Direct and Indirect Impacts of Education on Subjective Well-being of Older Persons in Vietnam: Gender Differences

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ผลกระทบทางตรงและทางอ้อมของการศึกษาต่อความอยู่ดีมีสุขเชิงอัตวิสัยของผู้สูงอายุในเวียดนาม: ความแตกต่างระหว่างเพศ

น.ส.ตรึก ง็อค ฮวน ดัง

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ตรึก ง็อค ฮวน ดัง : ผลกระทบทางตรงและทางอ้อมของการศึกษาต่อความอยู่ดีมีสุขเชิงอัตวิสัยของผู้สูงอายุในเวียดนาม: ความแตกต่างระหว่างเพศ. (Direct and Indirect Impacts of Education on Subjective Well-being of Older Persons in Vietnam: Gender Differences) อ.ที่ปรึกษาหลัก : ผศ. ดร.ปัทพร สุคนธมาน

เวียดนามกำลังเผชิญกับสถานการณ์ที่สัดส่วนของประชากรสูงอายุเพิ่มขึ้นอย่างรวดเร็ว อย่างไรก็ตาม สถานการณ์นี้เกิดขึ้นภายใต้บริบทที่ประเทศมีทรัพยากรจำกัด เช่นเดียวกับประเทศกำลังพัฒนาอีกหลายประเทศดังนั้นการเข้าใจเกี่ยวกับปัจจัยที่มีความสำคัญต่อความความอยู่ดีมีสุขในช่วงปลายของชีวิตจึงเป็นประเด็นด้านนโยบายที่สำคัญ วิทยานิพนธ์นี้มีวัตถุประสงค์เพื่อศึกษาความแตกต่างทางเพศของผลกระทบทางตรงและผลกระทบทางอ้อมของการศึกษาที่มีต่อความอยู่ดีมีสุขเชิงอัตวิสัยของผู้สูงอายุชาวเวียดนาม โดยใช้ข้อมูลจาก 2011Vietnam National Ageing Survey ทั้งนี้ งานวิจัยนี้ศึกษาความอยู่ดีมีสุขเชิงอัตวิสัยในสี่ด้าน ได้แก่ ความสุข ความพึงพอใจในชีวิต ความเหงา และความซึมเศร้า (จำนวนกลุ่มตัวอย่าง 2,789 คน แบ่งเป็นเพศหญิง 1,683 คน และเพศชาย 1,106 คน) ผลจากการวิเคราะห์เส้นทางพบว่าผู้ที่มีระดับการศึกษาสูงกว่ามีความสุขและความพึงพอใจในชีวิตมากกว่า และยังมีความเหงาและความซึมเศร้าน้อยกว่า การศึกษามีผลกระทบทั้งทางตรงและทางอ้อมต่อความอยู่ดีมีสุขเชิงอัตวิสัยของผู้สูงอายุทั้งเพศชายและเพศหญิง ในกรณีส่วนใหญ่ผลกระทบทางตรงจะมากกว่าในกรณีของเพศชาย ทั้งนี้อาจมีสาเหตุจากบทบาททางเพศในประเทศเวียดนามที่เพศชายถูกคาดหวังว่าจะเป็นผู้ดูแลครอบครัวในเชิงเศรษฐกิจสำหรับผลกระทบทางอ้อมของการศึกษาที่มีต่อความอยู่ดีมีสุขเชิงอัตวิสัยนั้น ส่งผ่านหลายช่อง เช่น ฐานะทางเศรษฐกิจ รูปแบบการอยู่อาศัย จำนวนบุตร สถานภาพสมรสสถานภาพการทำงานและศาสนา วิทยานิพนธ์นี้มีบทบาทสำคัญอย่างยิ่งในการส่งเสริมการศึกษาโดยการสนับสนุนให้บุคคลศึกษาต่อในระดับที่สูงขึ้น โดยมีเป้าหมายเพื่อลดความเหงาและความซึมเศร้าและเพิ่มความสุขและความพึงพอใจในชีวิตในช่วงวัยสูงอายุ ดังนั้นการศึกษาจึงเป็นการลงทุนระยะยาวอย่างยั่งยืนไม่เพียงเพื่อผลประโยชน์ด้านเศรษฐกิจของวัยทำงานเท่านั้น แต่เพื่อผลประโยชน์ด้านความอยู่ดีมีสุขเชิงอัตวิสัยในวัยสูงอายุอีกด้วย นอกจากนี้ วิทยานิพนธ์นี้สนับสนุนการส่งเสริมความเท่าเทียมทางเพศ เพื่อให้ผู้หญิงสามารถได้รับผลประโยชน์อย่างเต็มที่จากการลงทุนในการศึกษา

สาขาวิชา ประชากรศาสตร์ ลายมือชื่อนิสิต .....

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Truc Ngoc Hoang Dang : Direct and Indirect Impacts of Education on Subjective Well-being of Older Persons in Vietnam: Gender Differences. Advisor: Asst. Prof. Dr. PATAPORN SUKONTAMARN

Vietnam, like many developing countries, is undergoing a rapid pace of population ageing but within a resource limited context. Therefore, understanding the factors that are important to later life well-being has become a key policy issue. Using data from the 2011 Vietnam National Aging Survey, this thesis aims to investigate gender differences in the direct and indirect impacts of education on subjective well-being of older Vietnamese based on four domains: happiness, life satisfaction, loneliness, and depression (N=2,789, including 1,683 females and 1,106 males). The results from path analysis show that those with higher level of education are happier and more satisfied with their life, and they are also less lonely and less depressed. Education has both direct and indirect effects on subjective well-being of older males and females. In most cases the direct effects are stronger in the case of males, possibly due to gender roles in Vietnam where males are expected to be breadwinners. The indirect effects are found through several channels, including economic situation, living arrangement, number of children, marital status, working status, and religion. This thesis plays a very important role to promote education by encouraging individuals to continue their study to higher level of education, with the aim to avoid loneliness, depression and to get more happiness and life satisfaction in later life. Therefore, pursuing education is a long-term sustainable investment not only for the economic benefits of the working age, but also for subjective well-being benefits in old age. Moreover, the thesis supports the promotion of gender equality, in order to enable women to fully benefit from their investment in education.

Field of Study: Demography Student's Signature .....

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Truc Ngoc Hoang Dang

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1. Introduction

Ageing has become a global phenomenon, it occurs in many countries with different characteristics (United Nations Population Fund & HelpAge International, 2012). Like many other parts of the world, Asia has a high population growth rate in the modern-era. For instance, during the 20th century, Asia's population nearly quadrupled, as did the world population. Similar to other countries in the world, population ageing in Asian countries is progressing at a fast pace in the past decade, characterized by reduced fertility rates, increased life expectancy, medical advances, and better conditions for nutrition, hygiene, health care, education and economic life. Increasing proportion of older persons means that Asia's population will experience low support ratio and high dependency ratio, this could have further implications on socio-demographic and socio-economic conditions such as poverty and disadvantages in the living conditions, which is already an issue in developing countries, and a big question "Will we be rich before getting old?" is always a big question in these countries (Curran, 2017; World Health Organization, 2011).

By the year 2018, Vietnam has approximately 96.6 million people, which is equivalent to 1.26 per cent of the total world population (approximately 7.64 billion people), and ranked 15th in the list of countries with the largest population in the world (Worldometers, 2018). With the geographical location in Southeast Asia, Vietnam became a lower middle income country in the year 2012, and is currently one of the

world's fastest ageing countries, while policies for the older population are changing slowly and some are inefficient (United Nations, 2014). General Statistics Office (2011) reported major findings of survey on population changes and family planning that the proportion of people over 60 years old accounted for nearly 10.0 per cent of the population (8.65 million), and the proportion of people over 65 years old accounted for 7.0 per cent of the population (6.1 million) (Do Thi Thanh Huyen, 2018; General Statistic Office, 2011b).

The population ageing of a country happens when there is a shift in the age structure of the population, i.e. when there is an increase in the proportion of older people in the population. There are 2 main conditions to confirm about “ageing population” of a country. With regard to the first condition, the term "ageing society" is used in European countries where the proportion of people aged 65 or over is 7 per cent (Miskolczi M. & Cséfalvaiová K., 2013). However, with regard to second condition, the World Assembly on Ageing 1982 in Vienna recommended the use of a proportion of people aged 60 and over in developing countries when confirming about "ageing society" of a country when the elderly mortality rate remains high in these countries (Hao, 2004). Similarly, UNFPA (2011) also introduced 60 years old as a milestone for ageing classification in some reports. Specifically, when the proportion of people aged 60 and over accounts for 10 per cent of the population, the country is defined as "ageing population" (United Nations Population Fund, 2011). In addition to these two conditions, there are other terminologies, such as "aged society" and "super aged

society" when the persons aged 65 and over make up 14 per cent and 21 per cent of the population (Miskolczi M. & Cséfalvaiová K., 2013), or when the percentage of persons aged 60 and over is 20 per cent, 30 per cent, or 35 per cent, it corresponds to "aged population", "very aged population" and "hyper aged population", respectively (United Nations Population Fund, 2011). As a result, from terminologies of demographic ageing, Vietnam was officially considered "ageing society" or “ageing population” by 2011 when the proportion of people aged 65 and over touched 7 per cent which met the condition of "ageing society" of a country. Besides, the ageing index of Vietnam has increased by approximately 2.4 times over the period 1989-2014, and will more than triple by the year 2050 in both medium and low fertility rate scenarios (General Statistic Office, 2016). According to the analysis and forecast, while many countries in the world took almost 100 years to move from ageing to aged population, Vietnam will only take 15-20 years (United Nations Population Fund, 2011). Therefore, Vietnam is one of the world's fastest ageing countries.

In addition, the older persons in Vietnam face a series of disadvantages in their lives such as financial hardship, employment, family structure transition to nuclear family, etc. (Kham, 2014). For example, Vietnamese older people, mainly live in rural areas, are farmers and work in agricultural sector while proportion of agricultural land is increasingly shrinking due to modernization and industrial disasters. Over 70 per cent of older persons still work to earn money and only over 25.5 per cent of older people have pension fund or social allowances. Besides, every older person has on average

15.3 years for facing with diseases and disabilities, moreover, 95 per cent of the older persons have diseases, mainly chronic diseases (Institute of Social and Medical Studies, 2012). Although the incidence of chronic diseases is high in older population, Vietnam is poor in geriatric services in public health facilities, and the services are at relatively high costs for private health services. Therefore, the burden of health care costs is one of the major obstacles for the older persons while they are already poor in terms of economic conditions (Jones et al., 2010). Besides, the family, which is considered the basic unit of society, has undergone significant changes in structure, from traditional family which is extended family to modern nuclear family. Moreover, several new family structures in society derive from marital breakdowns, such as single parents, pre-marital and extra-marital status, which lead to greater disunity in relationship and mutual care responsibilities among family members (Truc et al., 2017). Thus, these kinds of changes have also a strong influence and damage to older persons' well-being in terms of psychology or subjective well-being due to conflict among generations.

Although Vietnamese older people are more likely to suffer from mental health problems because of rapid changes in family and social structures, as well as economic difficulties due to retirement and shortage of pensions or social welfare benefits mentioned above. From the past to now, Vietnam has not had any comprehensive or official national mental health research on older people (studies found are conducted on adolescents, youth, or childhood, or other specific groups, for examples the survey assessment of Vietnamese Youth round I and round II (SAVY I and SAVY II), that

conducted by the year 2003 and 2011, was national survey of Vietnamese adolescents and youth. In which, there is a part which evaluates mental well-being, aspiration and expectations. Coupled with national studies, there are many local studies about mental health on specific youth groups, such as high school students in some provinces, studies on experiences with disadvantages at childhood age, or studies on HIV patients, methadone maintenance patients, etc. (Khuong et al., 2018; OECD Development Centre, 2017; Thai et al., 2018; UNICEF, 2011). In addition, the lack of mental health protection law, the national actions plan on mental health program for older persons in particular, and the lack of comprehensive mental health information system, has been detrimental to the promulgation of good mental health policies for the older persons in Vietnam (Minas et al., 2017).

Besides, the Vietnamese culture and traditions are greatly influenced by the Confucian ideology and theory whose representative characteristics are patriarchy, gender prejudice, son preference, and harsh rules regarding gender roles which mostly are imposed and weighed heavily on the shoulders of women (Bourke-Martignoni, 2001; D. Goodkind, 1995; Taylor, 2004). To be more specific, men are expected to be the pillar of the family, maintain the family lineage by giving birth to sons, educate women in the family, be responsible for jobs outside, make important decisions for family members, and take the main role for family worship, etc. In contrast, women are expected to perform house works, educate and care for their children and family members (Rosenlee, 2006). In addition, women are expected to have a lower position

than men in the family and in society, for example, the daughter is obliged to obey her father when not married, the wife is obliged to obey her husband when married, and the widowed mother is obliged to obey her eldest son (Connell, 1987; Maharaj, 1995). Although Vietnam has developed many programs to promote gender equality and improve women's and children's rights, however, the ideology of gender prejudice has not improved much and still exists very deeply in the perception and conception of Vietnamese people. This is evidenced by the high sex ratio at birth, lower level of women's education compared to men, lower wages for women, and poor working environments for women compared to men. In addition, men are in charge of professional jobs such as science and technology, women are in charge of supporting tasks such as secretary, office staff, assistant, etc. (ILO, 2015).

In addition to gender issue, there are many empirical research papers/works about Vietnamese older persons in terms of social structure, family relationship or health status such as living arrangement, self-rated health, intergenerational solidarity, labor force participation and the needs for long-term care (Giang & Le, 2017; Le et al., 2018; Teerawichitchainan et al., 2015; S. A. Truong et al., 1997). However, there is no research about mental health or its proxy variables such as subjective well-being at the national level. Therefore, in order to improve and prevent older persons from mental traumas, Vietnam needs to have scientific and convincing assessments of subjective well-being or mental health of older people and the differences by gender.

The results of such assessments can contribute to the development of health care policy for older persons in Vietnam.

There are a number of theories and papers about the determinants of subjective well-being, for example, married couples are happier than celibates and those with other marital status, or those living in democratic societies are happier than those living in dictatorial environment, or employed persons are happier than the unemployed, etc. (Bratu, 2011; Diener & Suh, 2000; Knight et al., 2009; M. Ross et al., 1986). However, in this paper, our concern is about the relationship between the level of education and subjective well-being of older persons in Vietnam. The rationale is that evaluating the special impact of educational background on subjective well-being at later life of Vietnamese, is particularly important given that Vietnam is seriously trying to find ways to promulgate policies to improve and develop education and training system (Duggan, 2001; Ministry of Education and Training, 2017; Schiller & Liefner, 2007). In addition, research throughout the world reveals that subjective well-being and education always have a tight relationship. The association between subjective well-being and education is rather complex and multifaceted. From the literature review, both the inverse relationship between education and subjective well-being (higher education tend to lower level of subjective well-being) and the positive relationship between educational attainment and subjective well-being (increased education leads to increased subjective well-being) have been found (Clark & Oswald,

1994; Cuñado & de Gracia, 2012; del Mar Salinas-Jiménez et al., 2011; Ferrante, 2009; Hartog & Oosterbeek, 1998).

This thesis uses nationally representative ageing data from Vietnam in the year 2011 to study the benefits of education investment in a new aspect which is subjective well-being of older persons. Previous studies on benefits of education in Vietnam have only focused on other aspects, for example economic benefits for the working age groups, such as earnings, poverty, or health behaviors, such as smoking and drinking (Cloutier et al., 2008; De Walque, 2007; Moock et al., 1998; Tran et al., 2012). Besides, this thesis is also the first comprehensive exploration on indicators of subjective well-being of older persons in Vietnam through education. In other words, coupled with investigating the direct impacts of education on subjective well-being, I also investigate indirect impacts of education on subjective well-being through factors such as economic resources, marital status, family resources, living arrangement, physical health status, and religion. The analysis of direct and indirect impacts of education on subjective well-being are separated by gender.

The findings of this thesis should have important policy implications for policy makers in Vietnam to promulgate further laws and effective policies corresponding to the needs of specific disadvantaged groups. This will enable Vietnam to achieve “successful ageing” and overcome great challenges in population ageing. Furthermore, the study aims to persuade policymakers to formulate the national strategy for mental health care improvement preparing for "aged" and "super-aged" society in the future,

coupled with national strategy for education and vocational training under the trend of demographic transition around the world. This is accomplished by stressing out the impacts of educational background on the subjective well-being factors, namely degree of happiness, overall life satisfaction, loneliness, and depression, at the old age.

Corresponding to the significance of the thesis, the following are the research questions, research objectives and hypothesis of the thesis.

2. Research Questions

- What is the situation of education and subjective well-being (happiness, overall life satisfaction, loneliness, and depression) of older persons in Vietnam? How is the situation different by gender?
- What are direct and indirect impacts of education on subjective well-being (happiness, overall life satisfaction, loneliness, and depression) of older persons in Vietnam? Are the impacts different by gender?
- What are policy recommendations for the improvement of education in order to have better subjective well-being (happiness, overall life satisfaction, loneliness, and depression,) in old age in the path of overcoming difficulties of "ageing population"?

3. Research Objectives

- To examine the situation of educational attainment and subjective well-being (happiness, overall life satisfaction, loneliness, and depression) of older persons in Vietnam, and to investigate the differences by gender, using the Vietnam National Aging Survey 2011.
- To determine the direct and indirect impacts of education on subjective well-being (happiness, overall life satisfaction, loneliness, and depression) of older persons in Vietnam, and to investigate the differences by gender, using path analysis.
- To give policy recommendations that can contribute to national action plans for the improvement of education and subjective well-being of older persons in Vietnam in the path of overcoming difficulties of “ageing population”.

4. Hypothesis

- There are differences by gender in the level of education and subjective well-being (happiness, overall life satisfaction, loneliness, and depression) amongst older persons in Vietnam.
- Higher education directly impacts on increasing overall life satisfaction and happiness. On the other hand, higher education directly impacts on decreasing loneliness and depression.

- There are statistically significant direct and indirect impacts of education on subjective well-being (happiness, overall life satisfaction, loneliness, and depression) of older persons in Vietnam through intermediate factors, including economic resources, marital status, physical health, family resources, religion, and these impacts are different by gender.
- There are statistically significant direct impacts of other factors on subjective well-being (happiness, overall life satisfaction, loneliness, and depression) without starting from the impact of education in path analysis, and these impacts are different by gender.
- There are statistically significant direct impacts amongst factors in path analysis, and these impacts are different by gender.

The rest of the thesis is organized as follows. Chapter 2 contains country context of the situation of population ageing, characteristics of older persons, and education system in Vietnam. A review of related literature on theory, subjective well-being measurement, gender differences in Vietnam with regards to education and subjective well-being, and the determinants of subjective well-being is presented in chapter 3. Chapter 4, is the methodology part, which describes research ethics, data set and the construction of the measurements for both the dependent and independent variables, and methodology for the quantitative analysis. Chapter 5 presents direct and indirect impacts of education on subjective well-being by

gender. Chapter 6 presents results about the direct and indirect impacts of education on subjective well-being by gender and age groups. Chapter 7 provides key messages, discussion, conclusions, policy recommendations for education and subjective well-being, limitations of the study and suggestions for further studies.

Chapter 2: Country context: Population ageing in Vietnam, and Vietnamese education system

This chapter presents the general picture of the context of Vietnamese society in relation to population aging and the education system in Vietnam before proceed to literature review in the next chapter.

1. Trend of population ageing in Vietnam

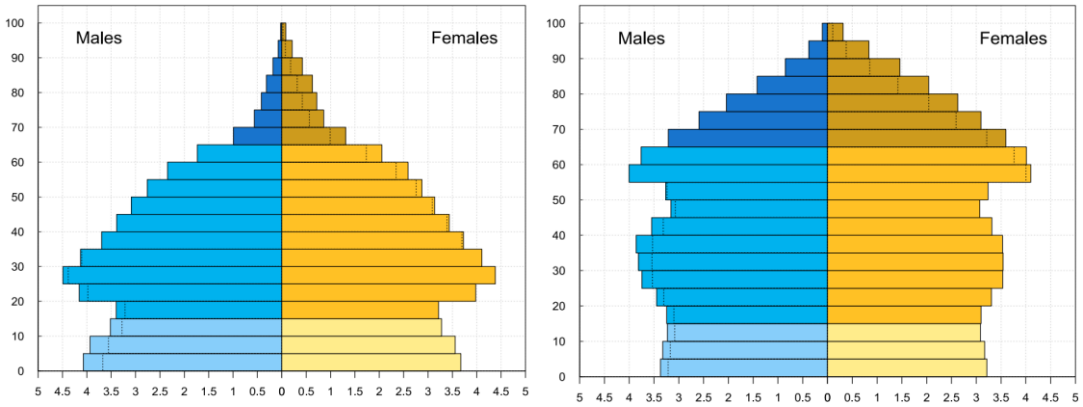
Over time, Vietnam's fertility rate has dropped significantly, and life expectancy is increasing due to the success of people's health care programs and the development in medical science as well as the improvement in people's lives. All these have changed the age structure of Vietnam's population towards ageing population. According to World Population Prospects: The 2017 Revision, Vietnam's population pyramid 2017 shows that the swelling of the bar is quite equal among several age groups with a large number of populations, for example, the groups of population aged 0 to 20, population aged 20 and 40, and population aged 50 and over. Then, by 2050, Vietnam's population pyramid represents a shape similar to stationary pyramid form, the typical shape of population aging, with the number of people in all age groups being nearly equal, and slightly larger towards to older age groups (Figure 1 and Figure 2) (United Nations, Department of Economic and Social Affairs, Population Division, 2017).

The pace of ageing is remarkable and much faster than other high-income or low and middle-income nations, with the share of old-age dependency ratio increasing

rapidly. For example, in 2015, old-age dependency ratio was 9.6, and accounted for 22.6 per cent of total dependency ratio (which was 42.5). In 2050, old-age dependency ratio is expected to reach 34.9, making up 56 per cent of total dependency ratio (which will be 62.4). This demographic transition is a final result of the combination among three main aspects which are life expectancy at birth improvement (increasing from 75.6 in 2015 to 82.1 in 2050), rapidly decreasing fertility and persistently low fertility (TFR = 1.92 and fluctuate around this number from year 1950s to the year 2015), and decline of mortality for all ages (CDR falls to 5.8 per thousand population in the year 2015 from 14.6 per thousand population in the 1950s) (United Nations, Department of Economic and Social Affairs, Population Division, 2017)

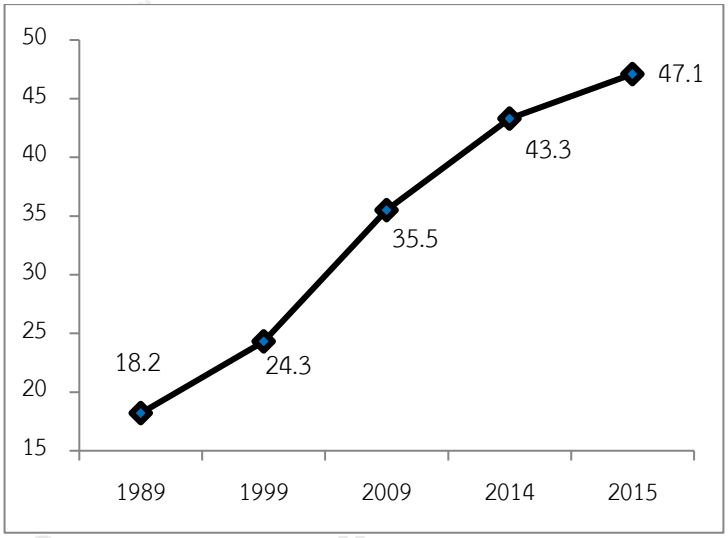
Ageing index, one of the important indicators of the trend of population ageing, is calculated as the number of persons 60 years old or over per hundred persons under age 15 (United Nations, Department of Economic and Social Affairs, Population Division, 2002). The ageing index has increased from 18.2 per cent in 1989 to 24.3 per cent in 1999, 35.5 per cent in 2009, 43.3 per cent and 47.1 per cent in 2014 and 2015 (Figure 2). This data suggests that the trend of population ageing in Vietnam takes place more rapidly in the past three decades and will become a big problem if Vietnam does not prepare its public policy in advance by better understanding the needs and the difficulties of the older population.

Figure 1: *Vietnam Population Pyramid 2017 and 2050*



Source: *United Nations, Department of Economic and Social Affairs, Population Division (2017)*

Figure 2: *Ageing index in Vietnam, 1989-2015*

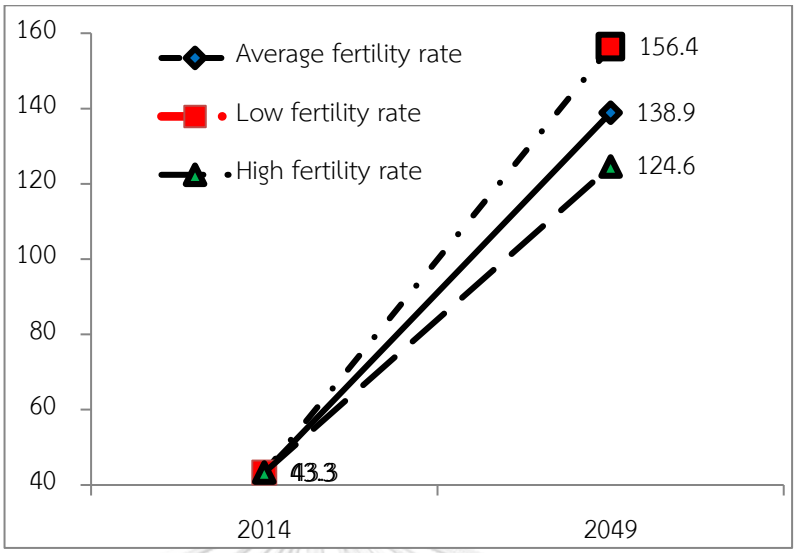


Source: *Author's own calculation based on information from General Statistic Office (2016)*

The results of the 2014 Population and Housing Census, the census in the middle of two official census times (2009 and 2019), showed that Vietnam population is still dominated by those in the labor force, sometimes called the period of "golden population structure". The United Nations defines this as the period in which the proportion of children under 15 years is below 30 per cent and the proportion of the older persons aged 65 years or older is below 15 per cent of the total population

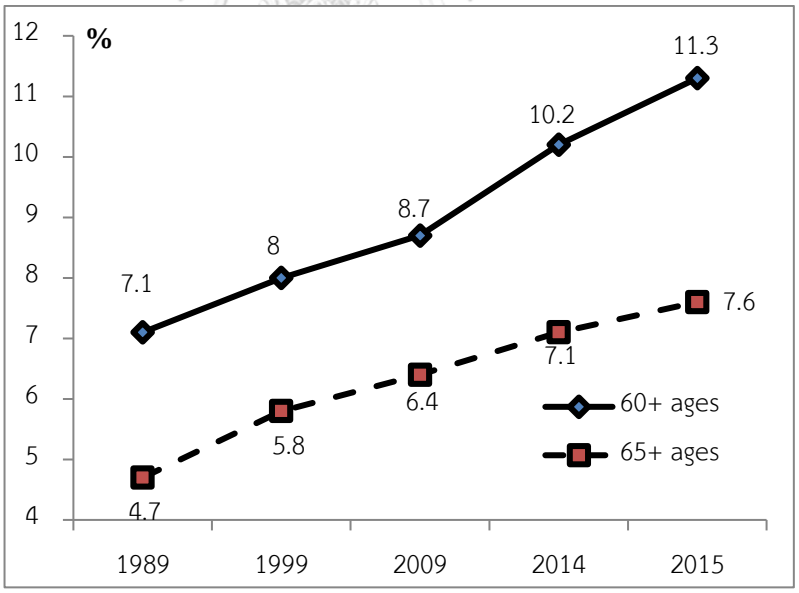
Therefore, according to the scenario of medium fertility in Figure 3 and the concept above, the period of "golden population structure" of Vietnam will end in the year 2040 because at this time the proportion of the population 65 and older will begin to surpass 15 per cent of the population (Hakkert, 2007). Furthermore, according to the analysis and forecast, figure 5 shows that while countries of the world took almost 100 years to move from “ageing population” to “aged population”, Vietnam only takes 15 -20 years. Therefore, Vietnam is one of the world's fastest ageing countries (United Nations Population Fund, 2011).

Figure 3: *Ageing index in Vietnam, Population projections, 2014-2049*



Source: *Author's own calculation based on information from General Statistic Office (2016)*

Figure 4: *Proportion of population 60+ and 65+ years-old in Vietnam*



Source: *Author's own calculation based on information from* General Statistic Office (2016)

Figure 5: *Time needed to move from 'ageing' to 'aged' in some countries*

Source: (United Nations Population Fund, 2011)

2. Reasons for rapid population ageing in Vietnam

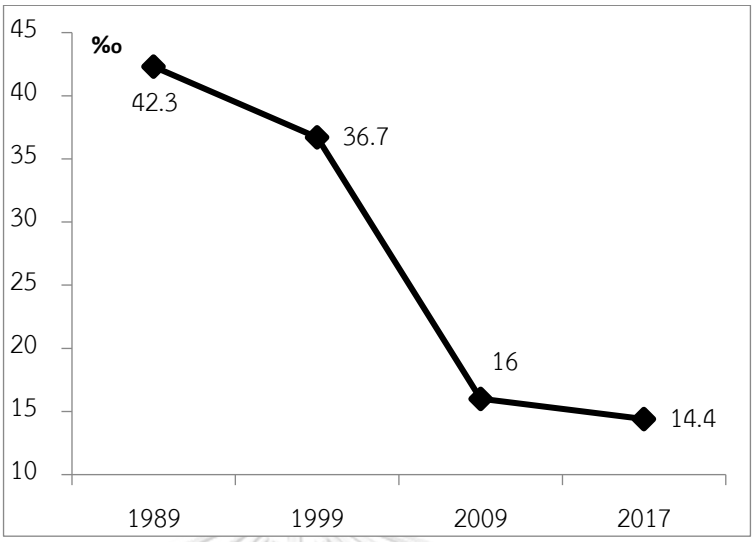
There are many reasons that contribute to the ageing of Vietnamese population. First of all, total fertility rate declined rapidly across the country over time, for example, TFR dropped from 6.0 in the 1970s to 4.0 in the 1980s, to 2.33 in the year 1999, and then fluctuated around 2.0 from 2009 to 2017 (Allman et al., 1991; General Statistic Office, 2017). There are two main factors that cause the decline of total fertility rate of Vietnam, including (i) the promoted *two-or-three-children norm* in the year 1963 (free contraceptive methods were only supported in some areas), and (ii) the official and comprehensive family planning in 1988, however this policy had been

introduced in the early 1980s in some certain areas, with the aim to encourage parents to have *one-to-two-children* (mainly applied to officials, teachers, other workers in State enterprises) (D. M. Goodkind, 1995).

Secondly, death rates have been declining impressively. Infant mortality rate (IMR) decreased rapidly, from 42.3 per thousand in 1989 to 14.4 per thousand in 2017 (as shown in Figure 6), child mortality rate decreased from 53.0 per thousand in 1990 to 21.5 per thousand in 2017 (WHO Viet Nam, 2018), and the crude death rate decreased from 7.3 per cent in 1989 to 6.8 per cent by the year 2017 (General Statistic Office, 2017).

Thirdly, and equally important, life expectancy at birth in Vietnam is increasing rapidly and is higher than other countries in the region. According to World Health Statistics (2018), life expectancy at birth for both sexes in Vietnam is 76.3 years, ranking 3/11 of ASEAN countries, which is lower than Singapore (82.9 years) and Brunei (76.4 years), and followed by Thailand (75.5 years) and Malaysia (75.3 years) (WHO, 2018). Figure 7 shows Vietnam's life expectancy at birth based on Census data from 1989-2015, and Figure 8 shows life expectancy at birth amongst ASEAN countries in 2018.

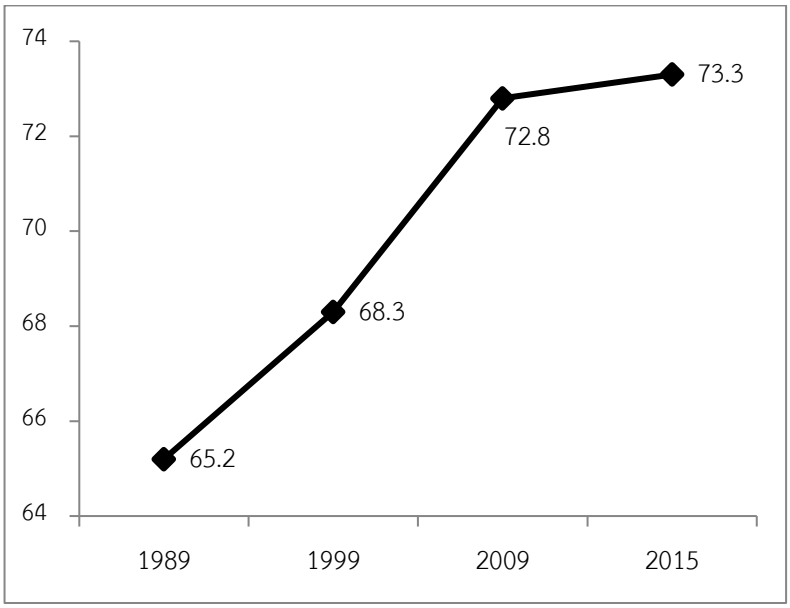
Figure 6: *Infant mortality rate over census time, 1989-2017 (‰)*



Source: *Author's own calculation based on information from GSO*

(General Statistic Office, 2011a, 2017)

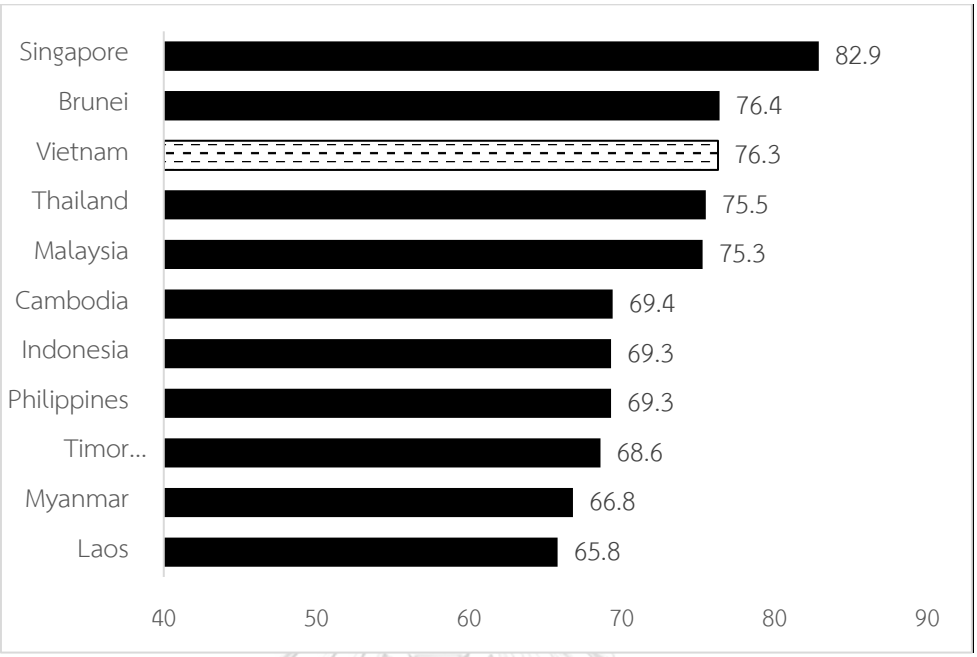
Figure 7: *Vietnam's life expectancy at birth (years), census 1989-2015*



Source: *Author's own calculation based on information from GSO*

(General Statistic Office, 2011a; GSO, 2015)

Figure 8: *Life expectancy at birth (years) amongst ASEAN countries in 2018*



Source: *Author's own calculation based on information from* WHO (2018)

To summarize, population ageing in Vietnam is taking place at a rapid pace due to the rapid change in the structure of the population presented above. According to classic or first demographic transition theory, these shifts are indispensable for all populations. In other words, every country in the world has to go through the same stages of demographic transition, both developed and developing countries, but the transition period varies from country to country (Lesthaeghe, 2007). With the rapid ageing of the population, Vietnam needs to have a prompt assessment of the problems of the older persons in order to ensure timely and adequate response to the needs of the older population. Finally, research on well-being in general or subjective well-being or mental health care in particular is one of the main themes for research on older population due to the extremely high cost for all stakeholders, such

as society, family, caregivers and older persons themselves (Department of Health and Human Services, 2001). Therefore, this study aims to contribute to fill the gap in doing research and suggesting policies about Vietnamese older persons.

3. Education system in Vietnam

Education has been determined as a part which could not be apart from Vietnam's history, it is considered as "national priority", "national strategy", and "national policy" over time. Throughout history, Vietnam's education has varied across regions, and has constantly changed over time as it is influenced by 4 main factors, including Confucian ideology due to nearly a thousand years as a Chinese colony during the year 111BC to the year 938AD (Huong & Fry, 2004), French-Vietnamese education system which is built and maintained during French colonial period from the end of the nineteenth century to the first half of the twentieth century (Ministry of Education and Training, 2014), United States and Soviet Union during the Vietnam War (1954-1975), and the education under the socialist-oriented market economy which is essentially Marxist-Leninist and Ho Chi Minh's Thought since 1986 when Vietnam applied "economic reform policy" to date (Huong & Fry, 2004; London, 2011; Vietnam National Assembly, 1998, 2005).

Generally, the recent education of Vietnam has only constructed and existed officially for approximately 20 years. In more details, the first Education Law was issued by the 10th Vietnam National Assembly in 1998, it stipulated that primary education is compulsory for all people, from grade 1 to grade 5, and children will begin

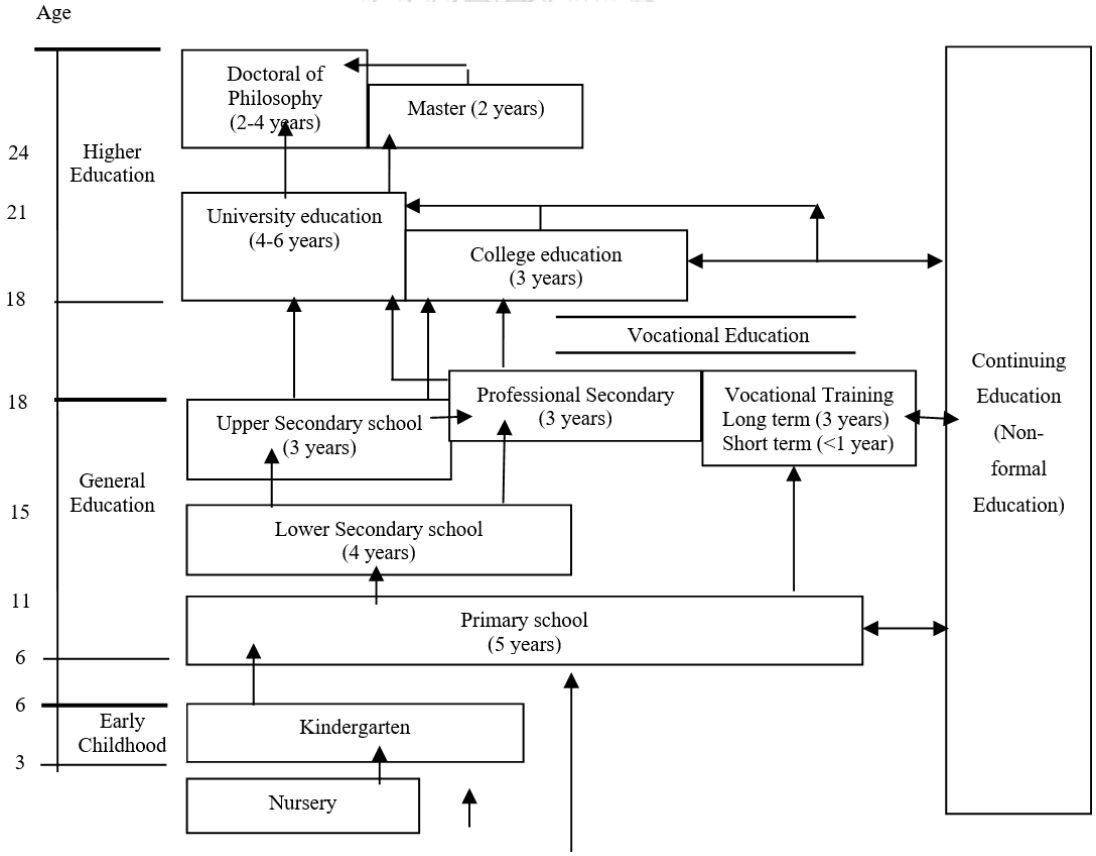
participating in primary school at the age of six (Vietnam National Assembly, 1998). In the year 2000, two years after the first education law was enacted, the Vietnamese government officially announced that her country had accomplished two major national objectives that are eradication of illiteracy and compulsory primary education (Huong & Fry, 2004). Following the achievements of the education sector, the 11th National Assembly continued its adoption of the new Education Law in the year 2005. It further amended the provision that primary education and basic secondary education are universal education levels. At the same time, people have the obligation to go to school and families have the responsibility to create conditions for family members to participate in education to achieve national education universalization (Vietnam National Assembly, 2005).

In addition, the law of education 1998 and 2005 also classified education to 4 main levels, including (1) "Preschool education" with crèches and kindergartens, (2) "General education" with primary education, lower secondary education, and upper secondary education, (3) "Professional education" with professional secondary education and vocational training, and (4) "Undergraduate and postgraduate education" with college, university, master and doctoral degrees. In addition, the law also provided time frame for general education, such as "Primary school" is conducted 5 years from the first to the fifth form, "Basic secondary education" is conducted in four school years from the sixth to the ninth form, "General secondary education" is conducted in three

school-years, from the tenth to the twelfth form (Vietnam National Assembly, 1998, 2005).

Furthermore, in order to contribute to the success of education improvement, the Ministry of Education and Training (2014) has implemented the report "Viet Nam National Education for All 2015 Review", to submit to the International Conference about "Education for All" at Incheon, Republic of Korea under the auspices of UNESCO, which clearly outlines the detailed hierarchy in the current Vietnamese education system as follows.

Figure 9: *National education system of Vietnam (2014)*



Source: *Ministry of Education and Training (2014)*

This thesis uses Vietnam National Ageing Survey 2011 with the sample of older persons aged 60 years-old and over, therefore, all of them were born in years before 1951, and their educational background was affected by two main periods which are French colonial influences before the year 1954, marked by the victory of the "Dien Bien Phu" campaign; and United States and Soviet Union during the Cold War when Vietnam was divided into 2 official countries at the 17th parallel under the compromise of Geneva conference 1954, including South Vietnam (Republic of Vietnam or State of Vietnam) and North Vietnam (Democratic Republic of Vietnam) (Huong & Fry, 2004; Ministry of Education and Training, 2014).

The education systems in these two stages are as follows. During the French colonial period, the traditional Confucian education system was replaced by the French-Vietnamese system, general education lasted 12 years, consisting of three levels (primary school accounted for five years, secondary school accounted for four years, and upper secondary accounted for three years) coupled with higher education (including vocational training and college / university). At this time, in addition, French was used as the dominant and official language of higher education (World Bank, 2005).

