

Measurement Article

Development and Validation of a Multidimensional Intergenerational Relationship Quality Scale for Aging Chinese Parents

Xue Bai, PhD*

Department of Applied Social Sciences, The Hong Kong Polytechnic University, Hong Kong, China.

*Address correspondence to: Xue Bai, PhD, GH338, Department of Applied Social Sciences, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong, China. E-mail: xuebai@polyu.edu.hk

Received: June 12, 2017; Editorial Decision Date: September 7, 2017

Decision Editor: Rachel Pruchno, PhD

Abstract

Background and Objectives: The quality of intergenerational relationships is crucial for maintaining the well-being of parents and adult children. This study developed and validated an Intergenerational Relationship Quality Scale for Aging Chinese Parents (IRQS-AP) based on the solidarity, conflict, and ambivalence models.

Research Design and Methods: The data were derived from a cross-sectional study in Hong Kong which included a random sample of 1,001 community-dwelling individuals aged ≥ 50 years. Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were performed to examine the factor structure of the scale. The internal consistency reliability and convergent validity of the scale were also assessed.

Results: EFA resulted in a 13-item four-factor (i.e., consensual–normative solidarity, structural–associational solidarity, affectual closeness, and intergenerational conflict) model, which was supported by the CFA and explained 70.7% of the total variance. The reliability of the scale measured using Cronbach's alpha was .776. The convergent validity of the IRQS-AP was established by its significant correlation with depressive symptoms ($r = -.385$), sense of loneliness ($r = -.449$), and self-image ($r = .384$).

Discussion and Implications: The IRQS-AP as a reliable and valid scale can enable researchers and service practitioners to measure the relationship quality between older people and their adult children accurately, inform the development of interventions to strengthen intergenerational relationships in target domains, and evaluate the effectiveness of related services.

Keywords: Intergenerational solidarity, Structural–associational solidarity, Affectual closeness, Intergenerational conflict, Ambivalence, Older Chinese, Scale validation

With an increase in the shared lifetimes between generations, the quality of intergenerational relationships becomes crucial for maintaining the well-being of parents and adult children. Studies have reported that the presence of a positive or higher quality intergenerational relationship is predictive of higher self-esteem and self-image (Lowenstein, 2007; Pinguart & Sørensen, 2000) and longevity in parents (Lowenstein, 2007); higher marital quality (Stokes, 2016) and partner well-being

in adult children (Polenick, Fredman, Birditt, & Zarit, 2016); and decreased loneliness (Long & Martin, 2000), better psychological well-being (Reczek & Zhang, 2016; Umberson, 1992), and higher life satisfaction (Bai, Guo, & Fu, 2017; Polenick et al., 2016) for both generations. By contrast, strained or ambivalent intergenerational relationships are associated with elevated psychological distress (Umberson, 1992) and worse well-being for both adult children and their parents (Fingerman, Pitzer,

Lefkowitz, Birditt, & Mroczek, 2008; Polenick, Birditt, & Zarit, 2017).

The Chinese cultural tradition is generally believed to emphasize respect and value for older people's contributions, leading many people to assume that Chinese older adults benefit from harmonious family relations, social prestige, and filial elder care responsibility. However, intergenerational relationships have changed as society and family structures have evolved (Bai et al., 2017; Chow & Bai, 2011). Recent studies on intergenerational relationships in Hong Kong have reported conflicting findings. Some studies have revealed that younger generations remain willing to respect and care for their older parents (Ting, 2009), indicating the high quality of these intergenerational relationships. However, other studies have discovered a low level of emotional closeness between members of the two generations and a lack of value and attitude consensus under the contemporary political and social context of Hong Kong (Chan, 2013; Au Jeong & Chow, 2014). These results indicated that accurately assessing the multidimensional relationship quality between older parents and their adult children is crucial; moreover, intergenerational relationships must be effectively strengthened in target domains through tailored services. Two main approaches have been used to understand relationship quality: the interpersonal approach, which focuses on the interaction process between two persons and on areas such as companionship, conflict behaviors, and communication methods; and the intrapersonal perspective approach, which emphasizes how individuals rate their satisfaction or happiness with a relationship (Reynolds, Houlston, & Coleman, 2014).

The assessment of intergenerational relationship quality has been complicated by the separate conceptualizations of intergenerational relationships using different theoretical models. Studies that did not focus specifically on intergenerational relationships (e.g., Merz, Consedine, Schulze, & Schuengel, 2009) mostly used a simple single-item measurement (e.g., "Taking everything together, how would you describe your relationship with your father/mother/child?"). Other studies focusing on parent–adult child relationships have generally involved the solidarity perspective (Bengtson & Schrader, 1982), which emphasizes positive emotions or behaviors, shared beliefs and feelings, and enduring ties between parents and children (e.g., Silverstein & Bengtson, 1997; Van Gaalen & Dykstra, 2006). In the solidarity model (Bengtson & Schrader, 1982; Bengtson & Roberts, 1991), the intergenerational relationship consists of six solidarity dimensions: structural (interaction opportunities), associational (interaction and activity frequency and type), affectual (positive sentiments and feelings), consensual (attitude and value agreement), normative (commitment to familial obligations), and functional (resource and support exchange). One of the earliest and most widely used instruments for measuring intergenerational solidarity is the Intergenerational Solidarity Inventory (Mangen,

Bengtson, & Landry, 1988). The most frequently asked questions adapted from this scale include "How close do you feel to this child?", "How well do you and this child get along together?", and "How is communication between yourself and this child?" (Guo, Xu, Liu, Mao, & Chi, 2016; Silverstein, Gans, Lowenstein, Giarrusso, & Bengtson, 2010). Other frequently used measures are the 10-item Positive Affect Index (Bengtson & Schrader, 1982), the 17-item Intimacy Scale (Walker & Thompson, 1983), and the Adult Attachment Scale (Cicirelli, 1995).

