Why do women interact with their parents more often than men? The demonstration effect vs. the biological effect

Hung-Lin Tao*

Department of Economics, Soochow University, Taipei, Taiwan

ARTICLE INFO

Article history:
Received 29 January 2013
Received in revised form 9 April 2014
Accepted 9 April 2014
Available online 6 May 2014

Keywords:
The demonstration effect
Empathizing
Systemizing
Children as old-age security

ABSTRACT

Neuroscientists have shown that females are biologically more caring than males. In this paper, two empirical strategies are applied to examine the validity of using gender difference as the evidence for the argument. The first approach is to compare visits to parents between single females and single males. The second approach is to investigate whether females evaluate children as old-age security to render them more important in their lives. The conclusions of these two approaches do not support the position.

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1. Introduction

Altruistic and exchange motives are the main competing models used to explain inter vivos, intergenerational transfers. These two theoretical models and their empirical tests produce mixed results (Laferrière & Wolff, 2006) and seem too simple to fully characterize the sophisticated behavior of the intergenerational transfers. Recently, an alternative motive, the demonstration effect, has been proposed. The demonstration effect postulates that, by taking care of their elderly parents, adult parents set a norm to manipulate their children to behave in the same way toward themselves when they age. The demonstration effect is also referred to as preference shaping.

Cox and Stark (1994) are probably the first to propose the demonstration effect and indicate that the presence of grandchildren increases contacts between elderly parents and adult parents. However, using French data, Wolff (2001) shows that the increased contact is due to the care provided by elderly parents for the grandchildren. Cox and Stark (2005) argue that elderly parents benefit if they have grandchildren since their adult children are more willing to provide services and time to them. They show that adult children who intend to have a child are more likely to be financially supported by their elderly parents with housing payments. Cox and Stark (2005) stress that the financial help received from elderly parents is intended to encourage the production of grandchildren.

However, it is possible that adult children who have a good relationship with their elderly parents are more likely to be financially supported by their elderly parents. A good relationship between the generations encourages the adult children to have a child. This finding cannot underpin the demonstration effect. The other piece of evidence that they provide in regard to the demonstration effect is that elderly parents are more likely to help their sons than their daughters with their housing purchases. They explain that housing is complementary to a satisfactory marriage and hence to the production of grandchildren. In the case
of marital breakups, mothers will usually retain their children. Elderly parents, whose children are adult fathers, cannot be beneficiaries of the demonstration effect in the case where their adult sons’ marriages break up. Elderly parents are therefore more motivated to help their sons than their daughters. Alternatively, it is almost a universal convention that males are the breadwinners in their families, and are hence responsible for housing. Again, this is not evidence of the demonstration effect.

Instead of circumventing the use of contacts between two generations, Mitrut and Wolff (2009) argue that females have longer life expectancy and thus are more motivated to manipulate the demonstration effect. Since manipulation of the preference shaping is effective when the next generation is young, and since females are more likely to take care of their elderly parents, they show that adult females who have a younger daughter are more likely to make contact with their elderly parents. Using Bulgarian data, Mitrut and Wolff (2009) claim that this is the first causal evidence of the demonstration effect, implying that none of the prior research provided causal evidence.

Whether or not differences in gender-specific intergenerational transfers can validate the demonstration effect is an open question. Without proposing the demonstration effect, abundant social science studies, for example, Lopata (1973), Spitz and Logan (1990), Silverstein, Parrott, and Bengston (1995), and Silverstein, Gans, and Yang (2006) find that daughters, rather than sons, bear most of the responsibility to take care of their elderly parents, except in some patriarchal societies, such as India, China, and Taiwan (Lee, Parish, & Willis, 1994; Lin & Yi, 2011; Lin et al., 2003; Ofstedal, Knodel, & Chayovan, 1999). In the patriarchal family system, taking care of elderly parents is the sons’ responsibility. The married females’ responsibility is to take care of their parents-in-law, and not their own parents. As a result, the demonstration effect varies with culture. To people in Confucian culture, the demonstration effect involves practicing filial piety and instilling filial piety in the next generation. In Confucian societies, such as China, Taiwan, and many East Asian countries, married females who have younger sons are more motivated to manipulate the demonstration effect since in a patriarchal society sons play the central role in taking care of their elderly parents. Married females are not encouraged to transfer many resources to their own parents. Theoretically, married people who have sons are more likely to visit their parents if they do not live with their elderly parents.

More importantly, females are more likely than males to express concern and responsibility for others’ well-being, and less likely than males to pursue materialism (Beutel & Marini, 1995). It is then not surprising that the motives behind sons’ and daughters’ intergenerational support of their aging parents differ substantially (Silverstein et al., 1995, 2006; Yi & Lin, 2009). Adult daughters are motivated by intergenerational affection, whereas adult sons are motivated by filial obligation and the legitimation of inheritance. In other words, adult daughters like to make contact with their elderly parents, while adult sons think they should make contact with their elderly parents. The motivational and behavioral differences between genders can be attributed to socialization and the biological gene. Some studies, such as Silverstein et al. (1995), Beutel and Marini (1995), and Silverstein et al. (2006), believe that gender-specific differences in intergenerational support are a consequence of socialization, for example, a consequence of the gendered division of labor in families. Of course, socialization is a consequence of the complex interplay of nature and nurture. It is very difficult to disentangle these two factors in terms of how they work in upward intergenerational support. While this study does not intend to argue that the biological factor is more important than the process of socialization, it intends to provide some biological evidence demonstrating that females are by nature more empathic and caring than males. If females are born to be more empathic and caring, then adult females are naturally more willing to take care of their aging parents.