During the Vietnam War, the education system in South Vietnam flourished and with great investment and support from the United States, the Saigon government maintained its hierarchy similar to that of the French colonial era, with general education taking 12 years, but the education program completely transformed from the influence of Europe and France to North America. The United States has made a

serious commitment to spend large budgets on education in the South, through the expansion of schools at all levels, corresponding to the meaning of "every university is seen as a museum", particularly for higher education development. Besides, the United States also gave funding and supported many scholarships for students in the South to study abroad, and provided strong support for the development of tools, methods and teaching quality of the Vietnamese people (Huong & Fry, 2004). While in North Vietnam, at this stage, the education system of the Ho Chi Minh government was heavily influenced by the education system of the Union of Soviet Socialist Republics (USSR). General education had three levels which are similar to the government of the South, but there is no similarity with regards to time at each level. For example, primary school was four years, upper secondary school was three years, upper secondary school was three years couple with higher education system (World Bank, 2005).

In sum, the older persons that we study in this thesis grew up during the period when Vietnamese education experienced many historical events and differences in teaching contents between the South and the North. However, in these two periods of history, the division of level of education remains the same, 6 main levels that are almost identical and are maintained to this day, including less than primary (early childhood education), primary school, lower secondary school, upper secondary school, vocational training, and higher education (college, undergraduate, master and doctorate level) (EP-Nuffic Internationalising Education, 2015; World Bank, 2005).

Finally, in table 1, we provide a summary of levels of the education by gender based on own calculation using weighted technique in order to represent for the population. It shows that a larger proportion of older men have received education compared to older women, from primary school to university level. The majority of older women have less than primary school education. This result could be explained by the Vietnamese social context which is Confucianism where women's values are underestimated, whereas men's values are always highly appreciated not only in the family but also from the point of view of society. For example, traditionally, a woman must have lower education, working position, wage, and obey, and follow the decision of her husband and male relatives (Rosenlee, 2006). Once women get older they tend to fall to the risk of financial insecurity due to no pension allowance and difficulty finding a job with their inadequate skills and knowledge. Furthermore, Vietnamese older female population might be stuck with mental problem which is loneliness because they tend to being alone without partner (Honigh-de Vlaming et al., 2014) and this is a bridge to connect with depression at old age (Singh & Misra, 2009).

Table 1: *Education of Vietnamese older persons by gender*

	Female		Male	
	Sample (%)	Population (%)	Sample (%)	Population (%)
Less than primary	1,164	628,314	336	223,545
	(69.16)	(64.84)	(30.38)	(30.56)
Primary	225	155,625	254	145,787
	(13.37)	(16.06)	(22.97)	(19.93)
Lower secondary	165	106,399	275	168,244
	(9.80)	(10.98)	(24.86)	(23.00)
Upper secondary	53	35,079	131	111,480
	(3.15)	(3.62)	(11.84)	(15.24)
Vocational Training	40	22,094	33	21,287
	(2.38)	(2.28)	(2.98)	(2.91)
College/University	36	22,511	77	61,152
	(2.14)	(2.22)	(6.97)	(8.36)
Total	1,683	969,022	1,106	731,495
	(100)	(100)	(100)	(100)

Source: *Author's calculation from VNAS 2011*

Note: Sample and sample (%) statistics are calculated from un-weighted data.

Population and population (%) statistics are calculated from weighted data.

Chapter 3: Literature review

In this section, I would like to present literature regarding subjective well-being, including measurements of subjective well-being and theories concerning subjective well-being. Besides, I explore research results about education and subjective well-being, and the determinants of subjective well-being.

1. Definitions and measurements of subjective well-being

Mental well-being is one of the public health issues and is considered one of the aspects to assess a person's health status as defined by the Constitution of the World Health Organization since 1946, in which, WHO stated that “Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (WHO, 1946). There are many ways to measure mental or psychology well-being, and different evaluation strategies are based on different component measurements (Schueller & Seligman, 2010). One of the measurements which came from researchers and health scientists is subjective well-being measurements, in particular, they concluded that studies on subjective well-being or measurements on indicators of subjective well-being play an important role on mental health care, that is to say subjective well-being problems represent mental illness or mental disorder (Keyes, 2006; Rees & Main, 2016).

In contrast to objective well-being, subjective well-being approaches relate to why and how people experience their lives in differential ways that range from negative to positive scale, including emotional reactions to life events, person's cognitive

evaluation, and affective reaction, which has been defined and synthesized in literature review about subjective well-being (SWB) (Diener, 1984, 2009; Snyder & Lopez, 2009). In other words, subjective well-being is the way people evaluate their own lives, including such factors as feelings of well-being which is comprised of cognitive-evaluative factor (life satisfaction) and affective factors, including pleasant emotions (e.g. happiness) and unpleasant emotions (e.g. loneliness, and depression) in their lives (Diener et al., 1997; OECD, 2013). Subjective well-being is conceived as an emotional state produced by positive and negative events and experiences in the life of an individual and a series of other social factors around human being such as level of education, engaging activities and work, age, region, number of sons and daughters, working status, social networks, marital status, chronic diseases, and gender (Campbell, 1981).

Diener and Chan (2011) conclude that high subjective well-being or positive psychological state is a core concept predicting longevity because it may lower diastolic blood pressure, cortisol that is concerned with cardiovascular disease, hypertension, or immune diseases. These non-communicable diseases are risks of death and are the trend of disease in the current and next centuries (World Health Organization, 2017). Moreover, a positive psychological well-being will help people to overcome difficulties in their life, and intervention to improve subjective well-being for Vietnamese older persons is a necessary and important policy for achieving "successful ageing" in the rapidly changing cultural context and social structure in this country

which is one of the world's fastest ageing countries while policies for the older population change slowly (World Health Organization, 2002).

In this study, we evaluate four aspects that belong to subjective well-being based on self-evaluation of older persons in Vietnam, in which four aspects are happiness, overall life satisfaction, loneliness and depression. These measurements are indicators of subjective well-being in "Guidelines for National Indicators of Subjective Well-being" (Diener, 2006). This classification also corresponds with definition of Diener et al. (1997) in a synthesis research findings on subjective well-being, as it is in line with the two main assessments about subjective well-being, including a person's “cognitive evaluations”, that are how people feel and react to their life through cognition, which is representative by “overall life satisfaction”, and a “person’s affective evaluations” which are the emotional differences by each individual, and presented by “happiness”, "loneliness", and "depression" (Diener et al., 1997).

2. Human Capital theory and its relations to benefits of education

Theory about “Human Capital” was first introduced by Gary Becker in the year 1964 as the first book on Labor Capital theory, and as a basic aspect or one of the focus issues of neoclassical economic theory or neoclassical growth theory during the 1960s (Na, 2012). Basically, the human capital theory is mainly used in the explanation of the effective development of labor resources and the economy. The basic premise of human capital theory is that each individual is considered as a machine. That is, the higher valuable inputs or the greater materials and equipment of machines, the higher the achievement of performance and quality outputs. Similarly, the higher investment on individual's education and training, the more effective and productive labor force (Reder, 1967).

Formal education is considered a prerequisite of human capital, and most often it takes a very long time for investment compared to other shorter investments of human capital, such as informal education (soft skills), on-the-job training, as well as knowledge and experiences that can be gained through working and living. It is interesting to note that the decision on human capital investment depends on individual decision without being affected by their socioeconomic background. Although human capital theory was first introduced by Gary Becker, many previous human capital studies existed by evaluating the educational aspect without mentioning the word “human capital” during the twentieth century. One of the very first studies by Eugene Gorselin in the 1930s, looked at difference in income amongst

persons who have different levels of education, controlling for other factors. Gorselin found that annual income of those who have higher education level is higher than annual income of those who have lower level of education (Langelett, 2002).

Before Gary Becker launched his first theory about human capital, Schultz already proved the benefits of investment in human capital in a research publication in 1961, and it is considered as first view about labor capital (Na & Ying, 2012). According to Schultz, the shape of economic growth depends mainly on human capital. Human capital investment, as defined by Schultz, focuses on the quality of the workforce, including education, knowledge, ability and health, rather than the number of workers, assets, and equipment. Schultz is also famous for saying, "The man without skills and knowledge leaning terrifically against nothing" (Schultz, 1961).

Regarding recent studies on human capital, Olaniyan and Okemakinde (2008) applied human capital theory in the explanation of benefits to education, in general, they proved that formal education improvement leads to boost the high rate of production capacity, more professional citizens, and it creates great standard for society in socio-economic and all aspects (Olaniyan & Okemakinde, 2008).

There are many studies that approached “Human Capital” theory for investigating the benefit of education or returns to education in terms of economic aspect, and the most famous concept is Mincer earning function (Mincer, 1974). In his research, Mincer explained wage income in a single equation regression with predictor variables being years of schooling and years of potential labor market experience:

$$\ln w = \ln w_0 + \rho s + \beta_1 x + \beta_2 x^2$$

In Mincer regression model: w is earnings; w_0 is the intercept, and means the earnings of someone with no education and no experience; s is number of years of schooling; x is number of years of labor experience.

For an example which applies Mincer earning equation to study returns to education, Bouaissa (2009) explored whether highly educated people will have high human capital when entering the labor market, which means that the learning ability of those with higher education will be higher than that of those with lower education. The results show that the duration of learning is less for those with higher education. In addition, the human capital of people with low educational attainment will only increase maximum to age 42 then decreases rapidly over time. On the other hand, the human capital of people with high levels of education continues to increase without age restriction and extends into retirement age with slower degrees.

Similarly, Booth et al. (2007) proved there is an increasing "return to education" from the fundamental concept of human capital. They concluded that there is a tight relationship between human capital theory and return to education. This argument is evidenced by the explanation that the individuals with better knowledge and ability to work (higher human capital investment) will have greater wage complement and more benefits at workplace than other individuals. Subsequently, these individuals feel happy and satisfied that their human capital values are well paid, so they accept to invest and spend more time on the jobs. Then, that leads them to produce more

products and profits for the business. As a result, individuals continue to be paid high or higher wage and benefits. Finally, the returns to education are maximized.

As a conclusion, over time, Human Capital theory is one of the best theories to orientate studies for exploring returns to education in terms of economic aspects. This is because whenever we mention about human capital, we have to mention about educational investment. However, in this thesis, we decided to pursue the search for benefits of education or human capital investment on another non-economic dimension, which is subjective well-being based on the theory of human capital. We believe that the more education investment, the more long-term other benefits, including subjective well-being. We look at not only the direct impacts but also the indirect impacts of education. In addition, this thesis serves as a confirmation for conclusions about the variety of benefits of education of Langelett (2002), for example, the improvement of good behavior, attitude, longer life expectancy, increasing proportion of female labor force, increasing gender equality, lower fertility, etc. and here is subjective well-being.

3. Mechanism impacts of education on subjective well-being

In this part, we present each subjective well-being indicator's definition used in this study, and its relationship with education. The four subjective well-being indicators are happiness, loneliness, depression and overall life satisfaction. Finally, we develop a general model of mechanism impacts of education on subjective well-being through literature review.

3.1 Mechanism impacts of education on happiness

There are many research articles that explore determinants of happiness. For example, the relationship between economic factors and happiness, such as income and money has been mentioned by research works of Easterlin (Easterlin et al., 2010; R. A. Easterlin, 1995). It is explained that the higher the economic status, the higher the level of happiness in comparison with others. In other words, happiness increases proportionally with economic advantage and vice versa[1]. Besides, (Easterlin, 2003) also confirmed that life experiences has affect a person's happiness in general, however, income, family circumstances and health status play the most significant roles in happiness compared to other factors, such as friend relationship and working status.

Regarding education and happiness, the impact can occur through several channels by direct and indirect effects of education on happiness (Cuñado & de Gracia, 2012; Witter et al., 1984). The influence of education on happiness can occur in many ways as follows. Firstly, most of the literature provides strong evidence that education continues to play an important role in increasing happiness in many countries around the world through the indirect effect. This is explained by the education effect on

[1] The relationship between income and level of happiness is positive in most developing countries. However, in some developed countries when the wealth or prosperity of the country has reached a standard point, there is no more relationship between income and happiness, and other factors are the main determinants of happiness such as health, social networks, family relations, etc. (Easterlin et al., 2010).

happiness through income, employment, and marital status. Empirical evidence from Spain suggests that highly educated people are more likely to find a good job/job diverse and also have higher income than those with lower education, thus they tend to report higher level of happiness. Secondly, following Cuñado and de Gracia (2012), an increase in education will result in an increase in happiness through direct effect. People with education will be more self-confident and gain pleasure from acquiring knowledge. They have inner happiness because they are satisfied with their personal lives and have deep insights about themselves and the world.

On the other hand, some authors argue that education can bring an obstacle for individual well-being. Higher education leads to greater expectations about income, work and quality of life, and if these expectations are not met, individual subjective well-being will be reduced. Higher educated people usually possess high income, great wealth and high status in society. It also means that if they become unemployed or face incidents which bring disadvantages, they will suffer a huge loss not only economic but also mental health that is greater than others (Clark & Oswald, 1994; del Mar Salinas-Jiménez et al., 2011). In addition, highly educated individuals may experience feelings of regret for having to give up some of life's chances, such as delaying their marriage or having to forgo promotion during schooling time, thus reducing the level of happiness of individuals (Ferrante, 2009).

In sum, the relationship between education and happiness is mainly found in the labor force through income satisfaction, working environment, and type of labor.

However, there is still a gap in studying the relationship between education and happiness in older persons.

3.2 Mechanism impacts of education on depression

Depression is always considered one of the top hazards that lead to suicide, and its consequences are a major concern for policy makers aiming to improve quality of life (Barraclough & Pallis, 1975; Rutz et al., 1995). In addition to suicide mortality, depression is also identified as one of the leading causes of medical burdens worldwide because of the negative association of depression with chronic diseases. That is, depression will worsen the condition of chronic illness (Moussavi et al., 2007). Meanwhile, WHO (2011) identifies global disease trends in the 21st century as chronic diseases, particularly in developing countries, because of poor lifestyles behavior of young adults, and ageing population compared to the 20th century (WHO, 2011). Thus, research studies on depression is significant for all ages and necessary for older persons. There are many determinants of depression disorder. For example, Brown et al. (2017) stated that education is one of the social factors associated with depression in the Caribbean, along with other factors such as gender, age, place of residence, marital status, as well as inequality in relationship. It is clear that education levels are inversely related to depression. More specifically, the higher education, the lower the level of depression, and vice versa (Brown et al., 2017).

With regard to depression symptom in Vietnam, Leggett et al. (2012) used a multidimensional examination model to find correlations with depressive symptoms

and worry in older persons aged 55 and older. The demographic characteristics, functional health, and emotional support of children and adolescents were included in the model. For the results, the study determined that gender, material difficulties, and low education levels were associated with depression and worry (Leggett et al., 2012). However, Leggett et al. conducted research data from using at Da Nang city which might represent for only Central region of Vietnam. We can therefore confirm that this thesis is the first representative study on depression at old age in Vietnam, and we use path analysis as a causal-relationship analysis to look at the direct and indirect impacts of level of education on depression of Vietnamese older persons.

3.3 Mechanism impacts of education on loneliness

With regard to loneliness, Perlman and Peplau (1981) presented definition of loneliness as feeling of displeasure or disagreement in lives due to the gap between expectations of an individual and his/her social relations. This measurement is subjective and differs among individuals. In addition, they also documented that loneliness was associated with many social matters such as crime, alcoholism and suicide (Perlman & Peplau, 1981). Jong-Gierveld et al. (2006) introduced loneliness definition from Europe explaining that loneliness is the experience at an individual level when they have feelings of dissatisfaction, or deficiency of quality in relationships, or feeling unsustainable in a relationship compared with the wishes they posed. It means that loneliness is judged subjectively from matching results between individual requirements and the status of social relationships, and of course, this matching results

or relationship evaluation will be different among individuals (Jong-Gierveld et al., 2006).

In the trend of ageing society, loneliness is predicted in older persons as a result of changes in social structure, culture, family model, and the gap between intergeneration as well as family members. Older people are frustrated with the deterioration in family relationships, along with the feeling of isolation in social relationships because of their lack of closeness with their descendants, or deficiency of conversation and care from family, and this is more evident among individuals with reduced mobility or poorer health (Coplan & Bowker, 2013). There are research studies about determinants of loneliness in older persons and the impacts of loneliness on other aspects. For examples, Pinquart et al. (2001) stated that social networks play a vital role in loneliness along with age, gender, low socioeconomic status, and living in nursing homes (Pinquart & Sorensen, 2001).

However, there is a lack of research that shows the relationship between level of education and loneliness of individuals in general and older persons in particular. Coupled with the definition and assumption about loneliness that is unpleasant feeling in social relationships, and that these expectations are different between individuals, this thesis would like to find out whether different levels of education will result in different levels of loneliness by gender at old age in Vietnam. Moreover, this topic also has not been explored in other research studies.

3.4 Mechanism impacts of education on overall life satisfaction

There are many research studies on life satisfaction in many life aspects, for all ages and all walks of life which include the group of older population (Adams et al., 1996; Ragheb & Griffith, 1982; Valenzuela et al., 2009). With regard to education determinant, Powdthavee et al. (2015) determined the causal relationship between education and life satisfaction of Australian older persons by using simultaneous equation model. In their research, those who have more years of schooling, have higher life satisfaction due to their higher income and better health status (Powdthavee et al., 2015). Another study of Palmore et al. (1972) revealed that education has positive relationship with health development and increases activities in organizations at middle age (Palmore & Luikart, 1972).

In Vietnam, research studies on life satisfaction has been conducted on patients with functional disabilities or youth generation and studies have investigated the relationship between life satisfaction and social capital or government capital (Bjørnskov et al., 2007; Proctor et al., 2009; Takahashi et al., 2011). There is no previous research which explores the relationship between education and life satisfaction in general or at old age in particular. Therefore, this thesis is expected to be the first national study in Vietnam to find out causal relationship between level of education and life satisfaction of older persons by applying path analysis model.

From the conclusions regarding the close association between education and subjective well-being, therefore, this study intends to analyze the direct and indirect

impacts of education on subjective well-being at the old age amongst Vietnamese older persons. Therefore, the statistical results and recommendations about education and subjective well-being from this study should provide solid evidence for policy makers in Vietnam.

4. Gender composition differences and feminization of older population, gender roles in Vietnamese society, and the relationship between gender, education and subjective well-being

In this part, first of all, we give a general review about gender composition differences and feminization of older population. Secondly, we present the distinction in culture and traditional beliefs in the division of gender role in Vietnam. Finally, we present the relationship between gender, education and subjective well-being. Therefore, from information in this part, we can affirm the important role of looking at gender differences in the relationship between education and subjective well-being.

4.1 Gender composition differences and feminization of older population

Regarding the gender composition of ageing population, world population ageing report (2015) projected that the number of people aged 60 and older will increase by 56% between 2015 and 2030 (from 901 million to 1.4 billion), and more than double between 2015 and 2050 (reaching nearly 2.1 billion) in the world. Asia is expected to increase the number of older people by 66 per cent, second place among all continents. The fastest growth is expected to be Latin America and the Caribbean (71 per cent). In addition, females were found to live longer than males for an average

of 4.5 years. Specifically, women make up 54 per cent of the population aged 60 and older and 61 per cent of those 80 or older globally by 2015 (United Nations, 2015). Similarly, there is also a big difference in gender composition of the older persons in Vietnam. Results from Vietnam Census (2009) reported that a total of 7,452,747 older persons consist of 3,012,476 men and 4,440,271 women. In other words, there are 148 older females for every 100 older males. When compared within each age group, we see that the ratio of women gradually increased in each age group, there are 131 women for every 100 men in the 60-69 age group (1,977,442 women compared to 1,515,184 men), similarly 150 women in the 70-79 age group (1,563,031 women compared to 1,048,400 men), and 201 women among 80 and older (899,798 women compared to 448,892 men) (General Statistic Office, 2010).

As a result, the "Feminization ageing trend" has become one of the global issues in terms of demography due to the stable growth of the number of older women populations in comparison with the number of older men. According to the first policy framework about active ageing, World Health Organization (2002) stated that feminization of older population is the fourth global ageing challenge in the group of seven challenges of ageing population when female life expectancy exceeds male life expectancy and this trend is stronger over time (World Health Organization, 2002). This challenge is explained by the World Health Organization in this framework by the following specific arguments. First, while women make up nearly two-thirds of the population aged 60 and older, and the proportion increases in older age group, women

are vulnerable during all stages of their lives, gender inequality issues have led to low levels of education, low income, and stigma in accessing all social services. All of these disadvantages accumulate over time, so older women are more likely to be living in poverty and undergoing health disabilities compared to older men. Second, because women are considered the second-class citizen in society, women's care policies are often limited, especially at old ages. Third, there are differences in norms regarding remarriage for men and women. Men remarry at a higher rate and sooner than women after family dissolution or death of a partner, leading to women becoming lonely when they get older (World Health Organization, 2002). This has been demonstrated by Bennett (2017) in the "attraction between the sexes" chart, which shows that while women tend to marry older men, all men at all ages are attracted to younger women (mostly under 25 years old) (Bennett, 2017). The results lead to the conclusion that older women are less likely to remarry because their marriage market is shrinking.

4.2 Gender roles in Vietnamese society

In Vietnam, the roles of women are underestimated compared to men both in the family and in society because of the long-term effects of Confucian ideology, due to over 1000 years as a colonial country of China (Huong & Fry, 2004). For example, with patriarchy system, traditionally, women must have lower education, lower technical expertise, working position, wages and obey as well as follow the decision of their husband and male relatives (Rosenlee, 2006). This situation of Vietnam corresponds with research of Klasen and Lamanna (2009) about challenges in gender

inequality in society, where women have to depend on her husband's income in the early period of life, mostly contribute to family income through informal work such as knitting, embroidery, sewing, or agriculture. Therefore, in later life these older women in Vietnam may have to face with financial crisis, including no pension fund, no social insurance or medical insurance and or other social benefits which are available only to those who worked in the formal sectors. In addition, due to their low level of education and technical expertise, they may face difficulties in finding employment in old age (Klasen & Lamanna, 2009). Corresponds to the predictions of women's economic difficulties when they get older if they had to depend on their husband's income when they were young, the first Vietnam National Ageing Survey (2012), which collected a sample of older persons from 50 years old and over, also indicated that women are poorer than men (Institute of Social and Medical Studies, 2012).

In addition, the most important factor is that older persons in Vietnam now were mostly born during the period when Vietnam has not industrialized, modernized, and when these campaigns on gender equality and empowerment of women were not deployed as well as norms and social pressure had very heavy impact on the lives of woman and family. Furthermore, Vietnamese older female population might be stuck with mental problem which is loneliness because they tend to alone without partner due to low rate of remarriage. Moreover, they are expected to stay at home and take care of family members from oldest to youngest generation in the family (Honigh-de Vlaming et al., 2014; UNFPA, 2016), and this is a bridge to connect with

depression at old age (Singh & Misra, 2009). For example, according to the results from Census of Population and Housing in the mid-term time at 1st April in 2014, the proportion of male population 60 years-old and over who were staying with a spouse or a partner is higher than the proportion of female population at the same age group by 1.83 times, 85.8 per cent compared with 47.0 per cent. In addition, the proportion of widowed female older population is almost 4 times the proportion of widowed male older population, 47.6 per cent compared with 12.6 per cent (General Statistic Office, 2015). Although the Vietnamese government has attempted to improve the role and empowerment of women in Vietnamese society, there is still a big gap in gender roles in society. This is clearly demonstrated by the small number of female deputies in the Vietnam National Assembly and government agencies. United Nations Development Programs (2014) reported that women accounted for only 28% of Vietnamese delegates in Vietnam National Assembly 2011, in particular the number of women as key leaders of central agencies or leading agencies, accounted for a small proportion compared to men.

4.3 Gender, education and subjective well-being

With regard to the relationship between education and life satisfaction, evaluating differences by gender, Botha (2014) used NIDS dataset 2008 from South Africa and pointed out that there is a positive relationship between level of educational and level of life satisfaction for both men and women. This relationship is found more strongly in blacks and colored individuals than whites, as well as stronger in females

than in males because men's life satisfaction is not correlated with their educational background. Thus, it can be concluded that education has a stronger impact on vulnerable groups in society than the rest. South Africa is where the education, social status, and income of women and blacks is always lower than that of men and whites (Botha, 2014).

With regard to the relationship between education and happiness, evaluating differences by gender, Meisenberg and Woodley (2015) confirmed a very surprising result that highly educated women tend to have lower subjective well-being in the communist and ex-communist countries compared to highly educated men. This is because in these cases the traditional role of gender has changed drastically, men are even forced to engage in traditional roles for women. Thus, men do not feel happy and contented, which influences and puts pressure on relationships with women in the family and society (Meisenberg & Woodley, 2015). Besides, regarding relationship between education and happiness, in a research conducted in Spain, Cuñado et.al (2012) explored that gender contributes to 10 per cent in explaining happiness, i.e. females are happier than males in general, controlling for educational background and other factors (Cuñado & de Gracia, 2012). This conclusion is also confirmed by Caporale et.al and Castriota in their research studies in year 2006 and 2009 (Caporale et al., 2009; Castriota, 2006).

With regard to the relationship between education and loneliness, evaluating differences by gender, research conducted in Finland by Savikko et.al. (2005) revealed

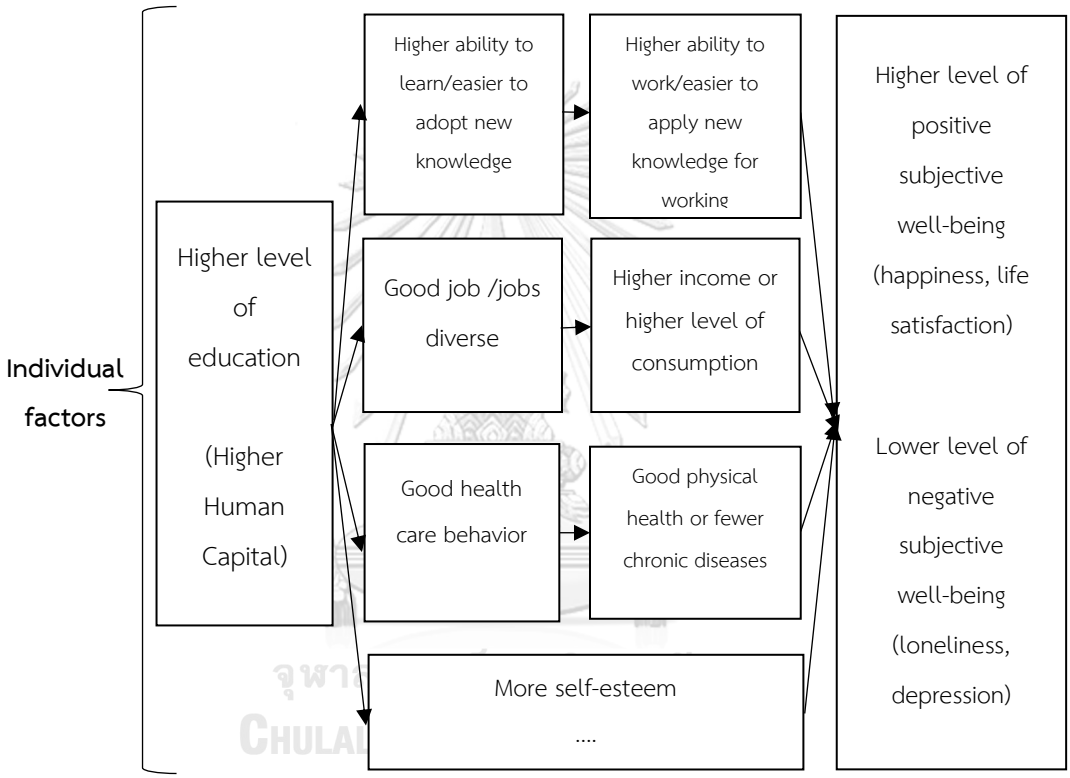
that older women suffer more from loneliness than older men, and the authors explained that women are more comfortable expressing emotions than men, or women are more sensitive in evaluating social relationships than men, and finally, women have a longer life span, therefore, they suffer more loneliness from widowhood or loss of close family members and friends than men. In addition, this study also found that loneliness was higher among people with lower education and less income (Savikko et al., 2005).

With regard to the relationship between education and depression, evaluating differences by gender, Ross and Mirowsky (2006), used the ageing survey in 1995, 1998, and 2001 in the United States, and found a difference between boys and girls in relation to education level and level of depression feeling. Specifically, when the level of education increases, the level of depression in women decreases very rapidly compared to men. The authors explained this result by arguing that women are socially restricted, they are often economically dependent, have very little chance of receiving high wages, full-time work, or get less authority or leadership position compared to men. In addition, education is a key factor for women to feel confident, the higher the level of education, the higher the level of creation in work. Education is a major factor affecting depression because education improves women's status in society and changes their social relationships more than men (C. E. Ross & Mirowsky, 2006).

In summary, the diagram below is constructed by the author through literature review about mechanism impacts of education on subjective well-being indicators as

mentioned above. Generally, we hypothesize that mechanism impacts of level of education on subjective well-being has stronger effect on female population than male population, and through individual factors.

Figure 10: *Mechanism impacts of level of education on subjective well-being through individual factors (indirect impacts)*



Source: *Author's construction based on literature review*

As a conclusion, from the information and research results mentioned above, this study aims to determine direct and indirect impacts of education on subjective well-being of older persons in Vietnam coupled with investigating the differences by gender. The investigation of the differences by gender is conducted due to the gender differences amongst older population not only in Vietnam but also in the world ageing

population trend, with the expectation that gender might have significant impact on subjective well-being amongst Vietnamese older persons.

5. Other determinants and subjective well-being

5.1 Economic resources and its proxy variables

Vietnamese older people mainly live in rural areas, and are farmers and work in agriculture sector. Over 70 per cent of older persons still work to earn money for living, accompanied with the support from children and families (only over 25.5 per cent of older people have pension fund or social allowance). While the proportion of agricultural land is increasingly shrinking, production difficulties caused by natural disasters, resulted in low income of farmers in general and older people in particular. According to the National Survey on Ageing 2011, there are 70 per cent of older people who have no material accumulation, 62.3 per cent of the older persons have difficulty and deprivation (68 per cent in the cases of rural areas and 50 per cent in the case of urban areas), 18 per cent of the older persons live poverty. Generally, older persons in Central area have the highest proportion of people who have saving (approximately 19 per cent), followed by Northern are (11.4 per cent), and older persons from the Southern have lowest per cent of those with saving (6.0 per cent) (Institute of Social and Medical Studies, 2012). Besides, the old generation was born during two main Vietnam wars that are French-Indochina war and Vietnamese war, Singhal (2018) found that older persons in Vietnam suffer mental health disorders due to long term impacts of Vietnam war (Singhal, 2018). Moreover, they also experience significant changes in

family structure that break intergeneration solidarity and care relationship among family members (Nguyen Huu Minh, 2014).

In the book of positive psychology, Carr (2013) pointed out that life satisfaction is significantly affected by financial satisfaction (A. Carr, 2013). In addition, Giang and Le (2017) found that workers are more likely to report a healthier condition than those who are unemployed or do not work (Giang & Le, 2017).

Thus, based on data available, in order to include the impact of economic resources on subjective well-being, we add four variables, including household poverty (poor or non-poor household), working status (still working or stopped working), feeling income and material support sufficiency (from all sources both their own earning and all types of financial support from government, social welfares, relatives and family members), and providing financial support to kin/relatives or friends, as intermediate factors in path analysis to evaluate the indirect impact of education on subjective well-being of older persons due to convincing evidence about the relationship between economic resources and subjective well-being.

5.2 Health status

Health status has always been shown to have a strong and consistent relationship with subjective well-being. For example, heart diseases, such as heart attacks or strokes, have negative relationship with subjective well-being due to the direct relationship with health conditions (Shields & Price, 2005). Besides, self-rated health which belongs to personality or current mode tends to exacerbate subjective

well-being problems. Furthermore, Oswald and Powdthavee (2006) determined that level of life satisfaction declines by disability status (Oswald & Powdthavee, 2008).

Although the average life expectancy of Vietnamese is high compared to other countries in the region and higher than the health expectation of low-middle income countries, Vietnam's healthy life expectancy is relatively low compared to the world. For example, data from World Health Organization in the year 2012 pointed out that life expectancy at birth of Vietnam is 76 years in which male's life expectancy is 71 years and female's life expectancy is 80 years by the year 2012 (WHO, 2012b); however, healthy life expectancy at birth (HALE) is only 66 years for both sexes (62 years for males and 69 years for females) in that year (WHO, 2012a). Thus, it's easy to recognize that in general older persons have on average nearly 10 years for facing with diseases and disabilities, older males only have to suffer on average 9 years of unhealthy life while older females have to suffer 11 years of unhealthy life. In other words, Vietnamese older persons' health is limited and weak due to the burden from diseases in both sexes. Consequently, the Vietnamese older people are facing the "double burden of disease", a characteristic of developing countries which at the same time must address infectious diseases, malnutrition as well as neglected diseases or neglected tropical diseases (Soil-transmitted helminthiasis, Dengue, Lymphatic filariasis, Guina-worm, Chagas disease, etc.), while are confronted with non-communicable diseases (Boutayeb, 2007). It is estimated that approximately higher than 70 per cent of the older persons at all age groups have at least a disease in the

year 2007, such as 72.32 per cent of those aged 60-69 ages, 75.08 per cent of those aged 70-79 ages, 82.44 per cent of those aged 80 and older (United Nations Population Fund, 2011). Besides, Kham (2014) said that older people often have many diseases at the same time, on average each older person has nearly 2.7 diseases (Kham, 2014).

In this study, in order to include the impact of physical health factor on subjective well-being, based on data available, we use "Difficulty in Daily life Activities (ADLs)" as a proxy variable for physical health of older persons in path analysis to evaluate the indirect impact of education on subjective well-being of older persons because of convincing evidences that health is considered as one of the main factors which impact on subjective well-being.

5.3 Family resources

In an effort to find social indicators and its relevance to subjective well-being of older people aged 60 and over, Badger & Chappell (1989) pointed out that marriage, companion, and living arrangement are important indicators related to happiness and life satisfaction of older persons. According to this study, people who live alone, are not married, or live without companion tend to report less happiness and life satisfaction compared to other groups (Badger & Chappell, 1989). Similarly, Vanassche et al. (2013) reveal that married people are happier than cohabiting couples (Vanassche et al., 2013), and Houser and Beckman (1982) pointed out the importance of having children and higher likelihood of high psychological well-being amongst widowed women (Houser & Beckman, 1982). In addition, older persons who live with their

daughters tend to report positive and high subjective well-being compared to those living with their sons (Chen & Short, 2008). Regarding another aspect of family resources, grand children are determined significant contribution to higher life satisfaction of older persons in Hong Kong through their emotional support (Lou, 2010). In contrast, many studies have demonstrated similarly that there is no relationship between interaction or receiving aid from kin or adult offspring with the emotional well-being (moral or life satisfaction) of older persons (Lee & Ellithorpe, 1982). The other factors, such as family members, family quality strongly and positively contribute to the well-being of older persons, whereas, the quantity of family contacts is not significantly related to the well-being of older persons or in some cases even negatively contribute to well-being (Siu & Phillips, 2002).

Therefore, based on data available, in order to include the impact of family resources on subjective well-being, we include marital status, total number of sons, total number of daughters, having grandchild, as intermediate factors in path analysis to evaluate the indirect impact of education on subjective well-being of older persons due to convincing evidences about the relationship between family resources and subjective well-being.

5.4 Religion

Along with informal social activities, religion is found to play an important role in significantly improving the physical and mental health of people. Studying the role of religion on human health has been made very diverse in every socio-economic

population, and the positive impact of religion on emotional well-being at the later life or at old age is confirmed in many studies. However, there are some arguments that religion has a negative effect on subjective well-being of older persons (McFadden, 1995). For example, older persons who understand the meaning of life from religion tend to increase the level of happiness, life satisfaction and optimistic thoughts compared to others, and the positive relationship between religion and subjective well-being is stronger and more meaningful to black people than white people (Krause, 2003). Another study indicated that participating in any form of religion activities, either organizational activities, non-organizational activities, or fundamental religious, religion has a strong and positive relationship with health, social and spiritual factors of the older persons in United States (Koenig et al., 1988). In general, the positive impacts of religion on subjective well-being and mental health can be because religious activities help expand positive relationships and social networks through activities, such as charity, community support, friendship and other interactive relationships in the lives of participants (Ellison, 1991).

In Vietnam, the moral ideology of society is primarily influenced by Confucianism, as Vietnam was under Chinese domination for more than a thousand years (Huy, 1998), and later on the communist government supported atheist ideology. Religion was reportedly severely suppressed in the North Vietnam since 1954 under the Communist regime and continued to be strictly controlled for the entire territory of Vietnam after 1975 when the country was unified. However, since 1986, when the

weakening of Marxism-Leninist threatened the power of Communist government, Vietnam has applied economic reform or Socialist-oriented market economy. Despite these reforms contributing to help Vietnam become more free and create more favorable conditions for religious and social activists, the religious roles are still not promoted in Vietnamese society under the management of the communist state because the requirement for individuals and organizations in public sectors is not to participate in any worship or religious activities. As a result, atheism is still considered a good ideal for people under the communist state. Therefore, because of the differences in the roles of religion in the Vietnamese social structure, first of all, we assume that the level of education will influence participation in religious activities because if highly indicated individuals want to protect their rights and their promotion at work so they might decide not to participate in religious activities. We also consider the impact of religion on subjective well-being of older persons similar to other records in the world (Denney, 2006).

Therefore, based on data available, in order to include the impact of religion on subjective well-being, we include four main types of religions amongst Vietnamese people, including free thinker, Buddhism, Christianity, and Confucianism, as intermediate factor in path analysis to evaluate the indirect impact of education on subjective well-being of older persons. We can confirm whether religion in Vietnamese context (a representative of communist country or atheist country with communist government) has any impact on subjective well-being at old age in the same way as

in other social contexts. We can also determine the direction of impact of religion on subjective well-being of older persons in Vietnam.

5.5 Living arrangement

Living arrangement is always a topic of interest in researching its relationship with the physical and mental health of older persons. This is because living arrangement is a direct result of previous historical events in the overall history of marriage and family of the older persons and therefore living arrangement is closely related to older persons' life at the present time (De Jong Gierveld et al., 2001). Chen and Short's (2008) determined that living arrangement plays an important role in the emotional health of older people aged 80 and older, and living alone is confirmed to have a negative relationship with subjective well-being compared to other types of living arrangements (Chen & Short, 2008). Similarly, many other studies have also demonstrated the intimate relationship between living alone and psychological health outcomes of the older persons, in particular the impact on loneliness (Lena L Lim & Ee-Heok Kua, 2011). In contrast, living alone is proven not to be related to the physical, mental health and mobility of female older persons. Living arrangements only play an important role and are considered for older persons who have physical health problems or limitations in their functional health because the relationship between living arrangements and health outcomes of the older persons begins to make sense and increases the significance corresponding to the weakness in health of the elderly (Magaziner et al., 1988).

In Vietnam, 72.3 per cent of older persons in Vietnam are living with children and grandchildren, while Vietnamese family structure is moving away from the traditional extended family to nuclear family. The percentage of older people who live without spouse is high. The percentage of female older persons who live without a spouse is 5.44 times higher than that of male older persons, the percentage of older divorced or separated female older persons is 2.2 times higher than that of male older persons (Institute of Social and Medical Studies, 2012). Consequently, living alone without spouse, with adult children living away from home due to economic requirements or nuclear family structure, is very detrimental psychologically and often results in loneliness in older persons because family is always the basic pillar for each member, especially as they age (Kim & Fredriksen-Goldsen, 2014; Lena L. Lim & Ee-Heok Kua, 2011).

Therefore, based on data available, in order to include the impact of living arrangement on subjective well-being, we include living alone (main consideration amongst living arrangement of older person) as intermediate factor in path analysis to evaluate the indirect impact of education on subjective well-being of older persons because living alone is considered a cause of loneliness, psychological problems, and having both positive and negative relationship with subjective well-being of older persons.

5.6 Age group

In a research report/article about age, health and life satisfaction among older Europeans, Angelini et al. (2012) revealed that health satisfaction ratings are proportional to the age of the individuals, which means that the older ones tend to be dissatisfied with health compared to the younger ones (Angelini et al., 2012). Similarly, another research work in Myanmar, Khin (2016) summarized that for older persons, those who are older are more likely to get higher level of loneliness due to losses in life, such as the loss of friend, social networks reduction, retirement, etc. (Khin, 2016).

Therefore, we decide to evaluate the direct and indirect impact of education on subjective well-being separately by each age group (the results are reported in the appendix) due to two convincing evidences, the first evidence is about differences of subjective well-being of older persons by different age group, and the second evidence is that older person's education is also different by age group due to changing and improving education system and modernization.

Chapter 4: Methodology

1. Research Ethics

The Vietnam National Ageing Survey 2011 was carried out under the consent of the Research Council of the Institute of Social and Medical Studies, which is under the authorization of the American Medical Board. The researchers completely ensure that all participants and their official representatives were clearly explained the objectives and contents of the research, and that their signatures were collected in the informed consent forms before the interview. The respondents had the right to stop or interrupt the interview at any time without any penalty. All personal information, and information provided by the survey is confidential and only for research purposes (Giang & Le, 2017).

2. Dataset description

Viet Nam Ageing Survey (VNAS) in 2011 is the first-ever nationally representative survey which is, under the Project VIE022 - "Promoting the rights of the disadvantaged older people in Vietnam", technically supported by HelpAge International Project, implemented by Vietnam Women Union and Vietnam Association Elderly. The survey used probability proportional to size (PPS) sampling method based on the sample frame determinant of Population and Housing Census in 2009 to ensure data are representative of the entire older population of all regions and areas (rural and urban). There were 4,007 people aged 50 and over living in 200 communes of 12 provinces, which are representative for six ecological regions of Vietnam, including

2,356 females and 1,651 males (Institute of Social and Medical Studies, 2012). In Vietnam, individuals aged 60 and above are considered older persons (Ministry of Justice, 2009); therefore, in this thesis, we only look at those who are 60 years old and over. The sample size is 2,789 older persons, including 1,683 older females and 1,106 older males.

3. Method of analysis

Path analysis is an analytical approach that seeks to find specific associations between the different components in the same regression model. This method can also be considered a causal analysis model, because it specifically determines the coefficient of impact of this variable on other variables in the linear model. For example, by using path analysis, we can accurately identity the direct and indirect impact of one variable on other variables.

In this path analysis model, we have two main variables, the endogenous variables and the exogenous variables. Exogenous variables are variables not affected by any variables in the analytical model. At the same time, endogenous variables may also be affected by one or more exogenous variables, and the endogenous variable may also affect from one or more endogenous variables in the analytical model. Thus, only exogenous variables are one-dimensional to the endogenous variables, while there is no reverse effect from the endogenous variables (Brannick, 2018).