Scholars who advocate an alternative model, the conflict model, argue that these measurements have focused only on the positive qualities of intergenerational bonds and ignored intergenerational conflict. They claim that studies should also pay attention to the conflicts, such as intergenerational disagreement and tensions (Clarke, Preston, Raksin, & Bengtson, 1999; Lowenstein, 2007; Van Gaalen & Dykstra, 2006). Scholars have subsequently employed instruments to measure both solidarity and conflict aspects. The measurement consisting of two positive items ("Overall, how much does your father/mother/child love and care for you?" and "How much does your father/mother/child understand you?") and two negative items ("How much does your father/mother/child criticize you?" and "How much does your father/mother/child make demands on you?"), has been used widely (Birditt, Tighe, Fingerman, & Zarit, 2012; Polenick et al., 2016; Umberson, 1992). However, this measure captures only the affectual dimension of intergenerational solidarity and thus may fall short in the accurate assessment of other dimensions of relationship quality. Similarly, other instruments developed to measure both the positive and negative aspects of relationships, including the Parent Adult Relationship Questionnaire (Pitzer, Fingerman, & Lefkowitz, 2011), and the 6-item scale of Willson, Shuey and Elder (2003), failed to cover various relationship dimensions suggested by the guiding models. Few studies have strictly followed the solidarity and conflict models and attempted to examine intergenerational solidarity through the six dimensions. Among the few studies, Lowenstein's (2007) study was based on the analysis of secondary data; thus, the measurement was limited to variables available in the dataset, and the structural validity of the scale was not adequately tested. Similarly, Hogerbrugge and Komter (2012) excluded consensual solidarity because of the limitation of the data set.

The ambivalence model suggests that the study of the parent–adult child relationship should move beyond the "love–hate relationship" to focus on intergenerational ambivalence or "the simultaneous coexistence and opposition of harmony and conflict" (Lüscher, 2002). By using the ambivalence model, scholars have used direct and indirect strategies to assess intergenerational ambivalence. In direct measures, participants are asked to rate the degree to which they have mixed feelings toward a parent or a child (Lüscher & Pillemer, 1998). In indirect measures which have been more widely used (e.g., Guo, Chi, & Silverstein,

2013), participants are asked separate questions regarding the closeness and conflict components of their relationship with a parent or a child, and the ambivalence score was then calculated using Thompson's formula (Thompson, Zanna, & Griffin, 1995).

Although well-established theoretical models have effectively guided the conceptualization of the older parent–adult child relationship, a reliable and valid multidimensional scale developed with reference to all the three influential models for measuring older parent–adult child relationship quality is not available. To address this methodological limitation, this study developed and validated an Intergenerational Relationship Quality Scale for Aging Parents (IRQS-AP) with reference to the solidarity, conflict, and ambivalence models and examined the psychometric properties of the IRQS-AP in a random sample of aging Chinese parents in Hong Kong. This scale can enable researchers and service practitioners to measure the relationship quality between older people and their adult children more accurately, effectively inform the development of interventions to strengthen intergenerational relationships in target domains, and evaluate the effectiveness of related services.

Methods

Sampling

This study is a part of a research project entitled “Intergenerational relationships and care expectations of aging parents in Hong Kong.” Adults who were aged 50 years or older, resided in Hong Kong, and were fluent in Cantonese or Putonghua were included as the target population of the survey. A sample list was obtained from the [Census and Statistics Department's \(2005\) Frame of Quarters](#), which included the Register of Quarters (i.e., a list of the addresses of permanent quarters in urban areas identified with detail information on street name, building name, and flat number) and the Register of Segments (i.e., a list of area segments in nonurban areas delineated by some identifiable boundaries such as stream, footpath, and so forth). This was the most up-to-date and complete sampling frame available in Hong Kong. A two-stage stratified sample design was adopted. In the first stage, records in the frame of quarters were stratified by the geographical area and type of quarter, and a sample of (5,000) addresses was randomly selected using the systematic replicated sampling technique with fixed sampling intervals and nonrepetitive random numbers. In the second stage, when more than one participant was eligible from one household, the earliest birthday method was adopted for selecting the participant for an interview. After the exclusion of vacant, demolished, and unidentifiable addresses; addresses without eligible Chinese inhabitants; and addresses eventually unused in this survey, the actual sample size was reduced to 1,966. With an effective sample size of 1,001, the precision of estimates is expected to be within the range of $\pm 3.1\%$ points

at the 95% confidence interval by assuming simple random sampling.

Data Collection

Face-to-face interviews using structured questionnaires were conducted by a group of professional interviewers from November 2016 to March 2017. All interviewers were required to attend a half-day training session on the content of questionnaires, sampling procedures, and interviewing techniques. A notification letter was sent to the sampled households explaining the purposes of the survey prior to the survey. Briefing and debriefing sessions were arranged during data collection to ensure that interviewers adequately understood fieldwork procedures and that problems encountered could be resolved and shared among the interviewers concerned as soon as practicable. Computer-assisted personal interviewing and its web support system were used for data collection. Each interview lasted for approximately 40 minutes. Of the 1,966 valid samples, 1,001 successfully completed interviews, yielding a response rate of 50.9%. Among the remaining 965 cases, 234 refused to participate in the survey and 731 were not contactable after more than five visits at different times of the day and on different days of the week.

Measurements

Intergenerational Relationship Quality

The 13-item IRQS-AP was developed on the basis of the solidarity, conflict, and ambivalence models and operationalized as a multidimensional concept comprising five domains: structural–associational solidarity, affectual closeness, consensual–normative solidarity, intergenerational conflict, and functional exchange. After a comprehensive review of studies on intergenerational relationship quality, a pool of 15 candidate scale items was generated to represent intergenerational relationship quality. The items were derived from or revised with reference to studies that had focused on one or more specific domains. To establish content validity, three researchers evaluated the conformity of items to the theoretical definitions and their redundancy. After screening all items independently, 13 items were retained for initial psychometric assessment: three items on structural–associational solidarity, two items on affectual closeness, three items on consensual–normative solidarity, two items on functional exchange, and three items on intergenerational conflict (see Appendix).

The structural and associational domains were integrated and measured together as structural–associational solidarity with three items to jointly reflect intergenerational interactions rather than being measured separately. The three items were adapted from the measurement introduced by [Bengtson and Roberts \(1991\)](#), assessing the residential proximity between parents and children (i.e., 1 = *live in different cities*, 2 = *live in the same city but not the*

same region, 3 = live in the same region but not the same district, 4 = living in the same district but not together, and 5 = live together) and the frequency of face-to-face contact and the frequency of contact by phone, letter, or email, ranging from 1 (*Once per year or less*) to 5 (*Once or more per day*).