This study uses Taiwanese data to investigate the demonstration effect. First, adults without children do not have a motive to manipulate the demonstration effect. If single females interact with their elderly parents more often than single males, then adult mothers with children interacting with their elderly parents more often than adult fathers, as found in the literature, cannot be explained by the demonstration effect. Second, a precondition to argue that females are more motivated to put the demonstration effect into practice is that females are more likely than males to regard children as their old age security. This study will investigate these two issues to examine whether the demonstration effect can interpret Taiwan’s data.

2. Gender biological differences

2.1. Gender differences in empathy

Neuroscientists find that males and females have very different brain systems beginning with their embryonic period. The crux of their findings is that the source of gender difference, in addition to socialization, is nature. Neuroscientists suggest that testosterone plays a key role in differentiating the development of the brain system between embryonic females and males. Testosterone stimulates the development of the right hemisphere, and the right hemisphere manages systemizing (Baron-Cohen, 2003; Geschwind & Galaburda, 1985, 1987; Lutchmaya, Baron-Cohen, Raggatt, 2002a, 2002b; Moir & Jessel, 1992), the drive to analyze, explore, and construct a system. Individuals with great systemizing ability intuitively figure out the underlying rules that govern the behavior of a system. Baron-Cohen (2003) and Baron-Cohen, Knickmeyer, and Belmonte (2005) call it the male brain, and punctiliously indicate that it might occur in females (with female genitals) if they have high levels of testosterone. The development of systemizing suppresses the development of empathy, which is the drive to identify people’s emotions and thoughts, and to respond accordingly. Baron-Cohen (2003) and Baron-Cohen et al. (2005) call it the female brain. Again, males (with male genitals) might have the female brain if their testosterone level is low. Empathy enables someone to care for and offer comfort to other
people even if they are strangers to them, and even if the person does not expect any reciprocity. Naturally, individuals with the female brain are the best choice for raising their next generation.

Individuals who lack empathy might hurt other people in order to meet their desires. A blatant example of a person lacking empathy is the rapist, who is almost always a male. However, a lack of empathy creates its own advantage. Robertson (2012) indicates that testosterone changes the chemistry of a person’s brain and increases the desire for power and winning. A lack of empathy and a stronger desire for winning are the most valuable characteristics of a competitor. To beat their opponents, they must not care about what kind of pain their opponents suffer. On a battlefield, they will endeavor to kill the enemy. In a modern society, they will exert all their power to climb to the top of the social class. They are compete and to fight. Consequently, they are the best candidates to protect the tribe. This innate gender difference might explain why females shy away from competition, while males embrace it (Niederle & Vesterlund, 2007, 2011). On average, males and females were born to a natural division of labor to ensure the survival of the human species in our ancient times.  

2.2. Gender differences in intergenerational interaction

Studies also find that preschool boys are more often involved in physical contact with each other, while preschool girls are more inclined to use verbal contact with each other (Charlesworth & Dzur, 1987; DiPietro, 1981). This can also explain what most parents observe. Young boys drive vehicles into other people and play ramming games, a sign of low empathy, while young girls drive vehicles more carefully. Scientists have shown that, on average, females are inborn with a high level of empathy. Consequently, the gender difference might provide an alternative explanation to what is found and referred to as the demonstration effect in Mitrut and Wolff (2009). Even without calculating their long-term interest, females have more of an inborn sense of caring for others. When the others are their parents who raised them become old and weak, females are usually more willing than their male siblings to take care of them. Because it is an innate characteristic of females to be more caring than males, young females are more willing to visit their parents and grandparents than their male siblings. The demonstration effect may well be a reflection of the biological effect.

Moreover, socialization reinforces gender differences through the division of labor in families. The females’ gender role predisposes them to be the center of their kin networks, thus females are involved in more close emotional bonds with family members (Lye, 1996). Consequently, adult daughters are more compassionate and altruistic than their male counterparts toward their aging parents and continue to maintain a close relationship with them after the daughters leave home. The gender difference in nature and the socialization rooted in this nature can easily explain the demonstration effect found in Mitrut and Wolff (2009). From the biological view presented above, adult daughters who have young daughters revealing greater numbers of visits to their elderly parents is nothing but evidence that females are more emotionally bonded with their family members. Adolescent grand-daughters are less willing than younger granddaughters to visit their grandparents, possibly because adolescents already have their own friend networks.

Accordingly, the main purpose of this study is to investigate whether using gender differences in relation to visits to elderly parents is valid in order to underpin the demonstration effect. There is no direct way of identifying the source effects behind the contacts between adult daughters and their elderly parents. To circumvent the difficulty, this study employs two strategies to investigate whether the motive behind the visits between adult daughters and their elderly parents is the demonstration effect or not. Causal evidence of the demonstration effect is based on whether the number of visits by adult daughters is greater than that by adult sons. The precondition of the evidence appropriately assumes that the personalities of males and females are either born or socialized to be the same. This so-called causal evidence could be simply due to the fact that females are more emotionally bonded to their family members, and is irrelevant to the demonstration effect. One of the necessary conditions for anyone to practice the demonstration effect is that this individual has at least one child. The demonstration effect for adult females without children is meaningless. Therefore, the first strategy is to compare visits between single females and their parents with visits between single males and their parents. If the former is significantly greater than the latter, then the more frequent visits between adult daughters and their parents cannot be interpreted as the demonstration effect.