Path analysis can identity casual-relationship or give out comprehensive explanation about the relationship among variables. Therefore, this study employs

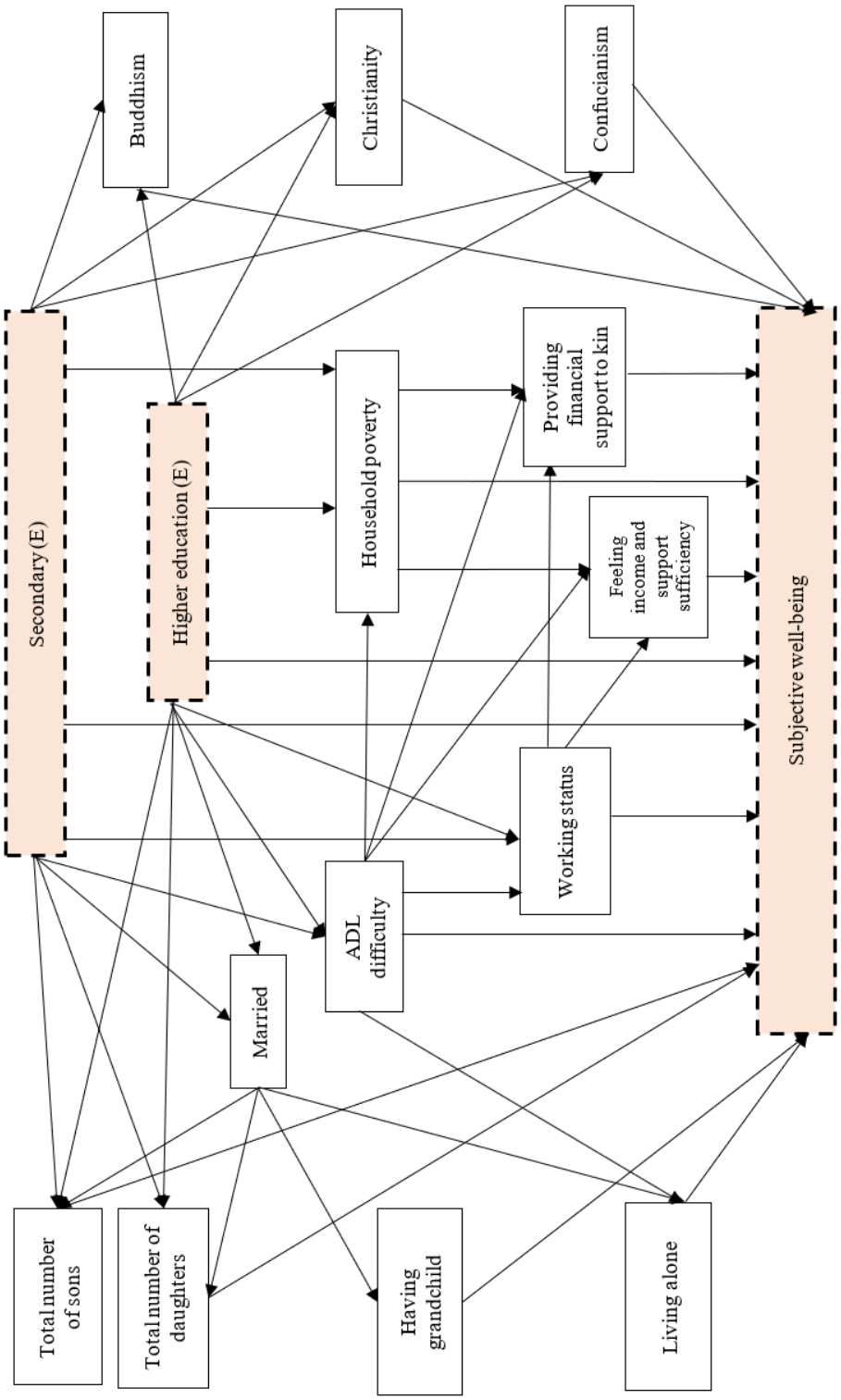
path analysis to determine the direct impact and indirect impact of the level of education (categorical variable) on subjective well-being (dichotomous variable), including happiness, overall life satisfaction, loneliness, and depression of the older persons in Vietnam. The analysis is conducted separately by gender and age groups. More specifically, in path-analysis model, levels of education are exogenous variables in the model, while other factors, including economic resources (household poverty, working status, feeling income and material support sufficiency, and providing financial support to kin/relatives), family resources (total number of sons, total number of daughters, having grandchild), marital status (being ever married), living arrangement (living alone), physical health (ADLs difficulty), and religion are endogenous variables, and subjective well-being is assumed the only endogenous variable which does not affect any variables in the model.

The main objectives of this study are to explore the impacts of education on subjective well-being, and to investigate the differences by gender. Therefore, we separate the sample by gender (female and male) before conducting path analysis. We have 1,683 observations in the case of females and 1,106 observations in the case of males. The analyses above are responsible to show the overall picture or key message of older Vietnamese population in terms of differences in the direct and indirect impacts of education on subjective well-being between older Vietnamese females and males who are at age 60 and older.

However, we also do an analysis to understand deeply the differences by age group for both females and males. The results are in the chapter of further analysis. Similar to previous analysis, we also divide our sample before doing path analysis by gender and age group. Therefore, both female and male samples are divided into two age groups: 60-69, and 70^{+} ages. Then, we have four sample sizes, including female at 60-69 ages (693 observations), female at 70^{+} ages (990 observations), male at 60-69 ages (496 observations), and male at 70^{+} ages (610 observations). The total number of observations for each sample size is large enough and meets the sample size requirement in structural analysis model (Siddiqui, 2013).

Finally, please note that we separate path analysis for every factor of subjective well-being. It means that happiness, overall life satisfaction, loneliness, and depression, is analyzed in different path analysis models, while we look at the direct and indirect impacts of level of education on subjective well-being with the same endogenous variables (intermediate factors) in each model, and the analysis is conducted separately by gender in the main analysis part, and by age group in appendix analysis. The results of path analysis are explained by standardized coefficients. Figure 11 was drawn with the purpose to show the overall diagram of path analysis in this study.

Figure 11: *The path-analysis diagram*



4. Variables description

Table 2: *Summary of variable measurements*

Variable	Classification and measurement of variables	Question
Exogenous variable (Education)		
Level of education		
Primary education	Not primary=0; Primary=1	Question B6: *What was the highest grade […] completed?*
Secondary education	Not secondary=0; Secondary=1	
University education	Not university=0; University=1	
Endogenous variables		
Subjective well-being		
Happiness	Unhappy=0; Happy=1	Question I44: *Here are some statements about how people might feel. After I read the statement, I would like you to tell me whether, in the past week, you have not felt this way, felt this way some of the time, or felt this way most of the time.*
Loneliness	Not lonely=0; Lonely=1	
Depression	Not depressed=0; Depressed=1	
Life satisfaction	Unsatisfied=0; Satisfied=1	Question I44D: *Overall how satisfied would you say you are with your life?*

Religion		
Free thinker	No=0; Yes=1	Question A3: *What religion if any do you follow?*
Buddhism	No=0; Yes=1	
Christianity	No=0; Yes=1	
Confucianism	No=0; Yes=1	
Marital status	Unmarried = 0 (single, separated, divorced, and widow); Married = 1 (married)	Question B5: *Marital status?*
Total number of sons	Continues variable	Question B9
Total number of daughters	Continues variable	Question B9
Living arrangement	Not alone = 0; Alone = 1	Question B3: *Relationship with the respondent?*
Having grandchild	No=0; Yes=1	Question B32: *Do you have any grandchildren?*
Daily life activities (ADLs)	Not difficulty = 0; Difficulty = 1	Question I10: *Do you have at least difficulty in ADL?*
Working status	Not working = 0; Still working = 1	Question E2: *Are you still working?*

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Household poverty	Non-poor = 0; Poor = 1	Question G1: *Is your household listed as poor household?*
Providing financial support to kin/relatives	No=0; Yes=1	Question C7: Did you give financial support to relatives, neighbors or friend in the past 12 months?
Feeling income and material support	Insufficient = 0; Sufficient = 1	Question F11: *How sufficient is your income or support to meet your daily need?*

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Chapter 5: Findings

This chapter is designed to present descriptive statistics by gender and age group in the first part, then the second part explains the direct and indirect impacts of education on subjective well-being of Vietnamese older population based on path analysis diagrams, exploring the similarities and differences by gender. There are four main parts in this chapter, including path analysis of the relationship between, (1) education and happiness, (2) education and life satisfaction, (3) education and loneliness, and (4) education and depression. In each path analysis, first, we explain the specific impact of education on each indicator that represents subjective well-being (happiness, life satisfaction, loneliness, and depression) by gender. Next, we summarize and discuss the differences, similarities and discuss the direct and indirect impacts of education on the subjective well-being indicators, the impact of education on other factors in the model as well as other factors impact on education without starting from the impact of education.

In addition, we also explore the impacts of education on subjective well-being in more detail by separating path analysis by age group for both females and males. These additional analyses are presented in the Chapter 6 which is named “Further analysis by age group”.

5.1 Descriptive statistics by gender and age group.

Table 3: *Distribution of the characteristics of sample by age groups and gender.*

	60 to 69 ages		70 to 79 ages		80^{+} ages	
	Female	Male	Female	Male	Female	Male
Education						
Primary completely (Ref.)	68.83	41.33	88.91	54.49	95.34	72.82
Secondary completely	23.08	47.58	8.06	34.06	3.64	20.91
Higher education	8.09	11.09	3.03	11.45	1.02	6.27
Happiness						
No (Ref.)	16.42	10.54	19.49	13.44	16.29	14.29
Yes	83.58	89.46	80.51	86.56	83.71	85.71
Loneliness						
No (Ref.)	66.67	83.26	53.49	77.38	51.38	65.55
Yes	33.33	16.74	46.51	22.62	48.62	34.45
Depression						
No (Ref.)	56.80	67.56	43.76	60.98	44.72	57.98
Yes	43.20	32.44	56.24	39.02	55.28	42.02
Life satisfaction						
No (Ref.)	35.16	26.45	38.48	29.84	34.59	33.19
Yes	64.84	73.55	61.52	70.16	65.41	66.81
Marital status						
Unmarried (Ref.)	42.14	7.66	64.31	14.86	78.95	31.36
Married	57.86	92.34	35.69	85.14	21.05	68.64
Living arrangement						
Not alone (Ref.)	90.48	97.98	85.28	95.98	84.21	92.33
Alone	9.52	2.02	14.72	4.02	15.79	7.67
Religion						
Free thinker (Ref.)	18.90	23.59	15.32	18.27	15.99	22.65
Buddhism	27.42	17.74	35.89	21.05	28.95	23.69
Christianity	9.52	8.67	9.07	5.88	10.12	9.06
Confucianism	44.16	50.00	39.72	54.80	44.94	44.60

Household poverty						
Non-poor household (Ref.)	82.25	86.69	74.19	80.50	77.13	77.35
Poor household	17.75	13.31	25.81	19.50	22.87	22.65
Working status						
Stop working (Ref.)	45.89	35.48	70.97	65.02	91.09	86.41
Still working	54.11	64.52	29.03	34.98	8.91	13.59
Feeling income and material support						
Insufficient (Ref.)	65.37	65.12	71.17	65.63	60.53	58.54
Sufficient	34.63	34.88	28.83	34.37	39.47	41.46
Providing financial support to kin/relatives						
No (Ref.)	75.61	67.94	83.87	74.92	92.91	81.88
Yes	24.39	32.06	16.13	25.08	7.09	18.12
Having grandchild						
No (Ref.)	8.37	5.04	4.44	2.17	2.63	1.05
Yes	91.63	94.96	95.56	97.83	97.37	98.95
Daily life activities (ADLs)						
Not difficulty (Ref.)	69.12	76.41	58.27	63.78	40.49	51.22
Difficulty	30.88	23.59	41.73	36.22	59.51	48.78
Total number of children						
Total number of sons	2.05 (1.51)	2.12 (1.38)	2.23 (1.57)	2.60 (1.51)	2.37 (1.58)	2.99 (1.74)
Total number of daughters	1.86 (1.50)	2.23 (1.51)	2.41 (1.74)	2.56 (1.51)	2.49 (1.60)	2.80 (1.68)

Note: *Percent is used for categorical and nominal variables, mean and standard deviation for continuous variables.*

Table 3 shows the distribution of the sample characteristics by gender and age group. Regarding education, women always have lower education than men in all age groups, table 3 shows that the proportions of women with secondary and university education levels are always lower than those of men of the same age group. The majority of women have primary education for all age groups. For the older age group,

women with primary education accounts for a higher proportion (95.34 per cent for age 80 and older, 88.91 per cent for age 70-79, and only 68.83 per cent for age 60-69). This shows that women's education has improved over time and younger generations have higher education.

Regarding subjective well-being, Vietnamese older women report worse mental health status than men of the same age group. For example, the proportions of women who report having happiness and life satisfaction are always lower than those of men in all age groups, while the proportions of men who have loneliness and depression are lower than women. This corresponds to previous research findings on the difference between men and women in the standard scores of psychological health, women often have more mental health problems than men. This is explained by the fact that women have lower ability to control mental and inner emotions as well as higher levels of depression than men (Ryff, 1989).

The proportions of those who report having happiness and life satisfaction do not seem to differ and fluctuate between age groups for both men and women. For example, for women, the proportion of those who report having happiness and life satisfaction corresponding to the three age groups are 83.51 per cent, 80.51 per cent, 83.71 per cent for happiness, and 64.84 per cent, 61.52 per cent, 65.41 per cent for life satisfaction. For men, the proportions of people who report having happiness and life satisfaction corresponding to the three age groups respectively are 89.46 per cent,

86.56 per cent, 85.71 per cent for happiness, and 73.55 per cent, 70.16 per cent, 66.81 per cent for life satisfaction.

In contrast, the proportions of those who report having loneliness and depression increase steadily from the lower age group to the higher age group for both men and women. For example, for women, the proportions of people who report having loneliness and depression corresponding to the three age groups respectively are 33.33 per cent, 46.51 per cent, 48.62 per cent for loneliness, and 43.20 per cent, 56.24 per cent, 55.28 per cent for depression. For men, the proportions of people who report having loneliness and depression corresponding to the three age groups respectively are 16.74 per cent, 22.62 per cent, 34.45 per cent for loneliness, and 32.44 per cent, 39.02 per cent, 42.02 per cent for depression.

Regarding demographic characteristics, the proportion of women who are married is always lower than that of men in the same age group, and the gap between men and women increases even more when the age increases. For example, the proportion of women who are married is lower than that of men by 1.6 times, 2.4 times, and 3.3 times respectively for age groups 60-69, 70-79, and aged 80 and older. This may be because the older the people get, the higher the probability of marriage breakdown due to many reasons such as conflicts in family relationships, life styles and emotional or child care conflict between men and women, and higher probability of spouse dying (Gigy & Kelly, 1993; Thurnher et al., 1983). However, men tend to remarry much more than women, and the high proportion of remarriage among men

and low remarriage among women can be explained by differences in the attractiveness of men and women in finding partners. Women tend to get more difficulty than men in finding partners when both of them get older. Bennett (2017) proved that before the age of 30, women tend to be attracted to older men, but after crossing the age of 30, they tend to be attracted to younger men, while men are always only attracted to younger women and often younger than age 25 (Bennett, 2017). Another reason is the difference between life expectancy of men and women, normally, women always tend to live longer than men (women live longer on average 4.5 years compared to men) (United Nations, 2015), in Vietnam, male's life expectancy is 71 years and female's life expectancy is 80 years by the year 2012 (WHO, 2012b). Then, due to the combination of the death of partner and the lower rate of women's remarriage, women tend to live alone and make up the lower proportion in the "married" group at old age.

In addition, men tend to remarry faster after marriage breakdown (within 2 years), while women's remarriage time after family breakdown is longer (Trost, 1984). Lastly, men are always more satisfied with their lives when they have a family than women, so it is often difficult for men to accept living alone after a marriage breakdown, besides, older men have more advantage than women in the marriage market, therefore, the probability of remarriage of men is higher than that of women (Treas & VanHilst, 1976). Corresponding to the proportion being married, the proportion of those living alone amongst men is always lower than that of women for all age

groups (nearly 5 times lower for age 60-69, 3 times lower for age 70-79, and 2 times lower for age 80 and older).

Regarding religion, Confucianism accounts for the highest proportion for both men and women for all age groups. Buddhism ranks second in women, while Buddhism and non-religion account for similar proportions and rank second amongst men in all age groups. Lastly, Christianity accounts for the lowest proportion for both men and women for all age groups. The diversity and differences in religious proportions in Vietnam can be explained by the following reasons, firstly, Confucianism and Buddhism has existed in Vietnam for more than 1000 years when Vietnam was dominated by China (Shao-hui, 2009), therefore, these two religions account for the highest proportions in Vietnam. Secondly, the communist regime began in the North since 1954, then expanded to the entire territory of Vietnam after the reunification of the country since 1975. The main ideology of the communist regime is atheism; therefore, the government tried to spread and encourage atheism to the people, in particular atheism is a mandatory provision in all laws and regulations of public sectors and government agencies (Denney, 2006). Thirdly, Christianity entered to entire Vietnam territory from the French colonial period and then continued to develop in South Vietnam from 1954-1975 under the Saigon government (Goh, 2005).

Regarding family factors, the proportion of women who are members of poor households is always higher than that of men from the age of 60 to 79 years, the poverty proportion is equal in both sexes in the group aged 80 and older. These figures

correspond to the rate of labor force and employment division of women and men at young age, due to the gender roles in Vietnamese society, men are often the main breadwinners of the family, while women have to take on the role of taking care of their children and family members. Therefore, women are almost always dependent on men and often have lower economic resources (Knodel et al., 2005). Corresponding to the above explanation, the proportion of people who continue to participate in the labor force and provide financial support to relatives is always higher in the case of older men compared to women in all age groups. Similarly, the proportion of people feeling they have income and material support sufficiency is higher in men compared to women. In addition, men always have more sons and daughters than women; therefore, the proportion of having grandchild for men is slightly higher than women in all age groups. It can be explained by the fact that traditional thought in Vietnamese society that "Trai nam the bay thiep, gai chinh chuyen chi co mot chong" [A moral man can have five to seven wives, while a moral woman only can have one husband]. As a result, women can only have emotional relationships and give birth to children through the way of official marriage; meanwhile, men can have their own children or relationships outside marriage without suffering any heavy prejudices from society and his family (Bui & Morash, 2008).

Regarding physical health status, this thesis uses difficulty in daily life activities (ADL difficulty) as a proxy variable for physical health status. There are five daily life activities that are measured in the questionnaire, including self-eating, self-dressing, self-washing, self-lying up and down, and self-getting to and using toilet. However, this

thesis combines five measurements into a binary variable which is having at least one ADL difficulty and not having any ADL difficulty. Generally, the proportion of men with difficulties in daily life activities is always lower than that of women in all age groups.

5.2 Empirical findings: Direct and indirect impacts of education on subjective well-being by gender.

This section explores the direct and indirect impacts of education on subjective well-being of Vietnamese older persons by gender. Figure 12 to figure 19 show path diagrams presenting the relationship between education and subjective well-being through intermediate variables, while table 4 to table 11 presents path coefficient of the direct impacts, specific indirect impacts, total indirect impact and total impacts of education on subjective well-being based on path diagrams.

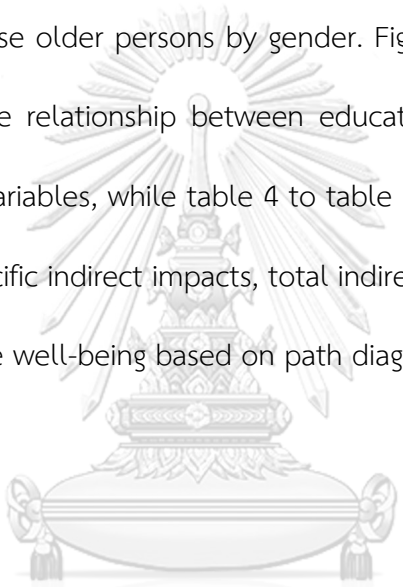


Figure 12: *Path diagram impact of education on older women's happiness*

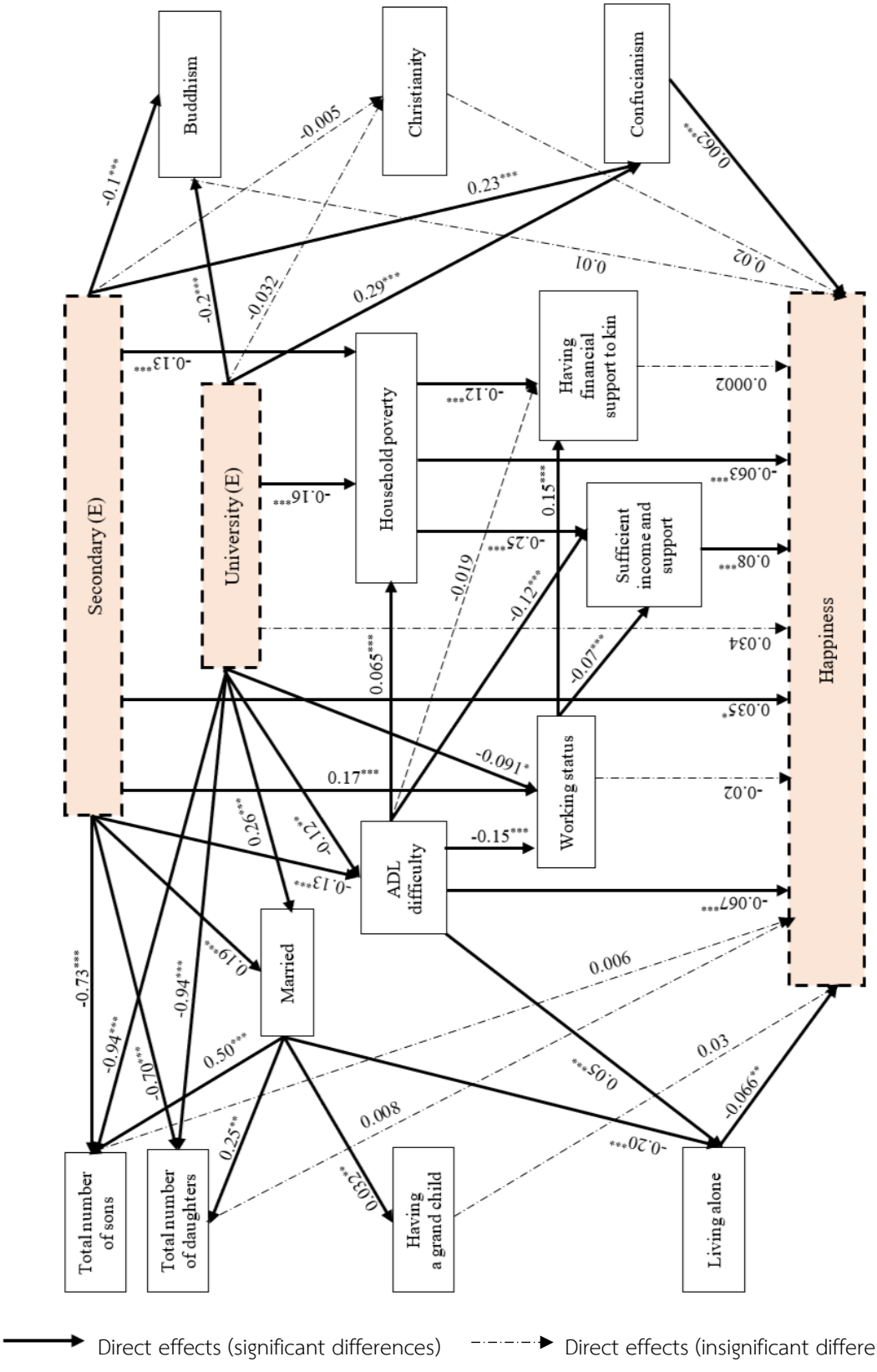


Figure 13: *Path diagram impact of education on older men's happiness*

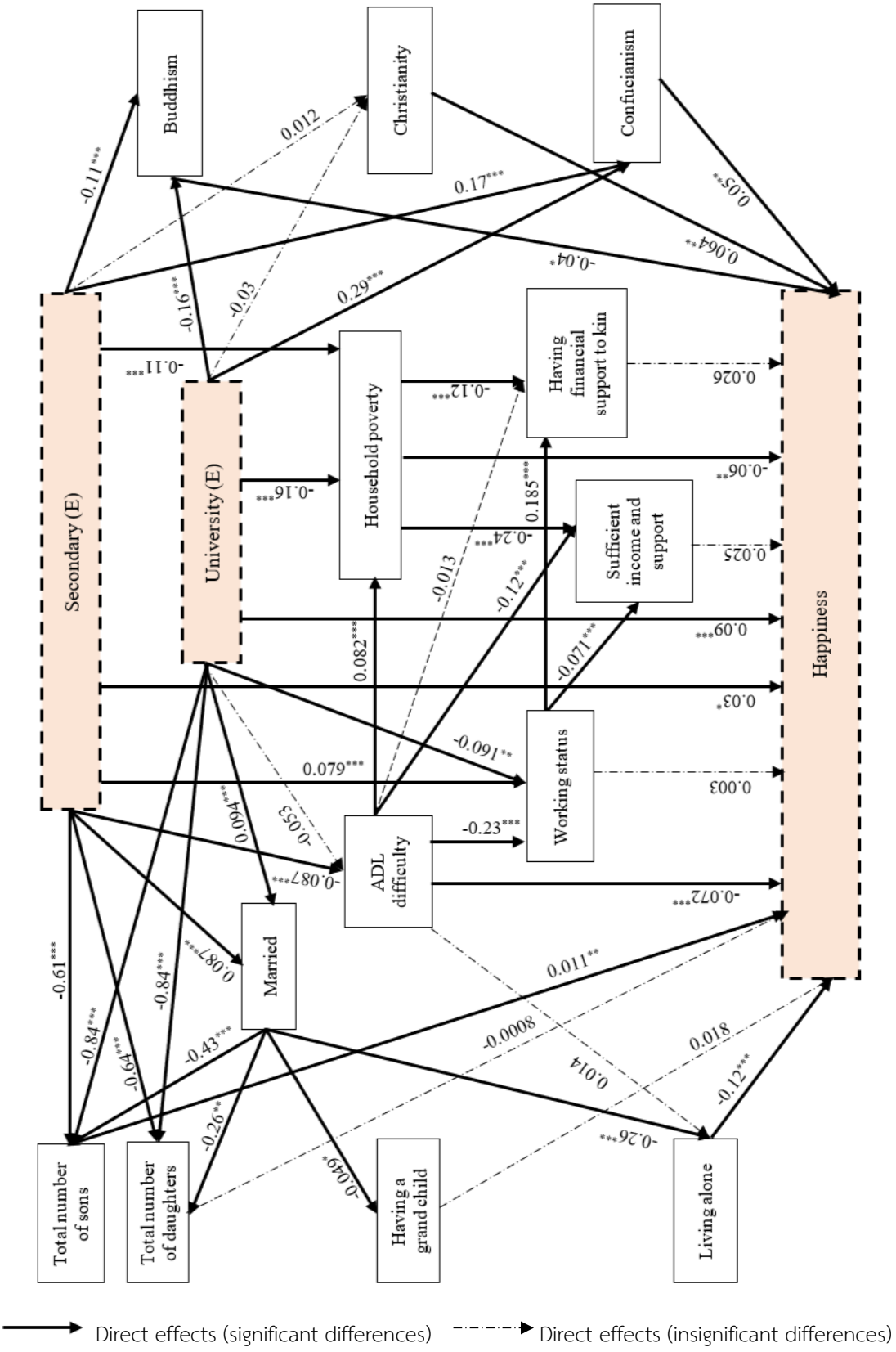


Table 4: *Direct effects, specific indirect effects, total indirect effects, and total effects of education on women's happiness (WH)*

Type	Source	Path coef.
Direct effect		
	Secondary ⟶ WH	0.035*
	University ⟶ WH	0.034
Indirect effect		
Secondary ⟶ Married ⟶ Living alone ⟶ WH (Path 1)		0.0025
University ⟶ Married ⟶ Living alone ⟶ WH (Path 1)		0.0034
Secondary ⟶ ADL difficulty ⟶ Living alone ⟶ WH (Path 2)		0.00043
University ⟶ ADL difficulty ⟶ Living alone ⟶ WH (Path 2)		0.0004
Secondary ⟶ ADL difficulty ⟶ WH (Path 3)		0.0087
University ⟶ ADL difficulty ⟶ WH (Path 3)		0.008
Secondary ⟶ ADL difficulty ⟶ Working status ⟶ Sufficiency income ⟶ WH (Path 4)		-0.00011
University ⟶ ADL difficulty ⟶ Working status ⟶ Sufficiency income ⟶ WH (Path 4)		-0.0001
Secondary ⟶ ADL difficulty ⟶ Household poverty ⟶ WH (Path 5)		0.00053
University ⟶ ADL difficulty ⟶ Household poverty ⟶ WH (Path 5)		0.00049
Secondary ⟶ ADL difficulty ⟶ Household poverty ⟶ Sufficiency income ⟶ WH (Path 6)		0.00017
University ⟶ ADL difficulty ⟶ Household poverty ⟶ Sufficiency income ⟶ WH (Path 6)		0.00015
Secondary ⟶ Working status ⟶ Sufficiency income ⟶ WH (Path 7)		-0.001
University ⟶ Working status ⟶ Sufficiency income ⟶ WH (Path 7)		0.0005
Secondary ⟶ Household poverty ⟶ WH (Path 8)		0.00819
University ⟶ Household poverty ⟶ WH (Path 8)		0.01

Secondary ⟶ Household poverty ⟶ Sufficiency income ⟶ WH (Path 9)		0.0026
University ⟶ Household poverty ⟶ Sufficiency income ⟶ WH (Path 9)		0.0032
Secondary ⟶ Confucianism ⟶ WH (Path 10)		0.01426
University ⟶ Confucianism ⟶ WH (Path 10)		0.01798
Total indirect effect		
	Secondary ⟶ Women's happiness	0.0235***
	University ⟶ Women's happiness	0.0333***
Total effect		
	Secondary ⟶ Women's happiness	0.058***
	University ⟶ Women's happiness	0.067*

Note: *Indirect path coefficients are calculated by multiple coefficients. Total indirect effect is calculated by additional indirect path coefficients. Total effect is calculated by additional direct path coefficient and indirect path coefficient.*

Table 5: *Direct effects, specific indirect effects, total indirect effects, and total effects of education on men's happiness (MH)*

Type	Source	Path coef.
Direct effect		
	Secondary ⟶ MH	0.03*
	University ⟶ MH	0.09***
Indirect effect		
Secondary ⟶ Married ⟶ Living alone ⟶ MH (Path 1)		0.0027
University ⟶ Married ⟶ Living alone ⟶ MH (Path 1)		0.0029
Secondary ⟶ Married ⟶ Total number of sons ⟶ MH (Path 2)		-0.0004
University ⟶ Married ⟶ Total number of sons ⟶ MH (Path 2)		-0.00044
Secondary ⟶ Total number of sons ⟶ MH (Path 3)		-0.0067
University ⟶ Total number of sons ⟶ MH (Path 3)		-0.0092

Secondary ⟶ ADL difficulty ⟶ MH (Path 4)		0.0063
Secondary ⟶ ADL difficulty ⟶ Household poverty ⟶ MH (Path 5)		0.00043
Secondary ⟶ Household poverty ⟶ MH (Path 6)		0.0066
University ⟶ Household poverty ⟶ MH (Path 6)		0.0096
Secondary ⟶ Buddhism ⟶ MH (Path 7)		0.0044
University ⟶ Buddhism ⟶ MH (Path 7)		0.0064
Secondary ⟶ Confucianism ⟶ MH (Path 8)		0.085
University ⟶ Confucianism ⟶ MH (Path 8)		0.0145
Total indirect effect		
	Secondary ⟶ Men's happiness	0.025***
	University ⟶ Men's happiness	0.0265**
Total effect		
	Secondary ⟶ Men's happiness	0.056***
	University ⟶ Men's happiness	0.113***

Note: *Indirect path coefficients are calculated by multiple coefficients. Total indirect effect is calculated by additional indirect path coefficients. Total effect is calculated by additional direct path coefficient and indirect path coefficient.*

5.2.1 Direct and indirect effects of education on women's happiness

This section explains the direct and indirect effects of education on women's happiness based on figure 12 and table 4. The results show that education has both direct and indirect effects on older women's happiness.

Regarding direct impact of education on happiness, compared to those with primary education, secondary education directly impacts on increasing happiness, however, there is no statistical difference between primary and university education. Regarding indirect impact of education on older women's happiness, education indirectly impacts on happiness through ten paths of marital status, health status,

economic resources, and religion. The other factors, such as total number of sons, total number of daughters, having grandchild, working status, having financial support to kin/relatives, Buddhism, and Christianity, have no direct impact on women's happiness. There is no other factor which directly effects on women's happiness without starting from the impact of education.

Regarding the impact of women's education on other factors in path model, compared to primary level, secondary and university education effects on having fewer total number of sons and daughters. In terms of marital status, secondary and university education have positive impacts on marriage. Education also has direct effects on religion. Compared to primary education, secondary and university education directly impacts on higher likelihood of being a member of Confucianism and lower likelihood of being member of Buddhism, and there is an increasing strength of the impacts with the level of education. Moreover, higher education effects on lower likelihood of being a member of a poor household, having ADLs difficulty, and participating in the labor market.

Regarding the impact of other factors amongst each other in the path model, being married has a direct impact on having higher total number of sons (increasing by 0.5), total number of daughters (increasing by 0.25), higher likelihood of having a grandchild (increasing by 0.032), and lower likelihood of living alone (decreasing by 0.20), compared to un-married women. Having ADL difficulties directly impacts on higher likelihood of living alone (increasing by 0.05), being member of poor-household

(increasing by 0.065), lower likelihood of feeling there is sufficient income and material support (decreasing by 0.12) and participating in labor market (decreasing by 0.15), while having ADL difficulties has no statistically significant direct impact on providing financial support to kin/relatives, compared to those without ADLs difficulty. Still working directly impacts on higher likelihood of providing financial support to kin/relatives (increasing by 0.15), while lower likelihood of feeling there is sufficient income and material support (decreasing by 0.07), compared to those who stopped working. Being a member of a poor-household directly effects on lower likelihood of providing financial support to kin/relatives (decreasing by 0.12) and feeling there is sufficient income and material support (decreasing by 0.25), compared to being a non-poor household member.

In general, the higher the level of education, the higher the increase of women's happiness due to both direct and indirect effects. Compared to primary education, for total effects, secondary and university education significantly increase women's happiness by 0.058 and 0.067, respectively.

5.2.2 Direct and indirect effects of education on men's happiness

This section explains the direct and indirect impacts of education on men's happiness based on figure 13 and table 5. Education has both direct and indirect effects on older men's happiness.

Regarding direct impact of education on happiness, compared to those with primary education, both secondary and university education directly impacts on

increasing happiness, there is an increasing strength of the impacts with level of education. Regarding indirect impact of education on older men's happiness, education indirectly impacts on happiness through eight paths of marital status, total number of sons, health status, economic resources, and religion. The other factors, such as total number of daughters, having grandchild, working status, feeling income and material support sufficiency, having financial support to kin/relatives, have no direct impact on men's happiness. Christianity directly impact on men's happiness without starting from the effect of education, being member of Christianity directly effects on increasing men's happiness.

Regarding the impact of men's education on other factors in path model, compared to primary level, secondary and university education effects on having fewer total number of sons and daughters. In terms of marital status, secondary and university education have positive effects on marriage. Education also has direct effects on religion. Compared to primary education, secondary and university education directly impacts on higher likelihood of being a member of Confucianism and lower likelihood of being a member of Buddhism, and there is an increasing strength of the impacts with level of education. Higher education impacts on lower likelihood of being a member of a poor household. Secondary education effects on lower likelihood of having ADLs difficulty compared to primary education, while there is no difference regarding having ADLs difficulty between primary and university education. Secondary education directly effects on higher likelihood of participating in the labor market,

while university education directly effects on lower likelihood of participating in the labor market, compared to primary education.

Regarding the impact of other factors amongst each other in the path model, being married has a direct impact on having lower total number of sons, total number of daughters, having a grandchild, and living alone, compared to un-married men. Having ADL difficulties directly impacts on higher likelihood of being member of a poor-household, lower likelihood of feeling there is sufficient income and material support and participating in labor market, while having ADL difficulties has no statistically significant direct impact on providing financial support to kin/relatives, compared to those without ADLs difficulty. Still working directly impacts on higher likelihood of providing financial support to kin/relatives, lower likelihood of feeling there is sufficient income and material support, compared to those who stopped working. Being a member of a poor-household directly effects on lower likelihood of providing financial support to kin/relatives and feeling there is sufficient income and material support sufficiency, compared to being a non-poor household member.

In general, the higher the level of education, the higher the increase of men's happiness due to both direct and indirect effects. Compared to primary education, total effects of secondary and university education are to significantly increase men's happiness by 0.056 and 0.113, respectively.

Figure 14: *Path diagram impact of education on older women's life satisfaction*

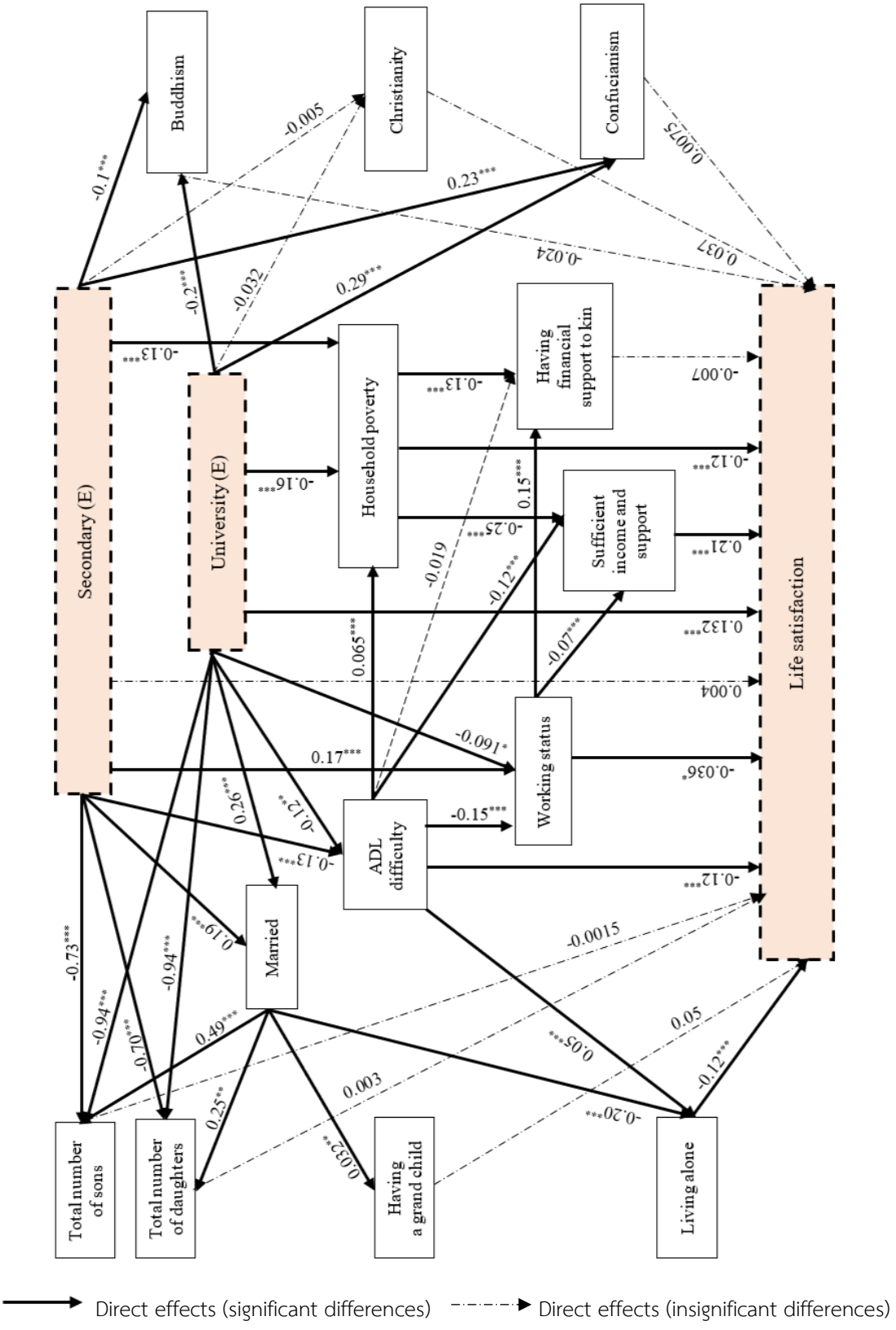


Figure 15: *Path diagram impact of education on older men's life satisfaction*

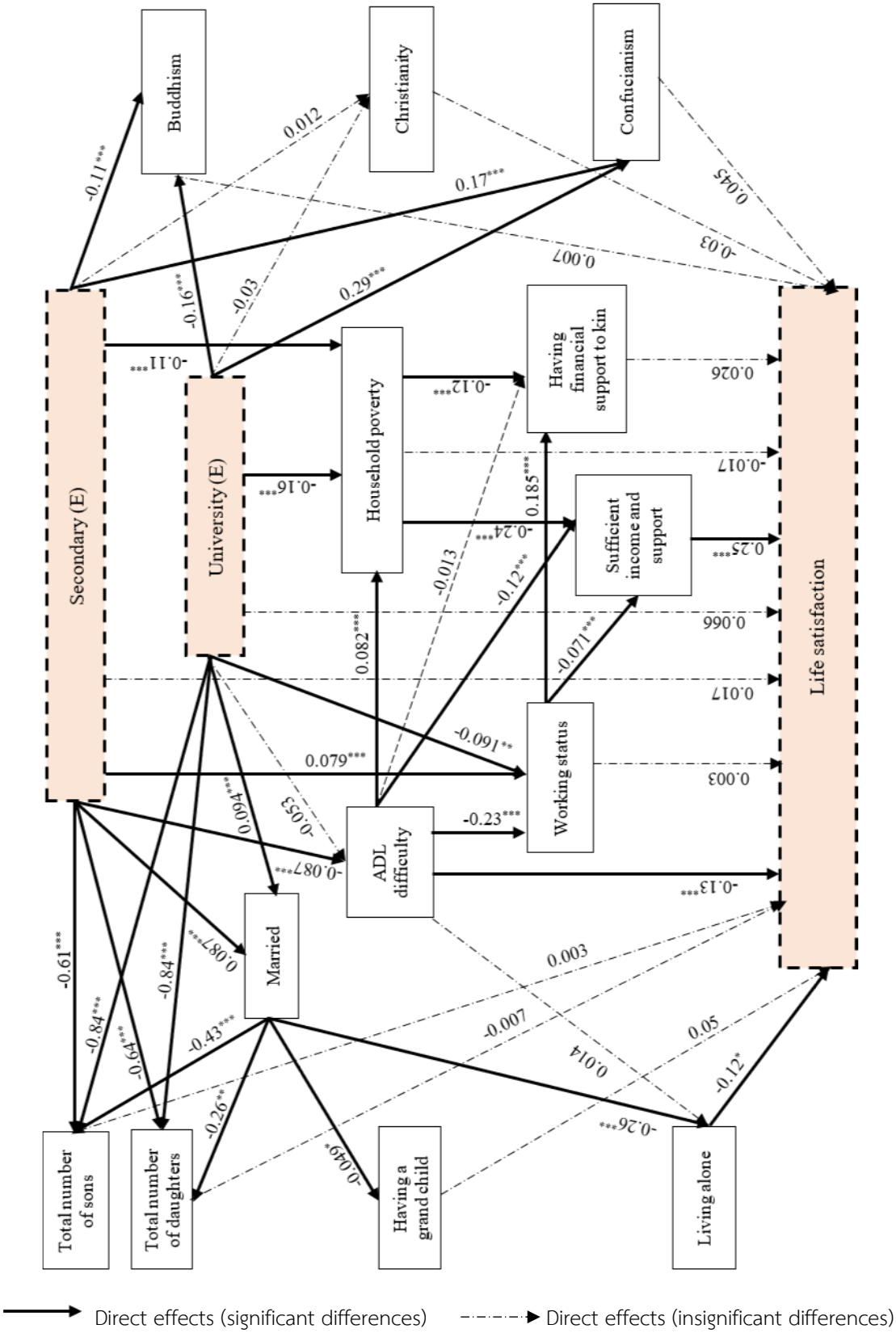


Table 6: *Direct effects, specific indirect effects, total indirect effects, and total effects of education on women's life satisfaction (WS)*

Type	Source	Path coef.
Direct effect		
	Secondary ⟶ WS	0.004
	University ⟶ WS	0.132***
Indirect effect		
Secondary ⟶ Married ⟶ Living alone ⟶ WS (Path 1)		0.0045
University ⟶ Married ⟶ Living alone ⟶ WS (Path 1)		0.0062
Secondary ⟶ ADL difficulty ⟶ Living alone ⟶ WS (Path 2)		0.00078
University ⟶ ADL difficulty ⟶ Living alone ⟶ WS (Path 2)		0.00072
Secondary ⟶ ADL difficulty ⟶ WS (Path 3)		0.0156
University ⟶ ADL difficulty ⟶ WS (Path 3)		0.0144
Secondary ⟶ ADL difficulty ⟶ Working status ⟶ WS (Path 4)		-0.0007
University ⟶ ADL difficulty ⟶ Working status ⟶ WS (Path 4)		-0.0006
Secondary ⟶ ADL difficulty ⟶ Working status ⟶ Sufficiency income ⟶ WS (Path 5)		-0.00028
University ⟶ ADL difficulty ⟶ Working status ⟶ Sufficiency income ⟶ WS (Path 5)		-0.00026
Secondary ⟶ ADL difficulty ⟶ Household poverty ⟶ WS (Path 6)		0.001
University ⟶ ADL difficulty ⟶ Household poverty ⟶ WS (Path 6)		0.0009
Secondary ⟶ ADL difficulty ⟶ Household poverty ⟶ Sufficiency income ⟶ WS (Path 7)		0.00044
University ⟶ ADL difficulty ⟶ Household poverty ⟶ Sufficiency income ⟶ WS (Path 7)		0.0004
Secondary ⟶ Working status ⟶ WS (Path 8)		-0.00612
University ⟶ Working status ⟶ WS (Path 8)		0.0032
Secondary ⟶ Working status ⟶ Sufficiency income ⟶ WS (Path 9)		-0.0025
University ⟶ Working status ⟶ Sufficiency income ⟶ WS (Path 9)		0.0013

Secondary ⟶ Household poverty ⟶ WS (Path 10)		0.0156
University ⟶ Household poverty ⟶ WS (Path 10)		0.0192
Secondary ⟶ Household poverty ⟶ Sufficiency income ⟶ WS (Path 11)		0.0068
University ⟶ Household poverty ⟶ Sufficiency income ⟶ WS (Path 11)		0.0084
Total indirect effect		
	Secondary ⟶ Women's life satisfaction	0.04***
	University ⟶ Women's life satisfaction	0.062***
Total effect		
	Secondary ⟶ Women's life satisfaction	0.045*
	University ⟶ Women's life satisfaction	0.194***

Note: *Indirect path coefficients are calculated by multiple coefficients. Total indirect effect is calculated by additional indirect path coefficients. Total effect is calculated by additional direct path coefficient and indirect path coefficient.*

Table 7: *Direct effects, specific indirect effects, total indirect effects, and total effects of education on men's life satisfaction (MS)*

Type	Source	Path coef.
Direct effect		
	Secondary ⟶ MS	0.017
	University ⟶ MS	0.066
Indirect effect		
Secondary ⟶ Married ⟶ Living alone ⟶ MS (Path 1)		0.0027
University ⟶ Married ⟶ Living alone ⟶ MS (Path 1)		0.0029
Secondary ⟶ ADL difficulty ⟶ MS (Path 2)		0.0113
Secondary ⟶ ADL difficulty ⟶ Sufficiency income ⟶ MS (Path 3)		0.0026
Secondary ⟶ ADL difficulty ⟶ Household poverty ⟶ Sufficiency income ⟶ MS (Path 4)		0.0004
Secondary ⟶ Household poverty ⟶ Sufficiency income ⟶ MS (Path 5)		0.0066
University ⟶ Household poverty ⟶ Sufficiency income ⟶ MS (Path 5)		0.0096
Secondary ⟶ Working status ⟶ Sufficiency income ⟶ MS (Path 6)		-0.0014

University ⟶ Working status ⟶ Sufficiency income ⟶ MS (Path 6)		0.0016
Total indirect effect		
	Secondary ⟶ Men's life satisfaction	0.035***
	University ⟶ Men's life satisfaction	0.042***
Total effect		
	Secondary ⟶ Men's life satisfaction	0.05**
	University ⟶ Men's life satisfaction	0.11***

Note: *Indirect path coefficients are calculated by multiple coefficients. Total indirect effect is calculated by additional indirect path coefficients. Total effect is calculated by additional direct path coefficient and indirect path coefficient.*

5.2.3 Direct and indirect effects of education on women's life satisfaction

This section explains the direct and indirect effects of education on women's life satisfaction based on figure 14 and table 6. Education has both direct and indirect effects on older women's life satisfaction.