The consensual and normative domains were integrated and measured with three items to jointly reflect the value and opinion similarities between parents and adult children overall and specifically on social issues and the filial responsibilities of care for older parents. Affectual closeness was assessed using two items from the indicators of affectional solidarity developed by Bengtson & Roberts (1991), in which participants reported their relationship with their children and general feelings of closeness on a scale ranging from 1 (*not close at all*) to 5 (*very close*). The three items used to measure conflict domain were compiled from two widely used instruments introduced by Umberson (1992) and Whitbeck, Hoyt, and Huck (1994), which assess the frequency with which older parents have tense and strained feelings toward their children, think that their children make excessive demands on them, and regard their children as being critical of them.

Although numerous intergenerational studies have investigated functional exchange between generations, it has less often been measured together with other relationship domains to determine intergenerational relationship quality. Because bidirectional functional exchange between generations is very common in Chinese societies, two items were used to assess functional exchange in terms of older parents' frequencies of receiving gifts or money from their adult children and helping their adult children with household chores. Five-point Likert scales were used for each indicator; the total scores ranged from 13 to 65, with a higher score indicating a higher relationship quality. The validity and reliability of the scale were examined and are reported in the results section.

Depressive Symptoms

Depressive symptoms were assessed using the 5-item Geriatric Depression Scale (Hoyle et al., 1999); the 5-item and 15-item Chinese versions of this scale have been widely used in various Chinese communities (Chin, Liu, Lee, & Chu, 2014; Lai, Fung, & Yuen, 2005). Participants were asked whether they were satisfied with their life, felt upset or helpless, would rather stay at home than go out for new things, and felt worthless. The total scores range from 0 to 5, with a higher score indicating a higher level of depressive symptoms. The scale showed satisfactory internal consistency (Cronbach's alpha = .747) in our sample.

Sense of Loneliness

Sense of loneliness was assessed using the Chinese version of the De Jong Gierveld Six-item Loneliness Scale

(De Jong Gierveld & van Tilburg, 2006; Leung, de Jong Gierveld, & Lam, 2008). This scale covers both emotional and social loneliness by using three response categories. The neutral and negative answers were coded as "1" for positively worded items, whereas the neutral and positive answers were coded as "1" for negatively worded items. The total scores range from 0 to 6, with a higher score indicating stronger sense of loneliness. The internal consistency of the scale in our sample, measured using Cronbach's alpha, was .742.

Self-Image

Self-image was assessed using the Chinese version of the Self-image of Aging Scale (Bai, Chan, & Chow, 2012). The 14-item scale examined how participants perceived themselves in terms of general physical health, social virtues, life attitudes, psychosocial status, and cognition. The items are rated on a 5-point scale, and the possible score range is from 14 to 70, with a higher score indicating a better self-image. The internal consistency of the scale in our sample, measured using Cronbach's alpha, was .848.

Sociodemographic Characteristics

Information regarding participants' age, gender, marital status, number of children, education level, employment status, and economic status were also collected. Marital status was categorized as married, divorced or separated, widowed, and never married. Education level was categorized as no formal education, primary education, and secondary or higher education. Employment status was categorized as retired or no longer working, working full time, and working part time. Self-perceived economic condition was categorized as very poor, poor, fair, rich, and very rich.

Data Analysis

Data analysis was performed using SPSS 24 and Amos 23. Figure 1 presents the flowchart of the study. Participants who had no child aged 18 years or older ($n = 185$) or had more than one missing value in the 13-item focal scale ($n = 15$) were excluded. For the six cases with a missing value for the 13 items, the missing values were replaced with the item means. Descriptive and frequency analyses were performed to describe the key sociodemographic characteristics of the remaining 801 participants and score distributions in terms of their depressive symptoms, sense of loneliness, and self-image. An initial confirmatory factor analysis (CFA) was conducted to examine whether our data fitted the theoretical five-factor model ($n = 801$) by using covariance matrices and the maximum likelihood method of estimation. A model is regarded as acceptable if the relative chi-square value (CMIN/df) is less than 3 (Hair, Anderson, Babin, & Black, 2010), the goodness-of-fit index

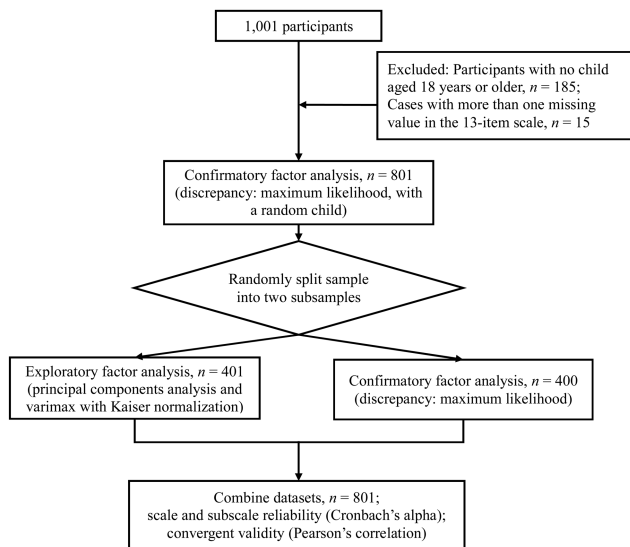


Figure 1. Flowchart of the study.

(GFI) exceeds .9 (Byrne, 1994), the comparative fit index (CFI) exceeds .93 (Byrne, 1994), and the root mean square error of approximation (RMSEA) is less than .8 (Browne & Cudeck, 1993). Because the purpose of this study was to develop and validate a scale, we further required that all factor loadings should exceed .4.

The results suggested a poor fit for the five-factor model, therefore an exploratory factor analysis (EFA) using the principle component analysis (PCA) with varimax rotation was subsequently performed on a random half of the sample ($n = 401$) to identify the factor structure of the scale. CFA was performed to further validate the scale by using the other random half of the sample ($n = 400$). When sampled cases rated their relationships with more than one child, one of the children was randomly selected as the target child by using the SPSS complex sampling function. After the factor structure was confirmed using CFA, the internal consistency of the scale was examined using Cronbach's alpha estimates and Spearman's item-total correlations based on the whole sample ($n = 801$). The convergent validity of the scale was established by correlating the IRQS-AP score with depressive symptoms, sense of loneliness, and self-image. The intergenerational ambivalence score was further calculated.

