adolescents are not deprived from family resources and social capital, which may restrict their psychosocial development.

Interestingly, when parents perceived low levels of parental sacrifice, adolescent-perceived parental sacrifice became a stronger predictor of adolescent resilience and cognitive competence. As previously mentioned, some poor parents may perceive that they fail to provide adequate resources for their children's development (Chase & Walker, 2013), which may reduce their positive perceptions of parental sacrifice to their children. However, their children may have different perceptions when they understand that their parents have tried their best for the adolescent's development through sacrificing their own needs and interests (Leung & Shek, 2011a). When adolescents perceive higher levels of parental sacrifice, they develop a sense of filial piety and strive to excel to reciprocate their parents' sacrifice (Fuligni & Yoshikawa 2003; Leung & Shek, 2013a, 2015), despite the low levels of parental sacrifice perceived by the parents. This interpretation provides an addition to the Operations Triad Model in the understanding of divergent perceptions of parental sacrifice, when adolescents perceive parental sacrifice more positively than do their parents.

When adolescents perceived high levels of paternal sacrifice, their resilience and cognitive competence scores were quite stable at different levels of father-perceived paternal sacrifice. At high levels of adolescent-perceived maternal sacrifice, their resilience scores were higher when mothers perceived lower levels of maternal sacrifice than those who perceived higher levels. This difference represents a deviation from the Operations Triad Model. Although parental sacrifice is a family capital that enhances adolescents' positive

wellbeing (Leung & Shek, 2013b), one must be aware that overprotection of adolescents from adversities may restrict adolescent development of resilience (Leung, Shek & Li, 2016). The overprotection is especially apparent in Chinese mothers who tend to emphasize the relational goals of establishing affective relationships with their children (Chao & Tseng, 2002). This finding echoes the results of a previous study that when adolescents perceived higher levels of family functioning, their scores of self-efficacy, self-determination and resilience were higher when mothers perceived lower levels of family functioning (Leung, Shek & Li, 2016). Indeed, more studies exploring the mechanisms through which parent-perceived and adolescent-perceived parental sacrifice interact and influence adolescent development are encouraged.

The results from the cluster analysis were generally in line with the findings of the multiple polynomial regression. It was interesting to find that among families with divergent parent-child perceptions of parental sacrifice, adolescents exhibited higher resilience and cognitive competence in divergent-medium-low-parent/medium-high-adolescent groups (Cluster 3) than did those in divergent-medium-high-parent/medium-low-adolescent groups (Cluster 4). When adolescents perceive parental sacrifice more positively than do their parents, it implies the adolescents' psychosocial maturity in understanding their parents' contributions and commitment. Adolescents are more motivated to enhance their resilience and cognitive competence in the face of economic hardship. On the contrary, when parents perceive parental sacrifice more positively than do their adolescents, it implies family tension between parents and adolescents on the allocation of family resources, which negatively influences adolescent psychosocial development (Olson et al., 1983).

There are several theoretical, practical and methodological implications of this study. Theoretically, the study examined how parent-adolescent convergence and divergence of perceived parental sacrifice influence adolescent development in poor Chinese families.

Because related studies have mainly focused on parent-adolescent discrepancies of perceived family functioning (e.g., Leung, Shek & Li, 2016; Ohannessian et al., 2000) and parenting behaviors (e.g., De Los Reyes et al, 2010; Lippold, Greenberg & Feinberg, 2011), there has been less emphasis on family attributes related to the allocation of family resources. Thus, our findings provide important theoretical implications on the understanding of family patterns of resource allocation and family dynamics in Chinese families experiencing economic disadvantage. Moreover, the findings provide some empirical support for the Operations Triad Model (De Los Reyes & Ohannessian, 2016) in the interpretations of multi-informant assessments. This study identified that parent-perceived parental sacrifice moderated the relationship between adolescent-perceived parental sacrifice and developmental outcomes of Chinese adolescents living in poverty, which provides important insights for future research and construction of Chinese family models in enhancing adolescent development. In addition, this study examined father-adolescent convergence and divergence in paternal sacrifice on adolescent development, which fills gaps in knowledge regarding the inclusion of fathers' perspectives (Lippold, Greenberg & Collins, 2013).

Practically, the current study showed that different parent-adolescent divergence of perceived parental sacrifice (adolescents perceived more positively than did parents versus parents perceived more positively than did adolescents) might imply different meanings to family and adolescent development. Clinical practitioners should be sensitive to the different perceptions among family members and should handle their parent-child congruencies and discrepancies with caution.