Second, the demonstration effect argues that the upper intergenerational transfer from adult children is to instill in their own children the same norm from which they can benefit when the adult children themselves age. As a result, the demonstration effect is founded on the old-age security motive. Ceteris paribus, the degree of the motive manipulates the degree of the desire of adult children to practice the demonstration effect. The premise to use the frequency of visits between adult daughters and their parents to support the demonstration effect is that females consider having children as security in their old age. To further confirm whether females are more motivated to manipulate the demonstration effect, this study looks into the effect of gender difference on the motive of having children as old age security under the control of educational attainment and income.
3. Data introduction and descriptions

Two types of data sets are employed. The first data set, Taiwan’s Panel Study of Family Dynamics (PSFD), is used to investigate visits between two generations. The second data set, the Taiwan Social Change Survey (TSCS), is employed to probe the effects of gender differences in the importance of children as security in old age.

3.1. Visits between two generations

The PSFD started in 1999, and is conducted and maintained by the Program for the Study of Chinese Families, Academia Sinica. There are three main samples. The first, the second, and the third main samples consist of 994 individuals born between 1953 and 1964; 1959 individuals born between 1935 and 1954; and 1152 individuals born between 1964 and 1976. The first main sample, the second main sample, and the third main sample were first surveyed in 1999, 2000, and 2003, and constituted the first wave data of each main sample, respectively. The main samples have been surveyed annually. As of 2012, the first, second, and third main sample surveys had been conducted in 14 waves, 13 waves, and 10 waves, respectively. The most recent wave was released in 2007.

Although visits between two generations are usually surveyed in most years and waves, the content of the survey questionnaires were not consistent until 2003. See the Appendix for the details on how survey questionnaires changed. Since 2003, the PSFD has consistently asked about the category of frequency of a respondent’s visit between him/her and his/her father and mother, respectively. Consequently, the PSFD from 2003 to 2007 is used to investigate visits between two generations. Another advantage of using the PSFD after 2003, rather than before, is that the third main sample, the younger generation, is included in the data. The frequencies of visits between a respondent and the father, and between a respondent and the mother might not be the same. A greater frequency is used to represent the frequency of visits between a respondent and his/her parents. The number of observations in the original data set is 16,505. Respondents who live with their parents do not answer the question regarding the frequency of visits between themselves and their parents. After deleting missing values and deleting respondents whose parents passed away or who live with their parents, the number of observations left is 4536.

Table 1 presents frequencies of visits between adult children and their parents by gender and their children’s sex. The children’s sex is divided into two groups: “have son” and “only have daughter.” “Have son” means the respondents might have sons and daughters or have only sons, while “only have daughter” means respondents do not have sons but only have daughter(s). The rationale behind this division is that having son is a fulfillment of life in a patrilineal society. Adult parents who have fulfilled lives and those who do not might have different degrees of motives to manipulate the demonstration effect.

Table 1 shows that, compared to married females with children, married males with children have higher proportions for the three highest frequencies of visits. The results, prima facie, violate what has been observed in Western countries. As early discussions noted, Taiwan Confucianism is an entrenched patriarchal family system, particularly for the elderly. It is more important for married females to take care of their parents-in-law than their own parents. The well-being of his parents is the first concern of a married male in this patriarchal system. Consequently, it is natural to see more visits between married males and their parents than visits between married females and their parents.

Moreover, among married people with children, married people who have sons demonstrate higher frequencies of visits with their parents. It is interesting to see that unmarried females or females without children have the highest sum of the proportions of the two most frequent visits among females, but unmarried males or males without children have the lowest sum among males. Two possible implications lie behind Table 1. First, married individuals without children are probably young and are impervious to old traditions as embodied by Confucianism. Young married females think taking care of their own parents is more important than taking care of their parents-in-law. Second, Confucianism still prevails among the young generation. Since unmarried females do not have parents-in-law, they can channel all their resources into taking care of their own parents.

3.2. Importance of children as security in old age

A more direct investigation of gender differences related to the old age security motive is to probe how males and females evaluate the importance of children as their own old age security. The PSFD did not ask children the question about security in old age, while the TSCS specifically did ask respondents to evaluate the importance of children as security in their old age. The PSFD is a panel data set, while the TSCS is not. Since 1990, the TSCS has conducted two-topic surveys annually with the exception of a few years. The TSCS has asked respondents to evaluate the importance of children as security in old age four times, each respectively in 1994 (phase 2, wave 5, Q1), 1999 (phase 3, wave 5, Q1), 2004 (phase 4, wave 5, Q2), and 2009 (phase 5, wave 5, Q2). These 4-year data sets will be employed. The scale of the importance of children as security in old age ranges from 0—“not important,” to 4—“absolutely important.”