Regarding direct effect of education on life satisfaction, compared to primary education, university education has a direct effect on increasing life satisfaction, however there is no statistical difference between primary and secondary education. Regarding indirect impact of education on older women's life satisfaction, education indirectly impacts on life satisfaction through eleven paths of marital status, health status, working status, economic resources, and religion. The other factors, namely total number of sons, total number of daughters, having grandchild, providing financial support to kin/relatives, and religion, have no direct impact on women's life satisfaction. There is no other factor which directly effects on women's life satisfaction

without starting from the impact of education. The effects of women's education on other factors and the effects of other factors amongst each other in the path model were presented in the section on happiness.

In general, the higher the level of education, the higher the increase of women's life satisfaction resulting from both direct and indirect effects. Compared to primary education, the total effects of secondary and university education are to significantly increase women's life satisfaction by 0.045 and 0.194, respectively.

5.2.4 Direct and indirect effects of education on men's life satisfaction

This section explains the direct and indirect effectss of education on men's life satisfaction based on figure 15 and table 7. Education has only statistically significant indirect effect on older men's life satisfaction.

Regarding direct impact of education on men's life satisfaction, compared to primary education, both secondary and university education directly effects on increasing life satisfaction, there is an increasing strength of the effects with the level of education, however the relationship is insignificant. Regarding indirect impact of education on older men's life satisfaction, education indirectly impacts on life satisfaction through six paths of marital status, health status, and economic resources. The other factors, namely total number of sons, total number of daughters, having grandchild, working status, providing financial support to kin/relatives, and religion have no direct impact on men's life satisfaction. There is no other factor which directly effects on men's life satisfaction without starting from the impact of education. The

impact of men’s education on other factors and the effects of other factors amongst each other in the path model were presented in the section on happiness.

In general, the higher the level of education, the higher the increase of men’s life satisfaction resulting from both direct and indirect effects. Compared to primary education, the total effects of secondary and university education are to significantly increase men's life satisfaction by 0.05 and 0.11, respectively.

Figure 16: *Path diagram impact of education on older women's loneliness*

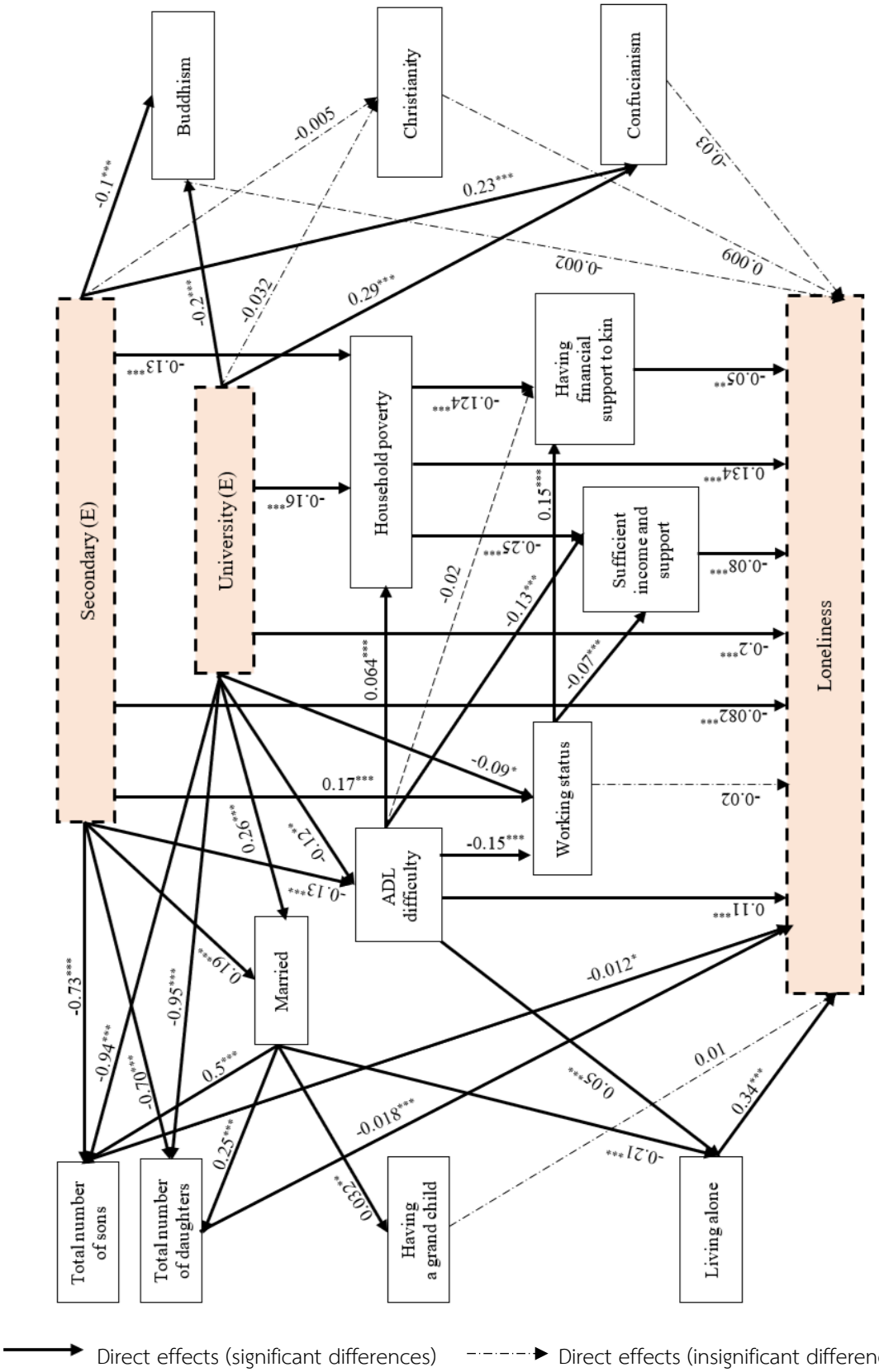


Figure 17: *Path diagram impact of education on older men's loneliness*

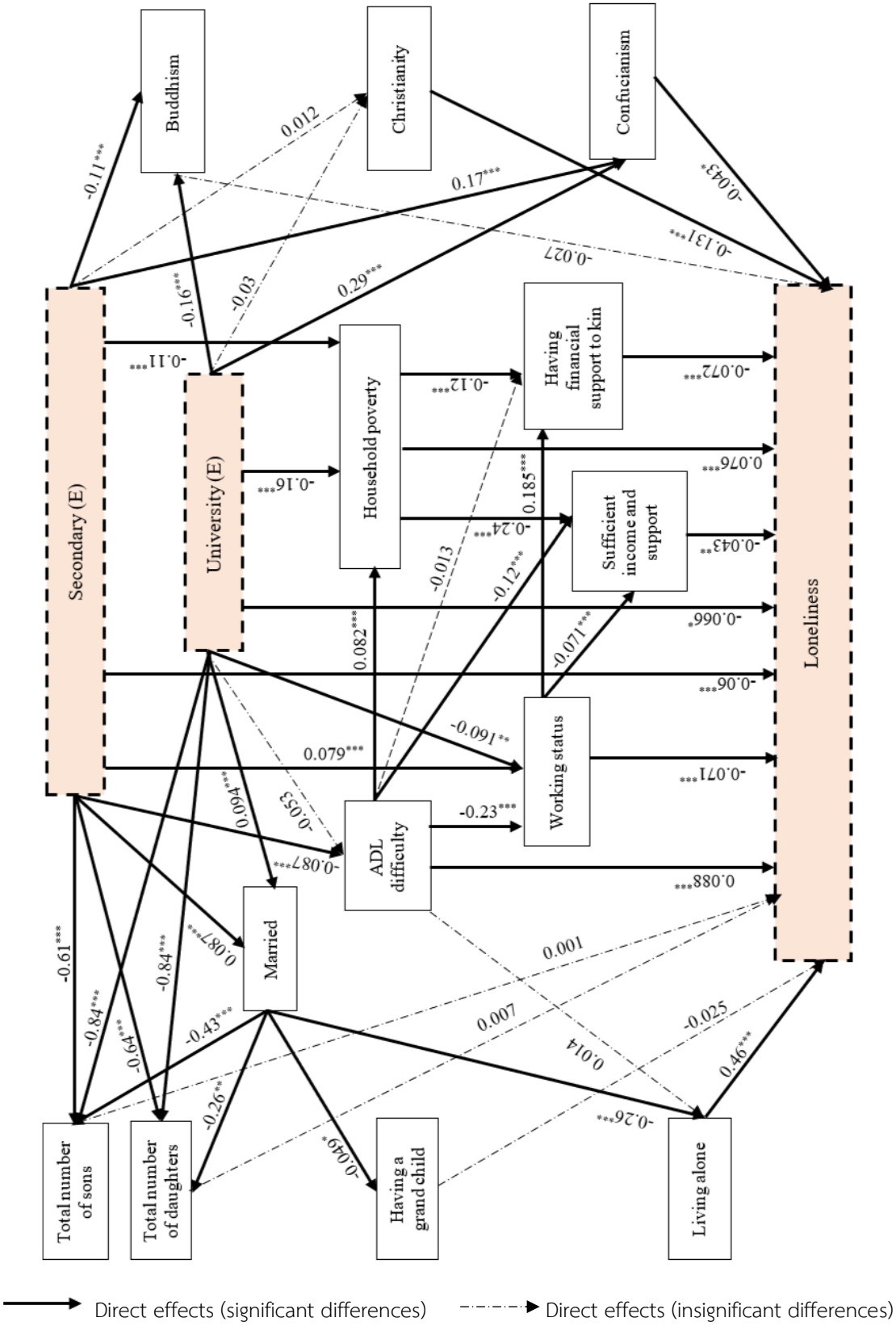


Table 8: *Direct effects, specific indirect effects, total indirect effects, and total effects of education on women's loneliness (WL)*

Type	Source	Path coef.
Direct effect		
	Secondary ⟶ WL	-0.082***
	University ⟶ WL	-0.2***
Indirect effect		
Secondary ⟶ Total number of sons ⟶ WL (Path 1)		0.00876
University ⟶ Total number of sons ⟶ WL (Path 1)		0.01128
Secondary ⟶ Total number of daughters ⟶ WL (Path 2)		0.0126
University ⟶ Total number of daughters ⟶ WL (Path 2)		0.0171
Secondary ⟶ Married ⟶ Living alone ⟶ WL (Path 3)		-0.014
University ⟶ Married ⟶ Living alone ⟶ WL (Path 3)		-0.019
Secondary ⟶ Married ⟶ Total number of sons ⟶ WL (Path 4)		-0.00114
University ⟶ Married ⟶ Total number of sons ⟶ WL (Path 4)		-0.00156
Secondary ⟶ Married ⟶ Total number of daughters ⟶ WL (Path 5)		-0.00085
University ⟶ Married ⟶ Total number of daughters ⟶ WL (Path 5)		-0.00117
Secondary ⟶ ADL difficulty ⟶ Living alone ⟶ WL (Path 6)		-0.00221
University ⟶ ADL difficulty ⟶ Living alone ⟶ WL (Path 6)		-0.0185
Secondary ⟶ ADL difficulty ⟶ WL (Path 7)		-0.0143
University ⟶ ADL difficulty ⟶ WL (Path 7)		-0.0132
Secondary ⟶ ADL difficulty ⟶ Working status ⟶ Financial support ⟶ WL (Path 8)		-0.00015
University ⟶ ADL difficulty ⟶ Working status ⟶ Financial support ⟶ WL (Path 8)		-0.00013
Secondary ⟶ ADL difficulty ⟶ Working status ⟶ Sufficiency income ⟶ WL (Path 9)		0.00011
University ⟶ ADL difficulty ⟶ Working status ⟶ Sufficiency income ⟶ WL (Path 9)		0.0001
Secondary ⟶ ADL difficulty ⟶ Household poverty ⟶ WL (Path 10)		-0.0011

University ⟶ ADL difficulty ⟶ Household poverty ⟶ WL (Path 10)		-0.001
Secondary ⟶ ADL difficulty ⟶ Household poverty ⟶ Sufficiency income ⟶ WL (Path 11)		-0.00016
University ⟶ ADL difficulty ⟶ Household poverty ⟶ Sufficiency income ⟶ WL (Path 11)		-0.00015
Secondary ⟶ ADL difficulty ⟶ Sufficiency income ⟶ WL (Path 12)		-0.0013
University ⟶ ADL difficulty ⟶ Sufficiency income ⟶ WL (Path 12)		-0.0012
Secondary ⟶ Working status ⟶ Providing financial support ⟶ WL (Path 13)		-0.00127
University ⟶ Working status ⟶ Providing financial support ⟶ WL (Path 13)		0.00067
Secondary ⟶ Working status ⟶ Sufficiency income ⟶ WL (Path 14)		0.0009
University ⟶ Working status ⟶ Sufficiency income ⟶ WL (Path 14)		-0.0005
Secondary ⟶ Household poverty ⟶ WL (Path 15)		-0.0174
University ⟶ Household poverty ⟶ WL (Path 15)		-0.0214
Secondary ⟶ Household poverty ⟶ Sufficiency income ⟶ WL (Path 16)		-0.0026
University ⟶ Household poverty ⟶ Sufficiency income ⟶ WL (Path 16)		-0.0032
Total indirect effect		
	Secondary ⟶ Women's loneliness	-0.045***
	University ⟶ Women's loneliness	-0.045***
Total effect		
	Secondary ⟶ Women's loneliness	-0.127***
	University ⟶ Women's loneliness	-0.26***

Note: *Indirect path coefficients are calculated by multiple coefficients. Total indirect effect is calculated by additional indirect path coefficients. Total effect is calculated by additional direct path coefficient and indirect path coefficient.*

Table 9: *Direct effects, specific indirect effects, total indirect effects, and total effects of education on men's loneliness (ML)*

Type	Source	Path coef.
Direct effect		
	Secondary ⟶ ML	-0.06***
	University ⟶ ML	-0.066*
Indirect effect		
Secondary ⟶ Married ⟶ Living alone ⟶ ML (Path 1)		-0.01
University ⟶ Married ⟶ Living alone ⟶ ML (Path 1)		-0.011
Secondary ⟶ ADL difficulty ⟶ ML (Path 2)		-0.0077
Secondary ⟶ ADL difficulty ⟶ Sufficiency income ⟶ ML (Path 3)		-0.00045
Secondary ⟶ ADL difficulty ⟶ Household poverty ⟶ ML (Path 4)		-0.00054
Secondary ⟶ ADL difficulty ⟶ Household poverty ⟶ Sufficiency income ⟶ ML (Path 5)		-0.00007
Secondary ⟶ ADL difficulty ⟶ Household poverty ⟶ Financial support ⟶ ML (Path 6)		-0.00006
Secondary ⟶ Household poverty ⟶ ML (Path 7)		-0.00836
University ⟶ Household poverty ⟶ ML (Path 7)		-0.01216
Secondary ⟶ Household poverty ⟶ Sufficiency income ⟶ ML (Path 8)		-0.0011
University ⟶ Household poverty ⟶ Sufficiency income ⟶ ML (Path 8)		-0.0016
Secondary ⟶ Household poverty ⟶ Providing financial support ⟶ ML (Path 9)		-0.00095
University ⟶ Household poverty ⟶ Providing financial support ⟶ ML (Path 9)		-0.00138
Secondary ⟶ Working status ⟶ ML (Path 10)		-0.0056
University ⟶ Working status ⟶ ML (Path 10)		0.0064
Secondary ⟶ Working status ⟶ Sufficiency income ⟶ ML (Path 11)		0.00024
University ⟶ Working status ⟶ Sufficiency income ⟶ ML (Path 11)		-0.00027
Secondary ⟶ Working status ⟶ Providing financial support ⟶ ML (Path 12)		-0.0011

University ⟶ Working status ⟶ Providing financial support ⟶ ML (Path 12)		0.0012
Secondary ⟶ Confucianism ⟶ ML (Path 13)		-0.0073
University ⟶ Confucianism ⟶ ML (Path 13)		-0.0124
Total indirect effect		
	Secondary ⟶ Men's loneliness	-0.05***
	University ⟶ Men's loneliness	-0.037***
Total effect		
	Secondary ⟶ Men's loneliness	-0.109***
	University ⟶ Men's loneliness	-0.104***

Note: *Indirect path coefficients are calculated by multiple coefficients. Total indirect effect is calculated by additional indirect path coefficients. Total effect is calculated by additional direct path coefficient and indirect path coefficient.*

5.2.5 Direct and indirect effects of education on women's loneliness

This section explains the direct and indirect effects of education on women's loneliness based on figure 16 and table 8. Education has both direct and indirect effect on older women's loneliness.

Regarding direct impact of education on loneliness, compared to primary education, secondary and university education directly effect on decreasing women's loneliness, there is an increasing strength of the impacts with level of education, the higher the level of education, the more the reduction of loneliness. Regarding indirect effects of education on older women's loneliness, education indirectly effects on women's loneliness through sixteen paths of marital status, total number of sons and daughters, health status, working status, and economic resources. The other factors,

such as having grandchild and religion, have no direct effect on women's loneliness. There is no other factor which directly effects on women's loneliness without starting from the impact of education. The effects of women's education on other factors and the effects of other factors amongst each other in the path model were presented in the section on happiness.

In general, the higher the level of education, the more the reduction of women's loneliness resulting from both direct and indirect effects. Compared to primary education, the total effects of secondary and university education are to significantly decrease women's loneliness by 0.127 and 0.26, respectively.

5.2.6 Direct and indirect effects of education on men's loneliness

This section explains the direct and indirect effects of education on men's loneliness based on figure 17 and table 9. Education has both statistically significant direct and indirect effects on older men's loneliness.

Regarding direct impact of education on men's loneliness, compared to primary education, both secondary and university education directly effect on decreasing men's loneliness, there is an increasing strength of the impacts with level of education, the higher the level of education, the more the reduction of men's loneliness. Regarding indirect impact of education on older men's loneliness, education indirectly impacts on men's loneliness through thirteen paths of marital status, health status, working status, economic resources, and religion. The other factors, such as total number of sons, total number of daughters, having grandchild, and being member of

Buddhism have no direct impact on men's loneliness. Christianity directly effects on men's loneliness without starting from the impact of education, being member of Christianity directly impacts on decreasing men's loneliness. The effects of men's education on other factors and the effects of other factors amongst each other in the path model were presented in the section on happiness.

In general, the higher the level of education, the more the reduction of men's loneliness resulting from both direct and indirect effects. Compared to primary education, the total effects of secondary and university education are to significantly decrease men's loneliness by 0.109 and 0.104, respectively.

Figure 18: *Path diagram impact of education on older women's depression*

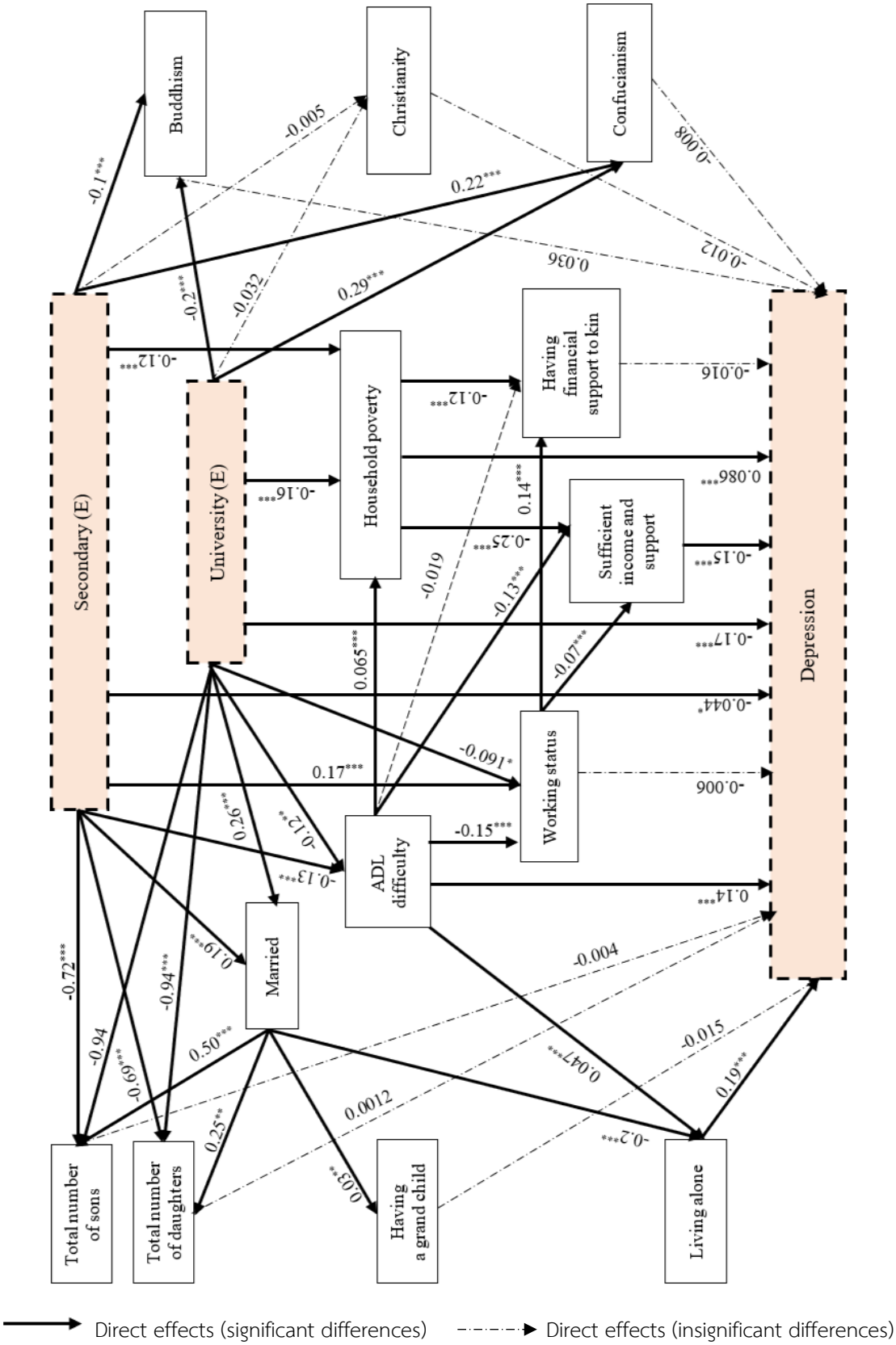


Figure 19: *Path diagram impact of education on older men's depression*

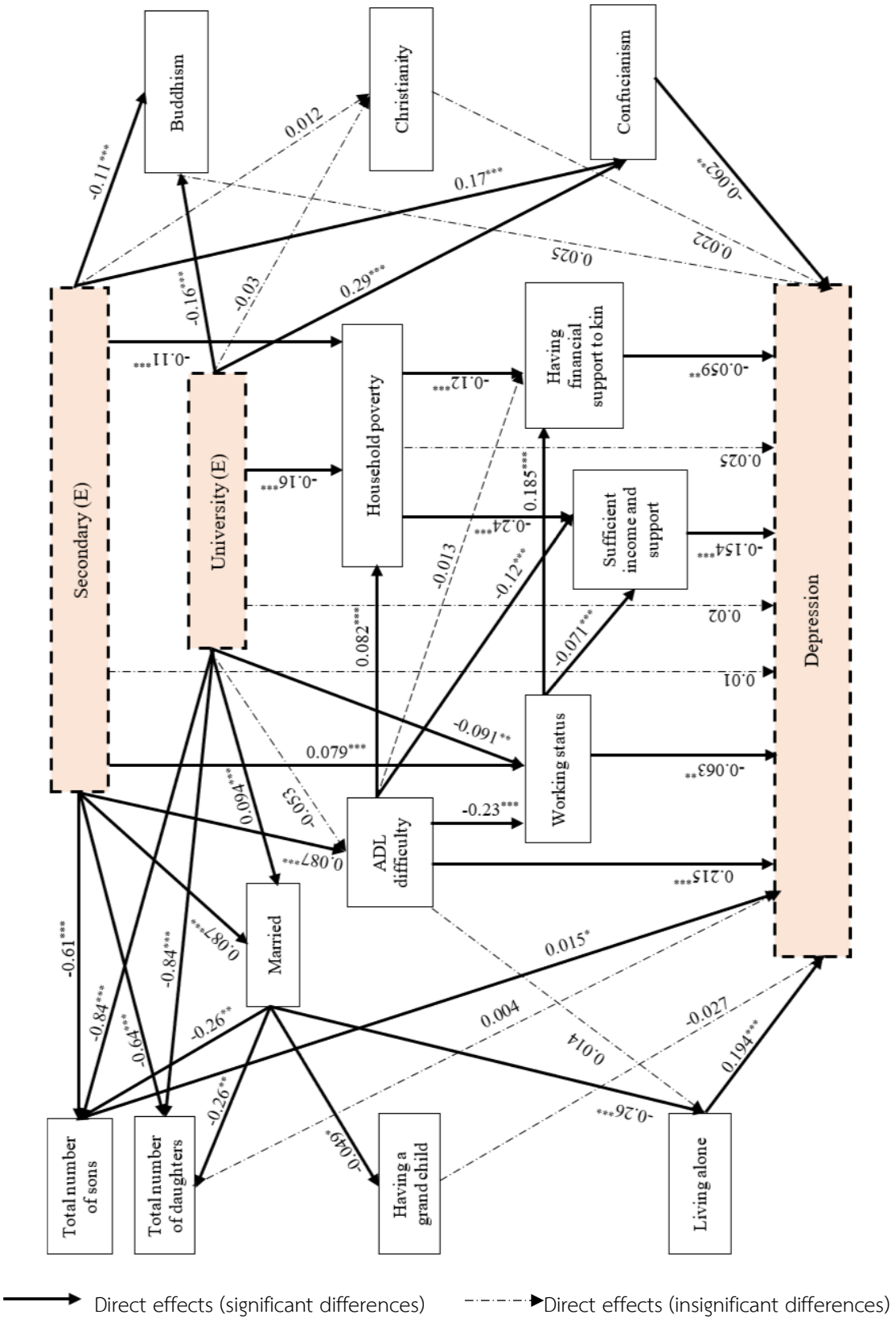


Table 10: *Direct effects, specific indirect effects, total indirect effects, and total effects of education on women's depression (WD)*

Type	Source	Path coef.
Direct effect		
	Secondary ⟶ WD	-0.044*
	University ⟶ WD	-0.17***
Indirect effect		
Secondary ⟶ Married ⟶ Living alone ⟶ WD (Path 1)		-0.00722
University ⟶ Married ⟶ Living alone ⟶ WD (Path 1)		-0.00988
Secondary ⟶ ADL difficulty ⟶ Living alone ⟶ WD (Path 2)		-0.0012
University ⟶ ADL difficulty ⟶ Living alone ⟶ WD (Path 2)		-0.0011
Secondary ⟶ ADL difficulty ⟶ WD (Path 3)		-0.0182
University ⟶ ADL difficulty ⟶ WD (Path 3)		-0.0168
Secondary ⟶ ADL difficulty ⟶ Working status ⟶ Sufficiency income ⟶ WD (Path 4)		0.0002
University ⟶ ADL difficulty ⟶ Working status ⟶ Sufficiency income ⟶ WD (Path 4)		0.000189
Secondary ⟶ ADL difficulty ⟶ Household poverty ⟶ WD (Path 5)		-0.00073
University ⟶ ADL difficulty ⟶ Household poverty ⟶ WD (Path 5)		-0.00067
Secondary ⟶ ADL difficulty ⟶ Household poverty ⟶ Sufficiency income ⟶ WD (Path 6)		-0.00032
University ⟶ ADL difficulty ⟶ Household poverty ⟶ Sufficiency income ⟶ WD (Path 6)		-0.00029
Secondary ⟶ ADL difficulty ⟶ Sufficiency income ⟶ WD (Path 7)		-0.0025
University ⟶ ADL difficulty ⟶ Sufficiency income ⟶ WD (Path 7)		-0.0023
Secondary ⟶ Working status ⟶ Sufficiency income ⟶ WD (Path 8)		0.0018
University ⟶ Working status ⟶ Sufficiency income ⟶ WD (Path 8)		-0.001
Secondary ⟶ Household poverty ⟶ WD (Path 9)		-0.0103
University ⟶ Household poverty ⟶ WD (Path 9)		-0.013

Secondary ⟶ Household poverty ⟶ Sufficiency income ⟶ WD (Path 10)		-0.0045
University ⟶ Household poverty ⟶ Sufficiency income ⟶ WD (Path 10)		-0.006
Total indirect effect		
	Secondary ⟶ Women's depression	-0.05***
	University ⟶ Women's depression	-0.06***
Total effect		
	Secondary ⟶ Women's depression	-0.094***
	University ⟶ Women's depression	-0.231***

Note: *Indirect path coefficients are calculated by multiple coefficients. Total indirect effect is calculated by additional indirect path coefficients. Total effect is calculated by additional direct path coefficient and indirect path coefficient.*

Table 11: *Direct effects, specific indirect effects, total indirect effects, and total effects of education on men's depression (MD)*

Type	Source	Path coef.
Direct effect		
	Secondary ⟶ MD	0.01
	University ⟶ MD	0.02
Indirect effect		
Secondary ⟶ Married ⟶ Living alone ⟶ MD (Path 1)		-0.0044
University ⟶ Married ⟶ Living alone ⟶ MD (Path 1)		-0.0047
Secondary ⟶ Married ⟶ Total number of sons ⟶ MD (Path 2)		-0.00034
University ⟶ Married ⟶ Total number of sons ⟶ MD (Path 2)		-0.00036
Secondary ⟶ Total number of sons ⟶ MD (Path 3)		-0.00915
University ⟶ Total number of sons ⟶ MD (Path 3)		-0.0126
Secondary ⟶ ADL difficulty ⟶ MD (Path 4)		0.0187
Secondary ⟶ ADL difficulty ⟶ Sufficiency income ⟶ MD (Path 5)		0.00016
Secondary ⟶ ADL difficulty ⟶ Working status ⟶ MD (Path 6)		0.00126
Secondary ⟶ ADL difficulty ⟶ Household poverty ⟶ Sufficiency income ⟶ MD (Path 7)		0.000264

Secondary ⟶ ADL difficulty ⟶ Household poverty ⟶ Financial support ⟶ MD (Path 8)		0.00005
Secondary ⟶ Household poverty ⟶ Sufficiency income ⟶ MD (Path 9)		-0.0041
University ⟶ Household poverty ⟶ Sufficiency income ⟶ MD (Path 9)		-0.0059
Secondary ⟶ Household poverty ⟶ Providing financial support ⟶ MD (Path 10)		-0.00077
University ⟶ Household poverty ⟶ Providing financial support ⟶ MD (Path 10)		-0.0011
Secondary ⟶ Working status ⟶ MD (Path 11)		-0.0049
University ⟶ Working status ⟶ MD (Path 11)		0.0057
Secondary ⟶ Working status ⟶ Sufficiency income ⟶ MD (Path 12)		0.00086
University ⟶ Working status ⟶ Sufficiency income ⟶ MD (Path 12)		-0.001
Secondary ⟶ Working status ⟶ Providing financial support ⟶ MD (Path 13)		-0.00086
University ⟶ Working status ⟶ Providing financial support ⟶ MD (Path 13)		0.001
Secondary ⟶ Confucianism ⟶ MD (Path 14)		-0.011
University ⟶ Confucianism ⟶ MD (Path 14)		-0.018
Total indirect effect		
	Secondary ⟶ Men's depression	-0.065***
	University ⟶ Men's depression	-0.063***
Total effect		
	Secondary ⟶ Men's depression	-0.054**
	University ⟶ Men's depression	-0.041

Note: *Indirect path coefficients are calculated by multiple coefficients. Total indirect effect is calculated by additional indirect path coefficients. Total effect is calculated by additional direct path coefficient and indirect path coefficient.*

5.2.7 Direct and indirect effects of education on women's depression

This section explains the direct and indirect effects of education on women's depression based on figure 18 and table 10. Education has both direct and indirect effects on older women's depression.

Regarding direct impact of education on women's depression, compared to primary education, secondary and university education directly effects on decreasing women's depression, there is an increasing strength of the impacts with level of education, the higher the level of education, the more the reduction of depression. Regarding indirect impact of education on older women's loneliness, education indirectly impacts on women's loneliness through ten paths of marital status, health status, working status, and economic resources. The other factors, such as total number of sons and daughters, having grandchild, working status, providing financial support and religion, have no direct impact on women's depression. There is no other factor which directly effects on women's depression without starting from the effect of education. The effects of women's education on other factors and the effects of other factors amongst each other in the path model were presented in the section on happiness.

In general, the higher the level of education, the more the reduction of women's depression resulting from both direct and indirect effects. Compared to primary education, the total effects of secondary and university education are to significantly decrease women's depression by 0.094 and 0.231, respectively.

5.2.8 Direct and indirect effects of education on men's depression

This section explains the direct and indirect effects of education on men's depression based on figure 19 and table 11. Education has only statistically significant indirect effects on older men's depression.

Regarding direct impact of education on men's depression, compared to primary education, both secondary and university education directly impacts on increasing men's depression, there is an increasing strength of the impacts with level of education, the higher the level of education, the more the reduction of men's depression, however, the direct effects of education on men's depression is insignificant. Regarding indirect impact of education on older men's depression, education indirectly impacts on men's depression through fourteen paths of marital status, total number of sons, health status, working status, economic resources, and Confucianism. The other factors, such as total number of daughters, having grandchild, being member of Buddhism and Christianity, and being member of poor household, have no direct impact on men's depression. There is no other factor which directly effects on men's depression without starting from the effect of education. The effects of men's education on other factors and the effects of other factors amongst each other in the path model were presented in the section on happiness.

In general, the higher the level of education, the more the reduction of men's depression resulting from both direct and indirect effects. Compared to primary education, the total effects of secondary and university education are to significantly decrease men's depression by 0.054 and 0.041, respectively.

Chapter 6: Further analysis by age group

This section provides in-depth analysis of the direct and indirect impacts of education on subjective well-being of Vietnamese older persons by gender and age group. I maintain the path analysis model according to the thesis analysis, but I divide both male and female samples by age group, which are age 60-69, and age 70 and above, for analysis in order to confirm whether education still has direct and indirect impact on subjective well-being in different age groups of older persons. Similar to the explanation in the methodology, because the sample size is divided into two age groups, so the sample size for each age group by gender is relatively small, but each sample size is expected to ensure sample size regulation in a model of path analysis which has more than ten factors. Accordingly, the sample size of each path model is distributed as follows: female at 60-69 ages (693 observations), female at 70^{+} ages (990 observations), male at 60-69 ages (496 observations), and male at 70^{+} ages (610 observations).

Although the sample size satisfies the sample size specification of the path analysis model, however, I still expect the results of the study to be more accurate in the future if I perform analysis on a larger sample size.