Methodologically, this study illustrates the use of cluster analysis and polynomial multiple regression analyses to examine how parent-adolescent convergence and divergence of perceived parental sacrifice influence adolescent resilience and cognitive competence, which provided additional insight for the analysis and interpretation of the data. In face of the

criticism of the conventional approach of using parent-child discrepancy scores to examine the effects of informant discrepancies on adolescent behavioral outcomes (Laird & De Los Reyes, 2013), the present study represents a methodological advance because it employed the polynomial regression approach to investigate the effects of parent-adolescent discrepancies on the perceptions of parental sacrifice, over-and-above the main effects of each informant attribute. At the same time, the use of cluster analysis provided an integral picture on adolescent development in relation to different family patterns of parent-child perceptions of parental sacrifice, allowing the analyses to be interpreted at a family level.

There are several limitations of this study. First, this study was cross-sectional, which had the limitation of inferring a cause-and-effect relationship between the independent and dependent variables. Thus, a longitudinal study is suggested in the future. Second, the respondent families were not randomly sampled, which may bring the generalizability of the results into question. Last, the study was based on poor Chinese families in Hong Kong. Because Hong Kong is a former British colony strongly influenced by Western culture, the parenting strategies and behaviors between Hong Kong and mainland China may be different (Lai, Zhang & Wang, 2000). Thus, future studies should be conducted to examine whether the findings from the current study can be generalized to other Chinese communities, such as intact families from mainland China and overseas Chinese families.

Despite these limitations, this study provides an important piece of work examining how convergence and divergence of parent-perceived and adolescent-perceived parental sacrifice influence adolescent developmental outcomes in poor intact Chinese families in Hong Kong. Particularly, this study employed the polynomial multiple regression analytical approach (Laird & De Los Reyes, 2013) and cluster analysis to investigate the dynamic interactions among family members on their perceptions of parental sacrifice and how their

perceptions interplay with each other to affect adolescent developmental outcomes, which provides important insights into the study of adolescence and the family.

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Table 1. Correlations of the measuring variables

		Range	Mean	SD	Cronbach's alpha	Inter-item correlations coefficient	1	2	3	4	5	6	7	8
1.	Mothers' duration of stay in Hong Kong	1-6	3.29	1.81	N.A.	N.A.	1.000							
2.	Age of adolescents	11-17	13.56	1.54	N.A.	N.A.	0.103	1.000						
3.	Educational level of adolescents	1-8	3.93	1.77	N.A.	N.A.	0.265***	0.843***	1.000					
4.	Father-reported paternal sacrifice	23-138	104.66	15.62	0.932	0.380	-0.133*	-0.079	-0.087	1.000				
5.	Adolescent-reported paternal sacrifice	23-138	84.42	20.46	0.938	0.398	-0.196**	-0.159**	-0.164**	0.263***	1.000			
6.	Mother-reported maternal sacrifice	23-138	109.92	14.79	0.922	0.348	-0.281***	-0.024	-0.104	0.282***	0.115	1.000		
7.	Adolescent-reported maternal sacrifice	23-138	99.28	10.48	0.942	0.414	-0.062	-0.143*	-0.132*	0.171**	0.557***	0.197**	1.000	
8.	Adolescents' resilience	6-18	14.05	2.58	0.824	0.610	-0.026	-0.076	-0.070	0.171**	0.319***	0.100	0.210***	1.000
9.	Adolescents' cognitive competence	6-18	13.53	2.66	0.826	0.612	0.029	-0.043	-0.003	0.214***	0.269***	0.173**	0.156**	0.662***

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

Table 2. Father (mother) and adolescent reports of paternal (maternal) sacrifice as a predictor of adolescent developmental outcomes