The original numbers of observations for the survey in each year are 1853, 1948, 1881, and 1927, respectively. After deleting missing data, the numbers of observations remaining are 1729, 1811, 1719, and 1903, respectively. Table 2 presents the results of children as security in old age surveys. Except for the results for 1994, the results of the other 3 years show that more females evaluate children as old age security as being “absolutely important” in their lives. The results coincide with early findings. Kagitcibasi (1982) summarizes the survey of the Value of Children Project conducted in the early 1970s. It is a nine-country comparative social psychological study2 focused on the motive of childbearing. Table 1 in Kagitcibasi (1982)

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2 The nine countries are West Germany, Indonesia, Korea, the Philippines, Singapore, Taiwan, Thailand, Turkey, and the United States.
Table 1
Visits between adult parents and their elderly parents.

| Seldom visit each other | 1–2 times per year | Once per 2–3 months | 1–3 times per month | 1–2 times per week | Almost everyday | Observations |
|-------------------------|--------------------|---------------------|---------------------|-------------------|----------------|--------------|
| Married males with children | 1.0% | 7.2% | 16.6% | 30.8% | 24.9% | 19.6% | 1394 |
| Only have daughter | 0.0% | 8.0% | 15.6% | 34.7% | 30.7% | 11.1% | 225 |
| Have son | 1.3% | 7.0% | 16.0% | 29.8% | 24.9% | 21.0% | 1169 |
| Unmarried males or males without children | 0.8% | 10.9% | 20.2% | 36.4% | 18.1% | 13.7% | 387 |
| Married females with children | 1.5% | 12.6% | 18.9% | 30.5% | 24.4% | 12.0% | 2449 |
| Only have daughter | 2.6% | 13.5% | 21.6% | 27.3% | 21.3% | 13.8% | 348 |
| Have son | 1.5% | 13.0% | 19.1% | 30.6% | 24.3% | 11.5% | 2101 |
| Unmarried females or females without children | 1.0% | 7.5% | 17.3% | 35.0% | 28.4% | 10.8% | 306 |

Data source: Taiwan’s Panel Study of Family Dynamics (PSFD).
This table divides male and female observations separately into two groups: married persons with children and persons without children. Married persons with children are again divided into two subgroups: only having a daughter and having a son. “Only having daughter” means that these parents have at least one daughter but do not have any sons. “Having son” means that these parents have at least one son.

Table 2
Importance of old-age security in lives by gender.

| Year | Not important 0 | 1 | 2 | 3 | Absolutely important 4 | Observations |
|------|-----------------|---|---|---|------------------------|--------------|
| 1994 | Male 28% | 22% | 17% | 14% | 20% | 805 |
|       | Female 27% | 24% | 16% | 13% | 20% | 924 |
| 1999 | Male 20% | 13% | 24% | 20% | 23% | 944 |
|       | Female 18% | 12% | 24% | 19% | 28% | 867 |
| 2004 | Male 14% | 18% | 30% | 18% | 21% | 872 |
|       | Female 13% | 16% | 25% | 19% | 27% | 847 |
| 2009 | Male 12% | 13% | 32% | 20% | 22% | 969 |
|       | Female 9% | 13% | 32% | 20% | 26% | 934 |

Data source: Taiwan Social Change Survey (TSCS).

reports that, except for West Germany with no male sample, more females consider having children as security in old age a very or somewhat important reason for having a child. Arnold et al. (1975) and Nugent (1985) indicate that women are more subject to the children as security in old age motive. Arnold et al. (1975) indicates that the stronger motive of children as security in old age of females reflects their greater degree of economic dependence and longer life expectancy, which is used in Jellal and Wolff (2000) and Mitrut and Wolff (2009) to postulate that females are more likely to practice the demonstration effect.

4. Empirical models

Of the two empirical models under examination, the first is an ordered probit panel data model to investigate the frequency of visits between adult children and their elderly parents. As noted earlier, the data set is a five-wave panel data set from the PSFD. To allow time-invariant variables to be included, the random-effects panel data model is employed. The dependent variable is divided into six categories. The explanatory variables include sex (male = 0 and female = 1), the cross-terms of sex and marital status (single = 1 and others = 0), educational attainment (the number of years educated), age, commuting time from the respondent’s home to his/her parents’ home (beyond 2 h = 1, else = 0), the number of siblings, the age and sex of children, and intergenerational financial transfers. The age and sex of children term is divided into five subgroups: no child; have only daughter(s) and at least one of them is younger than 10 years old; have only daughter(s) who are older than 10 years old; have son(s) and at least one son is younger than 10 years old (reference group); have son(s) who are older than 10 years old. As noted earlier, the younger children’s preferences are easier to shape and hence to set up a norm. This paper follows Mitrut and Wolff (2009) by using the age of 10 to divide the children.

The sex and marriage cross terms are divided into four subgroups: married males, married females, single males, and single females. The above discussion suggests that the norm in a patrilineal society is that males are obliged to take care of their elderly parents. We therefore expect that visits between adult males and their parents are more

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1 Income is not included as an explanatory variable since including this variable causes the ordered probit to not be convergent. There are 1280 people with zero income in the sample probably due to retirement or being housewives.
frequent than visits between adult females and their parents. To manipulate the demonstration effect, adult parents who have a young son are more likely to have more frequent visits with their elderly parents. Single respondents or married people without a child do not exhibit the demonstration effect. If the demonstration effect prevails, visits between these people and their parents are expected to be fewer.