Figure 20*: Path diagram impact of education on women's happiness aged 60-69*

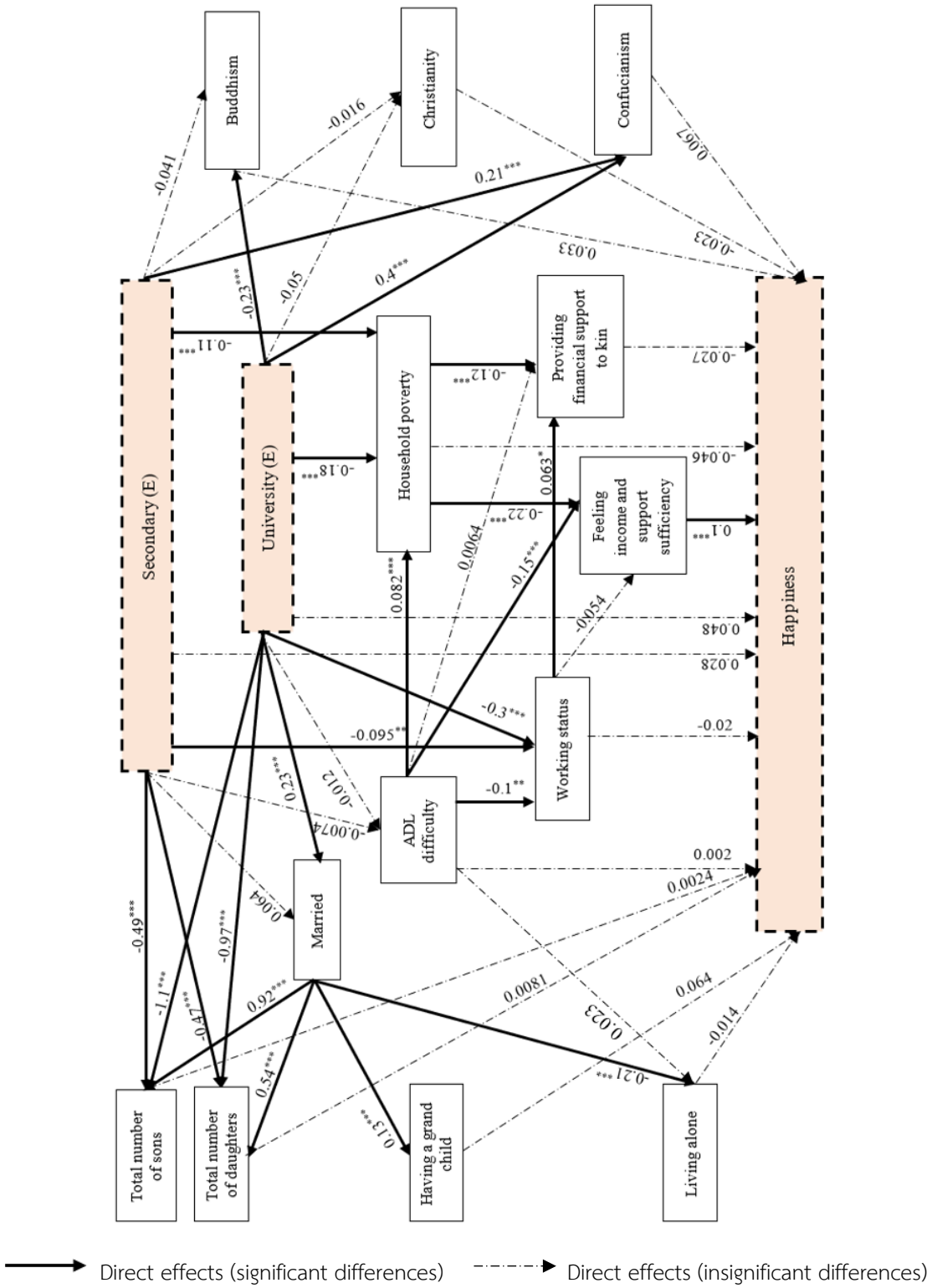


Figure 21*: Path diagram impact of education on women's happiness aged 70+*

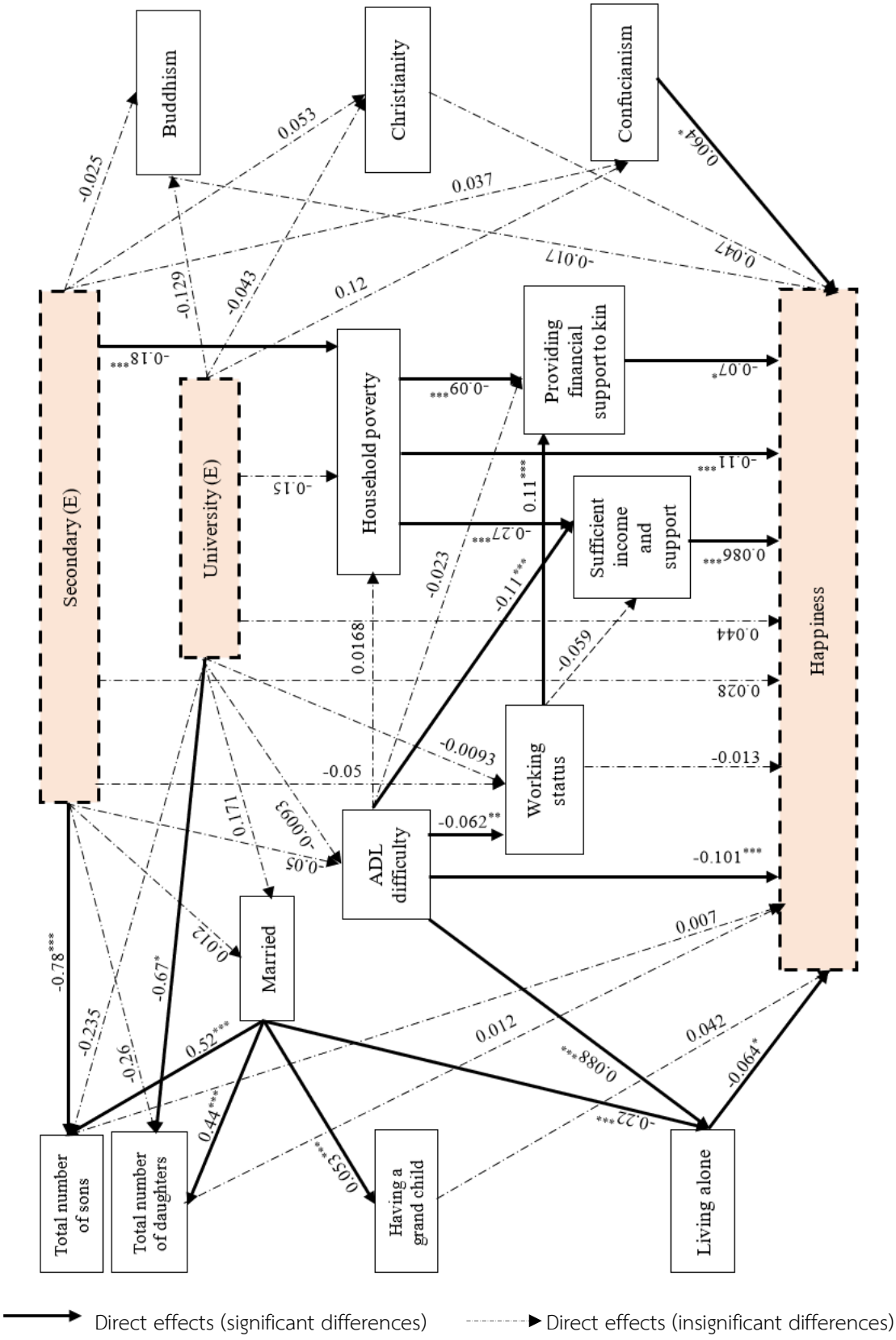


Figure 22: *Path diagram impact of education on men's happiness aged 60-69*

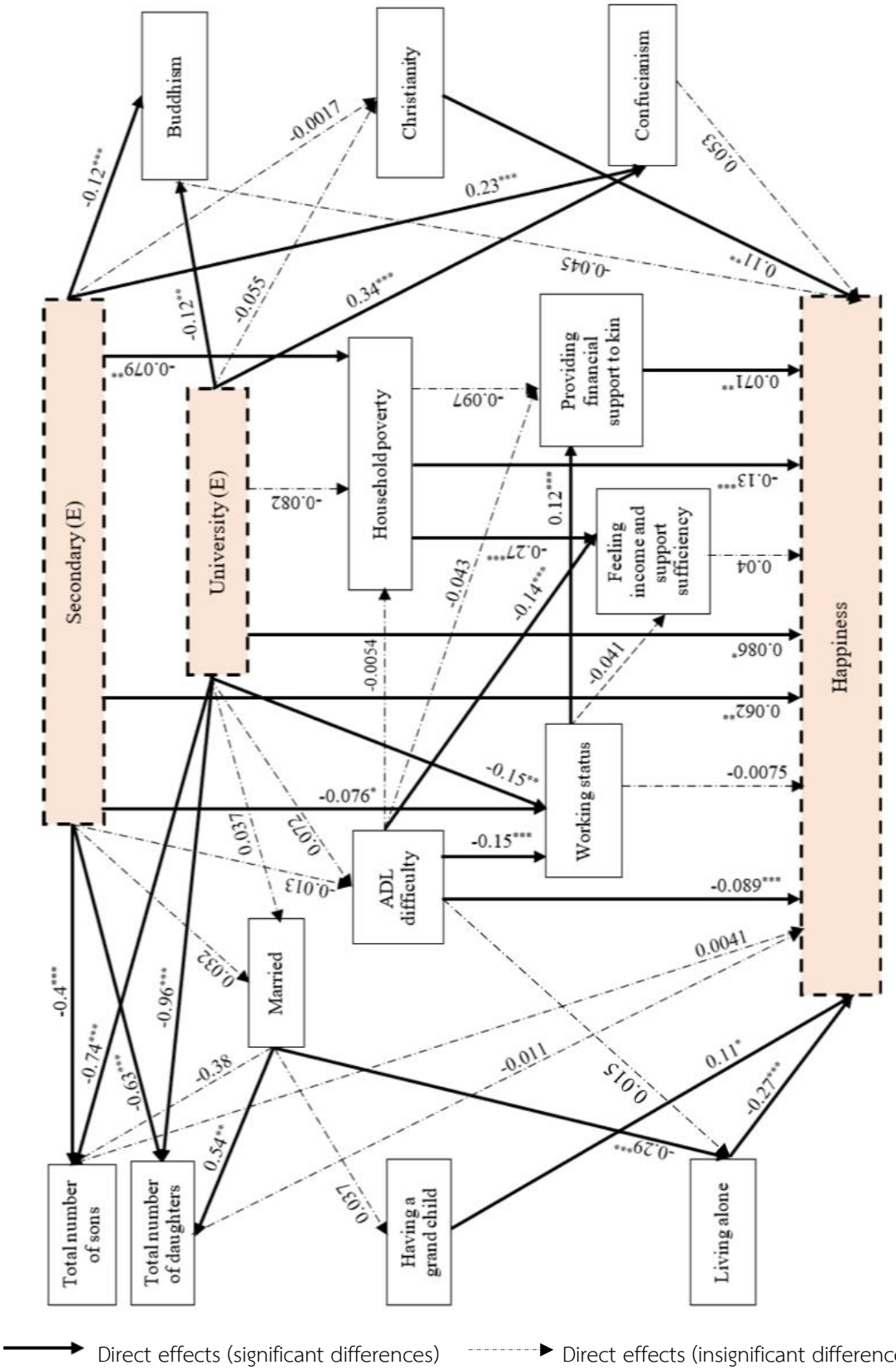


Figure 23: *Path diagram impact of education on men's happiness aged 70+*

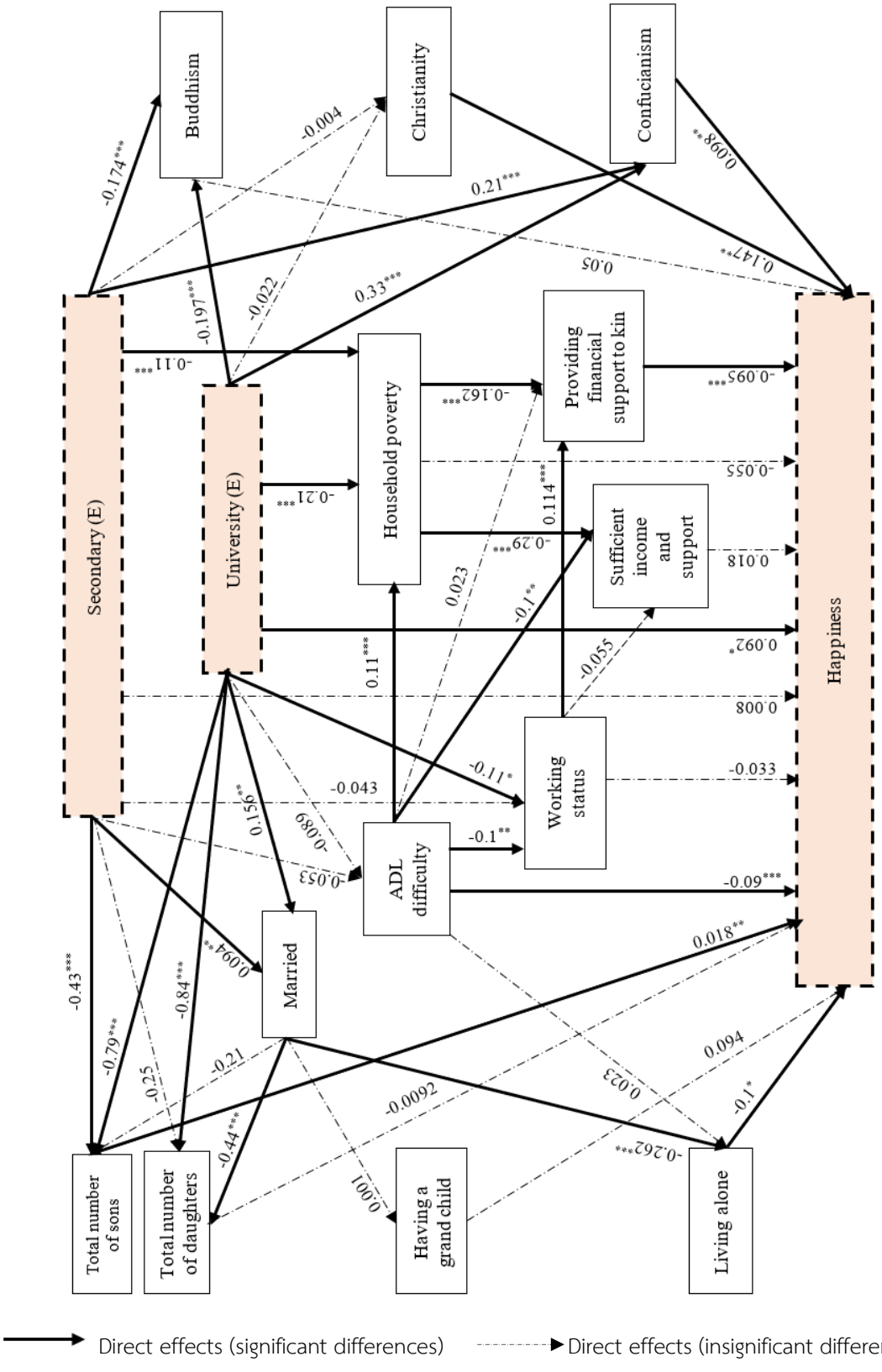


Table 12: *Direct effects, specific indirect effects, total indirect effects, and total effects of education on women's happiness (WH) at age 60-69*

Type	Source	Path coef.
Direct effect		
	Secondary ⟶ WH	0.028
	University ⟶ WH	0.048
Indirect effect		
Secondary ⟶ Household poverty ⟶ Feeling income and support sufficiency ⟶ WH		0.002
University ⟶ Household poverty ⟶ Feeling income and support sufficiency ⟶ WH		0.004
Total indirect effect		
	Secondary ⟶ Women's happiness	0.019
	University ⟶ Women's happiness	0.034
Total effect		
	Secondary ⟶ Women's happiness	0.046
	University ⟶ Women's happiness	0.082

Note: *Indirect path coefficients are calculated from multiple coefficients. Total indirect effect is calculated from additional indirect path coefficients. Total effect is calculated from additional direct path coefficient and indirect path coefficient.*

Table 13: *Direct effects, specific indirect effects, total indirect effects, and total effects of education on men's happiness (MH) at age 60-69*

Type	Source	Path coef.
Direct effect		
	Secondary ⟶ MH	0.03*
	University ⟶ MH	0.09***
Indirect effect		
Secondary ⟶ Household poverty ⟶ MH (Path 1)		0.01

Secondary ⟶ Working status ⟶ Providing financial support to kin ⟶ MH (Path 2)		0.0006
University ⟶ Working status ⟶ Providing financial support to kin ⟶ MH (Path 2)		0.0013
Total indirect effect		
	Secondary ⟶ Men's happiness	0.038***
	University ⟶ Men's happiness	0.033
Total effect		
	Secondary ⟶ Men's happiness	0.1***
	University ⟶ Men's happiness	0.12**

Note: *Indirect path coefficients are calculated from multiple coefficients. Total indirect effect is calculated from additional indirect path coefficients. Total effect is calculated from additional direct path coefficient and indirect path coefficient.*

Table 14: *Direct effects, specific indirect effects, total indirect effects, and total effects of education on women's happiness (WH) at age 70 and above*

Type	Source	Path coef.
Direct effect		
	Secondary ⟶ WH	0.028
	University ⟶ WH	0.044
Indirect effect		
Secondary ⟶ Household poverty ⟶ WH (path 1)		0.0198
Secondary ⟶ Household poverty ⟶ Feeling income and support sufficiency ⟶ WH (path 2)		0.0042
Secondary ⟶ Household poverty ⟶ Providing financial support to kin ⟶ WH (path 3)		-0.0011
Total indirect effect		
	Secondary ⟶ Women's happiness	0.027*
	University ⟶ Women's happiness	0.034

Total effect		
	Secondary ⟶ Women's happiness	0.055
	University ⟶ Women's happiness	0.078

Note: *Indirect path coefficients are calculated from multiple coefficients. Total indirect effect is calculated from additional indirect path coefficients. Total effect is calculated from additional direct path coefficient and indirect path coefficient.*

Table 15: *Direct effects, specific indirect effects, total indirect effects, and total effects of education on men's happiness (MH) at age 70 and above*

Type	Source	Path coef.
Direct effect		
	Secondary ⟶ MH	0.0084
	University ⟶ MH	0.092*
Indirect effect		
Secondary ⟶ Total number of sons ⟶ MH (path 1)		-0.0077
University ⟶ Total number of sons ⟶ MH (path 1)		-0.0142
Secondary ⟶ Married ⟶ Living alone ⟶ MH (path 2)		0.0025
University ⟶ Married ⟶ Living alone ⟶ MH (path 2)		0.0041
University ⟶ Working status ⟶ Providing financial support to kin ⟶ MH (path 3)		0.0012
Secondary ⟶ Household poverty ⟶ Providing financial support to kin ⟶ MH (path 4)		-0.0017
University ⟶ Household poverty ⟶ Providing financial support to kin ⟶ MH (path 4)		-0.0032
Secondary ⟶ Confucianism ⟶ MH (path 5)		0.021
University ⟶ Confucianism ⟶ MH (path 5)		0.032
Total indirect effect		
	Secondary ⟶ Men's happiness	0.021
	University ⟶ Men's happiness	0.039*

Total effect		
	Secondary ⟶ Men's happiness	0.029
	University ⟶ Men's happiness	0.13**

Note: *Indirect path coefficients are calculated from multiple coefficients. Total indirect effect is calculated from additional indirect path coefficients. Total effect is calculated from additional direct path coefficient and indirect path coefficient.*

6.1 *Direct and indirect impacts of education on happiness by age group*

This section explains the direct and indirect impacts of education on happiness based on figures 20, 21, tables 12, 14 for women, and figures 22, 23, tables 13, 15 for men by age group, including 60-69, and 70 years and above.

6.1.1 Happiness amongst age group 60-69

Women's happiness at age 60-69

Education level has no direct statistically significant impact on women's happiness. However, education has indirect impacts on happiness through one path of economic resources. Compared to primary education, secondary education indirectly impacts on increasing happiness by 0.002, university education indirectly impacts on increasing happiness by 0.004. The other factors, such as total number of sons, total number of daughters, having grandchild, living alone, having ADLs difficulty, working status, providing financial support to kin/relatives, being member of poor-household, Buddhism, Christianity or Confucianism, have no direct impact on happiness. There is no other factor which directly impact on women's happiness without starting from the impact of education.

Regarding the impact of women's education on other factors in path model, compared to primary level, secondary and university education impacts on having fewer total number of sons and daughters. In terms of marital status, secondary and university education have positive impacts on marriage but it's only statistically significant for those with university education. Education also has direct impacts with religion. Compared to primary education, older adults with secondary and university education directly impacts on higher likelihood of being a member of Confucianism and lower likelihood of being member of Buddhism, and there is an increasing strength of the impacts with level of education. Higher education impacts on lower likelihood of being a member of a poor household and participating in the labor market, while education has no statistically significant direct impact on having ADL difficulties and being a member of Christianity.

Regarding the impact of other factors amongst each other in the path model, being married has a direct impact on having higher total number of sons (increasing by 0.92), total number of daughters (increasing by 0.54), higher likelihood of having a grandchild (increasing by 0.13), and lower likelihood of living alone (decreasing by 0.21), compared to un-married. Having ADL difficulties directly impacts on higher likelihood of being member of poor-household (increasing by 0.082), lower likelihood of feeling there is sufficient income and material support (decreasing by 0.15) and participating in labor market (decreasing by 0.1), while having ADL difficulties has no statistically significant direct impact on providing financial support to kin/relatives, compared to

those without ADLs difficulty. Still working directly impacts on higher likelihood of providing financial support to kin/relatives (increasing by 0.063), while current employment has no statistically significant direct impact on feeling income and material support sufficiency, compared to those who stopped working. Being a member of poor-household directly impacts on lower likelihood of providing financial support to kin/relatives (decreasing by 0.12) and feeling income and material support sufficiency (decreasing by 0.22), compared to being a non-poor household member.

Men's happiness at age 60-69

Education has both direct and indirect impact on men's happiness. Regarding direct impact on happiness, compared to primary education, secondary and university education positively and directly impacts on men's happiness, and there is an increasing strength of the impact with level of education. Regarding indirect impact on happiness, education indirectly impacts on happiness through two paths of economic resources which are household poverty, working status, and providing financial support to kin/relatives.

Regarding other factors which directly impact on men's happiness without starting from the impact of education, having grandchild direct impacts on increasing happiness by 0.11 compared to those without a grandchild. Living alone directly impacts on decreasing happiness by 0.27 compared to those living with other persons. Having ADLs difficulty direct impacts on decreasing happiness by 0.089 compared to those without ADLs difficulty. Providing financial support to kin or relatives, directly

impacts on increasing happiness by 0.071. Being a member of Christianity direct impacts on increasing happiness by 0.11 compared to Free thinker. The other factors, such as total number of sons, total number of daughters, working status, subjective income/material support, being member of Buddhism and Confucianism, have no direct impact on men's happiness at age 60-69.

Regarding the impact of men's education on other factors in path model, compared to primary education, secondary and university education directly impacts on having fewer total number of sons and total number of daughters. Education also has direct impact on religion. Compared to primary education, secondary and university education directly impacts on higher likelihood of being a member of Confucianism, and there is an increasing strength of the impacts with level of education. Notably, both secondary and university education directly impacts on lower likelihood of being a member of Buddhism compared to primary education. Compared to primary education, secondary education directly impacts on lower likelihood of being a member of poor-household, secondary and university education directly impacts on lower likelihood of participating in the labor market, and there is an increasing strength of the impacts with level of education.

Regarding the impact of other factors amongst each other in path model, married men has direct impact on having higher total number of daughters (increasing 0.54), and lower likelihood of living alone (decreasing 0.29), while being married has no statistically direct impact on total number of sons and having grandchild, compared

to un-married men. Having ADLs difficulty directly impacts on lower likelihood of feeling income and material support sufficiency (decreasing by 0.14) and participating in labor market (decreasing by 0.15), while having ADLs has no statistically direct impact on living alone, being a member of a poor-household, and providing financial support to kin/relatives, compared to those without ADLs difficulty. Still working directly impacts on higher likelihood of providing financial support to kin/relatives (increasing by 0.12), while still working has no statistically direct impact on feeling income and material support sufficiency, compared to those who stopped working. Being a member of a poor-household, directly impacts on lower likelihood of feeling income and material support sufficiency (decreasing by 0.27), has no statistically direct impact on providing financial support to kin, compared to non-poor household member.

Summary of the differences regarding direct and indirect impacts of education on happiness between women and men aged 60-69

Education does not have a direct impact on women's happiness at the age of 60-69, but education has direct impact on men's happiness for age 60-69. The higher the level of education, the higher the happiness of men. Education indirectly impacts on increasing women's happiness through only one path of economic resources, whereas education indirectly impacts increasing men's happiness through 3 paths of economic resources. In general, regarding the total impact of education on happiness amongst those aged 60-69, education has no effect on women's happiness in both secondary and university levels compared with primary education. In contrast,

education has a significant impact on increasing men's happiness, and the higher the level of education, the higher the level of happiness.

6.1.2 Happiness amongst age group 70 and above

Women's happiness at age 70 and above

Similar to age group 60-69, education has no direct impact on women's happiness for age 70 and above. However, education has indirect impacts on happiness through three paths of economic resources, including household poverty, feeling income and support sufficiency, and providing financial support to kin/relatives instead of only one path at age 60-69. Regarding the first path, compared to primary education, secondary education indirectly impacts on increasing happiness by 0.0198. Regarding the second path, compared to primary level, secondary education indirectly impacts on increasing happiness by 0.0042. In the third path, compared to primary education, secondary education indirectly impacts on decreasing happiness by 0.0011. Finally, compared to primary education, the total indirect impacts of university education on happiness through all three paths are not statistically significant. However, the total indirect impacts of secondary education are significant increasing women's happiness by 0.027.

Regarding other factors which directly impact on women's happiness without starting from the impact of education, having ADL difficulties directly impacts on decreasing happiness by 0.101 compared to those without having ADL difficulties. Living alone directly impact on decreasing women's happiness by 0.064 compared to

not living alone. Confucianism directly impact on increasing women's happiness by 0.064 compared to Free thinker. The other factors, such as total number of sons, total number of daughters, having grandchild, working status, being member of Buddhism, Christianity, have no direct impact on women's happiness for those aged 70 and above.

Regarding the impact of women's education on other factors in path model, compared to primary education, secondary education impacts on having fewer total number of sons, while there is no difference regarding total number of sons between university and primary education. In contrast, compared to primary education, university education impacts on having fewer total number of daughters, while there is no difference regarding total number of daughters between secondary and primary education. In addition, compared to primary education, secondary education directly impacts on lower likelihood of being member of a poor-household, while there is no statistically significant difference between university and primary education on the likelihood of being member of poor-household. Moreover, education has no statistically significant direct impact on marriage, having ADL difficulties, participation in labor market, and religion.

Regarding the impact of other factors amongst each other in the path model, being married has a direct impact on having larger total number of sons (increasing by 0.52), total number of daughters (increasing by 0.44), higher likelihood of having grandchild (increasing by 0.053), and lower likelihood of living alone (decreasing by 0.22), compared to un-married women. Having ADLs difficulty directly impacts on lower

likelihood of feeling income and material support sufficiency (decreasing by 0.11), higher likelihood of living alone (increasing 0.088), and lower likelihood of still working, while having ADLs has no statistically significant direct impact on being member of a poor-household, and providing financial support to kin/relatives, compared to those without ADLs difficulty. Still working direct impacts on higher likelihood of providing financial support to kin/relatives (increasing by 0.11), while still working has no statistically significant direct impact on feeling income and material support sufficiency, compared to those who stopped working. Being a member of a poor-household directly impacts on lower likelihood of providing financial support to kin/relatives (decreasing 0.09) and feeling income and material support sufficiency (decreasing 0.27), compared to non-poor household members.

Men's happiness at age 70 and above

Similar to age group 60-69, education has direct impact on men's happiness for those aged 70 and above. However, education has indirect impacts on happiness through five paths of family resource, living arrangement, economic resource and religion instead of two paths of economic resource as at age 60-69. Regarding the first path, compared to primary education, secondary education indirectly impacts on decreasing happiness by 0.0077, university education indirectly impacts on decreasing happiness by 0.014. In contrast, regarding the second path, compared to primary education, secondary education indirectly impacts on increasing happiness by 0.0025, university education indirectly impacts on increasing happiness by 0.0041. Similarly,

regarding the third path, compared to primary education, university education indirectly impacts on increasing happiness by 0.0012. Regarding the fourth path, compared to primary education, secondary education indirectly impacts on decreasing happiness by 0.0017, university education indirectly impacts on decreasing happiness by 0.0032. Regarding the fifth path, compared to primary education, secondary education indirectly impacts on increasing happiness by 0.021, university education indirectly impacts on increasing happiness by 0.032.

Confucianism and having ADLs difficulty are the two factors which directly impact on men's happiness without starting from the impact of education. The other factors, such as such as total number of daughters, having grandchild, working status, feeling income and material support sufficiency, being member of a poor-household, Buddhism, have no direct impact on men's happiness for those aged 70 and above.

Regarding the impact of men's education on other factors in path model, compared to primary education, university education direct impacts on having fewer total number of sons and daughters, while secondary education only has direct impact on having fewer total number of sons. Compared to primary education, secondary and university education directly impacts on lower likelihood of being member of a poor-household, being member of Buddhism, increasing likelihood of being member of Confucianism, and there is an increasing strength of the impacts with level of education. University level directly impacts on decreasing likelihood of still working.

Regarding the impact of other factors amongst each other in the path model, being married has a direct impact on having fewer total number of daughters (decreasing by 0.44), and lower likelihood of living alone (decreasing by 0.26), while ever married has no statistically significant direct impact on total number of sons and having grandchild, compared to being un-married. Having ADL difficulties directly impacts on higher likelihood of being a member of a poor-household (increasing by 0.11), lower likelihood of feeling income and material support sufficiency (decreasing by 0.1) and still participating in the labor market, while having ADL difficulties has no statistically significant direct impact on living alone, providing financial support to kin/relatives and working status, compared to those without ADLs difficulty. Still working directly impacts on a higher likelihood of providing financial support to kin/relatives (increasing by 0.097), while still working has no statistically significant direct impact on feeling income and material support sufficiency, compared to those who stopped working. Being a member of poor-household directly impacts on lower likelihood of providing financial support to kin/relatives (decreasing by 0.19) and feeling income and material support sufficiency (decreasing by 0.23), compared to being a non-poor household member.

Summary of the differences regarding direct and indirect impacts of education on happiness between women and men aged 70 and above

Similar to age group 60-69, education does not have a direct impact on women's happiness for those aged 70 and above, but education has direct impact on

men's happiness for those aged 70 and above. Compared to primary education, university level directly impacts on increasing men's happiness, whereas there is no difference in men's happiness between primary and secondary education. Education indirectly impacts on increasing women's happiness through three paths of economic resources, whereas education indirectly impacts increasing men's happiness through five paths of economic resources, Confucianism, sons, and living arrangement. In general, regarding the total impact of education on happiness amongst those aged 70 and above, education has no effect on women's happiness in both secondary and university levels compared with primary education. In contrast, university has a significant impact on increasing men's happiness for those aged 70 and above. Again, there is no difference in men's happiness between primary and secondary education.

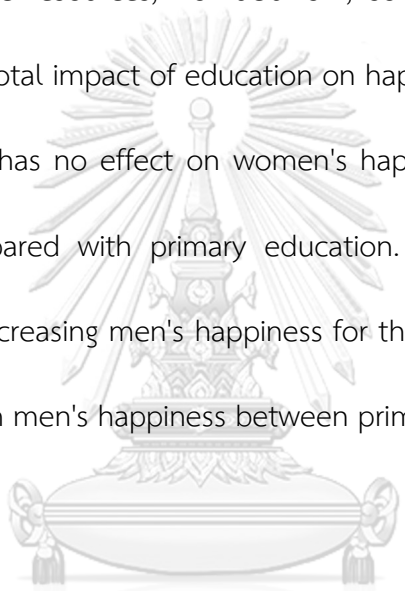


Figure 24: *Path diagram impact of education on women's life satisfaction aged 60-69*

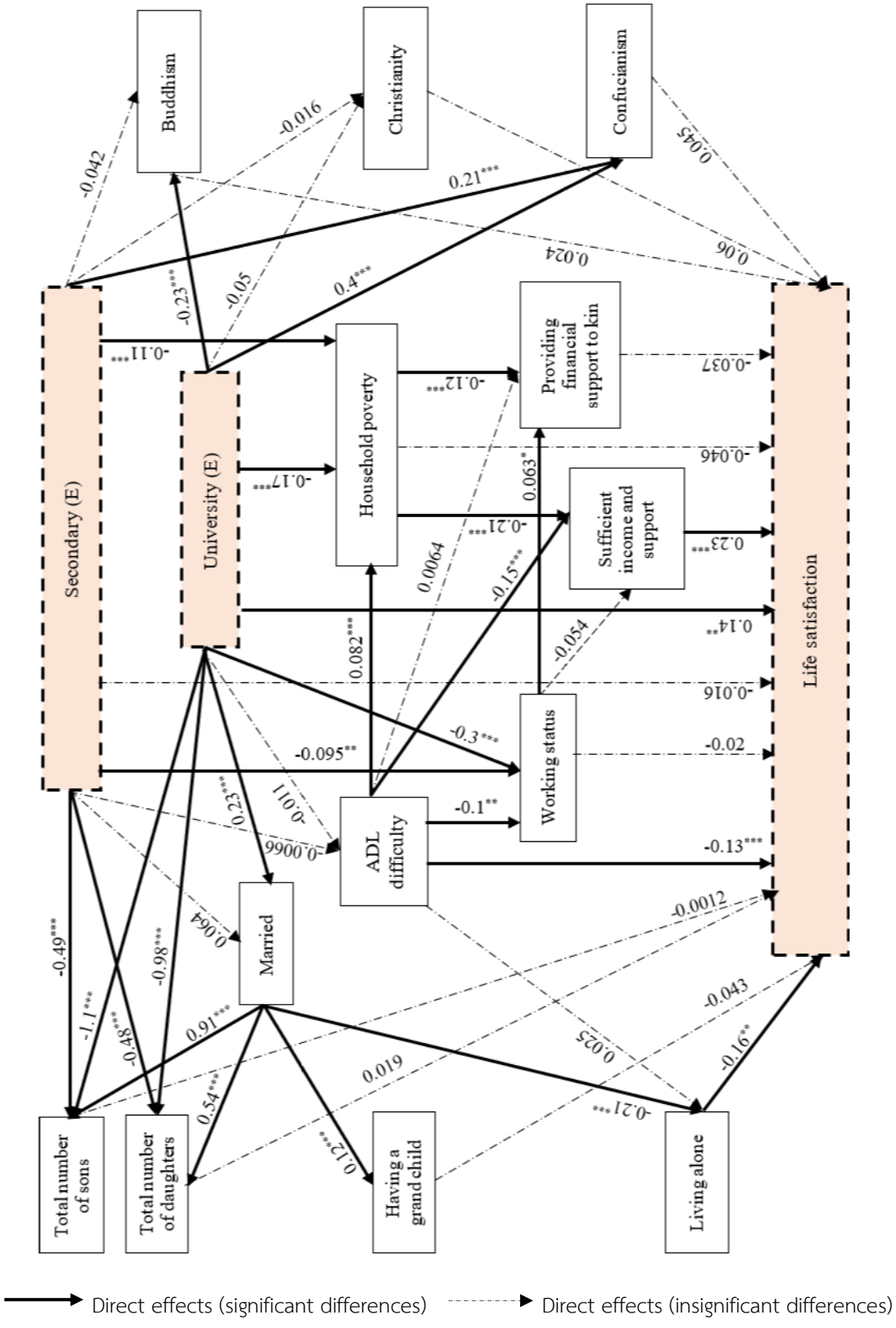


Figure 25: *Path diagram impact of education on women's life satisfaction aged 70+*

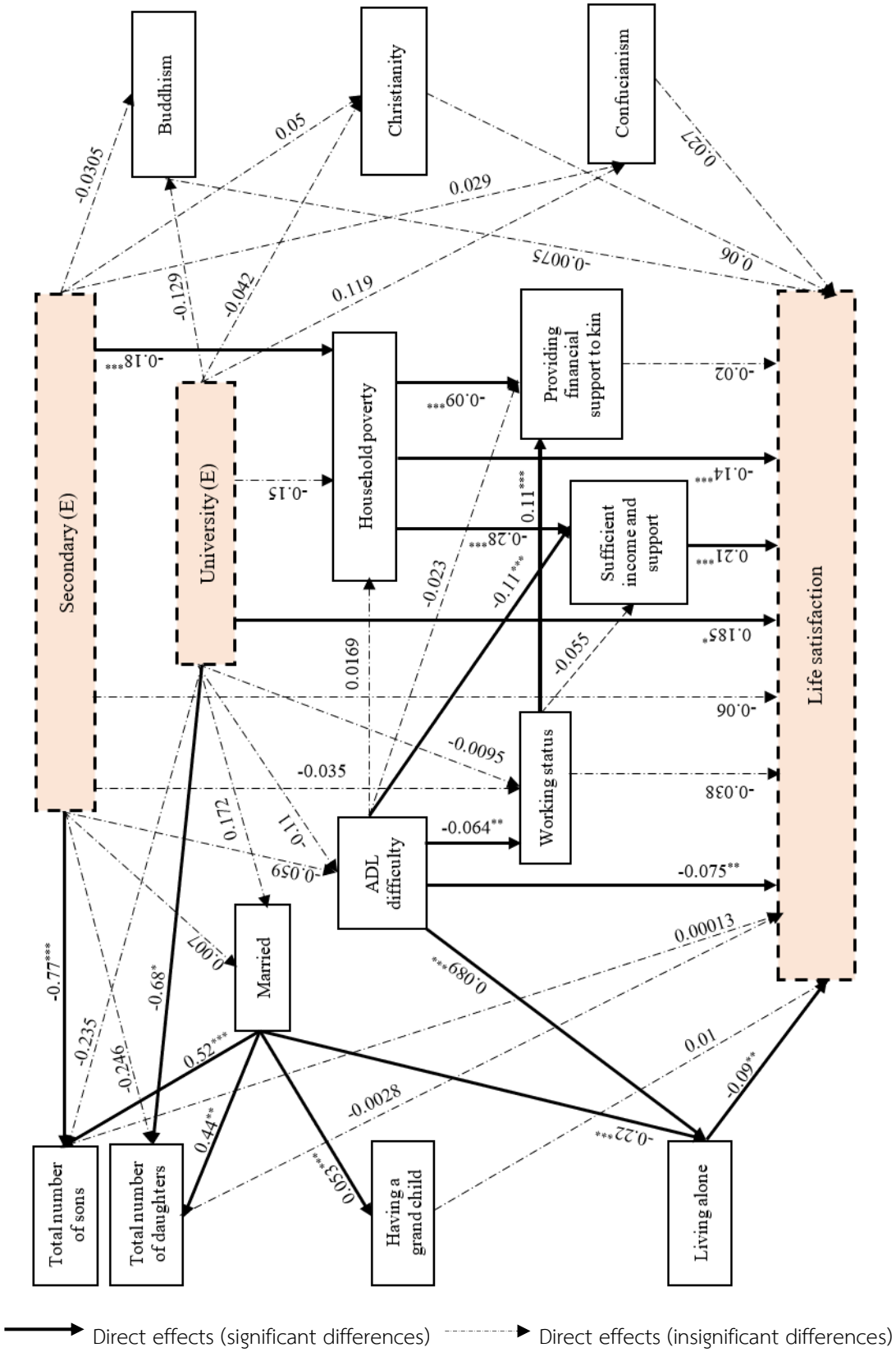


Figure *26: Path diagram impact of education on men's life satisfaction aged 60-69*

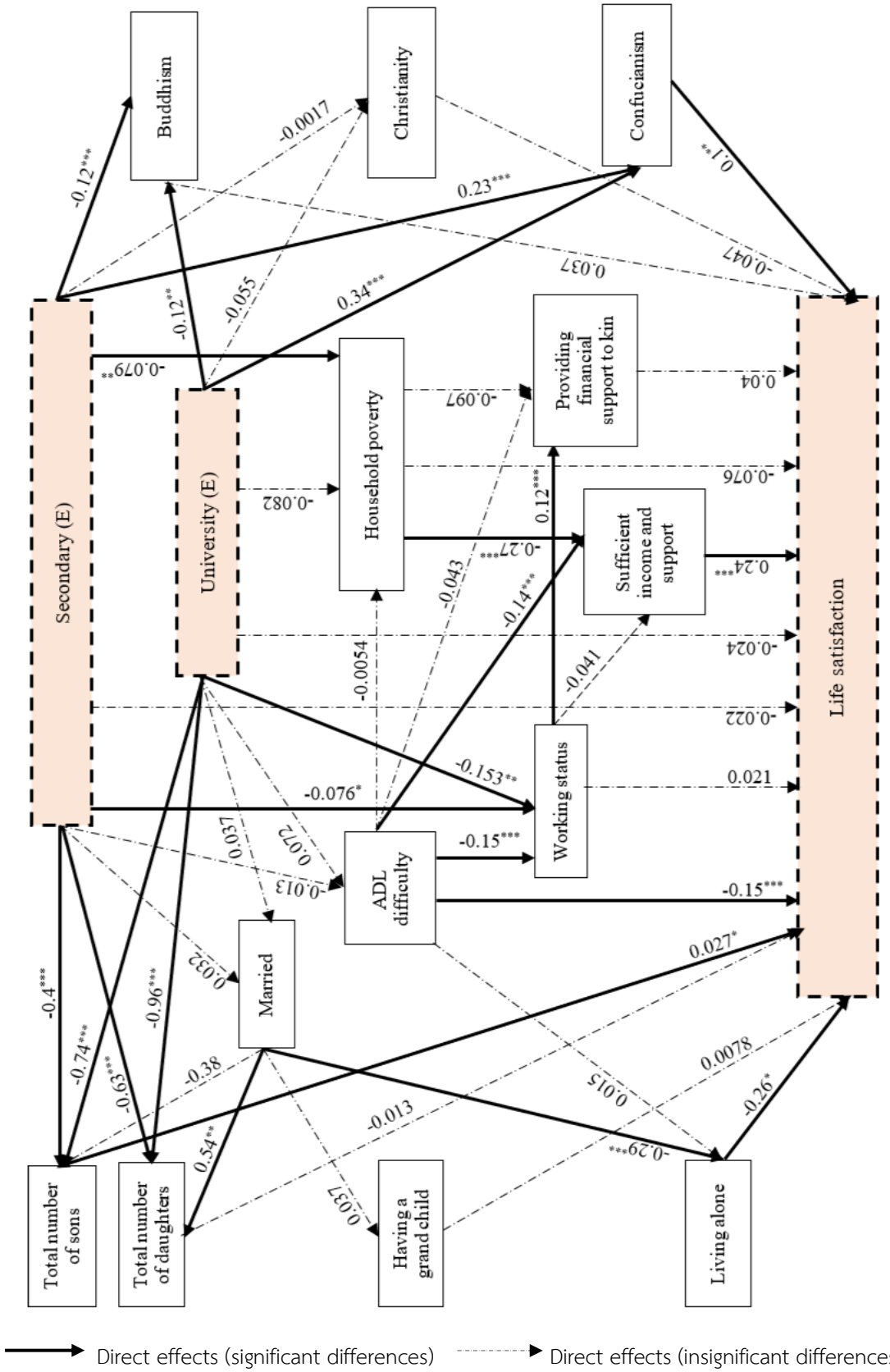


Figure *27: Path diagram impact of education on men's life satisfaction aged 70+*

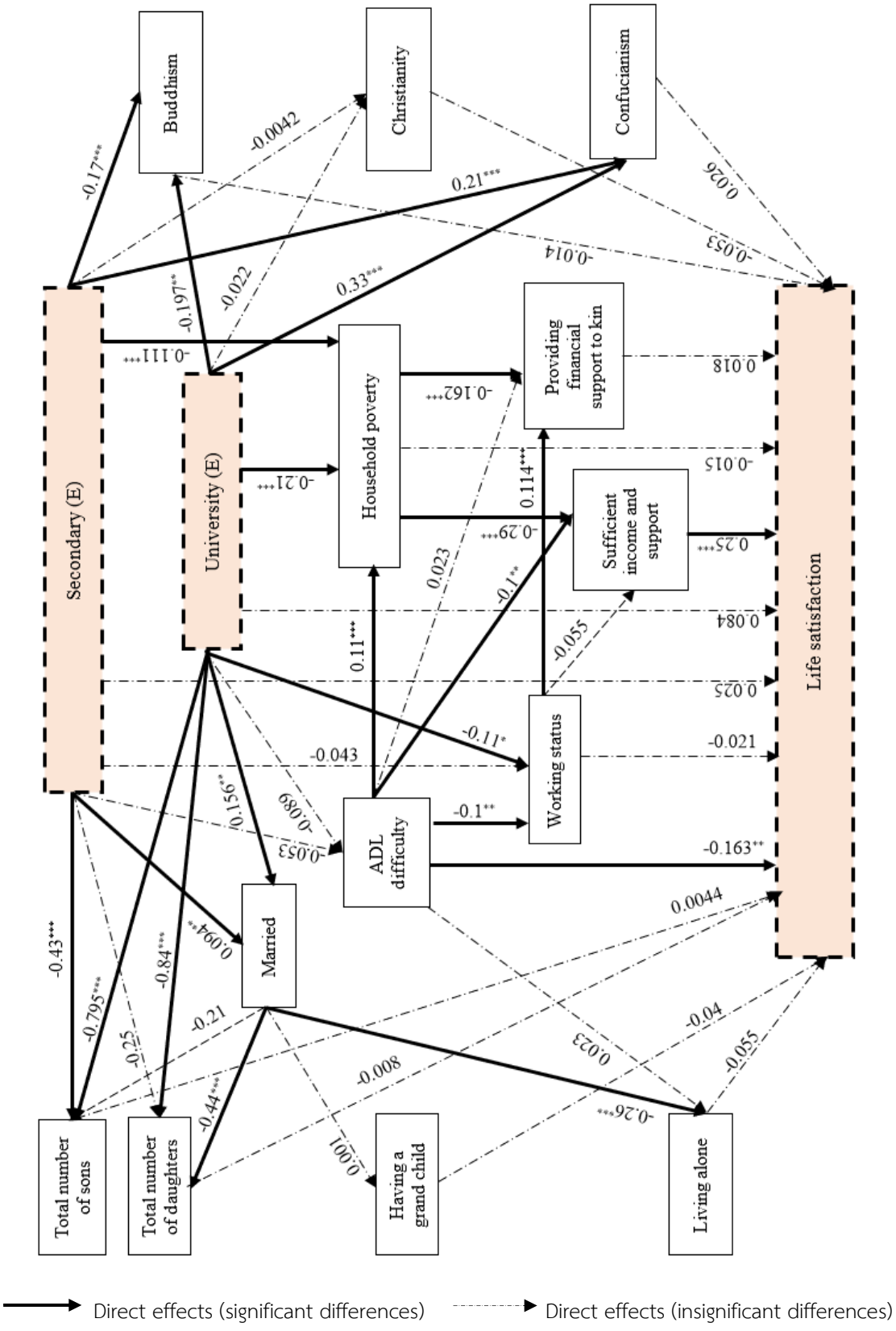


Table 16: *Direct effects, specific indirect effects, total indirect effects, and total effects of education on women's life satisfaction (WS) aged 60-69*

Type	Source	Path coef.
Direct effect		
	Secondary ⟶ WS	-0.016
	University ⟶ WS	0.14**
Indirect effect		
University ⟶ Married ⟶ Living alone ⟶ WS (path 1)		0.00773
Secondary ⟶ Household poverty ⟶ Feeling income and support sufficiency ⟶ WS (path 2)		0.0053
University ⟶ Household poverty ⟶ Feeling income and support sufficiency ⟶ WS (path 2)		0.0082
Total indirect effect		
	Secondary ⟶ Women's life satisfaction	0.018
	University ⟶ Women's life satisfaction	0.035
Total effect		
	Secondary ⟶ Women's life satisfaction	0.003
	University ⟶ Women's life satisfaction	0.178***

Note: *Indirect path coefficients are calculated from multiple coefficients. Total indirect effect is calculated from additional indirect path coefficients. Total effect is calculated from additional direct path coefficient and indirect path coefficient.*

Table 17: *Direct effects, specific indirect effects, total indirect effects, and total effects of education on men's life satisfaction (MS) at age 60-69*

Type	Source	Path coef.
Direct effect		
	Secondary ⟶ MS	-0.022
	University ⟶ MS	-0.024

Indirect effect		
Secondary ⟶ Total number of sons ⟶ MS (Path 1)		-0.011
University ⟶ Total number of sons ⟶ MS (Path 1)		-0.02
Secondary ⟶ Household poverty ⟶ Feeling income/support sufficiency ⟶ MS (Path 2)		0.005
Secondary ⟶ Confucianism ⟶ MS (Path 3)		0.023
University ⟶ Confucianism ⟶ MS (Path 3)		0.034
Total indirect effect		
	Secondary ⟶ Men's life satisfaction	0.03
	University ⟶ Men's life satisfaction	0.02
Total effect		
	Secondary ⟶ Men's life satisfaction	0.0092
	University ⟶ Men's life satisfaction	-0.0034

Note: *Indirect path coefficients are calculated from multiple coefficients. Total indirect effect is calculated from additional indirect path coefficients. Total effect is calculated from additional direct path coefficient and indirect path coefficient.*

Table 18: *Direct effects, specific indirect effects, total indirect effects, and total effects of education on women's life satisfaction (WS) at age 70 and above*

Type	Source	Path coef.
Direct effect		
	Secondary ⟶ WS	-0.06
	University ⟶ WS	0.185*
Indirect effect		
Secondary ⟶ Household poverty ⟶ WS (path 1)		0.0252
Secondary ⟶ Household poverty ⟶ Feeling income and support sufficiency ⟶ WS (path 2)		0.011
Total indirect effect		
	Secondary ⟶ Women's life satisfaction	0.048**
	University ⟶ Women's life satisfaction	0.047*

Total effect		
	Secondary ⟶ Women's life satisfaction	-0.0088
	University ⟶ Women's life satisfaction	0.233**

Note: *Indirect path coefficients are calculated from multiple coefficients. Total indirect effect is calculated from additional indirect path coefficients. Total effect is calculated from additional direct path coefficient and indirect path coefficient.*

Table 19: *Direct effects, specific indirect effects, total indirect effects, and total effects of education on men's life satisfaction (MS) at age 70 and above*

Type	Source	Path coef.
Direct effect		
	Secondary ⟶ MS	0.025
	University ⟶ MS	0.084
Indirect effect		
Secondary ⟶ Household poverty ⟶ Feeling income/material sufficiency ⟶ MS		0.008
University ⟶ Household poverty ⟶ Feeling income/material sufficiency ⟶ MS		0.015
Total indirect effect		
	Secondary ⟶ Men's life satisfaction	0.032*
	University ⟶ Men's life satisfaction	0.058**
Total effect		
	Secondary ⟶ Men's life satisfaction	0.057
	University ⟶ Men's life satisfaction	0.142**

Note: *Indirect path coefficients are calculated from multiple coefficients. Total indirect effect is calculated from additional indirect path coefficients. Total effect is calculated from additional direct path coefficient and indirect path coefficient.*

6.2 Direct and indirect impact of education on life satisfaction by age group

This section explains the direct and indirect impacts of education on life satisfaction based on figures 24, 25, tables 16, 17 for women and figures 26, 27, tables 18, 19 for men by age group, including 60-69, and 70 and above.