		Adolescent							
		Resilience				Cognitive competence			
		b	*SE*	*B*	*p*	*b*	*SE*	*B*	*p*
Father's model	Constant	13.783	0.205		< 0.001	13.308	0.214		< 0.001
	Adolescent's age	-0.172	0.272	-0.067	0.528	-0.396	0.284	-0.149	0.164
	Adolescent's educational level	0.103	0.273	0.04	0.706	0.468	0.284	0.176	0.101
	Father's report	0.204	0.156	0.079	0.192	0.36	0.162	0.135	0.027
	Adolescent's report	0.848	0.157	0.328	< 0.001	0.719	0.163	0.27	< 0.001
	Adolescent X Father	-0.535	0.156	-0.216	0.001	-0.424	0.163	-0.167	0.010
	Father squared	0.132	0.111	0.073	0.234	0.04	0.115	0.022	0.728
	Adolescent squared	0.274	0.111	0.152	0.014	0.291	0.115	0.157	0.012
	R			0.393	0.004			0.366	0.019
	R^2			0.155				0.134	
Mother's model	Constant	13.964	0.234		< 0.001	13.511	0.213		< 0.001
	Adolescent's age	-0.058	0.171	-0.022	0.735	0.204	0.172	0.077	0.236
	Adolescent's educational level	-0.283	0.294	-0.11	0.336	-0.445	0.302	-0.167	0.141
	Mother's duration of stay in Hong Kong	0.231	0.305	0.089	0.45	0.446	0.311	0.168	0.153
	Mother's report	0.201	0.252	0.078	0.428	0.537	0.176	0.202	0.002
	Adolescent's report	1.039	0.247	0.402	< 0.001	0.336	0.166	0.126	0.044
	Adolescent X Mother	-0.463	0.182	-0.19	0.012	-0.405	0.153	-0.161	0.008
	Mother squared	0.197	0.154	0.126	0.202	-0.057	0.101	-0.036	0.571
	Adolescent squared	-0.051	0.147	-0.029	0.727	0.154	0.111	0.084	0.168
	Mother X Adolescent squared	0.023	0.211	0.008	0.914				
	Mother squared X Adolescent	0.023	0.211	0.008	0.306				
	Mother cubed	0.013	0.067	0.032	0.842				
	Adolescent cubed	-0.198	0.069	-0.332	0.005				
	R			0.333	0.040			0.293	0.043
	R^2			0.111				0.086	

Table 3. Simple slope analyses of the prediction of adolescent-reported parental sacrifice on adolescent developmental outcomes with parent-reported parental sacrifice as a moderator

Moderator		Predictor		Resilience				Cognitive competence			
				b	*SE*	*B*	*p*	*b*	*SE*	*B*	*p*
Father-reported paternal sacrifice	Higher level (+ 1 SD)	Adolescent-reported paternal sacrifice	Linear	0.314	0.212	0.121	0.141	0.295	0.221	0.111	0.184
			Quadratic	0.274	0.111	0.152	0.014	0.291	0.115	0.157	0.012
	Lower level (- 1 SD)		Linear	1.383	0.230	0.535	< 0.001	1.142	0.239	0.430	< 0.001
			Quadratic	0.274	0.111	0.152	0.014	0.291	0.115	0.157	0.012
Mother-reported maternal sacrifice	Higher level (+ 1 SD)	Adolescent-reported maternal sacrifice	Linear	0.576	0.313	0.223	0.067	-0.070	0.233	0.026	0.765
			Quadratic	-0.036	0.205	-0.020	0.862	0.154	0.111	0.084	0.168
			Cubic	-0.198	0.069	-0.332	0.005	N.A.	N.A.	N.A.	N.A.
	Lower level (- 1 SD)		Linear	1.502	0.301	0.581	< 0.001	0.741	0.218	0.279	0.001
			Quadratic	-0.067	0.208	-0.038	0.748	0.154	0.111	0.084	0.168
			Cubic	-0.198	0.069	-0.332	0.005	N.A.	N.A.	N.A.	N.A.

Table 4. Adolescent developmental outcomes by clusters of perceived parental sacrifice

	Adolescent resilience						Adolescent cognitive competence					
	n	Adjusted mean[a]	*SD*	*F*	Scheffe's test comparison		Adjusted mean[a]	*SD*	*F*	Scheffe's test comparison		
					Mean difference	*SD*				Mean difference	*SD*	
Convergent-high group	55	15.04	0.09				14.73	0.25				
Convergent-low group	53	12.62	0.11				12.21	0.27				
Divergent-medium-low-parent-high-adolescent group	75	14.77	0.16				13.91	0.25				
Divergent-medium-high-parent-low-adolescent group	92	13.68	0.12				13.26	0.25				
				5950.12***					967.24***			
Convergent-high group vs. Divergent-medium-low-parent/medium-high-adolescent group					0.26[b]	0.02				0.82[b]	0.04	
Convergent-high group vs. Divergent-medium-high-parent/medium-low-adolescent group					1.35[b]	0.02				1.47[b]	0.04	
Convergent-high group vs. Convergent-low group					2.41[b]	0.02				2.52[b]	0.04	
Divergent-medium-low-parent/medium-high-adolescent group vs. Divergent-medium-high-parent/medium-low-adolescent group					1.09[b]	0.02				0.65[b]	0.04	
Divergent-medium-low-parent/medium-high-adolescent group vs. Convergent-low group					2.15[b]	0.02				1.70[b]	0.04	
Divergent-medium-high-parent/medium-low-adolescent group vs. Convergent-low group					1.06[b]	0.02				1.05[b]	0.04	