Moreover, except for visits, financial support or giving between elderly parents and adult children might influence visit behaviors between the generations. Elderly parents might provide financial support to their adult children during their visit. Alternatively, adult children might use financial support to substitute or to complement their visits. In the first model, financial support or giving is considered. From 2004 to 2007, the PSFD collects the average amounts of money that elderly parents give to their adult children per month and vice versa. The amount of the former minus the latter represents the net money flow from elderly parents to their adult children. However, probably because 25% observations exhibit zero net money flow, the ordered probit panel data model does not converge if the net amount of the giving flow is applied. Therefore, an alternative version of the model uses dummy variables instead of the amount of giving flow. The model classifies the net giving flow into three categories: positive net giving flow from elderly parents to their adult children, negative net giving flow, and zero net giving flow. Almost all the zero net giving flow consists of zero inflows and outflows; that is, there is no financial interaction between the two generations. The model also considers interactions between the net giving flow and sex, and between the net giving flow and age.

For simplicity, this study treats marriage as an exogenous variable, but marriage could be endogenous. In a patriarchal society, adult males who take on the responsibility to care for their aging parents are inclined to get married, so they will have a helper, their wives. By contrast, adult females who assume the responsibility of care for their elderly parents are inclined to remain single and to live with their parents. If this is the case, the number of single adult females living with their parents will be substantially greater than the number of single adult males living with their parents. Respondents who live with their parents did not answer the visit frequency between themselves and their parents and are not included in the sample. There are 310 individuals who, because they were living with their parents, are not included in the sample analyzed in this study. As expected, most of them, 193 out of 310, are married males. The proportions of observations from single adult males and single adult females living with their elderly parents are each 10%; that is, both account for 31 out of 310 observations. It appears that the number of single adult females living with their parents is not greater than that of single adult males. In conclusion, the endogeneity of marriage is not a severe problem in the study.

The second model is an ordered probit model exploring gender differences regarding the importance of children as old-age security. The data set is taken from four selected years of the TSCS. The dependent variable is the self-evaluation of the importance of children as security in old age. The degree of the importance ranges from unimportant (0) to very important (4). The explanatory variables include sex, age, marital status (single = 1, others = 0), working status (yes = 1, no = 0), educational attainment, and income.

5. Empirical results

5.1. Visits between adult children and their elderly parents

Table 3 presents the results of visits between adult children and their elderly parents. Model I stresses only the sex of respondents and of children so as to divide the status of children into three groups: have only daughters, have sons, and no children. The reference group is “have sons.” Model II considers the marriage of respondents. Model III stresses the age as well as the sex of children. In Model III, the children’s status is divided into five groups, and “son’s age less than 10” is the reference group.

Model I in Table 3 indicates that female adults have lower frequencies of visits between themselves and their parents. The presence of children is not related to visits between adult parents and elderly parents. The results of Model II demonstrate that, compared to married males, married females have significantly fewer visits between themselves and their parents. The result exactly coincides with what would happen in a patrilineal society. In olden times, married females were no longer a member of their original families but a member of their husbands’ families. According to traditional filial piety, married females should care for their parents-in-law, not their own parents. However, it is interesting to visualize that the result for single individuals is completely opposite. Visits between single females and their parents are the most frequent, while visits between single males and their parents are less frequent. The result is overturned once single males and single females get married. Elderly parents who have married sons are the beneficiaries, while elderly parents who have married daughters are the losers. This creates the so-called preference for sons in some Asian countries as indicated in Sen (1990), Edlund (1999), Qian (2008), and Lin and Luoh (2008). In terms of the demonstration effect, Cox and Stark (2005) argue that elderly parents offer housing payments to their sons to make it easier for them to have children so as to benefit from the demonstration effect. In a patrilineal society, parents who desire the benefits of filial piety have a simpler and more efficient alternative, that is, urging their sons to get married, if they have a son. It should be noted that this conclusion results from a panel data set, indicating that unobserved characteristics of individuals have been controlled.

The reference group of the status of children in Model II is “have sons.” Table 3 shows that adults who do not have a child have higher visit frequencies than those who have sons, while the visit frequencies between adult parents who only have daughters and those who have sons are not significantly different. The result might reflect the fact that adults who do not have a child have more time to visit their parents. When the children’s age is considered, Model III presents somewhat different results. The reference group in Model III is “have sons less than 10 years old.” Adult parents who have only daughters above 10 years old
Table 3
Results of visits between adult children and parents (random-effects panel data model).