6.2.1 Life satisfaction amongst age group 60-69

Women's life satisfaction at age 60-69

Education level has both direct and indirect impact on women's life satisfaction. Regarding direct impact of education, compared to primary education, university education directly impacts on increasing women's life satisfaction for those aged 60-69, while there is no difference in women's life satisfaction between primary and secondary education. Regarding direct impact of education, education has indirect impacts on life satisfaction through three paths of economic resources and living arrangement.

Regarding factors which directly impact on life satisfaction without starting from the impact of education, having ADLs difficulty directly impacts on decreasing life satisfaction by 0.13 compared to those without having ADLs difficulty. The other factors, such as total number of sons, total number of daughters, having grandchild, working status, providing financial support to kin/relatives, being member of poor-household, Buddhism, Christianity or Confucianism, have no direct impact on life satisfaction. The explanation regarding impact of women's education on other factors

and the impact of other factors amongst each other in path model was presented in the section on women's happiness at age 60-69.

Men's life satisfaction at age 60-69

Education level has no direct impact on men's life satisfaction for those aged 60-69. However, education has indirect impact on men's life satisfaction through 3 paths of economic resource, sons, and Confucianism. Regarding the path of religion (education ⟶ Confucianism ⟶ life satisfaction), compared to primary education, secondary education indirectly impacts on increasing life satisfaction by 0.023, university education indirectly impacts on increasing life satisfaction by 0.034, and there is an increasing strength of the impact with level of education. Regarding the path of family resource (education ⟶ total number sons ⟶ life satisfaction), compared to primary education, secondary education indirectly impacts on decreasing life satisfaction by 0.011, university education indirectly impacts on decreasing life satisfaction by 0.02, and there is an increasing strength of the impact with level of education. Regarding the path of religion (education ⟶ household poverty ⟶ feeling income/material support sufficiency ⟶ life satisfaction), compared to primary education, secondary education indirectly impacts on increasing life satisfaction by 0.005, there is no difference in men's life satisfaction between primary and university education.

Regarding other factors which directly impact on men's life satisfaction without starting from the impact of education, living alone directly impacts on decreasing life satisfaction by 0.26 compared to living with other persons. Having ADLs difficulty also directly impacts on decreasing life satisfaction by 0.15 compared to those without ADLs difficulty. The other factors, such as total number of daughters, having grandchild, working status, providing financial support to kin/relatives, being member of Buddhism or Christianity, have no direct impact on life satisfaction. The explanation about impact of men's education on other factors and the impact of other factors amongst each other in path model was presented in the section on men's happiness at age 60-69.

Summary of the differences regarding direct and indirect impacts of education on life satisfaction between women and men aged 60-69

Education has direct impact on women's life satisfaction for those aged 60-69, but education has no direct impact on men's life satisfaction for those aged 60-69. Compared to primary education, university education directly impacts on increasing women's life satisfaction, while there is no difference in women's life satisfaction between primary and secondary education. Education indirectly impacts on increasing women's life satisfaction through two paths of economic resources and living arrangement, whereas education indirectly impacts on increasing men's life satisfaction through three paths of economic resources, sons, and Confucianism. In general, regarding the total impact of education on life satisfaction amongst those aged 60-69, university education has effect on women's life satisfaction compared with primary

education. In contrast, education has insignificant impact on increasing the men's life satisfaction for those aged 60-69.

6.2.2 Life satisfaction amongst age group 70 and above

Women's life satisfaction at age 70 and above

Similar to age group 60-69, education has both direct and indirect impact on women's life satisfaction for those aged 70 and above. Regarding direct impact, compared to primary education, university education directly impacts on increasing women's life satisfaction by 0.185, there is no difference in women's life satisfaction between primary and secondary education. Regarding indirect impact, education indirectly impacts on women's life satisfaction through two paths of economic resources. Regarding the first path (education ⟶ household poverty ⟶ life satisfaction), compared to primary education, secondary education indirectly impacts on increasing life satisfaction by 0.0252. Regarding the second path (education ⟶ household poverty ⟶ feeling income and material support sufficiency ⟶ life satisfaction), compared to primary education, secondary education indirectly impacts on increasing life satisfaction by 0.011. Regarding the total indirect impact, compared to primary education, secondary education has total indirect impact on increasing women's life satisfaction by 0.048, university education has total indirect impact on increasing women's life satisfaction by 0.047.

Regarding other factors which directly impact on women's life satisfaction without starting from the impact of education, living alone directly impacts on decreasing life satisfaction by 0.09 compared to living with other persons. Having ADLs difficulty also directly impacts on decreasing life satisfaction by 0.075 compared to those without having ADLs difficulty. The other factors, such as total number of sons, total number of daughters, having grandchild, working status, providing financial support to kin/relatives, being member of Buddhism, Christianity, and Confucianism, have no direct impact on women's life satisfaction. The explanation about impact of women's education on other factors and the impact of other factors amongst each other in path model was presented in the section on women's happiness for those aged 70 and above.

Men's life satisfaction at age 70 and above

Completely different from the 60-69 age group, education is statistically significant in total indirect impacts and total impact on men's life satisfaction aged 70 and above. Although education does not have direct impact on men's life satisfaction aged 70 and above, education has indirect impacts on men's life satisfaction through economic resource (education ⟶ household poverty ⟶ feeling income and material support sufficiency ⟶ life satisfaction). Compared to primary education, secondary education indirectly impacts on increasing men's life satisfaction by 0.008, secondary education indirectly impacts on increasing men's life satisfaction by 0.015. Regarding

the total indirect impact, compared to primary education, secondary education has total indirect impact on increasing men's life satisfaction by 0.032, university education has total indirect impact on increasing men's life satisfaction by 0.058.

Regarding other factors which directly impact on men's life satisfaction without starting from the impact of education, having ADLs difficulty directly impacts on decreasing life satisfaction by 0.163 compared to those without having ADLs difficulty. The other factors, such as total number of sons, total number of daughters, having grandchild, living alone, working status, providing financial support to kin/relatives, being member of Buddhism, Christianity, and Confucianism, have no direct impact on men's life satisfaction. The explanation about impact of men's education on other factors and the impact of other factors amongst each other in path model was presented in the section on men's happiness for those aged 70 and above.

Summary of the differences regarding direct and indirect impacts of education on life satisfaction between women and men aged 70 and above

Similar to age group 60-69, education has direct impact on women's life satisfaction for those aged 70 and above, but education has no direct impact on men's life satisfaction for those aged 70 and above. Compared to primary education, university education directly impacts on increasing women's life satisfaction, while there is no difference in women's life satisfaction between primary and secondary education. Education indirectly impacts on increasing women's life satisfaction through two paths of economic resources, whereas education indirectly impacts on increasing

men's life satisfaction through only one path of economic resources. In general, regarding the total impact of education on life satisfaction of those aged 70 and above, compared to primary education, both secondary and university education has effect on increasing women's life satisfaction and men’s life satisfaction. Besides, university education has stronger total indirect impact on men’s life satisfaction compared to women’s life satisfaction. However, university education has stronger total impact on women’s life satisfaction compared to men’s life satisfaction of those aged 70 and above.

Figure 28: *Path diagram impact of education on women's loneliness aged 60-69*

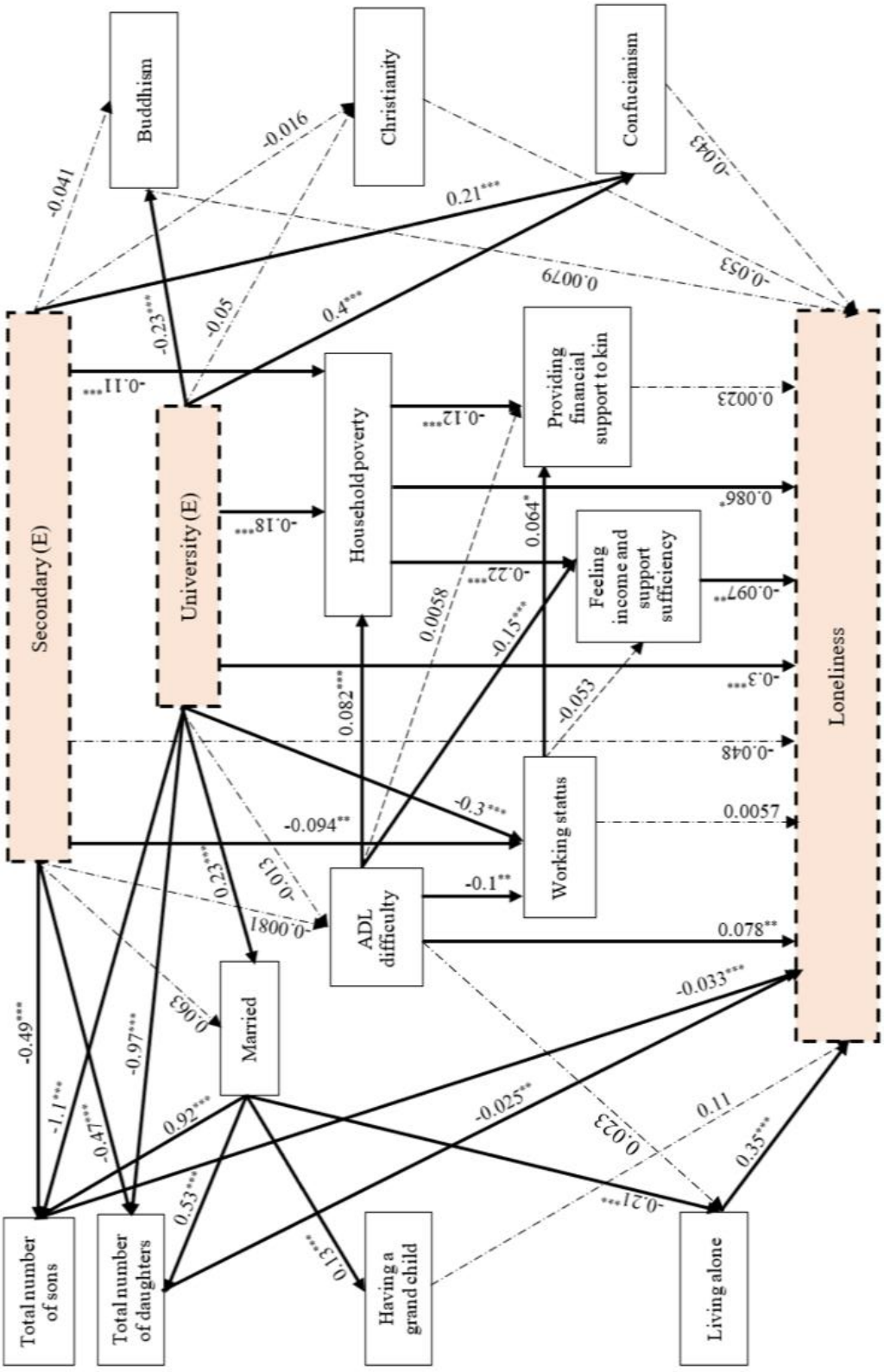


Figure *29: Path diagram impact of education on women's loneliness aged 70+*

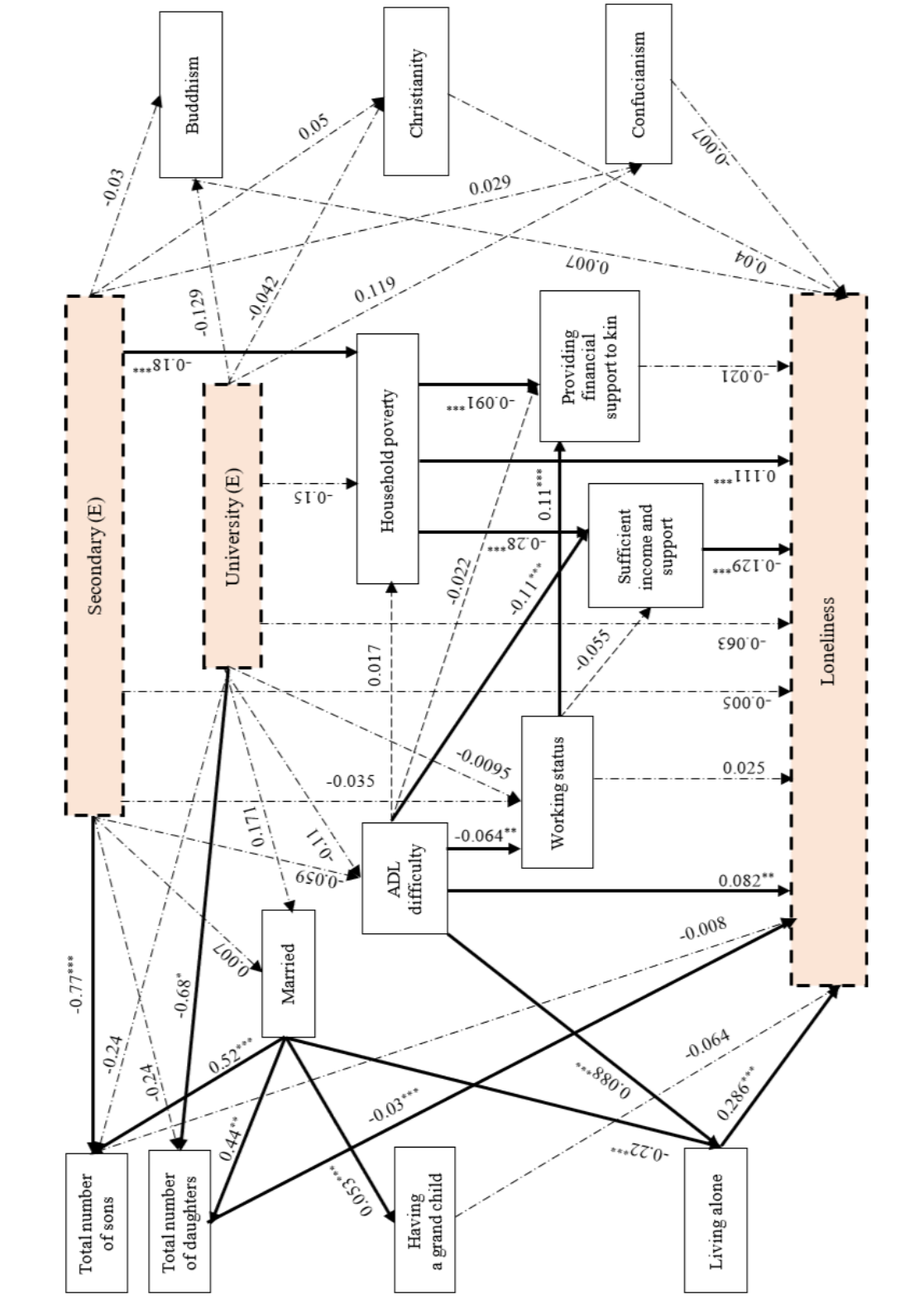
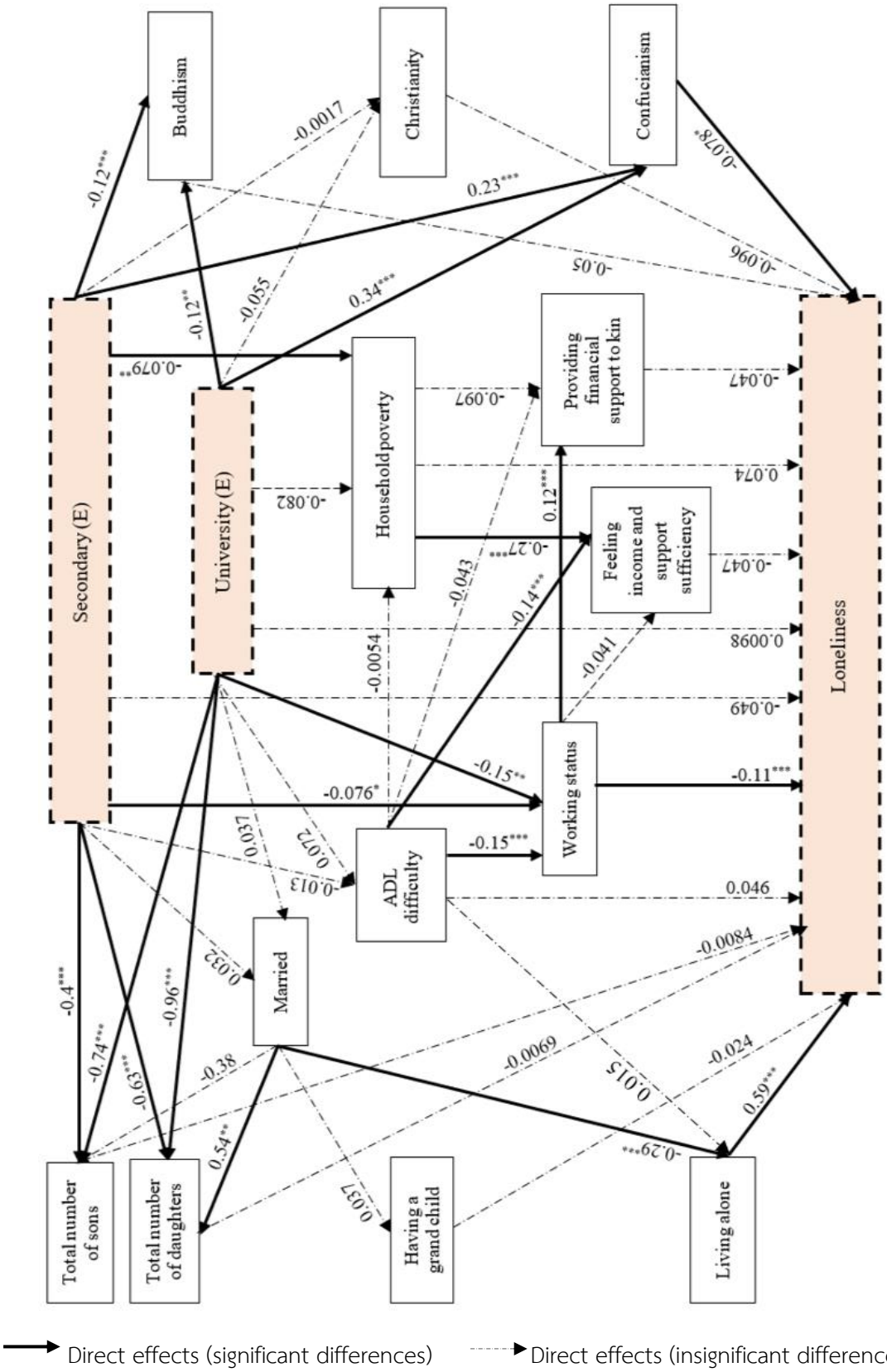


Figure 30: *Path diagram impact of education on men's loneliness aged 60-69*



Direct effects (significant differences) Direct effects (insignificant differences)

Figure 31*: Path diagram impact of education on men's loneliness aged 70+*

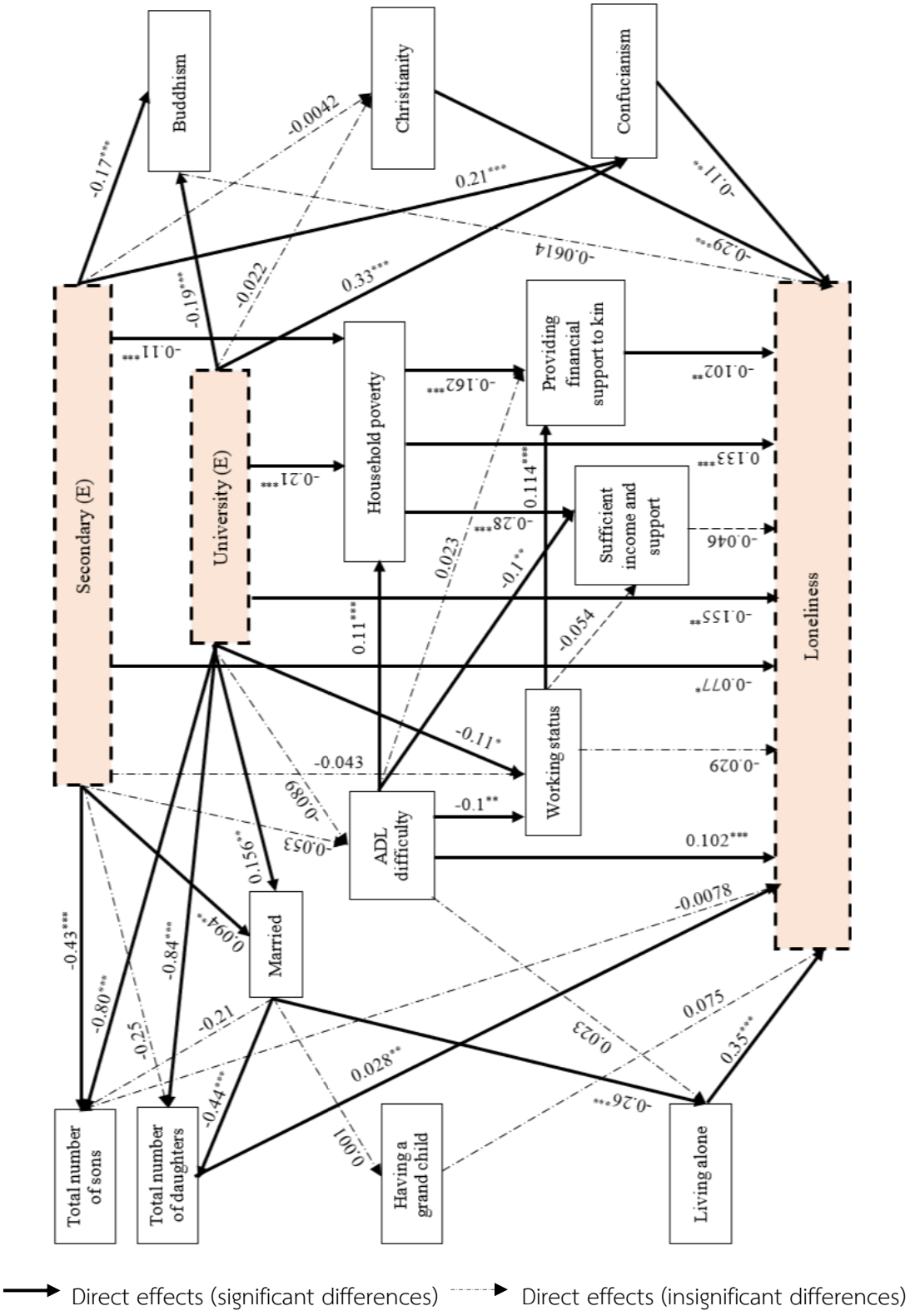


Table 20: *Direct effects, specific indirect effects, total indirect effects, and total effects of education on women's loneliness (WL) aged 60-69*

Type	Source	Path coef.
Direct effect		
	Secondary ⟶ WL	-0.048
	University ⟶ WL	-0.3***
Indirect effect		
Secondary ⟶ Total number of sons ⟶ WL (path 1)		0.016
University ⟶ Total number of sons ⟶ WL (path 1)		0.04
Secondary ⟶ Total number of daughters ⟶ WL (path 2)		0.012
University ⟶ Total number of daughters ⟶ WL (path 2)		0.024
University ⟶ Married ⟶ Total number of sons ⟶ WL (path 3)		-0.007
University ⟶ Married ⟶ Total number of daughters ⟶ WL (path 4)		-0.003
University ⟶ Married ⟶ Living alone ⟶ WL (path 5)		-0.017
Secondary ⟶ Household poverty ⟶ WL (path 6)		-0.01
University ⟶ Household poverty ⟶ WL (path 6)		-0.015
Secondary ⟶ Household poverty ⟶ Feeling income and support sufficiency ⟶ WL (path 7)		-0.0023
University ⟶ Household poverty ⟶ Feeling income and support sufficiency ⟶ WL (path 7)		-0.004
Total indirect effect		
	Secondary ⟶ Women's loneliness	-0.00025
	University ⟶ Women's loneliness	-0.0041

Total effect		
	Secondary ⟶ Women's loneliness	-0.048
	University ⟶ Women's loneliness	-0.31***

Note: *Indirect path coefficients are calculated from multiple coefficients. Total indirect effect is calculated from additional indirect path coefficients. Total effect is calculated from additional direct path coefficient and indirect path coefficient.*

Table 21: *Direct effects, specific indirect effects, total indirect effects, and total effects of education on men's loneliness (ML) at age 60-69*

Type	Source	Path coef.
Direct effect		
	Secondary ⟶ ML	-0.049
	University ⟶ ML	0.0098
Indirect effect		
Secondary ⟶ Still working ⟶ ML (Path 1)		0.0084
University ⟶ Still working ⟶ ML (Path 1)		0.016
Secondary ⟶ Confucianism ⟶ ML (Path 2)		-0.018
University ⟶ Confucianism ⟶ ML (Path 2)		-0.03
Total indirect effect		
	Secondary ⟶ Men's loneliness	-0.0095
	University ⟶ Men's loneliness	0.0065
Total effect		
	Secondary ⟶ Men's loneliness	-0.059*
	University ⟶ Men's loneliness	0.0163

Note: *Indirect path coefficients are calculated from multiple coefficients. Total indirect effect is calculated from additional indirect path coefficients. Total effect is calculated from additional direct path coefficient and indirect path coefficient.*

Table 22: *Direct effects, specific indirect effects, total indirect effects, and total effects of education on women's loneliness (WL) at age 70 and above*

Type	Source	Path coef.
Direct effect		
	Secondary ⟶ WL	-0.005
	University ⟶ WL	-0.063
Indirect effect		
University ⟶ Total number of daughters ⟶ WL (path 1)		0.0204
Secondary ⟶ Household poverty ⟶ WL (path 2)		-0.02
Secondary ⟶ Household poverty ⟶ Feeling income and support sufficiency ⟶ WL (path 3)		-0.0065
Total indirect effect		
	Secondary ⟶ Women's loneliness	-0.021
	University ⟶ Women's loneliness	-0.031
Total effect		
	Secondary ⟶ Women's loneliness	-0.026
	University ⟶ Women's loneliness	-0.094

Note: *Indirect path coefficients are calculated from multiple coefficients. Total indirect effect is calculated from additional indirect path coefficients. Total effect is calculated from additional direct path coefficient and indirect path coefficient.*

Table 23: *Direct effects, specific indirect effects, total indirect effects, and total effects of education on men's loneliness (ML) at age 70 and above*

Type	Source	Path coef.
Direct effect		
	Secondary ⟶ ML	-0.077*
	University ⟶ ML	-0.155**
Indirect effect		
University ⟶ Total number of daughters ⟶ ML (path 1)		-0.024
Secondary ⟶ Married ⟶ Total number of daughters ⟶ ML (path 2)		-0.00116
University ⟶ Married ⟶ Total number of daughters ⟶ ML (path 2)		-0.0019
Secondary ⟶ Married ⟶ Living alone ⟶ ML (path 3)		-0.0085
University ⟶ Married ⟶ Living alone ⟶ ML (path 3)		-0.0019
University ⟶ Still working ⟶ Providing financial support to kin ⟶ ML (path 4)		0.0013
Secondary ⟶ Household poverty ⟶ ML (path 5)		-0.0146
University ⟶ Household poverty ⟶ ML (path 5)		-0.028
Secondary ⟶ Household poverty ⟶ Providing financial support to kin ⟶ ML (path 6)		-0.0014
University ⟶ Household poverty ⟶ Providing financial support to kin ⟶ ML (path 6)		-0.0027
Secondary ⟶ Confucianism ⟶ ML (path 7)		-0.0231
University ⟶ Confucianism ⟶ ML (path 7)		-0.0363
Total indirect effect		
	Secondary ⟶ Men's loneliness	-0.048**
	University ⟶ Men's loneliness	-0.092***

Total effect		
	Secondary ⟶ Men's loneliness	-0.125***
	University ⟶ Men's loneliness	-0.247***

Note: *Indirect path coefficients are calculated from multiple coefficients. Total indirect effect is calculated from additional indirect path coefficients. Total effect is calculated from additional direct path coefficient and indirect path coefficient.*

6.3 Direct and indirect impacts of education on loneliness by age group

This section explains the direct and indirect impacts of education on loneliness based on figures 28, 29, tables 20, 22 for women and figures 30, 31, and tables 21, 23 for men by age group, including 60-69, and 70 and above.

6.3.1 Loneliness amongst age group 60-69

Women's loneliness amongst age group 60-69

Education has both direct and indirect impact on women's loneliness for those aged 60-69. Regarding direct impact of education on women's loneliness, compared to those with primary education, secondary and university education positively and directly impacts on decreasing loneliness (women with higher education levels are less lonely than women with lower education levels), but it is not significant in the case of university education.

Regarding indirect impact of education on women's loneliness, education indirectly impacts on women's loneliness through seven paths of economic resources, family resources and marriage. Regarding the first path (education ⟶ total number of

sons ⟶ loneliness), compared to primary education, secondary education indirectly impacts on increasing loneliness by 0.016, university education indirectly impacts on increasing loneliness by 0.04. Regarding the second path (education ⟶ total number of daughters ⟶ loneliness), compared to primary education, secondary education indirectly impacts on increasing loneliness by 0.012, university education indirectly impacts on increasing loneliness by 0.024. Regarding the third path (university education ⟶ marriage ⟶ total number of sons ⟶ loneliness), compared to primary education, university education indirectly impacts on decreasing loneliness by 0.007. Regarding the fourth path (university education ⟶ marriage ⟶ total number of daughters ⟶ loneliness), compared to primary education, university education indirectly impacts on decreasing loneliness by 0.003. Regarding the fifth path (university education ⟶ marriage ⟶ living alone ⟶ loneliness), compared to primary education, university education indirectly impacts on decreasing loneliness by 0.017. Regarding the sixth path (education ⟶ household poverty ⟶ loneliness), compared to primary education, secondary education indirectly impacts on decreasing loneliness by 0.01, university education indirectly impacts on decreasing loneliness by 0.015. Regarding the seventh path (education ⟶ household poverty ⟶ feeling income and material support sufficiency ⟶ loneliness), compared to primary education, secondary education indirectly impacts on decreasing loneliness by 0.0023, university education indirectly impacts on decreasing loneliness by 0.004.

Regarding other factor which directly impact on loneliness without starting from the impact of education, having ADLs difficulty directly impacts on increasing loneliness by 0.078 compared to those without ADLs difficulty. The other factors, such as having grandchild, working status, providing financial support to kin/relatives, being member of Buddhism, Christianity, and Confucianism, have no direct impact on loneliness. The explanation about impact of women's education on other factors and the impact of other factors amongst each other in path model was presented in the section on women's happiness at age 60-69.

Men's loneliness amongst age group 60-69

Education has no direct impact on men's loneliness for age group 60-69. However, education has indirect impact on loneliness through two paths of economic resource and religion. Regarding the first path (education ⟶ working status ⟶ loneliness), compared to primary education, secondary education indirectly impacts on increasing loneliness by 0.0084, university education indirectly impacts on increasing loneliness by 0.016, and there is an increasing strength of the impact with level of education. Regarding the second path (education ⟶ Confucianism ⟶ loneliness), compared to primary education, secondary education indirectly impacts on decreasing loneliness by 0.018, university education indirectly impacts on decreasing loneliness by 0.03, and there is an increasing strength of the impact with level of education.

Living alone, is the only one factor which directly impacts on men's loneliness without starting from the impact of education, directly impacts on increasing men's loneliness by 0.59 compared to those living with others. The explanation about impact of men's education on other factors and the impact of other factors amongst each other in path model was presented in the section on men's happiness at aged 60-69.

Summary of the differences regarding direct and indirect impacts of education on loneliness between women and men aged 60-69

Education has direct impact on women's loneliness for those aged 60-69, but education has no direct impact on men's loneliness for those aged 60-69. Compared to primary education, university education directly impacts on decreasing women's loneliness, while there is no difference in women's loneliness between primary and secondary education. Education indirectly impacts on women's loneliness through seven paths of economic resources, living arrangement, and total number of sons and daughters, whereas education indirectly impacts on men's loneliness through two paths of economic resources and Confucianism. In general, regarding the total impact of education on loneliness amongst for those aged 60-69, university education has total effect on decreasing women's loneliness by 0.31 compared with primary education. In contrast, secondary education has total effect on decreasing men's loneliness for those aged 60-69 by 0.059 compared to primary education.

6.3.2 Loneliness amongst age group 70 and above

Women's loneliness at age 70 and above

Different from age group 60-69, education has no direct impact on women's loneliness for those aged 70 and above. However, education indirectly impacts on loneliness through three paths of economic resources and total number of daughters. Regarding the first path (education ⟶ total number of daughters ⟶ loneliness), compared to primary education, university education indirectly impacts on increasing women's loneliness by 0.02, there is no difference in women's loneliness between primary and secondary education. Regarding the second path (education ⟶ household poverty ⟶ loneliness), compared to primary education, secondary education indirectly impacts on decreasing loneliness by 0.02, there is no difference in women's loneliness between university and primary education. Regarding the third path (education ⟶ household poverty ⟶ feeling income and material support sufficiency ⟶ loneliness), compared to primary education, secondary education indirectly impacts on decreasing loneliness by 0.0065, there is no difference in women's loneliness between university and primary education.

Regarding other factors which directly impact on loneliness without starting from the impact of education, having ADLs difficulty directly impacts on increasing loneliness by 0.082 compared to those without ADLs difficulty, living alone directly impacts on increasing loneliness by 0.082 compared to those who live with other

people. The other factors, such as total number of sons, having grandchild, working status, providing financial support to kin/relatives, being member of Buddhism, Christianity, and Confucianism, have no direct impact on women's loneliness for those aged 70 and above. The explanation about impact of women's education on other factors and the impact of other factors amongst each other in path model was presented in the section on women's happiness for those aged 70 and above.

Men's loneliness at age 70 and above

Different from age group 60-69, education has both direct and indirect impact on men's loneliness for those aged 70 and above. Regrading direct impact of education on loneliness, compared to primary education, secondary education directly impacts on decreasing men's loneliness by 0.077, university education directly impacts on decreasing loneliness (men with university education are less lonely than men with primary education, university level decreases loneliness by 0.155).

Regarding indirect impact of education on loneliness, education indirectly impacts on loneliness through sevens paths of economic resource, family resources, and religion. Regarding the first path (education ⟶ total number of daughters ⟶ loneliness), compared to primary education, university education indirectly impacts on decreasing loneliness by 0.024. Regarding the second path (education ⟶ married ⟶ total number of daughters ⟶ loneliness), compared to primary education, secondary education indirectly impacts on decreasing loneliness by 0.00116, university education

indirectly impacts on decreasing loneliness by 0.0019. Regarding the third path (education ⟶ married ⟶ living alone ⟶ loneliness), compared to primary education, secondary education indirectly impacts on decreasing loneliness by 0.0085, university education indirectly impacts on decreasing loneliness by 0.0019. Regarding the fourth path (education ⟶ still working ⟶ providing financial support to kin ⟶ loneliness), compared to primary education, university education indirectly impacts on increasing loneliness by 0.0013. Regarding the fifth path (education ⟶ household poverty ⟶ loneliness), compared to primary education, secondary education indirectly impacts on decreasing loneliness by 0.0146, university education indirectly impacts on decreasing loneliness by 0.028. Regarding the sixth path (education ⟶ household poverty ⟶ providing financial support to kin ⟶ loneliness), compared to primary education, secondary education indirectly impacts on decreasing loneliness by 0.0014, university education indirectly impacts on decreasing loneliness by 0.0027. Regarding the seventh path (education ⟶ Confucianism ⟶ loneliness), compared to primary education, secondary education indirectly impacts on decreasing loneliness by 0.0231, university education indirectly impacts on decreasing loneliness by 0.0363.

Regarding other factors which directly impacts on loneliness without starting from the impact of education, having ADL difficulty directly impacts on increasing loneliness by 0.102 compared to those living with others. Being member of Christianity directly impacts on decreasing loneliness by 0.29 compared to free thinker. The other

factors, such as total number of sons, having grandchild, working status, feeling income and material support sufficiency, Buddhism, have no direct impact on loneliness. The explanation about impact of men's education on other factors and the impact of other factors amongst each other in path model was presented in the section on men's happiness at aged 70-79.

Summary of the differences regarding direct and indirect impacts of education on loneliness between women and men aged 70 and above

Completely different from age group 60-69, education has direct impact on men's loneliness for those aged 70 and above, but education has no direct impact on women's loneliness for those aged 70 and above. Compared to primary education, both secondary and university education directly impacts on decreasing men's loneliness, there is an increasing strength with level of education. Education indirectly impacts on women's loneliness through three paths of economic resources and total number of daughters, whereas education indirectly impacts on men's loneliness through seven paths of economic resources, total number of daughters, living arrangement, and Confucianism. In general, regarding the total indirect impact of education on loneliness for those aged 70 and above, both secondary and university education has insignificant total indirect effect on women's loneliness. In contrast, both secondary and university education has significant total indirect effect on men's loneliness for those aged 70 and above, the higher the level of education, the lower the men's loneliness (secondary and university's total effect are 0.048 and 0.092,

respectively). Similarly, both secondary and university education has significant total effect on men's loneliness for those aged 70 and above, whereas secondary and university education has insignificant total effect on women's loneliness for those aged 70 and above.