***$p < 0.001$

[a] Mean was adjusted for the age and education level of adolescents and the mothers' duration of stay in Hong Kong.

[b] All differences were significant ($p < 0.001$).

Fig. 1 Predicted values of adolescent resilience as a function of adolescent-reported paternal sacrifice at high and low levels of father-reported paternal sacrifice

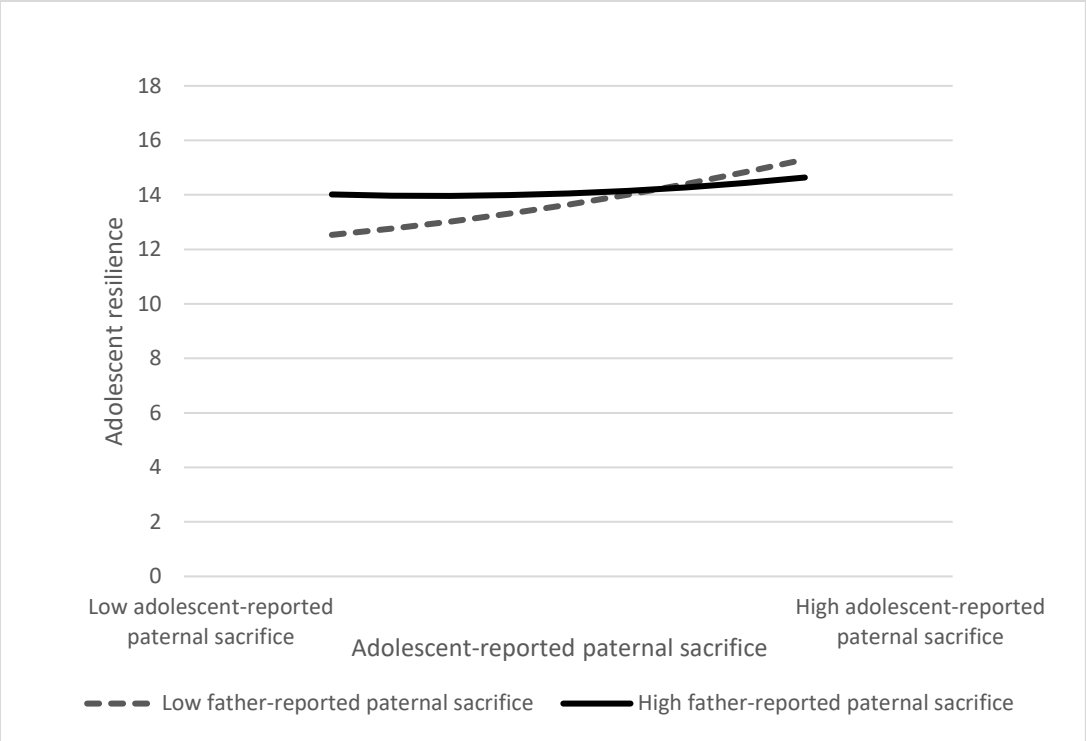


Fig. 2 Predicted values of adolescent resilience as a function of adolescent-reported maternal sacrifice at high and low levels of mother-reported maternal sacrifice