Results

Table 1 lists the sociodemographic characteristics of the participants. Of the 801 participants, 453 (56.6%) were women and 348 (43.4%) were men. The mean (standard deviation [SD]) age of the participants was 68.576 (10.880) years. Most of the participants ($n = 474$, 59.5%) were married, whereas others were divorced or separated ($n = 81$, 10.2%), widowed ($n = 234$, 29.6%), or never married ($n = 2$, 0.3%). The mean (SD) of the number of children was 2.489 (1.397). Approximately 23.6% ($n = 189$)

of the participants had only one child, 37.7% ($n = 302$) had two children, 19% ($n = 152$) had three children, and 19.7% ($n = 158$) had four or more children. Approximately one fifth ($n = 166$, 20.9%) of the participants received no formal education, 343 (43.2%) received primary education, and the remaining participants ($n = 285$, 35.9%) obtained secondary or higher education. The majority ($n = 598$, 74.9%) of the participants were retired or no longer working, whereas the remaining 25.1% worked either full time ($n = 155$, 19.4%) or part time ($n = 45$, 5.6%). In terms of their self-perceived economic status, the majority ($n = 572$, 71.9%) of the participants rated it as fair, whereas others reported it as very poor ($n = 18$, 2.3%), poor ($n = 107$, 13.5%), rich ($n = 95$, 11.9%), or very rich ($n = 3$, 0.4%).

An initial CFA was performed to examine whether the data fitted the theoretically hypothesized five-factor model. The GFIs showed that the model was inadequate for our sample ($\chi^2 = 349$, $df = 55$, $p < .001$, $CMIN/df > 5$, $CFI = .940$, $GFI = .935$, and $RMSEA > .08$). In addition, the factor loading of item 9 in the functional exchange domain was lower than the threshold of .4.

To identify the factor structure of the scale, an EFA was performed on a random half of the sample ($n = 401$) by using PCA with varimax rotation. The Kaiser–Meyer–Olkin value was .741, and Bartlett's test of sphericity reached statistical significance ($p < .001$), indicating that the sample met the criteria for factor analysis (Hair et al., 2010). The rotated component matrix (Table 2) yielded four factors with eigenvalues greater than one, which explained 70.7% of the total variance. Each item had a single dominant factor loading, and all loadings were over .50. Factor 1 (items 11, 12, and 13; 30.7% variance explained) measured consensual–normative solidarity, Factor 2 (items 1, 2, 3, and 10; 17.9% variance explained) measured structural–associational solidarity, Factor 3 (items 4, 5, and 9; 12.8% variance explained) was related to affectual closeness between generations, and Factor 4 (items 6, 7, and 8; 9.4% variance explained) involved intergenerational conflict. The communalities of most variables were greater than .5 with a mean level of .7, indicating that the reliability of the indicators is acceptable (MacCallum, Widaman, Zhang, & Hong, 1999).

The findings of the EFA provided initial support for the four-factor solution, and a CFA was further performed to determine the structural validity of the scale based on the other random half of the sample ($n = 400$). As shown in Figure 2, all factor loadings exceeded .5, except for item 9 (.43). The GFIs showed that the model was acceptable ($\chi^2 = 187$, $df = 59$, $p < .001$, $CMIN/df = 3.2$, $CFI = .949$, $GFI = .933$, and $RMSEA = .074$). On the basis of modification indices, we further added one covariance between the errors of item 1 and item 2 within Factor 2 because the face-to-face contact should be strongly associated with the residential proximity between two generations. Figure 2 presents the results estimated using the standardized parameter with path diagrams and factor loadings.

Table 1. Characteristics of Participants ($n = 801$)

Demographics	Category	N (%)	Mean (SD)
Age group	Soon-to-be-old (50–64)	311 (38.8)	68.576 (10.880)
	Young-old (65–74)	262 (32.7)	
	Mid-old (75–84)	149 (18.6)	
	Old-old (85 and older)	79 (9.9)	
Gender	Male	348 (43.4)	—
	Female	453 (56.6)	
Marital status (missing = 10)	Married	474 (59.9)	—
	Divorced/separated	81 (10.2)	
	Widowed	234 (29.6)	
	Never married	2 (0.3)	
Number of children	1	189 (23.6)	2.489 (1.397)
	2	302 (37.7)	
	3	152 (19.0)	
	4 and above	158 (19.7)	
Education level (missing = 7)	No formal education	166 (20.9)	—
	Primary education	343 (43.2)	
	Secondary or higher education	285 (35.9)	
Employment status (missing = 3)	Retired/no longer working	598 (74.9)	—
	Full-time employment	155 (19.4)	
	Part-time employment	45 (5.6)	
Self-perceived economic condition (missing = 6)	Very poor	18 (2.3)	—
	Poor	107 (13.5)	
	Fair	572 (71.9)	
	Rich	95 (11.9)	
	Very rich	3 (0.4)	
Depressive symptoms (missing = 8)	Possible score range (0–5); Actual score range (0–5)	—	1.035 (1.373)
Sense of loneliness (missing = 21)	Possible score range (0–6); Actual score range (0–6)	—	2.671 (1.865)
Self-image (missing = 25)	Possible score range (14–70); Actual score range (22–70)	—	49.659 (7.568)

Note: SD = standard deviation.

The GFIs improved ($\chi^2 = 170$, $df = 61$, $CMIN/df = 2.8$, $p < .001$, $CFI = .957$, $GFI = .939$, and $RMSEA = .067$) and confirmed the validity of this scale (Hair et al., 2010). Table 3 presents the GFIs of the four-factor model by the gender of the parent and child. The GFIs in the mother–daughter ($n = 216$, $\chi^2 = 95$, $df = 59$, $p = .002$, $CMIN/df = 1.610$, $CFI = .968$, $GFI = .941$, and $RMSEA = .053$), father–daughter ($n = 167$, $\chi^2 = 89$, $df = 59$, $p = .007$, $CMIN/df = 1.508$, $CFI = .973$, $GFI = .931$, and $RMSEA = .055$), mother–son ($n = 237$, $\chi^2 = 138$, $df = 59$, $p = .000$, $CMIN/df = 2.339$, $CFI = .948$, $GFI = .919$, and $RMSEA = .075$), and father–son ($n = 181$, $\chi^2 = 137$, $df = 59$, $p = .000$, $CMIN/df = 2.322$, $CFI = .934$, $GFI = .901$, and $RMSEA = .086$) subsamples were all satisfactory.