|                      | I       | II      | III     |
|----------------------|---------|---------|---------|
|                      | Coeff   | t       | Coeff   | t       | Coeff   | t       |
| Constant             | 3.585   | 20.368**| 3.707   | 20.632**| 3.687   | 20.417**|
| Male (reference)     |         |         |         |         |         |         |
| Married male (reference) |        |         |         |         |         |         |
| Female               | −0.358  | −5.562***| −0.409  | −6.296***| −0.403  | −6.189***|
| Female single        | 0.461   | 3.728** | 0.449   | 3.616** |         |         |
| Male single          |         |         |         |         |         |         |
| Have sons (reference) |         |         |         |         |         |         |
| Only daughter        | −0.061  | −1.199  | −0.066  | −1.308  |         |         |
| No children          | 0.032   | 0.596   | 0.134   | 1.993   | 0.083   | 1.082   |
| Son’s age <10 (reference) |     |         |         |         |         |         |
| Only daughter’s age ≤ 10 |     |         |         |         |         |         |
| Only daughter’s age > 10 |     |         |         |         |         |         |
| Son’s age >10        |         |         |         |         |         |         |
| Education            | 0.019   | 4.055***| 0.017   | 3.481***| 0.017   | 3.373** |
| Age                  | −0.008  | −2.638***| −0.009  | −3.037***| −0.007  | −2.191***|
| Commuting time <2 h  |         |         |         |         |         |         |
| (reference)          |         |         |         |         |         |         |
| Commuting time ≥ 2 h | −1.606  | −34.053***| −1.607  | −33.893***| −1.606  | −33.899***|
| Number of siblings   | −0.014  | −1.590  | −0.014  | −1.618  | −0.015  | −1.680  |
| Negative or zero net giving flow (reference) |         |         |         |         |         |         |
| Positive net giving flow | −1.009  | 2.378** | −0.865  | −2.095** | −0.866  | −2.085** |
| Female positive net giving flow | 0.416   | 2.062** | 0.332   | 1.661   | 0.333   | 1.652** |
| Negative net giving flow | −0.109  | −0.682  | −0.144  | −0.900  | −0.163  | −1.011  |
| Female negative net giving flow | 0.136   | 1.841   | 0.146   | 1.987   | 0.148   | 2.013   |
| Age negative net giving flow | 0.003   | 0.974   | 0.004   | 1.102   | 0.004   | 1.203   |
| Age positive net giving flow | 0.025   | 2.556** | 0.023   | 2.398** | 0.023   | 2.393** |
| Sigma                | 0.186   | 4.324** | 0.182   | 4.187** | 0.183   | 4.202** |
| Mu(01)               | 1.269   | 23.672***| 1.272   | 23.651***| 1.270   | 23.627***|
| Mu(02)               | 2.177   | 38.248***| 2.182   | 38.219***| 2.180   | 38.173***|
| Mu(03)               | 3.238   | 53.501***| 3.245   | 53.299***| 3.244   | 53.244***|
| Mu(04)               | 4.154   | 63.886***| 4.163   | 63.690***| 4.163   | 63.631***|
| Log likelihood       | −6411.952 | 4536   | −6402.131 | 4536   | −6400.528 | 4536   |
| # of observations    |         |         |         |         |         |         |

Data source: Taiwan Panel Study of Family Dynamics (PSFD).

SD is the standard deviation of the corresponding coefficient.

* Significance at 10% level.

** Significance at 5% level.

*** Significance at 1% level.

have lower frequencies of visits between themselves and their elderly parents. Frequencies of visits between elderly parents and adult children, who do not have a child, who only have daughters younger than 10, and who have sons younger than 10 years old, are insignificantly different. The results do not seem to be consistent with the modified version of the demonstration effect. However, visits between elderly parents and adult parents who have sons older than 10 appear to be less frequent at the 10% level. Therefore, the status of the age and sex of children can be divided into two similar behavioral groups. Adult parents who have older children exhibit lower visit frequencies than adults who have younger children or have no children. It appears that the children's sex does not matter; their age does. Without further investigation, the results cannot underpin the demonstration effect since frequent visits between elderly parents and adults who have young children might be due to the joy that young children bring to grandparents, to the exchange motive that grandparents help to take care of their younger grandchildren as Wolff (2001) indicates, or to the fact that adolescents begin to have their own social networks. In Model II, without taking the children’s age into consideration, the coefficient of “no child” is positively significant at the 10% level. The 10% significance disappears in Model III when the children’s age is considered.4

A positive net giving flow means that the parents’ giving to their adult children is greater than their adult children’s giving. Some argue that elderly parents might use financial support in exchange for their adult children’s visits. If this is true, the coefficient of “positive net giving flow” will be significantly positive. Table 3 shows that the coefficient is significantly negative at the 5% level. Compared to the zero giving flow, the exchange does not seem to work out.

4 Wolff (2001) demonstrates that the frequency of visits between elderly parents and adult parents who have younger children is due to the elderly parents helping to take care of their grandchildren. The PSFD asked respondents who took care of the children when they were below the age of three. This study attempts to incorporate this variable, but finds that there are only six respondents whose youngest children were currently under 3 years old. Consequently, taking care of young grandchildren is not a concern here.
Elderly parents will possibly pay more in exchange for visits from those adult children who do not like to visit them. Adult children might pay more to substitute or to complement meeting with their elderly parents. Table 3 shows that the coefficient of the “negative net giving flow” is insignificant. Some possible stories can explain the insignificant result. It is possible that, compared to the zero giving flow, both the substitution effect and the complementarity effect exist but are offset. It is also possible that the substitution effect and the complementarity effect do not exist. Alternatively, the dummy variables are not sufficiently sensitive to capture these two types of effects.