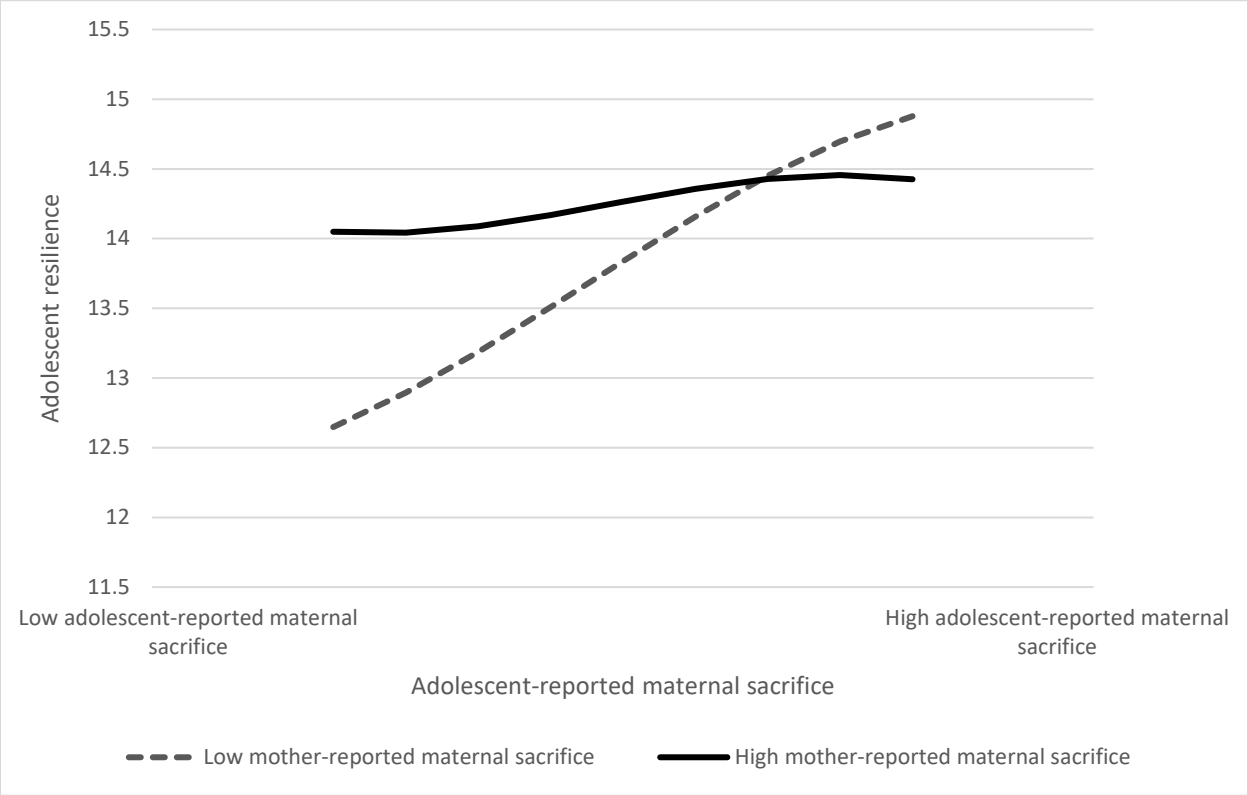


Fig. 3 Predicted values of adolescent cognitive competence as a function of adolescent-reported paternal sacrifice at high and low levels of father-reported paternal sacrifice