Figure 32: *Path diagram impact of education on women's depression aged 60-69*

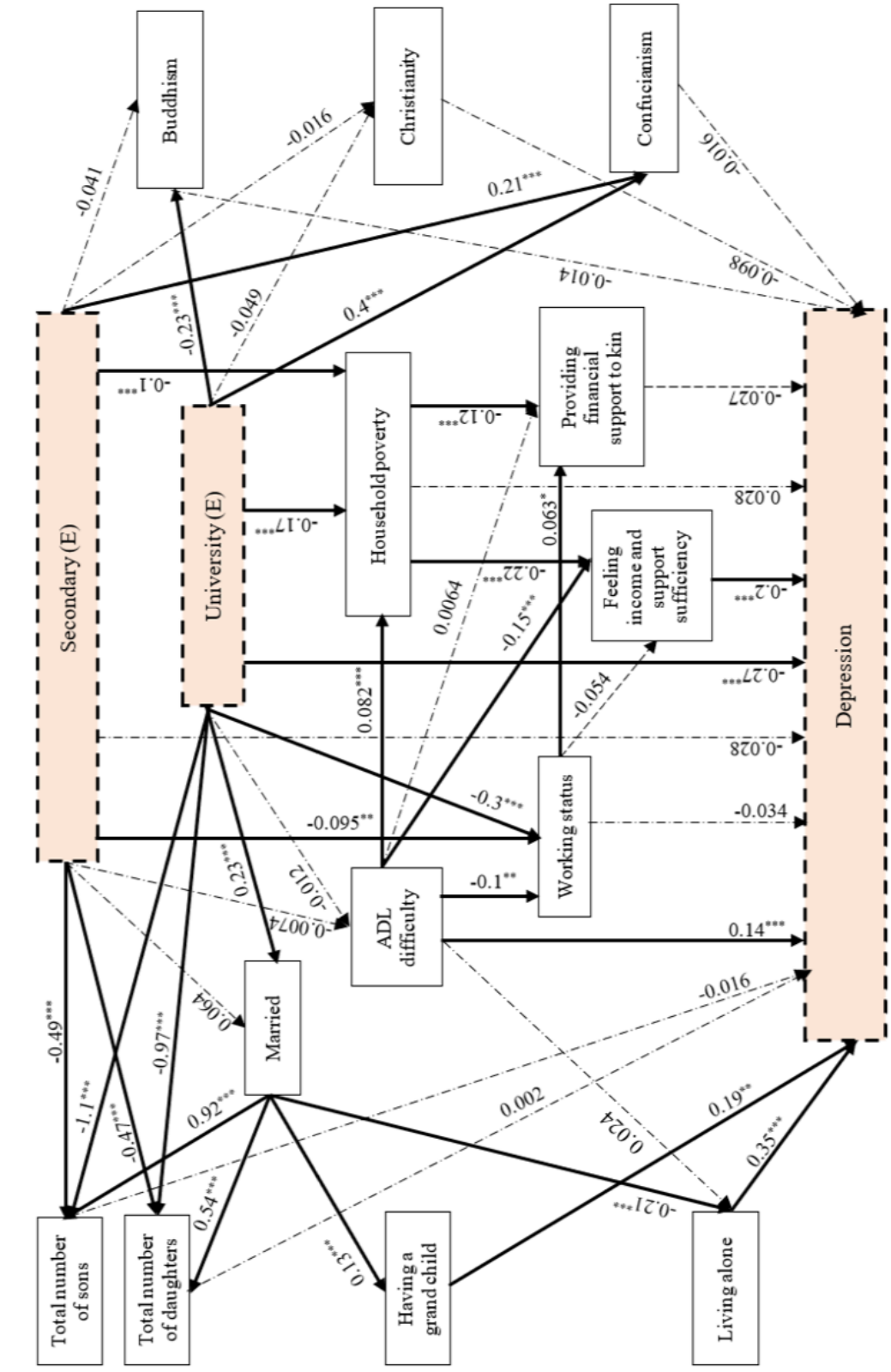


Figure 33*: Path diagram impact of education on women's depression aged 70+*

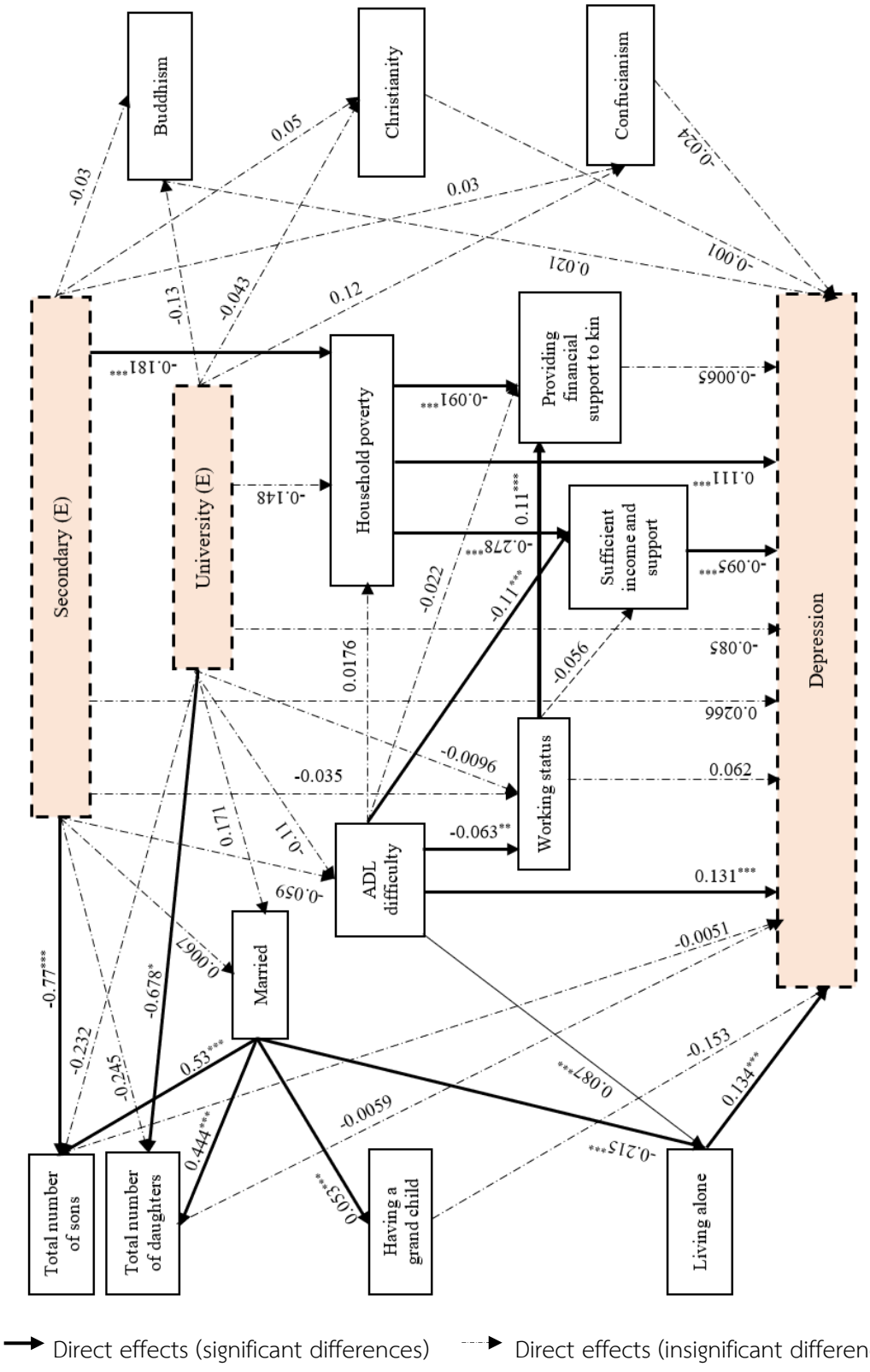


Figure 34*: Path diagram impact of education on men's depression aged 60-69*

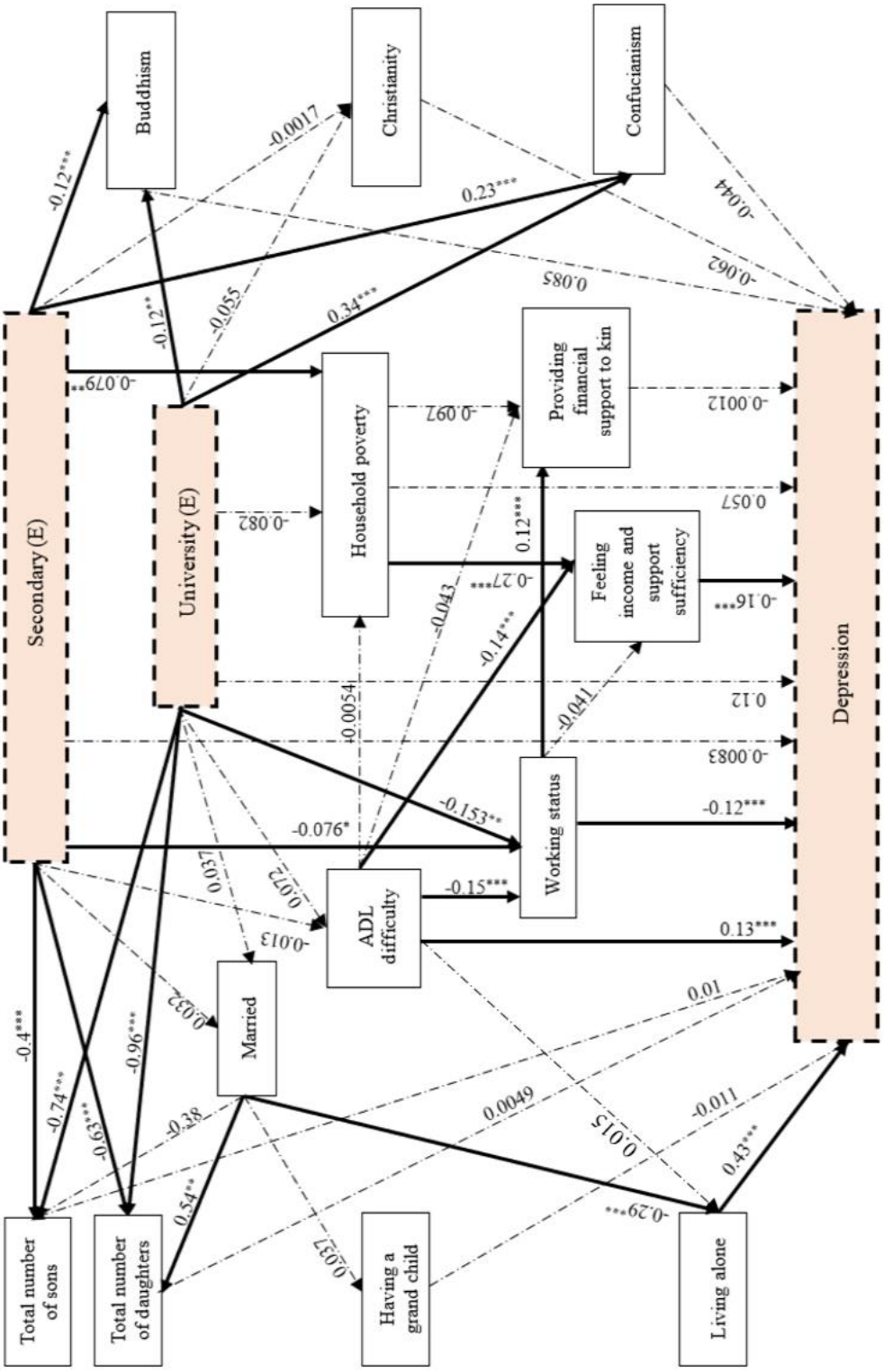


Figure 35*: Path diagram impact of education on men's depression aged 70+*

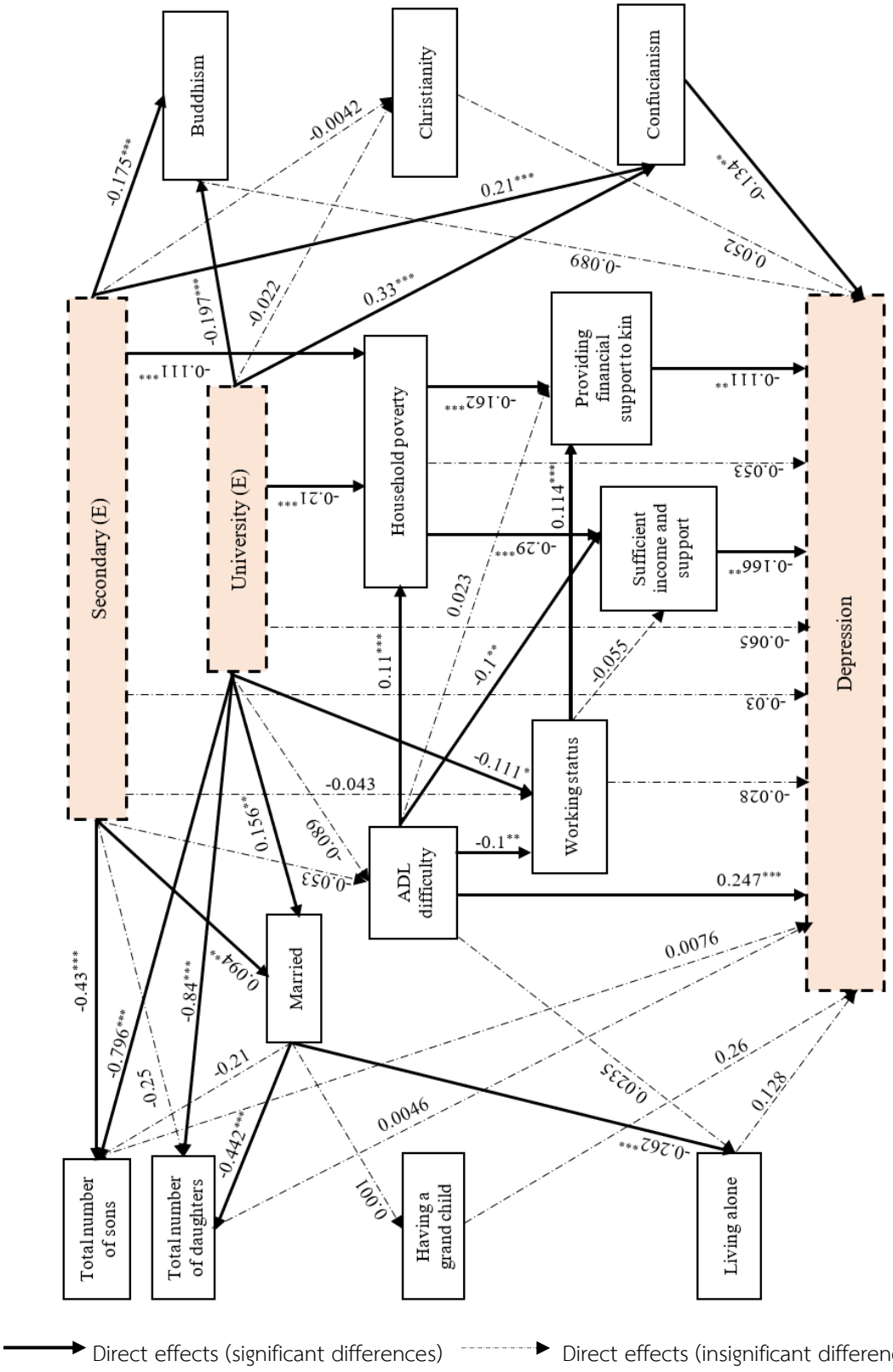


Table 24: *Direct effects, specific indirect effects, total indirect effects, and total effects of education on women's depression (WD) aged 60-69*

Type	Source	Path coef.
Direct effect		
	Secondary ⟶ WD	-0.028
	University ⟶ WD	-0.27***
Indirect effect		
Secondary ⟶ Household poverty ⟶ Feeling income and support sufficiency ⟶ WD (path 1)		-0.0044
University ⟶ Household poverty ⟶ Feeling income and support sufficiency ⟶ WD (path 1)		-0.0075
University ⟶ Married ⟶ Having grandchild ⟶ WD (path 2)		0.006
University ⟶ Married ⟶ Living alone ⟶ WD (path 3)		0.017
Total indirect effect		
	Secondary ⟶ Women's depression	-0.0051
	University ⟶ Women's depression	-0.0055
Total effect		
	Secondary ⟶ Women's depression	-0.033
	University ⟶ Women's depression	-0.275***

Note: *Indirect path coefficients are calculated from multiple coefficients. Total indirect effect is calculated from additional indirect path coefficients. Total effect is calculated from additional direct path coefficient and indirect path coefficient.*

Table 25: *Direct effects, specific indirect effects, total indirect effects, and total effects of education on men's depression (MD) at age 60-69*

Type	Source	Path coef.
Direct effect		
	Secondary ⟶ MD	-0.0083
	University ⟶ MD	0.12
Indirect effect		
Secondary ⟶ Household poverty ⟶ Feeling income and support sufficiency ⟶ MD (path 1)		-0.0034
Secondary ⟶ Still working ⟶ MD (Path 2)		0.009
University ⟶ Still working ⟶ MD (Path 2)		0.02
Total indirect effect		
	Secondary ⟶ Men's depression	-0.033*
	University ⟶ Men's depression	-0.017
Total effect		
	Secondary ⟶ Men's depression	-0.0413
	University ⟶ Men's depression	0.11

Note: *Indirect path coefficients are calculated from multiple coefficients. Total indirect effect is calculated from additional indirect path coefficients. Total effect is calculated from additional direct path coefficient and indirect path coefficient.*

Table 26: *Direct effects, specific indirect effects, total indirect effects, and total effects of education on women's depression (WD) at age 70 and above*

Type	Source	Path coef.
Direct effect		
	Secondary ⟶ WD	0.026
	University ⟶ WD	-0.085
Indirect effect		
Secondary ⟶ Household poverty ⟶ WD (path 1)		-0.02
Secondary ⟶ Household poverty ⟶ Feeling income and support sufficiency ⟶ WD (path 2)		-0.0048
Total indirect effect		
	Secondary ⟶ Women's depression	-0.032*
	University ⟶ Women's depression	-0.045*
Total effect		
	Secondary ⟶ Women's depression	-0.006
	University ⟶ Women's depression	-0.13

Note: *Indirect path coefficients are calculated from multiple coefficients. Total indirect effect is calculated from additional indirect path coefficients. Total effect is calculated from additional direct path coefficient and indirect path coefficient.*

Table 27: *Direct effects, specific indirect effects, total indirect effects, and total effects of education on men's depression (MD) at age 70 and above*

Type	Source	Path coef.
Direct effect		
	Secondary ⟶ MD	-0.03
	University ⟶ MD	-0.065
Indirect effect		
University ⟶ Still working ⟶ Providing financial support to kin ⟶ MD (path 1)		0.0014

Secondary ⟶ Household poverty ⟶ Providing financial support to kin ⟶ MD (path 2)		0.002
University ⟶ Household poverty ⟶ Providing financial support to kin ⟶ MD (path 2)		-0.0038
Secondary ⟶ Household poverty ⟶ Feeling income/material sufficiency ⟶ MD (path 3)		-0.0053
University ⟶ Household poverty ⟶ Feeling income/material sufficiency ⟶ MD (path 3)		-0.01
Secondary ⟶ Confucianism ⟶ MD (path 4)		-0.028
University ⟶ Confucianism ⟶ MD (path 4)		-0.044
Total indirect effect		
	Secondary ⟶ Men's depression	-0.035*
	University ⟶ Men's depression	-0.066**
Total effect		
	Secondary ⟶ Men's depression	-0.066
	University ⟶ Men's depression	-0.131*

Note: *Indirect path coefficients are calculated from multiple coefficients. Total indirect effect is calculated from additional indirect path coefficients. Total effect is calculated from additional direct path coefficient and indirect path coefficient.*

6.4 Direct and indirect impacts of education on depression by age group

This section explains the direct and indirect impacts of education on depression based on figures 32, 33, tables 24, 26 for women and figures 34, 35, tables 25, 27 for men by age group, including 60-69, and 70 age and above.

6.4.1 Depression amongst age group 60-69

Women's depression at age 60-69

Education has both direct and indirect impact on women's depression for those aged 60-69. Regarding direct impact of education on women's depression, compared to those with primary education, secondary and university education directly impacts on decreasing depression (women with higher education levels have less depression than women with lower education levels), but it is not significant with secondary education.

Regarding indirect impact of education on women's depression, education indirectly impacts on depression through three paths of economic resource and marriage. Regarding the first path (education ⟶ household poverty ⟶ feeling income and material support sufficiency ⟶ depression), compared to primary education, secondary education indirectly impacts on decreasing depression by 0.0044, university education indirectly impacts on decreasing depression by 0.0075. Regarding the second path (education ⟶ married ⟶ having a grandchild ⟶ depression), compared to primary education, university education indirectly impacts on increasing depression by 0.006. Regarding the third path (education ⟶ married ⟶ living alone ⟶ depression), compared to primary education, university education indirectly impacts on decreasing depression by 0.017.

Regarding other factors which directly impact on depression without starting from the impact of education, having ADLs difficulty directly impacts on increasing depression by 0.14 compared to those without ADLs difficulty. The other factors, such as total number of sons, total number of daughters, working status, providing financial support to kin/relatives, being member of Buddhism, Christianity, and Confucianism, have no direct impact on depression. The explanation about impact of women's education on other factors and the impact of other factors amongst each other in path model was presented in the section on women's happiness at age 60-69.

Men's depression at age 60-69

Education has no direct impact on men's depression for those aged 60-69. Regarding indirect impact of education on men's depression, education indirectly impacts on depression through two paths of economic resources. Regarding the first path (education ⟶ household poverty ⟶ feeling income and material support sufficiency ⟶ depression), compared to primary education, secondary education indirectly impacts on decreasing men's depression by 0.0034. Regarding the second path (education ⟶ working status ⟶ depression), compared to primary education, secondary education indirectly impacts on increasing depression by 0.009, university education indirectly impacts on increasing depression by 0.02.

Regarding other factors which directly impact on men's depression without starting from the impact of education, living alone directly impacts on increasing men's

depression by 0.43 compared to living with others. Having ADLs difficulty directly impacts on increasing depression by 0.13 compared to those without ADLs difficulty.

The other factors, such as total number of sons, total number of daughters, having grandchild, providing financial support to kin/relatives, being member of Buddhism, Christianity, and Confucianism, have no direct impact on depression. The explanation about impact of men's education on other factors and the impact of other factors amongst each other in path model was presented in the section on men's happiness for those aged 60-69.

Summary of the differences regarding direct and indirect impacts of education on depression between women and men aged 60-69

Education has direct impact on women's depression for those aged 60-69, but education has no direct impact on men's depression for those aged 60-69. Compared to primary education, university education directly impacts on decreasing women's depression, while there is no difference in women's depression between primary and secondary education. Education indirectly impacts on women's depression through three paths of economic resources, having grandchild, and living arrangement, whereas education indirectly impacts on men's depression through two paths of economic resources. In general, regarding the total indirect impact of education on depression for those aged 60-69, education has insignificant total indirect effect on women's depression. However, secondary education has significant total indirect effect on decreasing men's depression aged 60-69 compared to primary education. In contrast

to total indirect impacts, university education has significant total effect on women's depression for those aged 60-69, whereas secondary and university education has insignificant total effect on men's depression for those aged 60-69.

6.4.2 Depression amongst age group 70 and above

Women's depression at age 70 and above

Different from age group 60-69, education has no direct impact on women's depression for those aged 70 and above. However, education indirectly impacts on depression through two paths of economic resources. Regarding the first path (education ⟶ household poverty ⟶ depression), compared to primary education, secondary education indirectly impacts on decreasing depression by 0.02. Regarding the second path (education ⟶ household poverty ⟶ feeling income and support sufficiency ⟶ depression), compared to primary education, secondary education indirectly impacts on decreasing depression by 0.0048.

Regarding other factors which directly impact on depression without starting from the impact of education, living alone directly impacts on increasing women's depression by 0.134 compared to those living with others. Having ADLs difficulty directly impacts on increasing depression by 0.131 compared to those without ADLs difficulty. The other factors, such as total number of sons, total number of daughters, having grandchild, providing financial support to kin/relatives, being member of Buddhism, Christianity, and Confucianism, have no direct impact on depression. The

explanation about impact of women's education on other factors and the impact of other factors amongst each other in path model was presented in the section on women's happiness for those aged 70-79.

Men's depression at age 70 and above

Similar to age group 60-69, education has no direct impact on men's depression aged 70 and above. However, education has indirect impact on men's depression through four paths of economic resources, and Confucianism.

Regarding the first indirect path (education ⟶ still working ⟶ providing financial support to kin ⟶ depression), compared to primary education, university education indirectly impacts on increasing depression by 0.0014. Regarding the second path (education ⟶ household poverty ⟶ providing financial support to kin ⟶ depression), compared to primary education, secondary education indirectly impacts on increasing depression by 0.002, university education indirectly impacts on decreasing depression by 0.0038. Regarding the third path (education ⟶ household poverty ⟶ feeling income and material support sufficiency ⟶ depression), compared to primary education, secondary education indirectly impacts on decreasing depression by 0.0053, university education indirectly impacts on decreasing depression by 0.01. Regarding the fourth indirect path (education ⟶ Confucianism ⟶ depression), compared to primary education, secondary education indirectly impacts on decreasing

depression by 0.028, university education indirectly impacts on decreasing depression by 0.044.

Regarding other factors which directly impact on men's depression without starting from the impact of education, having ADLs difficulty directly impacts on increasing depression by 0.247. The other factors, such as total number of sons, total number of daughters, having grandchild, living alone, working status, Buddhism, and Christianity, have no direct impact on men's depression aged 70 and above. The explanation about impact of men's education on other factors and the impact of other factors amongst each other in path model was presented in the section on men's happiness aged 70 and above.

Summary of the differences regarding direct and indirect impacts of education on depression between women and men aged 70 and above

Education has no direct impact on both women's and men's depression, but education has indirect impact on both women's and men's depression for those aged 70 and above. Education indirectly impacts on women's loneliness through two paths of economic resources, whereas education indirectly impacts on men's depression through four paths of economic resources, and Confucianism. Regarding the total indirect impact of education on depression for those aged 70 and above, education has significant total indirect effect on decreasing both women's and men's depression, the higher the level of education, the lower the depression of both women and men. However, education has stronger impact on decreasing men's depression compared

to women's depression. In contrast to total indirect impacts, the total impact of education on decreasing women's depression for those aged 70 and above is insignificant for both secondary and university compared to primary education. However, university education has significant total effect on decreasing men's depression for those aged 70 and above. In sum, educational background has stronger impact on decreasing men's depression compared to women's depression.

Chapter 7: Discussion, conclusions, and policy recommendations

7.1 Summary and discussion on education and subjective well-being

7.1.1 Education and happiness: Differences by gender

In general, education has an impact on both males' and females' happiness, the higher the level of education, the higher the level of happiness. However, women's education does not have a direct impact on women's happiness (for both the analysis of all older women and the analysis of women by age group). On the other hand, men's education directly impacts on men's happiness for all age groups. This can be explained by the fact that older women in this sample were born in the year 1950 or earlier, which is when Vietnam had not initiated anything related to improving gender equality, moreover, the main tradition of the Vietnamese society at the time was Confucianism, where women did not care about their education, the main task of women was to take care of their families, and their marriage was arranged according to their parents' opinions. In addition, after marriage, other factors related to women would be decided by their husbands and family-in-law, including religion, ritual, as well as other important decisions. We also need to understand that women's wealth largely depended on her husband's wealth, while it was less dependent on her education, because she was mostly in charge of family affairs, and was not assigned a key role in contributing to the family economy. Besides, men were expected to be the pillar of the family, maintain the family lineage by giving birth to sons, educate women in the family, be responsible for jobs outside, make important decisions for family members,

and take the main role for family worship, etc. In order to fulfill these responsibilities, men were expected to have high education and high social status, so we observe that education has both direct and indirect impacts on older men's happiness, while education only has indirect impacts on older women's happiness through family resources, children, health status and religion, etc.

Furthermore, the direct and indirect impacts of education on happiness of Vietnamese older persons are also different by age group. ***For 60-69 age group***, education has no direct impact on women's happiness, but has direct impact on men's happiness. This result can be explained by two aspects, including gender equality and retirement age in Vietnam. Regarding gender equality, although Vietnam has mentioned gender equality in the 1946 constitution, and also enacted national policies, programs, and strategies on gender equality the following years, the gap between commitments and actions still exists to a large extent to this day. According to statistics, among Vietnamese female workers, the majority of the labor force are in the agricultural sector (accounting for 76%), 14% of the female labor force are in service sectors, and only 10% are in industrial sector. At the same time, the higher the position, the lower the percentage of women (in particular the leadership positions in government agencies and the Communist Party of Vietnam) (T. Truong et al., 2008). Corresponding to this, the first explanation is that we assume that education is closely related to the position and power of work, but Vietnamese women have little power or high position in their work, as well as social relationships compared to men. At the

early time of the post-retirement period, women's happiness is not affected by power loss in previous work or social relations no matter what level of their education, while men with high education are often associated with higher positions or higher power at work, so they can extend time for working (those with professional works, high skills in technology, medical science or holding doctoral degree, and professors at university can continue to work from at least 1 year and up to 5 years) compared to those with low education (they have to suffer the feeling of loss of economic power and social relations) (Committee for Government Organization and Personnel, 2001). As a result, for men, higher education directly impacts on increasing happiness at age 60 to 69.

In addition, another factor which can help explain the finding is Vietnamese official retirement age, the retirement age of men and women is 60 and 55, respectively (Giang & Le, 2017). Corresponding to this, the second explanation is that Vietnamese women retire 5 years earlier than men, so for highly educated women with high and powerful position at work and in social relations, they have 5 more years compared to men for accepting power loss in work and social relationships after retirement. Consequently, education does not directly impact on women's happiness for those aged 60-69, while education directly impacts men's happiness for those aged 60-69 (this is the first period after retirement for men).

Another interesting different point for the age group 60-69 is that education indirectly impacts on women’s happiness through only one path (education ⟶

household poverty ⟶ feeling income and material support sufficiency ⟶ happiness). In contrast, education indirectly impacts on men's happiness through two paths, including (education ⟶ household poverty ⟶ happiness), and (education ⟶ working status ⟶ providing financial support to kin/relatives ⟶ happiness). This is because providing financial support to kin/relatives does not statistically impact on women's happiness. This difference could be explained by gender role in Vietnamese family. Traditionally, Vietnamese men are defined as the economic pillars of the family and accordingly have the right to make important decisions for family members (Binh, 2012), so older men who are providing financial support to family members, are believed to still be able to maintain their power and the main role of the family, thus continuing to provide financial support to relatives directly impacts on increasing men's happiness. Meanwhile, the role of women in the family remains unchanged, whether or not they provide financial support to relatives does not impact to these women's happiness.

Regarding other direct impacts on happiness, the total number of sons directly impacts on increasing men's happiness, while the total number of sons does not have direct impact on women's happiness. This can be explained by the tradition of Confucianism, men have a very important role in family and society compared to women, this is reflected in the immortal statement of Vietnamese Confucian families that "Nhat nam viet huu, thap nu viet vo" [If you have a son then your family has

descendant, but if there is no son then your family has no descendant even if you have 10 daughters]. Accordingly, the sons of Confucian families will be responsible for worshiping grandparents, ancestors, and inheriting the lineage's property (McGoldrick et al., 2005). Because the daughter of the Confucian family is only named in the genealogy of the husband's family after marriage, she has no name in her original genealogy. Children must follow their father's surname instead of their mother's surname and become the descendants of the husband's family. In addition, Confucian parents believe that sons are their children and daughters are another's children. Therefore, taking good care of their sons, and leaving inheritances to their sons has both helped to maintain the lineage and ensure caregivers when they get old (Haughton & Haughton, 1995). Therefore, the total number of sons plays an important role in men's happiness compared to women as this factor satisfies the ideology and the need based on Vietnamese traditions and beliefs.

Equally important, another different point about men's and women's happiness is that the feeling that they have sufficient income and material support directly impacts on older women's happiness, while the feeling that they have sufficient income and material support does not have direct impact on older men's happiness. Traditionally, in Vietnam, males always are wealthier and independent about the expenditure of himself and his family members compared to females due to gender inequality in Vietnamese society. Men can find better jobs in the labor market (this is more evident in the private labor market than in the public sector), as

well as get higher wages than women in the same industry and job requirements. Therefore, it could be expected that the feeling they have sufficient income and material support has more significant impact on women's happiness than men. In other words, women who feel that they have sufficient financial and material support will be happier than men, especially in old age when they have fewer opportunities to earn money because of the labor market limitation (Zhuang, 2011).

Another interesting result is that participating in religious activities has a significant impact on men's happiness compared to being a free thinker. Being either a member of Buddhism, Christianity or Confucianism directly impacts on men's happiness compared to being a free thinker. In contrast, for woman only Confucianism has direct impact on women's happiness compared to being a free thinker. This is explained by the theory of religion and gender, whereby women tend to believe, participate and practice religious activities more than men. Thus, for a country that encourages atheism and Confucianism as historical and traditional belief like Vietnam, men who still participate in religious activities such as Buddhism and Christianity are expected to have very strong faith in these religions compared to free thinker men because they have to possess high spirit in order to overcome the disadvantages imposed by society, such as lower chance to promote their career position, lower chance to earn higher salary while power and career position are usually the most important aspects for a man in Confucianism countries. Therefore, being a member of either Buddhism or Christianity has a significant direct impact on men's happiness

compared to being a free thinker man, where a member of Buddhism tends to less happy and a member of Christianity tends to happier compared to a free thinker.

Besides, the other factors such as living alone, having ADLs difficulty, being a member of a poor-household directly impact on both men's and women's happiness in the same direction. In contrast, whether the person still participates in the labor market does not have direct impact on both men's and women's happiness.

Regarding age group 70 and above, the findings suggest that education has a more important role for men's happiness compared to women's happiness. This may be because women aged 70 and above tend to experience more loss of family and friends, leading to the narrowing of their family and social networks, as well as higher likelihood of living alone compared to younger women (Savikko et al., 2005). Therefore, an older woman aged 70 and above has to suffer many disadvantages in her life, which can impact on her happiness more than the role of education. This is supported by the finding that living alone directly impacts on women's happiness for those aged 70 and older without starting from the impact of education, while living alone has no direct impact on women's happiness for those aged 60 to 79. In addition, physical health (having ADLs difficulty) is also a factor that directly impacts on women's happiness for those aged 70 and older without starting from the impact of education, when older women are less able to do things on their own, they are likely to be less happy. These objective factors can lead to the finding that education no longer has an impact on women's happiness for those aged 80 and above.

7.1.2 Education and life satisfaction: Differences by gender

In general, education has an impact on both males and females' life satisfaction, the higher the level of education, the higher the level of life satisfaction. However, men's education does not have direct impacts on men's life satisfaction, while women's education directly impacts on women's life satisfaction. This result contrasts with the results of education and happiness. Education has no direct impact on women's happiness, while it has a direct impact on men's happiness. This discrepancy can be explained by different assessments of individual happiness and life satisfaction. Accordingly, happiness and life satisfaction are defined as the emotional feelings of personal life at a certain time. However, happiness is assessed with a narrow perspective that corresponds to an important aspect of that individual in life, while life satisfaction is assessed and explained on the whole aspect of personal life (Diener et al., 2011). Because of differences in the definitions, coupled with the differences of the impacts of education on happiness and life satisfaction, there are also some different results between impacts of other factors on happiness and life satisfaction. For example, whether still working has no impact on women's happiness, while still working directly impacts on women's life satisfaction. Religion has direct impact on both men's and women's happiness, while religion has no direct impact on men's and women's life satisfaction. Feeling there is sufficient income and material support directly impacts on men's life satisfaction, while it does not have direct impact on men's happiness. Similarly, being a member of a poor-household directly impacts on

men's happiness, while being a poor-household member does not have direct impact on men's life satisfaction. Finally, the impacts of other factors on life satisfaction and the impacts among factors in path models have the same direction with the results regarding happiness.

7.1.3 Education and loneliness: Difference by gender

Education has both direct and indirect impacts on males' and females' loneliness, the higher the level of education, the lower the level of loneliness. Having one more son or daughter directly impacts on decreasing women's loneliness, while having one more son or daughter has no direct impact on men's loneliness. This is explained through the role and relationship between mothers, fathers and children. Accordingly, a mother has always been recognized as the primary caregiver of children, the mother always spends more time with her children than the father, and she plays a role in nurturing emotions, sharing life with her children. On the contrary, a father spends less time caring for the children because he is responsible for the family income, the father has to spend a lot of time on work outside of the home and social relationships. As a traditional habit, children also spend more time sharing their feelings with their mothers than their fathers (C. M. Carr & Wolchik, 2015). Therefore, it is expected that children will contribute to reducing women's loneliness more than men's loneliness. In addition, regarding women's loneliness, having one more daughter directly impacts on decreasing women's loneliness more than having one more son. This result is consistent with two research studies in United States on the role of

daughters compared to sons in taking care of their parents' health and other aspects of life. In the first study, daughters are always the main caregivers compared to sons and spend more time with parents even when both sons and daughters are employed (Stoller, 1983). The second study determined that daughters are recognized as the primary caregivers of parents in terms of emotional and mental factors, while sons are expected to support their parents in terms of financial or other material support, such as repairing equipment or houses (Mui, 1995). Another study in New York city also demonstrated that sons are only primary caregivers for their parents when there are no sisters in their families, or they have to rely on their partners to take care of their parents. It means that a son is only considered a second caregiver for parents in the family (Horowitz, 1985). In Vietnam there is no study on the benefits of the total numbers of daughters or the total numbers of sons on improving either physical or mental health of the older persons. However, there are research studies about living arrangement of older persons and the benefits of being able to live with the favorite children on older persons' mental health. For examples, Friedman et al. (2003) stated that Northern Vietnamese older persons tend to live with married son, while other Southern Vietnamese older persons tend to live with daughters due to strong patriarchal tradition in the North which is located nearby China, and the South is affected by Cambodia and Thailand. In addition, in Vietnam, living with a married son will help to increase mental health of the older persons compared to living with other children (Teerawichitchainan et al., 2015). Therefore, this study shows higher benefits

of having more daughters compared to having more sons on decreasing loneliness of older persons which will contribute to the gap of research on improving psychological well-being of older persons. Finally, the impacts of other factors on loneliness are consistent with the results regarding happiness, and the impacts among factors in path models have the same direction with the results regarding happiness.

7.1.4 Education and depression: Differences by gender

Education impacts on both males and females' depression, the higher the level of education, the lower the level of depression. The total number of sons, providing financial support to kin/relatives, still working, and being a member of Confucianism directly impact on men's depression, while these factors have no direct impact on women's depression. This difference between males and females can be explained similarly to the results presented in the happiness section by the gender roles on the tradition of Confucianism in Vietnam. In sum, according to the Confucian tradition, men are expected to take the main responsibility for the family income, support family members, accumulate family wealth, and maintain relative financial status of the family compared to other families in society. In addition, men are obliged to have a son to follow the family line in order to maintain the family genealogy because the children have to follow their father's surname, then when the grandson grows up, he will continue to marry, giving birth to a son to continue the family's surname (Zhang & Locke, 2002). Therefore, whether the person still participates in the labor market, provides financial support to kin/relatives, or practices Confucianism ideology directly

impact on reducing men's depression due to the maintenance of men's value and their power within family and community.

Besides, this study shows that increasing the total number of sons directly impacts on increasing men's depression. This is a very interesting result because traditionally, Vietnamese people tend to prefer to have sons (son preference culture) instead of daughters, and Teerawichitchainan et al. (2015) also concluded that living with preferred children (mostly and traditionally this would be their married son) will positively impact on psychology well-being of Vietnamese older persons. Therefore, this study has pointed out new information and added to the literature of Vietnamese studies that although having sons contributes to positive mental health of older persons, however, having too many sons can cause more depression of males at old age. This is because Confucian families tend to give away inheritance rights and valuable assets of their families directly to their sons instead of their daughters (Zhang & Locke, 2002). As a result, having more sons can cause men's depression due to the pressure to prepare funds for the sons' weddings and the amount of inheritance later, etc. Finally, the impacts of other factors on depression are consistent with the results regarding other subjective well-being indicators, and the impacts among factors in path models have the same direction with the results regarding happiness.

7.2 Summary and discussion on the relationships among other factors

It is noticeable that having ADLs difficulty directly increases the likelihood of living alone amongst women, while having ADLs difficulty does not have statistical

impact on the likelihood of living alone amongst men. This can be explained by two reasons. First is the difference in the percentage being married between older males and females. Based on the sample, the percentage of women who are married is always lower than that of men in all age groups, lower than approximately 1.6 times, 2.4 times, and 3.3 times, respectively for age groups 60-69, 70-79, and 80 and older. This is because men tend to remarry more than women after marriage breakdown. Traditionally, men are 6 times more likely to remarry than women, and the time for remarriage is no more than 2 years after the marriage dissolution (Trost, 1984). In addition, Bennett (2007) explains that the difference in the sex attraction between men and women has created many disadvantages for women in their search for partners when they are older. This is because women aged 30 and older tend to be attracted to younger men, while men of all ages are only attracted to women who are younger than twenty-five years old (Bennett, 2017). The second reason is the shift in the Vietnamese family structure, adult children tend to stay separately from their parents after marriage, forming a nuclear family, moreover the age of children of these older Vietnamese persons also fall into the working age group, so they tend to leave their families and migrate to big cities to live and work (Truc et al., 2017). As a result, if older persons don't have companion or spouse in old age, they will have to live alone regardless of ADLs difficulty. It means that having ADLs difficulty cannot help unmarried women to escape from the situation of living alone because children are also not able to live with them.

An interesting result is that married men have lower likelihood of having children compared to un-married men. The first explanation for this strange result is that un-married category was defined as persons who are not in marital relationship now, including single, separated, divorced, and widowed persons. Therefore, it does not mean these un-married persons cannot have daughters and sons because their children can come from their previous marital relationships even if these relations had already broken down. Another good explanation for the question why married men tend to have fewer children compared to un-married men could be based on Vietnamese common adage "Trai lon lay vo, gai lon ga chong" [Whether a boy or a girl, they must be married when they grow up]. In other words, getting married plays the most important role in Vietnamese people's life (Vu, 2018), and the maintenance of marriage represents the filial piety of the children because the tradition is "Cha me dat dau con ngoi do" [Marriage must be arranged by parents, children who argue with their parents will be guilty of filial piety] (Williams & Guest, 2005). In addition, in tradition, the higher the social class which corresponds to higher level of education, the lower the percentage of marital dissolution. Therefore, it could be explained that men who are married might belong to the group of highly educated people compared to other men who divorced and have lower level of education. According to research, people with lower level of education and socio-economic status tend to have higher fertility than those with higher level of education and social class. Therefore, un-married men at the present tend to have more children compared to married men.