As shown in Table 2, the mean (SD) score of the IRQS-AP was 44.744 (7.072), with the possible score ranging from 13 to 65. The mean (SD) scores of Factors 1, 2, 3, and 4 were 8.511 (2.465), 13.172 (3.906), 11.042 (2.316), and 12.019 (2.397), respectively; the score range of Factor 2 was from 4 to 20, whereas those of other factors were from 3 to 15. Item–total correlations using Spearman's rho ranged from .285 to .672 ($p < .01$). The Cronbach's alpha coefficient for the scale was .776. The subscale alpha coefficients were .882 (Factor 1), .768 (Factor 2), .751 (Factor

3), and .812 (Factor 4), respectively. These results indicated that the scale had a satisfactory internal consistency (Hair et al., 2010).

Intergenerational ambivalence was calculated using indirect strategies based on the following adapted Thompson's formula (Thompson, Zanna, & Griffin, 1995): ambivalence = (positive + negative)/2 – |positive – negative| + 3. In the present study, a positive score was the sum of the first three factor scores divided by the number of items in each factor (e.g., positive score = Factor 1/3 + Factor 2/4 + Factor 3/3), and 18 minus the score of Factor 4 was used as a negative score (e.g., negative score = 18 – Factor 4). The formula indicates that opposing feelings should be both intense and similar in magnitude to obtain a high ambivalence score. The addition of 3 was used to eliminate negative scores; thus, the possible score range of ambivalence was from 0 to 15, with a higher score indicating stronger intergenerational ambivalence. The mean (SD) score of ambivalence with the selected child in the present sample was 6.65 (3.29).

Convergent validity was examined using correlational analyses of IRQS-AP scores with conceptually related variables such as depressive symptoms, sense of loneliness, and self-image. As listed in Table 4, the correlations of IRQS-AP

Table 2. Analysis of the 13-Item IRQS-AP

	<i>n</i> = 801			PCA—loadings [†] (<i>n</i> = 401)				
	<i>M</i>	<i>SD</i>	Item–total correlation*	Com [^]	1	2	3	4
Factor 1: Consensual–normative solidarity (range [3–15]; VE: 30.7%)	8.511	2.465						
12. How similar are your opinions on social issues?	2.746	.915	.514	.780	.892	.007	–.043	.030
11. Overall, how similar are your opinions?	2.831	.910	.551	.818	.892	.031	.006	–.002
13. How similar are your opinions regarding government versus family responsibility for the care of older adults?	2.934	.915	.524	.752	.873	–.057	.038	–.021
Factor 2: Structural–associational solidarity (range [4–20]; VE: 17.9%)	13.172	3.906						
1. How closely located are your homes?	3.659	1.409	.570	.755	–.087	.915	–.075	–.014
2. How often have you had face-to-face contact in the past 12 months?	3.680	1.233	.672	.847	–.075	.911	.079	.059
10. How often do you help him/her perform household chores?	2.298	1.338	.465	.452	.079	.656	–.109	–.126
3. How often have you contacted each other by phone, letter, or email in the past 12 months?	3.535	1.082	.659	.523	.258	.511	.147	.070
Factor 3: Affectual closeness (range [3–15]; VE: 12.8%)	11.042	2.316						
5. How well do you get along with him/her?	4.011	.848	.529	.895	–.072	–.025	.966	.035
4. What are your general feelings of closeness to him/her?	3.920	.887	.554	.883	–.047	.013	.955	–.031
9. How often do you receive gifts or money from him/her?	3.111	1.083	.457	.370	.218	–.063	.538	–.057
Factor 4: Intergenerational conflict (range [3–15]; VE: 9.4%)	12.019	2.397						
7. How often do you think he/she makes excessive demands on you?	4.059	.911	.285	.715	–.023	–.066	–.083	.851
8. How often does he/she criticize you or your actions?	3.921	.900	.332	.726	.071	.010	.003	.844
6. How often do you have tense and strained feelings toward him/her?	4.039	.996	.352	.680	–.037	.016	.045	.816
Total (range [13–65]; VE = 70.7%)	44.744	7.072						
Cronbach's alpha (<i>n</i> = 801): .776					.882	.768	.751	.812

Note: **p* value of the item–total correlation coefficient (Spearman's rho) for each item was <.001; [^]Com = Communalities; [†]Kaiser–Meyer–Olkin measure of sampling adequacy = .741; *p* value of Bartlett's test of sphericity <.001. *M* = mean; PCA = principal component analysis; *SD* = standard deviation; VE = variance explained.

scores with depressive symptoms, sense of loneliness, and self-image were $-.385$, $-.449$, and $.384$, respectively, with all being significant in expected directions. Thus, the 13-item IRQS-AP demonstrated its convergent validity.

Discussion

This is the first study to develop and validate a measurement for assessing the relationship quality of Chinese older adults with their adult children based on the effective integration

of the solidarity, conflict, and ambivalence models (see Appendix). Compared with the five-factor (i.e., affectual, consensual–normative, structural–associational, functional exchange, and conflict) model proposed, EFA suggested a 13-item four-factor solution with satisfactory factor loadings for our sample of Chinese older adults. The subsequent CFA confirmed this model with an independent subsample.

The four factors identified in the present study were consensual–normative solidarity, structural–associational solidarity, affectual closeness, and intergenerational conflict.

Although the factors covered the core dimensions of the hypothesized model, the functional exchange domain was not retained as a separate factor in the final construct, indicating the cultural uniqueness of this scale when applied to Chinese older adults. This uniqueness was because the item measuring gift and monetary transfers from adult children to older parents (which was intended to measure functional exchange) was loaded on the affectual closeness domain, whereas the other item on the functional exchange domain measuring the extent of parents helping with their children's household chores was loaded on the structural-associational domain. This result reflected to some extent the changing practice of financial care for older parents in Hong Kong. It used to be customary for adult children to serve as the main source of financial support for their elderly parents; however, this function has been undermined in contemporary society by changing

family structures, family evolution, and displacement (Chong & Liu, 2016). Moreover, the high living costs and heavy caregiving burden in Hong Kong also weaken their caregiving abilities. Although providing financial support to older parents is still regarded as a desirable filial behavior, its fulfilment is considered to be situational and even symbolic (Ting, 2009). Therefore, Chinese adult children giving money or gifts to parents is more of a symbol of respect and indicates a close intergenerational relationship rather than functioning as the main source of financial support. Similarly, parents helping with household chores and caring for grandchildren is too common to be regarded as a special form of support; however, it can increase the likelihood of intergenerational interactions.

This factor pattern could be specific to Chinese culture, but its potential for use in other cultural contexts remains. Most of the emergent domains are consistent with the suggestions of the three theoretical models, indicating that this scale captured the essence of multidimensional intergenerational relationships. When applied in cross-cultural contexts, factor patterns are expected to display subtle differences. For instance, the functional exchange domain may emerge as a separate domain. More culturally sensitive items can be further developed to represent this domain.