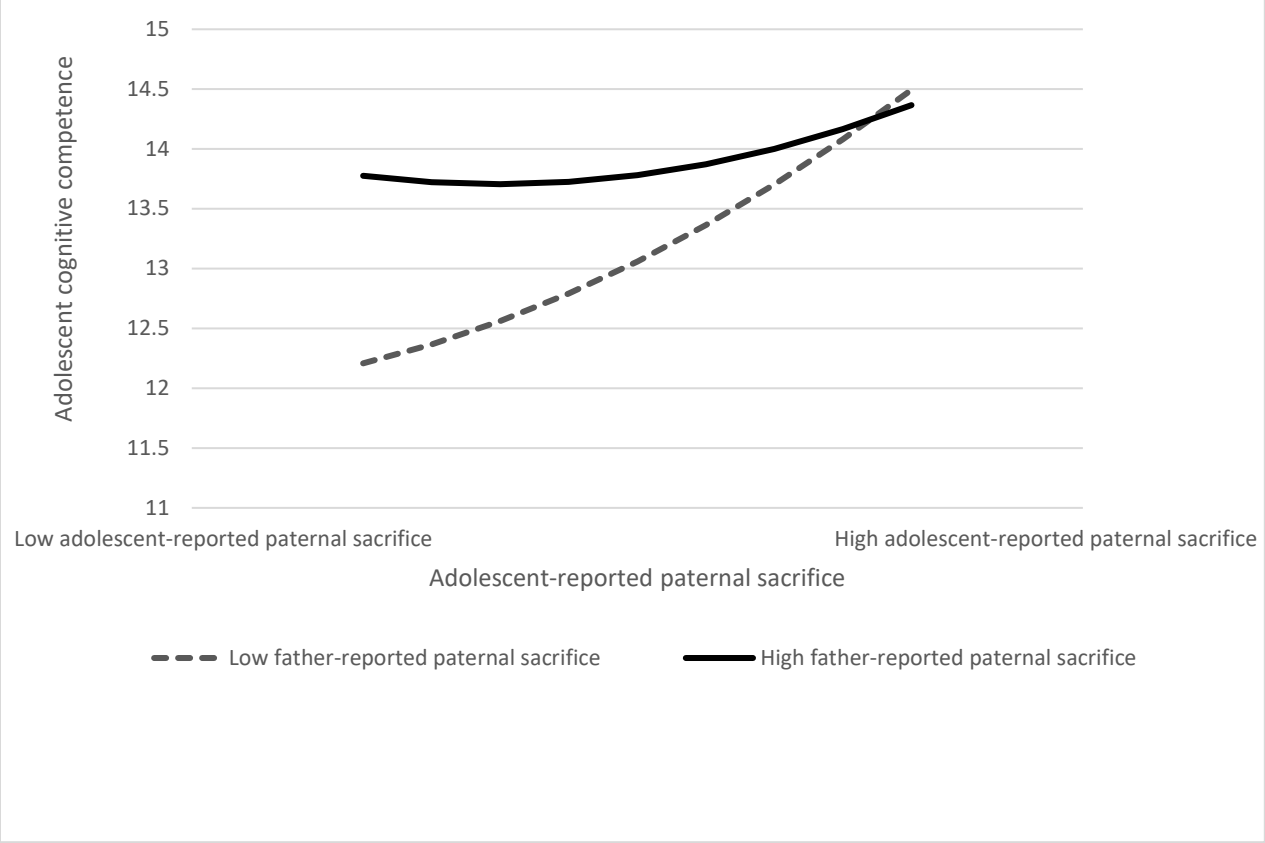


Fig. 4 Predicted values of adolescent cognitive competence as a function of adolescent-reported maternal sacrifice at high and low levels of mother-reported maternal sacrifice