More importantly, whether the net giving flow is positive or negative, the interaction terms with females demonstrate that females meet their elderly parents more often than males. Both female interaction terms with net giving flow are significantly positive at least at the 10% level. The model adds the interactions of age and net giving flows to explore whether the financial support influence differs with age. The coefficient of “age-positive net giving flow” is positive and significant at the 5% level, indicating that aged adult children are more influenced by their elderly parents’ financial giving.5

The conclusion about how marriage and sex influence visits between adults and their elderly parents goes a little further to echo the main concern of this study.6 It is important to stress that single individuals are not influenced by the demonstration effect since they do not have children to demonstrate for. Moreover, if socialization prevails, it is likely to render single males as being much more obliged by the paternal system than single females. Therefore, by assuming that females and males are identical biologically, single females are expected to have lower frequencies of visits toward their parents. On the contrary, the empirical results show the opposite. Single females reveal the highest frequency of visits, while single males show the lowest. The contradiction implies that female and male characteristics are not essentially the same. The empirical results are likely to coincide with what neuroscientists claimed: females show more empathy than males.

5.2. Importance of children as security in old age

Finally, Table 4 exhibits the ordered probit results regarding the importance of children as security in old age from the TSCS for four selected years. The status of children is not considered in the models since the surveys conducted in 2004 and 2009 did not ask for information about the respondents’ children, while the surveys conducted in 1994 and 1999 did ask for such information, but did not ask about the children’s sex. In Table 2, most females evaluate children as being more important as security in their old age than males. After controlling for the respondents’ characteristics, in particular, educational attainment and income, Table 4 exhibits different results from Table 2. That is, females do not evaluate children as being more important as security in their old age than males if they have the same economic conditions as the males. In some years, married females or single females even evaluate children as being less important as security in their old age than married males. The results therefore indicate that the reason why females are more dependent on children as security in their old age is not due to their innate nature, but due to the consequences of their socialization. In other words, males usually play the role of breadwinners in their families, while females usually depend on their spouses to provide outside resources. When females aged, they depend on their sons.7

It is not surprising that, in rural areas of a developing society, elderly females are more dependent on their adult children to provide resources. In a developing society, social security usually has not been constructed and in rural areas job opportunities for females are few. These conditions cause elderly females to be more dependent on their adult children, indicating that females in rural areas or in developing societies are more likely to regard children as being important to their security in their old age. The patriarchal family system deprives females of their rights in many respects and further renders females more dependent on their spouses and sons. In a developed society, social security has been established, accessing the labor market is not difficult for females, and gender equality usually prevails. As a result, it is not necessary for females to evaluate children as being more important as security in old age than males. As a matter of fact, the data from the Value of Children Project conducted in the early 1970s, Table 1 in Kagitsibasi (1982) shows that American males and females do not have a different evaluation for children as security in their old age as a reason for having a child, with 8% of females and 7% of males responding “very important.” Hoffman, Thornton, and Manis (1978) use a sample surveyed by the Institute for Social Research of the University of Michigan in 1975 and show how American females and males evaluate children as security in old age. About 6% of mothers and 9% of fathers as well as 8.1% of females and 10% of males without children agree that the advantage of having a child is economic utility (their Table 1). Old-age security is a specific type of economic utility. When security in old age as a reason for having a child is specified, 1.8% of females and 4% of males among American parents and 5.3% of females and 4.4% of males among nonparents agree that having children as security in old age is a motive for having a child. About 40 years ago in the United States, females did not consider children to be more important.

5 It is worth noting that intergenerational financial transfers could be endogenous. Including this variable in the model might bias the visit regression result. However, the sign and significance do not substantially change when the model drops the intergenerational financial transfers, indicating that the possible endogeneity of the financial transfers is not a severe problem.

6 An attempt has also been made to include working status in the models. Because of missing data, the number of observations drops to 3394. The conclusions regarding gender and marriage do not change after including working status.

7 A direct way to examine whether the old age security motivates contact between two generations is to include old age security as an explanatory variable while analyzing contact frequency between two generations. Unfortunately, PSFD and TSCS do not simultaneously collect these two types of information.
as security in old age than males. It is believed that in the United States, fewer females will agree that children are important to them as security in their old age.

The above argument is supported by more recent research on modern societies. Mayer, Albert, Trommsdorff, and Schwarz (2005) employ a data set for Germany for 2002. They do not have male adult data but have male adolescent data instead. As for children being security in old age, male adolescents value children as security in old age as being more important than female adolescents, but the difference is insignificant. Bühler (2008) employs the Bulgarian panel survey conducted in 2002 and 2005 and shows that more males agree that children are security for their old age. Their data show that 46.3% of single males and 42% of single females agree that having a child would be security in their old age. Similarly, for married or cohabiting people, 52.6% of males and 47.1% of females agree that having a child provides security for their old age (recalculated from Appendix B1 in Bühler, 2008). The mean scores of utility for the value of children are the same or very close between females and males in Henz (2010). The mean scores for males and females in West Germany are, respectively, 1.9 and 2.0, while the mean scores for both males and females in East Germany are 2.3. The higher the value, the more they agree that utility is an important factor in the value of children.