The mean scale score of 44.2 obtained from the existing sample is moderately high. Hong Kong families generally have good intergenerational relationships, probably because family is of central importance in China, and family harmony has been a crucial achievement goal of Chinese families for centuries (Xu & Chi, 2011). The subscale scores exhibited a relatively high level of structural-associational solidarity and affectual closeness and a low degree of conflict. This could be explained by previous findings, which indicate that the attributes of contemporary filial piety usually contain four major attitudinal and social interactional dimensions: (1) respecting older family members, (2) obeying them, (3) pleasing them, and (4) keeping in contact with them (Gallois et al., 1999), which would contribute to more frequent contact and stronger affectual solidarity. It is a traditional norm for young people to respect, care for, and obey their older family members (Chong & Liu,

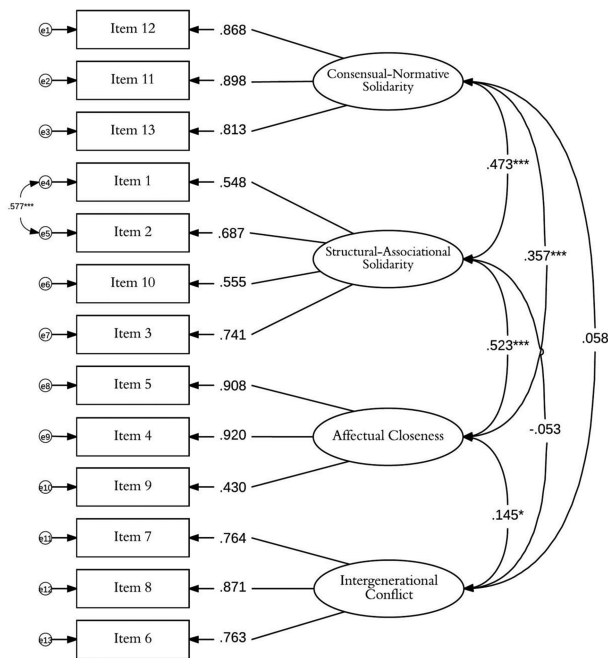


Figure 2. Results of confirmatory factor analysis ($n = 400$). *** $p < .001$; * $p < .05$.

Table 3. Structural Validation in Subsamples Categorized According to the Gender of Parent and Child

	Mother-daughter ($n = 216$)	Father-daughter ($n = 167$)	Mother-son ($n = 237$)	Father-son ($n = 181$)
Chi-square	95	89	138	137
Degrees of freedom	59	59	59	59
Probability level	.002	.007	.000	.000
CMIN/ df	1.610	1.508	2.339	2.322
CFI	.968	.973	.948	.934
GFI	.941	.931	.919	.901
RMSEA	.053	.055	.075	.086

Note: CFI = comparative fit index; CMIN/ df = relative chi-square value; GFI = goodness-of-fit index; RMSEA = root mean square error of approximation.

Table 4. Subscale Correlations and Convergent Validity: Bivariate Pearson Correlations ($n = 801$)

	IRQS-AP	1	2	3	4	5
1. Consensual–normative solidarity	.654***					
2. Structural–associational solidarity	.759***	.322***				
3. Affectual closeness	.701***	.341***	.366***			
4. Intergenerational conflict	.371***	.054	-.069 [^]	.161***		
5. Ambivalence	-.390***	-.074*	-.020	-.155***	-.896***	
6. Depressive symptoms	-.385***	-.215***	-.259***	-.359***	-.149***	.151***
7. Sense of loneliness	-.449***	-.210***	-.231***	-.428***	-.329***	.335***
8. Self-image	.384***	.236***	.300***	.243***	.170***	-.185***

Note: *** $p < .001$, * $p < .05$, [^] $p < .1$. IRQS-AP = Intergenerational Relationship Quality Scale for Aging Chinese Parents.

2016), and strong obedience to older people reduces the conflict level in Chinese families. A previous finding that older generation members in a family tend to report lower levels of negative relationship quality could be another reason for the low degree of conflict observed in the present study (Birditt et al., 2012).

Consensual–normative solidarity had the lowest rating in all subdomains. This finding is consistent with that of a previous study conducted in Hong Kong, which found that older adults in Hong Kong reported a lower level of consensus with their children regarding values when compared with those in Western countries, such as England, Germany, Spain, Norway, and Israel (Chan, 2013). Among the items measuring the intergenerational consensus, item 12 (“Overall, how similar are your opinions to those of your child on social issues?”) yielded the lowest score. The low score in this domain may be a result of the unique social, political, and historical context in Hong Kong. During recent years, a series of prodemocracy protests, characterized by the Occupy Central and Umbrella Movement, has created more chances than ever for parents and young generations to display different opinions on social and political issues. The media reported a lack of consensus within families over attending protests (Au Jeong & Chow, 2014). Moreover, the score of value consensus over older care responsibilities was moderately low, which, to some extent, reflected intergenerational discrepancies toward traditional filial care obligations. Programmes could be developed to foster older adults’ alignment to social changes (Bai, 2016), and encourage more effective communications between generations.

The four factors were significantly and moderately intercorrelated, which provided evidence for structural relationships among the separate dimensions of this model and, to some extent, supported the combination of these factors into a single additive scale. Only the intergenerational conflict showed no significant association with structural–associational solidarity and consensual–normative solidarity. This finding indicates that frequent intergenerational interactions may not contribute to less conflict. The convergent validity results suggested that the better the relationship between older parents and their adult children is, the higher

the self-image and the milder the depressive symptoms and sense of loneliness that parents experience, thereby increasing the chance of successful aging (Bai, 2014). Therefore, service practitioners should strengthen public knowledge on the importance of high-quality family relationships and develop more tailored services and programs to enhance intergenerational relationships for older adults, thereby improving their well-being.

Limitations

This study has several limitations. First, parents were chosen as single informants for the measure. Thus, whether data collected from adult children would yield different results remains unclear, and further investigation is needed. Second, test–retest exercise was not conducted to evaluate the stability of older parents’ responses. Third, because of its cultural sensitivity, the current 13-item IRQS-AP is recommended as a valid and reliable multidimensional instrument for use among aging Chinese adults or other societies that have a similar culture. Some theoretically meaningful domains, such as the functional exchange domain, may not have been fully represented in the current scale. Future studies should continue to investigate the meaningful facets of this construct and develop culturally sensitive items to represent them. It would also be valuable to further unravel how the characteristics of parents and children may affect intergenerational relationship quality; and provide tailored services to help the most vulnerable groups to improve their intergenerational relationships.