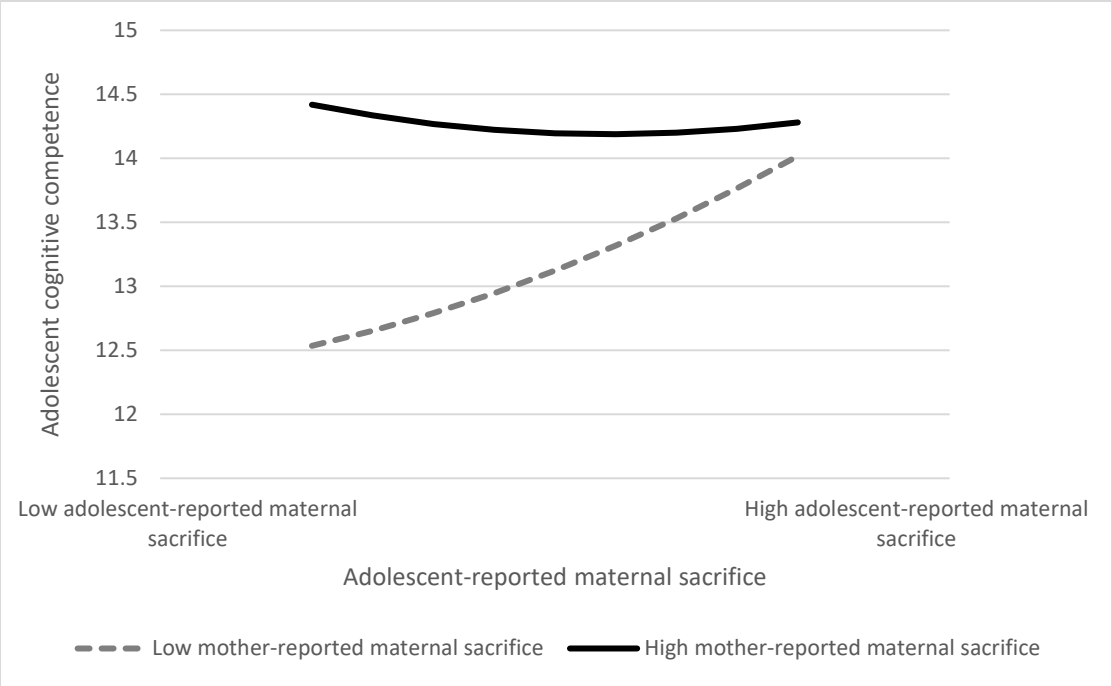
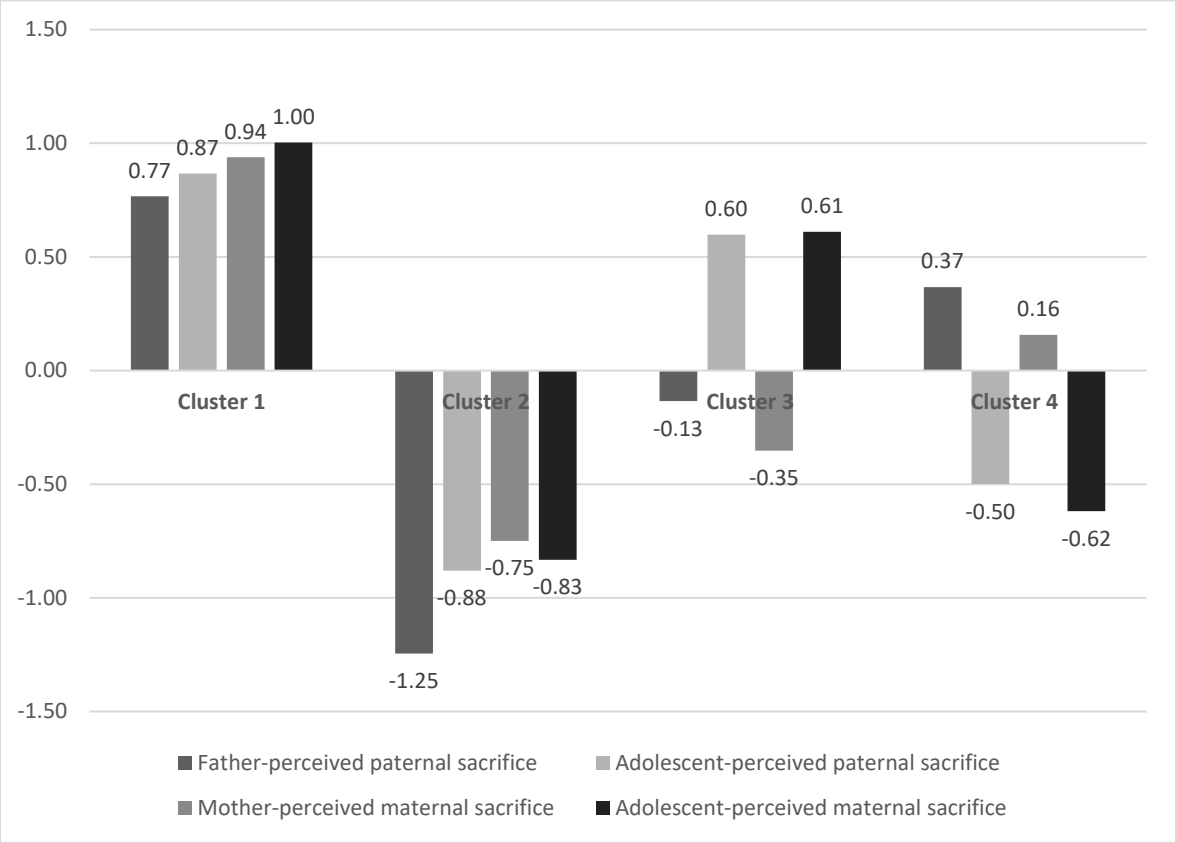


Fig. 5 Standardized mean scores of perceived parental sacrifice in different clusters of perceived parental sacrifice



Note: Cluster 1: Convergent-high group (n = 55, 20.0%); Cluster 2: Convergent-low group (n = 53, 19.3%); Cluster 3: Divergent-medium-low-parent/medium-high-adolescent group (n = 75, 27.3%); Cluster 4: Divergent-medium-high-parent/medium-low-adolescent group (n = 92, 33.5%)