On the other hand, by summarizing various surveys of the early 1970s, Kagiti büs (1982) reports that females and males in Korea, Singapore, and Taiwan exhibit substantial differences in regard to their children being security in their old age as a motive for having a child: 54% of Korean females and 40% of Korean males, 51% of Singaporean females and 44% of Singaporean males, and 79% of Taiwanese females and 72% of Taiwanese males respond by saying that having children as security in their old age is a "very important" reason for having a child. These three countries are patrilineral Confucian societies in which elderly females are dependent on their sons. However, by using more recent data for Taiwan, and by controlling for the respondents’ characteristics, this study finds no evidence of females regarding children as security in their old age as being more important than males.

### 6. Conclusion

Neuroscientists have shown that embryonic brain development makes females more empathic than males. Even without the demonstration effect, female adults are biologically more caring toward their elderly parents. Single individuals are not influenced by the demonstration effect. Comparing the frequency of visits between single females and males and their respective parents is a means of examining the validity of that data as evidence of the demonstration effect. The study first finds that the visits between single females and their parents are more strongly significant than the visits between single males and their parents. It reveals that the more frequent visits between females and their parents have nothing to do with the demonstration effect.

Second, if females do not think that children as security in old age is more important than males, then, compared to males, females are not more motivated to manipulate the demonstration effect. Consequently, the more frequent visits between females and their elderly parents cannot be interpreted as evidence of the demonstration effect. Using four selected years of data, this study provides no evidence to underpin the view that females evaluate children as security in their old age as being more important than males. This conclusion is consistent with current studies employing data for Western countries. In their studies, females do not evaluate children as security in old age as being more important than males. Given these findings,

### Table 4
Ordered probit result of importance of old-age security.

| Year | Coeff | t  | Coeff | t  | Coeff | t  | Coeff | t  |
|------|-------|----|-------|----|-------|----|-------|----|
| 1994 | 1.224 | 6.412 *** | 1.386 | 7.582 *** | 1.791 | 10.153 *** | 2.231 | 11.950 *** |
| 1999 |       |     |       |     |       |     |       |     |
| 2004 |       |     |       |     |       |     |       |     |
| 2009 |       |     |       |     |       |     |       |     |

Data source: Taiwan Social Change Survey (TSCS).
SD is the standard deviation of the corresponding coefficient.
* Significance at 10% level.
** Significance at 5% level.
*** Significance at 1% level.
more frequent visits between females and their parents cannot underpin the demonstration effect.

It is important to stress that this study has no intention of denying that resources transferred from adults to their elderly parents might be partially motivated by the demonstration effect. What this study emphasizes is that gender differences in relation to inter vivos intergenerational transfers cannot be regarded as evidence to back up the demonstration effect, because this gender difference might simply result from biological gender differences in nature and is irrelevant to the demonstration effect. Motives behind human behavior are complex and sophisticated and usually cannot be singled out. For example, in addition to the motives discussed in the literature, gratitude could be another type of motive behind more frequent intergenerational visits. As an old Chinese saying aptly puts it: “We do not have gratitude toward our parents until we raise our own children.” Since adult mothers usually bear the main responsibility of raising the children, adult daughters have a deeper gratitude toward their parents. The gratitude motive is an alternative explanation of what the demonstration effect desires to explain. Instead of the demonstration effect, the gratitude motive might predispose adult mothers to visit their parents more often than others.

The visit data in the PSFD do not distinguish who, adult children or elderly parents, initiate the visits. This is this study’s limitation. However, in a patriarchal society, married daughters are an asset of their husbands’ families, and some of them even live with their parents-in-law. Therefore, it is inconvenient for elderly parents to frequently visit their married daughters. By contrast, it is conventional for elderly parents to frequently visit their married sons. There is no inconvenience for elderly parents to frequently visit their unmarried adult children, but patrilineality encourages parents to visit their sons more frequently than their daughters. As a result, elderly parents are more likely to initiate the visits between them and their adult sons, whereas adult daughters are more likely to initiate the visits between them and their parents. From the visit initiative viewpoint, the numbers of visits between elderly parents and their adult sons, and between elderly parents and their adult daughters are overstated and understated, respectively. Consideration of the visit initiative does not change this study’s conclusion.

Acknowledgments

The data analyzed in this paper were provided by the Center for Survey Research of Academia Sinica. The author appreciates the assistance given by the Center. Financial support from Taiwan’s National Science Council is gratefully acknowledged (NSC 101-2410-H-031-013). The views expressed herein are those of the author alone.

I am indebted to the Journal editor, Scott Alan Carson, for his editorial assistance.

Appendix. PSFD survey questionnaires changed for visits between two generations from 1999 to 2002

In the first wave of the first and the second main samples, in the years 1999 and 2000, the PSFD asked respondents the number of times that they and their elderly fathers and elderly mothers visited each other, respectively. In 2001 and 2002, the third and the fourth waves for the first main sample and the second and the third waves for the second sample, the PSFD asked respondents about the frequency with which they and their elderly parents visited each other. The frequency was divided into six categories: (1) almost every day; (2) once or twice per week; (3) once to three times per month; (4) every 2–3 months; (5) once or twice per year; and (6) seldom visit each other. In other words, in 2001 and 2002, instead of the number of times, the PSFD asked with what category of frequency they visited each other. Furthermore, in 2001 and 2002, the PSFD did not ask about visits between a respondent and his/her father and his/her mother separately, but asked about visits between a respondent and his/her parents.

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