Supplementary Material

Supplementary material can be found at *The Gerontologist* online.

Funding

This work was supported by the General Research Fund–Early Career Scheme sponsored by the Research Grant Council of Hong Kong (Reference No. 25608915).

Acknowledgment

I would like to thank my two research assistants Ms Chang Liu and Ms Zoey Kuang for their assistance in literature review and data analysis. I would also like to thank the editor and two anonymous reviewers for their insightful comments and suggestions.

Conflict of Interest

None reported.

References

- Au Jeong, W. Q. & Chow, Z. Y. (2014). "Occupy Central" hurting society; activists ostracised, especially by families and friends. *Wenweipo*. Retrieved May 15, 2017, from <http://paper.wenweipo.com/2014/10/03/YO1410030008.htm>
- Bai, X. (2014). Image of ageing in society: A literature review. *Journal of Population Ageing*, 7, 231–253. doi:10.1007/s12062-014-9103-x
- Bai, X. (2016). Alignment or struggle? Exploring socio-demographic correlates of individual modernity in Chinese older people. *Ageing and Society*, 36, 133–159. doi:10.1017/S0144686X14001020
- Bai, X., Chan, K. S., & Chow, N. (2012). Validation of self-image of aging scale for Chinese elders. *International Journal of Aging and Human Development*, 74, 67–86. doi:10.2190/AG.74.1.d
- Bai, X., Guo, Y., & Fu, Y. Y. (2017). Self-image and intergenerational relationships as correlates of life satisfaction in Chinese older adults: Will gender make a difference? *Ageing and Society*, 1–18. Advance online publication. doi:10.1017/S0144686X17000113
- Bengtson, V. L., & Roberts, R. E. L. (1991). Intergenerational solidarity in aging families: An example of formal theory construction. *Journal of Marriage and the Family*, 53, 856–870. doi:10.2307/352993
- Bengtson, V. L., & Schrader, S. S. (1982). Parent-child relations. In D. J. Mangen & W. A. Peterson (Eds.), *Research instruments in social gerontology: Social roles and social participation* (pp. 115–129). Minneapolis, MN: University of Minnesota Press.
- Birditt, K. S., Tighe, L. A., Fingerman, K. L., & Zarit, S. H. (2012). Intergenerational relationship quality across three generations. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, 67, 627–638. doi:10.1093/geronb/gbs050
- Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 136–162). Newsbury Park, CA: Sage.
- Byrne, B. M. (1994). *Structural equation modeling with EQS and EQS/Windows*. Thousand Oaks, CA: Sage Publications.
- Census and Statistics Department. (2005). *Introduction to the 2001 population census*. Hong Kong: Census and Statistics Department.
- Chan, Y. L. (2013). Filial piety requires emotional care, not just financial support. *South China Morning Post*. Retrieved May 15, 2017, from http://www.nur.cuhk.edu.hk/gb/about-us/news/lang_en/filial-piety-requires-emotional-care-not-just-financial-support/
- Chin, W. C., Liu, C. Y., Lee, C. P., & Chu, C. L. (2014). Validation of five short versions of the Geriatric Depression Scale in the elder population in Taiwan. *Taiwan Journal of Psychiatry*, 28, 156–163. Retrieved May 15, 2017, from http://www.sop.org.tw/sop_journal/index.asp?kd/1/1.html
- Chong, A. M. L., & Liu, S. S. (2016). Receive or give? Contemporary views among middle-aged and older Chinese adults on filial piety and well-being in Hong Kong. *Asia Pacific Journal of Social Work and Development*, 26, 2–14. doi:10.1080/02185385.2015.1131619
- Chow, N. W. S., & Bai, X. (2011). Modernization and its impact on Chinese older people's perception of their own image and status. *International Social Work*, 54, 800–815. doi:10.1177/0020872811406458
- Cicirelli, V. (1995). A measure of caregiving daughters' attachment to elderly mothers. *Journal of Family Psychology*, 9, 89–94. doi:10.1037//0893-3200.9.1.89
- Clarke, E. J., Preston, M., Raksin, J., & Bengtson, V. L. (1999). Types of conflicts and tensions between older parents and adult children. *The Gerontologist*, 39, 261–270. doi:10.1093/geront/39.3.261
- De Jong Gierveld, J., & van Tilburg, T. G. (2006). 6-Item Scale for overall, emotional, and social loneliness: Confirmatory tests on survey data. *Research on Aging*, 28, 582–598. doi:10.1177/0164027506289723
- Fingerman, K. L., Pitzer, L. M., Lefkowitz, E. S., Birditt, K. S., & Mroczek, D. (2008). Ambivalent relationship qualities between adults and their parents: Implications for the well-being of both parties. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, 63, P362–P371. doi:10.1093/geronb/63.6.P362
- Gallois, C., Giles, H., Ota, H., Pierson, H. D., Ng, S. H., Lim, T. S., Maher, J., Somera, L., Ryan, E. B., & Harwood, J. (1999). Intergenerational communication across the Pacific Rim: The impact of filial piety. In J.-C. Lasry, J. Adair, & K. Dion (Eds.), *Latest contributions to cross-cultural psychology* (pp. 192–211). Lisse, The Netherlands: Swets & Zeitlinger B.V.
- Guo, M., Chi, I., & Silverstein, M. (2013). Sources of older parents' ambivalent feelings toward their adult children: The case of rural China. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, 68, 420–430. doi:10.1093/geronb/gbt022
- Guo, M., Xu, L., Liu, J. Y., Mao, W. Y., & Chi, I. (2016). Parent-child relationships among older Chinese immigrants: The influence of co-residence, frequent contact, intergenerational support and sense of children's deference. *Ageing and Society*, 36, 1459–1482. doi:10.1017/S0144686X15000446
- Hair, J., Anderson, R., Babin, B., & Black, W. (2010). *Multivariate data analysis: A global perspective*. Upper Saddle River, NJ: Pearson.
- Hogerbrugge, M. J., & Komter, A. E. (2012). Solidarity and ambivalence: Comparing two perspectives on intergenerational relations using longitudinal panel data. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, 67, 372–383. doi:10.1093/geronb/gbr157
- Hoyle, M. T., Alessi, C. A., Harker, J. O., Josephson, K. R., Pietruszka, F. M., Koelfgen, M., ... Rubenstein, L. Z. (1999). Development and testing of a five-item version of the Geriatric Depression Scale. *Journal of the American Geriatrics Society*, 47, 873–878. doi:10.1111/j.1532-5415.1999.tb03848.x
- Lai, D. W., Fung, T. S., & Yuen, C. T. (2005). The factor structure of a Chinese version of the Geriatric Depression Scale. *International Journal of Psychiatry in Medicine*, 35, 137–148. doi:10.2190/CRK0-CBN7-QEVE-XWPG

- Leung, G. T. Y., de Jong Gierveld, J., & Lam, L. C. W. (2008). Validation of the Chinese translation of the 6-item De Jong Gierveld Loneliness Scale. *International Psychogeriatrics*, *20*, 1262–1272. doi:10.1017/S1041610208007552
- Long, V. M., & Martin, P. (2000). Personality, relationship closeness and loneliness of the oldest old and their children. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, *55B*, 311–319. doi:10.1093/geronb/55.5.P311
- Lowenstein, A. (2007). Solidarity-conflict and ambivalence: Testing two conceptual frameworks and their impact on quality of life for older family members. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, *62*, S100–S107. doi:10.1093/geronb/62.2.S100
- Lüscher, K. (2002). Intergenerational ambivalence: Further steps in theory and research. *Journal of Marriage and Family*, *64*, 585–593. doi:10.1111/j.1741-3737.2002.00585.x
- Lüscher, K., & Pillemer, K. A. (1998). Intergenerational ambivalence: A new approach to the study of parent-child relations in later life. *Journal of Marriage and Family*, *60*, 413–425. doi:10.2307/353858
- MacCallum, R. C., Widaman, K. F., Zhang, S., & Hong, S. (1999). Sample size in factor analysis. *Psychological Methods*, *4*, 84–99. doi:10.1037/1082-989X.4.1.84
- Mangen, D., Bengtson, V. L. & Landry, P. H., Jr. (Eds.). (1988). *The measurement of intergenerational relations*. Beverly Hills, CA: Sage.
- Merz, E., Consedine, N. S., Schulze, H., & Schuengel, C. (2009). Wellbeing of adult children and ageing parents: Associations with intergenerational support and relationship quality. *Ageing and Society*, *29*, 783–802. doi:10.1017/S0144686X09008514
- Pinquart, M., & Sörensen, S. (2000). Influence of socioeconomic status, social network, and competence on subjective well-being in later life: A meta-analysis. *Psychology and Aging*, *15*, 187–224. doi:10.1037//0882-7974.15.2.187
- Pitzer, L., Fingerman, K. L., & Lefkowitz, E. S. (2011). Development of the parent adult relationship questionnaire (PARQ). *International Journal of Aging and Human Development*, *72*, 111–135. doi:10.2190/AG.72.2.b
- Polenick, C.A., Birditt, K.S., & Zarit, S.H. (2017). Parental support of adult children and middle-aged couples' marital satisfaction. *The Gerontologist*, gnX021. Advance online publication, doi:10.1093/geront/gnx021
- Polenick, C. A., Fredman, S. J., Birditt, K. S., & Zarit, S. H. (2016). Relationship quality with parents: Implications for own and partner well-being in middle-aged couples. *Family Process*, *12*, 1–16. doi:10.1111/famp.12275
- Reczek, C., & Zhang, Z. (2016). Parent-child relationships and parent psychological distress: How do social support, strain, dissatisfaction, and equity matter? *Research on Aging*, *38*, 742–766. doi:10.1177/0164027515602315
- Reynolds, J., Houlston, C., & Coleman, L. (2014). *Understanding relationship quality*. UK: OnePlusOne.
- Silverstein, M., & Bengtson, V. L. (1997). Intergenerational solidarity and the structure of adult child-parent relationships in American families. *American Journal of Sociology*, *103*, 429–460. doi:10.1086/231213
- Silverstein, M., Gans, D., Lowenstein, A., Giarrusso, R., & Bengtson, V. L. (2010). Older parent - Child relationships in six developed nations: Comparisons at the intersection of affection and conflict. *Journal of Marriage and the Family*, *72*, 1006–1021. doi:10.1111/j.1741-3737.2010.00745.x
- Stokes, J. E. (2016). The influence of intergenerational relationships on marital quality following the death of a parent in adulthood. *Journal of Social and Personal Relationships*, *33*, 3–22. doi:10.1177/0265407514558962
- Thompson, M. M., Zanna, M. P., & Griffin, D. W. (1995). Let's not be indifferent about (attitudinal) ambivalence. In R. E. Petty & J. A. Krosnick (Eds.), *Attitude strength: Antecedents and consequence* (pp. 361–386). Mahwah, NJ: Lawrence Erlbaum.
- Ting, K. F. (2009). *The meaning and practice of filial piety in Hong Kong*. Hong Kong: A Report to Central Policy Unit, the Government of Hong Kong Special Administrative Region.
- Umberson, D. (1992). Relationships between adult children and their parents: Psychological consequences for both generations. *Journal of Marriage and Family*, *54*, 664–674. doi:10.2307/353252
- Van Gaalen, R. I., & Dykstra, P. A. (2006). Solidarity and conflict between adult children and parents: A latent class analysis. *Journal of Marriage and Family*, *68*, 947–960. doi:10.1111/j.1741-3737.2006.00306.x
- Walker, A. J., & Thompson, L. (1983). Intimacy and intergenerational aid and contact among mothers and daughters. *Journal of Marriage and the Family*, *45*, 841–849. doi:10.2307/351796
- Whitbeck, L., Hoyt, D. R., & Huck, S. M. (1994). Early family relationships, intergenerational solidarity, and support provided to parents by their adult children. *Journal of gerontology*, *49*, S85–S94. doi:10.1093/geronj/49.2.S85
- Willson, A., Shuey, K., & Elder, G. (2003). Ambivalence in the relationship of adult children to aging parents and in-laws. *Journal of Marriage and Family*, *65*, 1055–1072. doi:10.1111/j.1741-3737.2003.01055.x
- Xu, L., & Chi, I. (2011). Life satisfaction among rural Chinese grandparents: The roles of intergenerational family relationship and support exchange with grandchildren. *International Journal of Social Welfare*, *20*, S148–S159. doi:10.1111/j.1468-2397.2011.00809.x