In contrast to men, married women have higher likelihood of having children compared to un-married women, the most important thing which combines the above reasons and contributes to the differences between males and females is the traditional thought in Vietnamese society "trai nam the bay thiep, gai chinh chuyen mot chong" [A man have many wives in his life, he's still recognized as an ethical man; in contrast, a woman could have only one husband for the whole of her life to be recognized as an ethical woman]. As a result, women can only have emotional relationships and give birth to children through the way of marriage. Meanwhile, men can have their own children or relationships outside marriage without suffering any heavy prejudice from society and family (Leung & Boehnlein, 2005). In addition, divorced women will be the target of gossips and social prejudice, so maintaining marriage is an important issue for women in the family (Thi, 2016). The results of this study also demonstrate that better educated people tend to marry less and have fewer children than those with lower education.

Another point is that compared to primary education, higher education directly impacts on lower likelihood of being Buddhism, and higher likelihood of being Confucianism. Although Buddhism and Confucianism has influenced the Vietnamese society since a thousand years ago, however, the main ideology of the present Vietnamese communist government is atheism, government agencies and government officials are encouraged not to follow any religion. Therefore, people tend not to participate in any religious activities to gain more opportunities for promotion (Denney,

2006). Thus, this explanation can support the result that more educated people are less likely to become a member of Buddhism than lower education people. In contrast, Confucianism is a system of thoughts, philosophies, practices in social life, in which worship to ancestors is one of Confucian regulations. Therefore, leaving activities of official religions is expected to encourage individuals to seek practice in other beliefs to develop their spiritual life. As a result, more educated people tend to practice Confucianism (worship ancestors) than less educated people.

7.3 Conclusion and policy recommendations

This thesis investigates the direct and indirect impacts of educational background on subjective well-being, namely happiness, life satisfaction, loneliness and depression amongst Vietnamese older people using a representative survey, Vietnam National Aging Survey 2011. This thesis is a first-ever nationally representative research on the benefits of education investment on a new aspect and objective that is older persons and subjective well-being, whereas, the other studies on the benefits of education only focus on economic benefits during the working age. It extends the previous researches on older persons in Vietnam by considering mental health issues, in particular investigating on gender differences. It is clear that those with higher level of education have higher level of happiness and life satisfaction, along with lower level of loneliness and depression, regardless of gender. To conclude, increasing the level of education is expected to increase subjective well-being for both genders although education has the impact in different ways in some cases. For example, education has

more impact, including direct, total indirect and total impacts, on male's subjective well-being compared to female's subjective well-being. Besides, there are two main differences about the indirect impacts of education on subjective well-being between males and females. Education has indirect impact on female's subjective well-being through family resources stronger than in the case of males, and education has stronger indirect impact on males' subjective well-being through economic resources and Confucianism than in the case of females.

Therefore, this thesis plays a very important role to promote education through increasing the level of education, with the aim of avoiding loneliness, depression and getting more happiness and life satisfaction in later life. Furthermore, increasing educational background also has significant impact on other aspects of life such as increasing economic status and health status of individuals in particular, and the wealthy, humanitarian status of a society as well (Bleiklie, 2005; Hunt, 1969; Stacey, 1998). Therefore, pursuing education is a long-term sustainable investment not only for the economic benefits of the working age, or physical health benefits based on previous studies of other countries (Hraba et al., 1998; C. E. Ross & Wu, 1995), but also a long-term investment for subjective well-being or psychological well-being benefits in old age. Equally important, this thesis points out that the gender inequality has a strong impact on the benefit impact of education on subjective well-being at old age, in which gender gaps or gender differences which are women disadvantage have reduced the good impacts of education on female's subjective well-being compared

to men's subjective well-being. In other words, education impacts have negative bias compared to its real expectation impacts on subjective well-being at old age in the case of women. As a result, this thesis can propose policies for improving two main aspects which are education and gender inequality to gain full benefits of impacts of education on subjective well-being (happiness, life satisfaction, loneliness, and depression) at old age:

Regarding policies for improving education, based on the latest Education law proposed by the Ministry of Education and Vocational Training in Vietnam in the year 2005, primary education in public schools is compulsory and free for formal school hours. However, in the practical situation, most parents must pay for extra tuition fees such as extra classes, uniforms, student-parent funds, facilities and equipment, and these additional expenses are many times larger than the main tuition that is fully subsidized by the government. Especially urban parents pay four to seven times higher tuition than parents in rural and mountainous areas (Ha & Harpham, 2005). Thus, although the Vietnamese government applies a free policy for primary education nationwide, it seems that primary education is not practically free as expected. This is because although the costs incurred are non-official school fees, in fact these costs are almost formal and are applied publicly throughout Vietnam. Similarly, the official tuition fee set by the Ministry of Education and Vocational training for secondary and upper-secondary school is also relatively small compared to the total cost that the

parents must pay to the school, including extra classes, uniforms, facilities and school equipment, and parents' funds.

Therefore, in order to achieve the purpose of extending each individual's time for education or to raise the level of education of the community, I boldly propose the following reasonable policies to reform and overcome the defect points and gaps in current education policy in Vietnam such as:

1. Apply free education policy for general education, including primary education, secondary education, and upper-secondary education. Currently, the Vietnamese government only enforces the free school fee policy for the primary school, while the unofficial tuition portion of this level is many times higher than the official which is subsidized fee. In addition, Vietnam has not applied a free school fee policy for secondary and upper-secondary education. Thus, for the secondary and upper-secondary education levels, the burden on parents for their children's education is quite large at the present because they have to pay both official tuition fee and non-official fees which are presented above (Ministry of Education and Vocational Training, 2016). This is defined as one of the main factors that increases the dropout rate of students at these two levels of education.

2. Have an intervention to minimize the economic burden on parents for education, thereby enabling children to fully participate in general education. *This is a stepping stone for students to attend higher education.* The implementation of the proposed second policy will ensure good implementation of the first policy proposal,

because when well-controlled tuition is, it will be easier to implement a completely free education policy. In order to implement this proposal, the government needs to take actions to reduce the pressure of competing for scores among students through the publication of individual academic transcripts, instead of showing the grades on the general notice of the class, or read grades directly in the classroom. This will inadvertently put competitive pressure on the students, which in turn will lead to the need for parents and students to participate in extra-curriculum classes, overtime classes, etc. These activities will create a burden for unofficial tuition. This can be easily solved in many ways, for example, the government should build a student management information system to ensure the provision of personal and academic results in a private way for individuals, such that students will no longer be subject to academic competition pressure from other friends.

3. The Government should create maximum conditions for private sector investment in education from the lowest level, starting from primary education. That is because diversification in construction, investment, and arrangement will create conditions for diversity in educational methods, teaching methods, and curriculum programs. It seems that at the present, the content of the formal education programs of the Ministry of Education and Vocational Training are quite heavy, difficult, and may exceed the capacity of the students if they only participate in formal school hours as prescribed. Therefore, a large number of students need to take part in extra classes, which creates financial burden for student learning. Thus, school diversification,

adoption of appropriate models, methods and content will attract students to school, which may reduce the dropout rate.

All the above policies contribute to maximizing the time of individuals for education to create opportunities for individuals to continue to participate in higher education, including vocational training, professional skills, college and university education.

Regarding policies for improving gender equality, this thesis finds that education has a direct impact on subjective well-being of older men more strongly than older women. It means that for women, the impact of education on subjective well-being at old age is mostly indirect impact through the paths of family resources such as marriage, total numbers of sons and daughters, having grandchild, living arrangement, health status, etc. Meanwhile, education has both direct and indirect impacts on almost all indicators of subjective well-being in this thesis. Therefore, in addition to developing policies to encourage individuals to participate in lifelong education or long-term investment in education, the government needs to develop and improve gender equality policy further in Vietnam by the implementation of the transformation of gender roles in the family (women no longer have to take the main responsibility for family management and care), such as conducting regular propaganda videos on mass media such as television, radio, social media (Facebook and YouTube, etc.). This practice has been applied for a long time and very well in other countries such as Thailand by combining with companies in bringing propaganda content to

change knowledge and community behavior while ensuring the content is conveyed to advertise products. When Vietnamese society can remove gender prejudices or norms of gender practice according to Confucian ideology, this will create a leverage for Vietnam to develop further not only in improving education for girls and women but also in creating a higher level of technical human resources in the future because the total female population accounts for a higher proportion than the male population in Vietnam. In addition, the participation of women in the workforce with high technical qualifications will contribute to reducing the economic burden for men and boosting national economic growth because of the achievement of great resources of high-tech sciences. In short, building up gender equality, bringing Vietnamese women out of dependent thought and the role of family care not only improves mental health for women themselves in old age but also help to further develop the national economy.

Coupled with policy for improving the level of education and gender equality for productive ageing, the Vietnamese government should issue policies to improve subjective well-being for different specific groups, such as older women who have ADLs difficulty because they tend to suffer living alone compared to other older women, older men who have few sons and are a member of Buddhism because they tend to be less happy compared to other men. For example, in order to improve psychological well-being of single women with ADLs difficulty, the government needs to develop a program to find partners for the older persons, such as "living partner program" that can help older persons to take care of each other every day by

reminding their partners of health treatment, encouraging them to attend social activities and exercise regularly, etc. In addition, the government can establish housing areas for older people without spouse or children living together, these areas can encourage older persons to actively take care of each other, support daily activities and enjoy healthy lifestyles together.

7.4 Limitations and direction for further studies

Although this thesis explores the long-term benefits of education at old age which is new in Vietnamese research, it still has many limitations that should be addressed in the future by new research studies. Firstly, Vietnam National Aging Survey was conducted only in year 2011 (the first and latest national aging survey in Vietnam), therefore, we cannot compare different cohorts of older persons regarding effects of education on subjective well-being. Secondly, the survey only recorded the level of education of older persons in Vietnam so we cannot explore differences between impacts of years of schooling on subjective well-being and impacts of level of education on subjective well-being. Thirdly, in this thesis, we aim to explore the direct and indirect impacts of education on subjective well-being, therefore, we use path analysis model which only analyses one-way impact between variables in the regression model. While the path analysis cannot solve endogeneity problems that are inverse relationship between subjective well-being and other variables in path model, however, our main exogenous (main independent variable) is the level of education, and there is no inverse relationship between subjective well-being on level of

education. It could only have inverse relationship between subjective well-being with other endogenous variables in path model.

In addition, this thesis only explores the direct and indirect impact of education background on subjective well-being of Vietnamese older persons. In other words, this study only explores the long-term benefits of education on the mental health of the older persons. Therefore, this thesis still has not answered the question of benefits of other types of education (short-term vocational training program at old age, third-age education, etc.) on the older persons because these other types of education have applied in some countries at presently. Thus, the possible topics for future research are to pursue more in-depth research on the short-term and long-term benefits of education for the older persons in terms of not only its benefits for older persons but also its benefits on national economy and prosperity, labor markets, environment and interconnection between generations, etc.

VIETNAM NATIONAL AGING SURVEY QUESTIONNAIRE 2011

INDOCHINA RESEARCH & CONSULTING (IRC) and
INSTITUTE OF SOCIAL AND MEDICAL STUDIES (ISMS)

Vietnam National Aging Survey (VNAS)

Questionnaire for Individual

Questionnaire ID_____

Start time (Hour Minute): ____/____ **Code**

Province/ City _____ ☐

District _____ ☐

Commune _____ ☐

Village _____ ☐

Name of household head (CAPITAL LETTER)
_____ ☐

Household Code _____ ☐

Name of respondent (CAPITAL LETTER)
_____ ☐

Use interpretation during interview?
(yes:.....1; no:....2)

Name of interviewer _____ ☐

Name of supervisor _____ ☐

Day.....Month……...Year 2011
Supervisor

(Signature)

Day.....Month……...Year 2011
Interviewer

(Signature)

VNAS QUESTIONNAIRE

SECTION A: BACKGROUND OF RESPONDENT

No	Question	Code	
A1	What is your ethnicity?	☐	**1→ A3**
A2	What is the main language you use for daily conversion?	Only ethnic minority language ..... 1 Mostly ethnic minority language and little Vietnamese ..... 2 Both ethnic minority language and Vietnamese ..... 3 Mostly Vietnamese and little ethnic minority language ..... 4 Only Vietnamese 5	
A3	What religion if any do you follow?	Buddhism..... 1 Catholic..... 2 Protestant ..... 3 Hoa hao..... 4 Cao Dai ..... 5 Muslim..... 6 Luong..... 7 Others..... 8 Free thinker 9	
A4	Do you have an altar in your house?	Yes..... 1 No 2	**2→ A6**
A5	How often do you worship?	Daily or weekly ..... 1 At least once a month ..... 2 Only on special occasions..... 3 Do not remember..... 8	
A6	Do you know how to read?	No ..... 1 Yes, but with difficulty..... 2 Yes, easily..... 3 I used to but forgot..... 4	
A7	Do you know how to write?	No ..... 1 Yes, but with difficulty..... 2 Yes, easily..... 3 I used to but I forgot 4	
A8	Where did you live most when you grow up?	North..... 1 Central ..... 2 South..... 3	
A9	How long have you lived in this commune/city?	Since birth..... 1 Less than 5 years..... 2 5-9 years ..... 3 10-19 years ..... 4 20 years and over..... 5	

AP	Assessment of interviewer about the level of external assistance for the interviewee in answering the question in this section.	Never……1 Some times……..2 Most of the time……3 This section was answered by the representative……4	

SECTION B: HOUSEHOLD PROFILE – CHILD PROFILE AND GRANDCHILD PROFILE

SECTION B (Part 1): HOUSEHOLD PROFILE

	B1	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**B8**
Household member code	List name of regular household member who live under the same roof with the respondent (**at least 6 months per year**), starting with the respondent.	Gender Male……1 Female…2	Relationship with the respondent? **(Code B3)**	Year of birth **(if only age stated, convert to year)**	Marital status? Single……1 Married……2 Divorced……3 Separated…..4 Widow……5	What was the highest grade [……] completed? **(CODE B6)**	What is [……] current occupation?(**CODE B7)**	Does [……] contribute to the household in cash or in-kind? Yes……1 No……2
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

CODE B3: Respondent 1
Spouse.....2
Son.....3
Daughter 4
Son/daughter in law 5
Adopted child...6
Parent.....7
Parent in law 8
Grandparent 9
(Great) Grandchildren 10
Siblings 11
Other relatives..12
House servant...13
Other (specify)_____96

CODE B6
Still very young..... 0
No schooling 1
Incomplete primary education..... 2
Primary school..... 3
Lower secondary education..... 4
Upper secondary education 5
Prof. Secondary education..... 6
Junior College/University Diploma..... 7
Master..... 8
Doctor..... 9
Other (specify)_____96

CODE B7
Not working 1
Employer……..2
Own account worker in farm…….. 3
Own account worker in non-farm 4
Unpaid family worker 5
Wage worker.....6
Other (specify)……96

201

SECTION B (Part 2): CHILDREN PROFILE

Introduction to child profile

B9: Now I would like to ask you some information about all of your children including both those who live with you and those who do not. Can you tell me how many living children you have including your own, adopted and step children?

	Own (biological)	In law	Adopted	Step
Sons				
Daughters				
Total				

Interviewer statement: I would like to ask you about each of your living children, including any adopted children and step children that you helped raise. I see you are living with …… children.

[Interviewer instruction]: - List the first names of all of respondent's children. First list the name of all children ***who do not live in the household*** *and then list (and confirm) the names of co- resident children by looking at the household profile****.*** *Confirm names with respondent. If the number of children in the household equals the total number of children, confirm that the respondent has no other children and start the child profile questions*

202

Ask B10 to B24 one by one for ALL respondent's children

	B10	**B11**	**B12**	**B13**	**B14**	**B15**
Child code	Name of children (first **list the names of all children who do not live in the household and then list the names of co-resident children)**	Gender? Male..... 1 Female2	[…..] is ? Biological…..1 Adopted……..2 Step…….3 In law…….4	Year of birth?	Location of child? **(Code B14)** **B14 = 1 →B15;** **if B14 >=2 → B16**	Interviewer writes down Member code from B0 in household profile. (leave B15 blank for children who do not live with the interviewee)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

Code B14: Same household ……..... ...1
Next door ……..... 2
Same village/resident unit.. ...3
Same commune …….4
Same district……...5
Same province……...….6
Other province……... 7
Other country…….. ...8

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Interviewer: ask B16 to B24 for all children, including those who LIVE and DO NOT LIVE in respondent's household

BC1	**B10b**	**B16**	**B17**	**B18**	**B19**	**B20**	**B21**	**B22**	**B23**	**B24**
Child code	Name of child who **do not live** and **live** in respondent's household	[…] have any child? Yes…...1 No……2	Does […] frequently help with household chores? Yes……1 No…….2	Did [……] give you any money in the last 12 months? Yes ..... 1 No..... 2 Offered but Refused ... 3 **(2,3→ B20)**	How much? **(Code B19)**	Did […] give you gifts/things in last 12 months of total value over 500,000 VND? Yes ..... 1 No..... 2 Unsure of value….3	Did […] help you with your work (such as business or family farm in past 12 months? Yes…...1 No……2 **(Code B21)**	Within previous 12 months, did you give money to […]? Yes…...1 No……2	How much? **(Code B23)**	Did you give […] gifts/things in past 12 months of total value over 500,000 VND? Yes……..1 No……..2 Unsure of value ……3
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
	Code 19: (in VND) Less than 500,000.....1 500,000 - <2,000,000 .....2 2,000,000 - < 5,000,000 .....3 5,000,000 - <10,000,000 .....4 More than 10,000,000 .....5 Don't know the value ……98				**Code B21:** Yes, frequently ….....1 Yes, but not frequently……..2 No……..…...3 Don't need their help……....4 Don't apply……...5			**Code B23: (in VND)** Less than 500,000……1 500,000 - <2,000,000……2 2,000,000 - < 5,000,000……3 5,000,000 - <10,000,000……..4 More than 10,000,000……5 Don't know the amount……98		

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Interviewer: ask B25 to B31 only for children who DO NOT LIVE in respondent's household (B14=2,3,4,5,6,7,8)

	B10C	**B25**	**B26**	**B27**	**B28**	**B29**	**B30**	**B31**
Child code	Name of child who **do not live** in household	Marital status **(Code B25)**	Highest grade completed? **(Code B26)**	Current Occupation ? **(Code B27)**	Contribute to the household economically? Yes……...1 No……2	How often do you and […..] visit each other? **(Code B29-31)**	How often do you talk with [……] on the phone? **(Code B29-31)**	How often do you contact […] by email? **(Code B29-31)**
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
	Code B25 Single……1 Married…....2 Divorced.....3 Separated…..4 Widow……..5	**Code B26:** Still very young .....0 No schooling .....1 Incomplete primary education.....2 Primary school .....3 Lower secondary education.....4 Upper secondary education .....5 Prof. Secondary education.....6 Junior College/university Diploma.....7 Master.....8 Doctor.....9 Other (specify)_____96		**CODE B27** Not working.....……1 Employer……...2 Own account worker in farm……. ..3 Own account worker in non-farm ….. 4 Unpaid family worker.....……5 Wage worker.....……6 Other (specify)……96		**Code B29-31** Rarely/ never ..... 1 Yearly .....2 Several times per year.... 3 Monthly ..... 4 Weekly/several times a month …..5 Daily/several times a week…….6		

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SECTION B (PART III): GRANDCHILDREN INFORMATION

No	Question	Code	Skip
B32	Do you have any (great) grandchildren?	Yes .....1 No.....2	**2 >> Section C**
B33	During the last 12 months have you (and/or your spouse) helped care for any of your (great) grandchildren under age 10?	Yes .....1 No.....2	**2>> B40**
B34	Why have you helped care for your grandchildren? *(multiple answers permitted -- indicate all that apply)*	Their parents work during the day……1 Their parents work far away.....2 Their parents do not have enough money to care for them……3 Their parents died or disappeared.,,….4 Other……..…..5	**4>> B37**
B35	Where did you take care of your (great) grandchildren? *(multiple answers permitted -- indicate all that apply)*	In your household or nearby …….1 Not nearby (respondent and/or spouse went to care for grandchild at the (great) grandchild parent's home) ……2 Other (specify_____) ……3	**if only 2>> B37**
B36	Where were the (great) grandchild's parents living when the grandchildren were being cared for? *(multiple answers permitted -- indicate all that apply)*	With you in your household or nearby .....1 Not nearby.....2	
B37	During the past 12 months, how many months did you (and/or your spouse) care for these (great) grandchildren?	_____ _____ **(number of months)**	
B38	During the time (great) grandchildren were being cared for, who paid primarily for their support?	You and/or your spouse ..... 1 The grandchild(ren)'s own parents ..... 2 Other (specify)_____3	
B39	[do not ask, if proxy is interviewed] Overall was it a burden for you (and/or your spouse) to care for the (great) grandchildren?	Not at all.....1 Only a little.....2 Somewhat of a burden.....3 A considerable burden 4	
B40	Prior to the past 12 months, did you (and/or your spouse) ever care for a grandchild under age 10 whose parents were living far away?	Yes .....1 No.....2	**2 → BP3**
B41	How many grandchildren under age 10 whose parents were living away did you (and/or your spouse) take care of?	Number ……	
B42	During the time you (and/or your spouse) were taking care of this/these grandchildren, who paid primarily for these support?	You and/or your spouse ..... 1 The (great)grandchild(ren)'s own parents Other (specify)_____ 3	

SECTION C: CONTRIBUTIONS OF THE OLDER PERSONS

	Questions	Code	Skip
C1	Do you do housework?	Yes ..... 1 No ..... 2 No, but watches house 3	 **2→C3** **3→C3**
C2	Are you the main person doing the housework?	Yes ..... 1 No 2	
C3	Do you help with house repairs/ maintenance?	Yes ..... 1 No 2	 **2→C5**
C4	Are you the main person helping with repairmen/maintenance of the house?	Yes ..... 1 No 2	
C5	Excluding grandchildren, do you take care of any other household member?	Yes ..... 1 No 2	**2→C7**
C6	Whom do you take care of? (Multiple answers allowed-- circle all that apply)	Respondent ..... 1 Spouse..... 2 Son ..... 3 Daughter ..... 4 Son/daughter in law ..... 5 Parent ..... 6 Parent in law ..... 7 Grandparent ..... 8 (Great)Grandchildren..... 9 Siblings ..... 10 Other relatives..... 11	
C7	Did you **GIVE** financial support to relatives, neighbors or friend in the past 12 months?	Yes .....1 No 2	**2→ CP**
C8	To whom did you GIVE? ***(Multiple answers allowed--*** circle all that apply)	Spouse.....1 Son/daughter .....2 Son/daughter in law .....3 Adopted/Step .....4 Parent .....5 Grandparent .....6 Grandchildren .....7 Siblings .....8 Other relatives) ..... 9 Friends/neighbor .....10 Others (specify) 11	
C9	How much did you give in total to all whom you assisted last year?	Less than 500,000 ..... 1 500,000 -<2,000,000..... 2 2,000,000-<5,000,000..... 3 5,000,000 - <10,000,000..... 4 More than 10,000,000..... 5 Does not know amount……8	

SECTION D: HOUSING

Now I would like to ask questions about your housing situation

	Question	Code	Skip
D1	What is total living area excluding storage and kitchen?	_____M2	
D2	What type of housing are you living in?	Villa ..... ….1 Permanent structure - kitchen & bathroom inside ….2 Permanent structure - kitchen or bathroom outside 3 Semi- permanent houses..... ….4 Temporary and other types..... ….5	
D3	How long have you been living in this place?	_____ months _____years	
D4	Who owns this house?	Respondent and/or spouse..... 1 Children/children in-law..... 2 Others, without payment ..... 3 Others, with payment ..... 4 Other, specify_____6	
D5	What is the main material of dwelling roof?	Tiles..... 1 Cement/concrete..... 2 Straw/thatch..... 3 Bamboo ..... 4 Galvanized tin..... 5 Wood ..... 6 Other_____7	
D6	What is the main material of dwelling floor?	Tiles..... 1 Cement/concrete..... 2 Earth ..... 3 Wood ..... 4 Other_____6	
D7	What is the main source of lighting used in your house?	National power grid..... 1 Accumulator, power generator ..... 2 Gas, oil, kerosene lighter..... 3 Others_____6	
D8	How satisfied are you with your current housing?	Very satisfied..... 1 Satisfied..... 2 Neutral ..... 3 Dissatisfied..... 4 Very dissatisfied..... 5	
D9	Do you own any piece of cultivable land or house (outside of the land you are living)?	Yes.....……1 No .....……2	**2→ D11**
D10	What is total area of land/house?	_____M2	

D11	What is the major source of drinking water?	Tap water ..... 1 Protected spring, well ..... 2 Unprotected spring, well ..... 3 Rainwater..... 4 Bottled water ..... 5 Pond, river, stream..... 6 Other (specify)_____9	
D12	What is the major source of water used for other daily living activities?	Tap water .....…1 Protected spring, well .....…2 Unprotected spring, well .....…3 Rainwater.....…4 Bottled water .....…5 Pond, river, stream.....…6 Other (specify)_____ 9	
D13	Does your household have its own toilet?	Yes.....…1 No .....…2	**2→ DP**
D14	What is the type of toilet that your household uses?	Flush toilet.....…1 Double vault compost/ latrine .....…2 Open air toilet.....…3 Other (specify)_____ 9	

DP	Assessment of interviewer about the level of external assistance for the interviewee in answering the question in this section.	Never……1 Some times……...2 Most of the time……3 This section was answered by the representative…….4	

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SECTION E: EMPLOYMENT

[This section is to be asked about the respondent and spouse (if any). Ask respondent first then ask about their spouse]

	Question	Code	Respondent	Spouse	Skip
E1	Main lifetime occupation	Not working.....1 Employer.....2 Own account worker in farm..... 3 Own account worker in non-farm ..... 4 Unpaid family worker.....5 Wage worker.....6 Other (specify).....96			1>> E7
E2	Are you still working? [spouse]	Yes ..... 1 No..... 2			**2→ E7**
E3	What types of job do you do? [spouse]	Not working.....1 Employer.....2 Own account worker in farm..... 3 Own account worker in non-farm ..... 4 Unpaid family worker.....5 Wage worker.....6 Other (specify).....96	....	....	
E4	No. of working months last 12 months [spouse]	record in Months	☐	☐	
E5	Do you work full time or part time during those months? [spouse]	Whole day ..... 1 Half day..... 2 Others..... 3			
E6	How much do you earn last year from this occupation? [spouse]		..... Thousand VND	..... Thousand VND	
E7	***(If not working)*** What is the main reason for not working? [spouse]	Retired..... 1 Cannot find a suitable job ..... 2 Do not know where to find a job 3 Taking care of family..... 4 Health issue..... 5 Encouraged by the family ..... 6 Laid off..... 7 Want to rest ..... 8 Others (specific)_____ 9	☐	☐	
E8	How long have you stopped working? [spouse]	_____years	☐	☐	
E9	Would you like to continue working? [spouse]	Yes ..... 1 No.....2	☐	☐	

SECTION F: FIXED ASSETS, DURABLE APPLIANCES AND SOURCES OF SUPPORT

	Questions	Code	
F1	Please let us know if your household has any of the following items? ***[Read each response to respondents]***	**Yes**	**No**
	a. Cars, vans or trucks	1	2
	b. Motorbikes	1	2
	c. Bicycles	1	2
	d. Landline telephone	1	2
	e. Mobile phone	1	2
	f. Video players	1	2
	g. Color T.V sets	1	2
	h. Black and white T.V sets	1	2
	i. Radio players	1	2
	j. Electric fans	1	2
	k. Computer	1	2
	l. Cameras, Video cameras	1	2
	m. Refrigerator	1	2
	n. Freezer	1	2
	o. Air-Conditioner	1	2
	p. Washing machines and dryers	1	2
	q. Water heaters	1	2
	s. Gas cookers	1	2
	t. Electric cookers, rice cookers, pressure cookers	1	2
	u. Wardrobes of various kinds	1	2
	v. Beds	1	2
	w. Tables, chairs, sofas …	1	2
	x. Vacuum cleaners, water filters	1	2
	y. Microwaves	1	2
F2	What are the sources of income/support/asset for your daily living? [read each item in the list for the interviewee to choose]	Yes	No
	a. Working	1	2
	b. Retirement source	1	2
	c. Other government social allowance	1	2
	d. Savings	1	2
	e. Parents' support	1	2
	f. Spouse's support	1	2
	g. Children's support	1	2
	h. Sibling's support	1	2
	i. Other relatives	1	2
	j. Friends/neighbors	1	2
	k. Other (specify)	1	2

F3	[If more than one source indicated in F2, ask the following:] What is the most important source of income/support/asset for your daily living?	a. Working……1 b. Retirement source……2 c. Other government social allowance..3 d. Savings ……4 e. Spouse's support……....5 f. Children's support……6 g. Parents' support……..7 h. Siblings' support……..8 i. Other relatives…… 9 j. Friends/neighbors ……...……10 k. Other (be specific) ……96
F4	What was the total annual income in the past 12 months of the household	<2,000,000 ..... 1 2,000,000-<10,000,000 ..... 2 10,000,000 - <50,000,000 .....3 50,000,000-<100,000,000 .....4 100,000,000-300,000,000 .....5 More than 300,000,000 .....6 Does not know 8
F5	Do you have any type of savings (money, gold…except for land)?	Yes .....1 No.....2 → **F7**
F6	What is the current value of your savings?	<2,000,000 ..... 1 2,000,000-<10,000,000 ..... 2 10,000,000 - <50,000,000 ..... 3 50,000,000-<100,000,000…….4 100,000,000-300,000,000……....5 More than 300,000,000 ..... 6 Does not know amount 8
F7	What is your main purpose of savings?	Retirement..... ….1 Inheritance…….....… 2 For emergencies..... 3 Others (specific)_____ 9
F8	Does your household have any debt?	Yes ..... 1 No..... 2 → **F10**
F9	What is the total value of the debt?	_____thousand VND
F10	What is the cause of your household's debt? *(Multiple answers permitted -- Circle all that apply.)*	Investment for business…… 1 Health problem..... 2 Daily expense..... 3 Building/Renovating houses ..... 4 Wedding/funeral expenses 5

		Purchasing house appliances..... 6 Unexpected shocks..... 7 Others (be specific)_____9	
F11	How sufficient is your income or support to meet your daily need?	Rarely or never enough.....1 Sometimes not enough.....2 Enough .....3 More than enough 4	
F12	How is your economic situation compared to that of three years earlier?	Much Worse.....1 Somewhat worse .....2 About the same .....3 Somewhat better.....4 Much better 5	
F13	How is your financial situation compared with others your age in the neighborhood?	Much Worse.....1 Somewhat worse .....2 About the same .....3 Somewhat better.....4 Much better 5	

FP	Assessment of interviewer about the level of external assistance for the interviewee in answering the question in this section.	Never……1 Some times……...2 Most of the time……3 This section was answered by the representative……4	

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SECTION G: SOCIAL PROTECTION & SOCIAL INCLUSION

The older persons themselves have to answer the questions in this section. If the interview is given by a proxy only ask G1 to G4 and then skip to section H

	Question	Code	Skip
G1	Is your household listed as poor household?	Yes ..... 1 No..... 2	
G2	Do you receive social and health insurance/social allowances or any other old age fund? (multiple answers allowed -- circle all that apply)	Social allowances in cash (monthly).... 1 Social allowances in kinds ..... 2 Retirement fund ..... 4 Free health insurance card..... 5 No..... 6 Others (Specific)_____9	**If G2=3,4 5,9 →G4**
G3	Why are you receiving social allowances from the government?	Living alone in poor household ..... ……..1 Living w/ elderly spouses, w/o children and familial support in poor household..... ……..2 80+ without pensions and other social allowances……..3 Severely physically disabled in a poor household……..4 War merits……..5 Others_____9	
G4	Have you ever participated in any social activity/club, exercise groups organized by community/village?	Yes ..... 1 No..... 2	**2→ G6**
G5	How often do you take part in these activities?	Seldom ..... 1 Few times per year ..... 2 Monthly..... 3 Weekly ..... 4 Daily..... 5	
G6	Are you the member of Vietnam Association of the Elderly (VAE)?	Yes ..... 1 No..... 2	**2→ G8**
G7	Did you participate in the last 12 months?	Yes ..... 1 No..... 2	
G8	Are you the member of Farmer Union?	Yes ..... 1 No..... 2	**2→ G10**
G9	Did you participate in the Farmer Union activities in the last 12 months?	Yes ..... 1 No..... 2	
G10	Are you the member of Veteran Association?	Yes ..... 1 No..... 2	**2→G12**
G11	Did you participate in the last 12 months?	Yes ..... 1 No..... 2	
G12	**Only for female respondent:** Are you the member of Vietnam Women Union?	Yes ..... 1 No..... 2	**2→ G14**
G13	**Only for female respondent:** Did you participate in the last 12 months?	Yes ..... 1 No..... 2	

G14	How often do you **watch/read/listen** to the following type of media? Please tick the appropriate option		
	a. Newspaper/Magazines	Daily.....1 Weekly.....2 Monthly.....3 Seldom.....4 Not at all.....5	
	b. TV	Daily.....1 Weekly.....2 Monthly.....3 Seldom.....4 Not at all.....5	
	c. Radio	Daily.....1 Weekly.....2 Monthly.....3 Seldom.....4 Not at all.....5	
	d. Internet	Daily.....1 Weekly.....2 Monthly.....3 Seldom.....4 Not at all.....5	
	e. Public speakers	Daily.....1 Weekly.....2 Monthly.....3 Seldom.....4 Not at all.....5	
G15	Have you experienced being spoken harshly by the family member in the last 12 months?	Yes.....1 No.....2	**2→ G17**
G16	How often?	Seldom.....1 Sometimes.....2 Frequently.....3	
G17	Have family members ever refused to talk to you in the last 12 months?	Yes.....1 No.....2	**2→ G19**
G18	How often?	Seldom.....1 Sometimes.....2 Frequently.....3	
G19	Have you been shaken/ hit by family member in the last 12 months?	Yes.....1 No.....2	**2→ G21**
G20	How often?	Seldom.....1 Sometimes.....2 Frequently.....3	
G21	Do your family members usually ask for your opinion when they need to make decision on important matters?	Yes, they listened to me.....1 Yes but do not take it seriously….2 No, not at all.....3	

The older person themselves have to answer all questions in this section. Section H should be skipped if a proxy interview

SECTION H: AWARENESS OF RIGHTS AS SENIOR CITIZENS

	Questions	Code	
H1	Do you know about the availability of the following services / rights?	**Yes**	**No**
	a. Priority to use medical services (for elderly aged 80+)	1	2
	b. Clinics for the elderly	1	2
	c. Discount on public services, such as transportation, sightseeing…	1	2
	d Legal aid for the elderly	1	2
	e. Assistance for the poor elderly or elderly without family support	1	2
	f. Funeral service for poor elderly or elderly without family	1	2
	g. Income tax exemption for persons aged 65 and above	1	2
	h. Priority loan (low interest)	1	2
	i. (Longevity wishing ceremony)	1	2
	k. (Re-participation in social activities)	1	2
H2	Through which source(s) do you know about the information regarding the rights of senior citizen? *(Multiple answers permitted -- circle all that apply)*	Never heard.....1 From local authorities .....2 From MOLISA officers .....3 From other mass organizations (Association of the Elderly (VAE); Veteran Association; Women Union…).....4 From media (TV, radio, newspapers, public speakers, etc .....5 Public speakers……6 From neighbors .....7 Others (be specific)_____ 9	

	i. Cataract	1	2	1	2
	j. Heart diseases	1	2	1	2
	k. Liver diseases	1	2	1	2
	l. **For men only:** Prostate hyperplasia	1	2	1	2
	m. Other (specify)_____	1	2	1	2

I5	How well can you see without wearing glasses?	Well.....1 Fair.....2 Poor.....3 Very poor.....4 Cannot see at all.....5	
I6	Do you wear glasses?	Yes.....1 No.....2	
I7	How well can you hear without a hearing aid?	Well.....1 Fair.....2 Poor.....3 Very poor.....4 Cannot see at all.....5	
I8	Do you use a hearing aid?	Yes.....1 No.....2	

I am now going to ask you whether you can do a number of physical tasks **on your own without assistance**. I first want to know if you have any difficulty with these tasks, and if you have difficulty, I want to know whether you have mild, moderate, severe difficulty, or whether you cannot do the task at all by yourself, without help.

I9	Do you have any difficulty in…?	Yes….1 No….2 → **next item**		How much difficulty?
	a. Walking 200-300 meters?	1	2	Mild.....1 Moderate.....2 Severe.....3 Cannot do at all.....4
	b. Lifting or carrying something as heavy as 5 kg?	1	2	Mild.....1 Moderate.....2 Severe.....3 Cannot do at all.....4
	c. Crouching or squatting?	1	2	Mild.....1 Moderate.....2 Severe.....3 Cannot do at all.....4
	d. Using fingers to grasp or hold things	1	2	Mild.....1 Moderate.....2 Severe.....3 Cannot do at all.....4
	e. Walking up and down a set of stairs	1	2	Mild.....1 Moderate.....2 Severe.....3 Cannot do at all.....4
	f. Standing up when sitting down?	1	2	Mild.....1 Moderate.....2

	i. Cataract	1	2	1	2
	j. Heart diseases	1	2	1	2
	k. Liver diseases	1	2	1	2
	l. **For men only:** Prostate hyperplasia	1	2	1	2
	m. Other (specify)_____	1	2	1	2

I5	How well can you see without wearing glasses?	Well..... 1 Fair..... 2 Poor..... 3 Very poor..... 4 Cannot see at all..... 5	
I6	Do you wear glasses?	Yes..... 1 No..... 2	
I7	How well can you hear without a hearing aid?	Well..... 1 Fair..... 2 Poor..... 3 Very poor..... 4 Cannot see at all..... 5	
I8	Do you use a hearing aid?	Yes..... 1 No..... 2	

I am now going to ask you whether you can do a number of physical tasks **on your own without assistance**. I first want to know if you have any difficulty with these tasks, and if you have difficulty, I want to know whether you have mild, moderate, severe difficulty, or whether you cannot do the task at all by yourself, without help.

I9	Do you have any difficulty in…?	Yes….1 No….2 → **next item**		How much difficulty?
	a. Walking 200-300 meters?	1	2	Mild..... 1 Moderate..... 2 Severe..... 3 Cannot do at all..... 4
	b. Lifting or carrying something as heavy as 5 kg?	1	2	Mild..... 1 Moderate..... 2 Severe..... 3 Cannot do at all..... 4
	c. Crouching or squatting?	1	2	Mild..... 1 Moderate..... 2 Severe..... 3 Cannot do at all..... 4
	d. Using fingers to grasp or hold things	1	2	Mild..... 1 Moderate..... 2 Severe..... 3 Cannot do at all..... 4
	e. Walking up and down a set of stairs	1	2	Mild..... 1 Moderate..... 2 Severe..... 3 Cannot do at all..... 4
	f. Standing up when sitting down?	1	2	Mild..... 1 Moderate..... 2

				Severe ..... 3 Cannot do at all..... 4
	g. Extending your arms above shoulder level	1	2	Mild ..... 1 Moderate..... 2 Severe ..... 3 Cannot do at all..... 4
Now I would like to ask you about things you need to do to take care of yourself. Can you tell me if you have any difficulty doing these things on your own without help, and if you have difficulty, whether you have mild, moderate, severe difficulty, or whether you cannot do the task at all without help.				
I10	Do you have any difficulty in	1. Yes 2. No → **next item**		ii. How much difficulty
	a. Eating?	1	2	Mild ..... 1 Moderate..... 2 Severe ..... 3 Cannot do at all..... 4
	b. Getting dressed and undressed?	1	2	Mild ..... 1 Moderate..... 2 Severe ..... 3 Cannot do at all..... 4
	c. Bathing/washing yourself?	1	2	Mild ..... 1 Moderate..... 2 Severe ..... 3 Cannot do at all..... 4
	d. Getting up when you are lying down?	1	2	Mild ..... 1 Moderate..... 2 Severe ..... 3 Cannot do at all..... 4
	e. Getting to and using the toilet?	1	2	Mild ..... 1 Moderate..... 2 Severe ..... 3 Cannot do at all..... 4

I10x. *Interviewer: examine if respondent indicated having any problems in I10a-e, check the appropriate box and follow instruction*	… no problems →**I17**
	… has 1 or more problem → continue to **I11**

	Questions	Code	Skip
I11	When it comes to doing things you need to do to take care of yourself, like bathing and getting dressed, do you receive any help from anyone?	Yes .....1 No.....2	**1→ I14**
I12	Do you think that you need such help when having the above difficulties?	Yes .....1 No.....2	**2→ I17**
I13	[do not ask, if proxy is interviewed] Can you tell me who you would like to help you? (Multiple answers allowed -- *Circle all that apply*)	Spouse.....1 Son .....2 Daughter.....3 Son in law .....4 Daughter in law.....5	Record the number then go to I17

		Grandson.....6 Granddaughter.....7 Other relative .....8 Community member/ neighbor/friend.....9 Hired worker/care giver .....10 Health worker.....11 Other person (specify _____.....96 Does not know/unsure.....98	
I14	Can you tell me who helps you? (Multiple answers allowed -- *Circle all that apply). After respondent names someone, ask who else.*)	Spouse.....1 Son .....2 Daughter.....3 Son in law .....4 Daughter in law.....5 Grandson.....6 Granddaughter.....7 Other relative .....8 Community member/ neighbor/friend.....9 Hired worker/care giver .....10 Health worker.....11 Other person (specify _____) .....96 Does not know/unsure.....98	*If only one person mentioned in I14, go to I16*
I15	Can you tell me who helps you **most**?	Spouse.....1 Son .....2 Daughter.....3 Son in law .....4 Daughter in law.....5 Grandson.....6 Granddaughter.....7 Other relative .....8 Community member/ neighbor/friend.....9 Hired worker/care giver .....10 Health worker.....11 Other person (specify _____) .....12 Does not know/unsure.....98	
I16	**[do not ask, if proxy is interviewed]** Would you say that the help that you get is as much as you need or not enough?	As much as needed..... 1 Not enough.....2	
I17	Do you have any type of health insurance? (Read one by one all answers for interviewee)	Public compulsory .....1 Public voluntary 2	

	Public compulsory: for working people with salary and retired people with pension) *(Multiple answers allowed -- circle all that apply)*	Free .....3 Private .....4 No insurance .....5 Other (specify)_____6	
I18	During the last 12 months, were there any times that you were sick or injured that prevented you from performing your usual activities?	Yes .....1 No.....2	**2→ I33**
I19	Because of illnesses or injuries during the last 12 months, how many days were you unable to perform your usual activities because of these?	_____Days	
I20	Did you receive any professional treatment for these illnesses or injuries over the last 12 months?	Yes .....1 No.....2	**1→ I23**
I21	***[do not ask, if proxy is interviewed]*** Do you think that you needed treatment?	Yes .....1 No.....2	**2→ I29**
I22	***[do not ask, if proxy is interviewed]*** What was the main reason that you did not receive this treatment?	I did not have enough money to pay for treatment .....1 I did not have anyone to help me pay for treatment .....2 No one to take me for treatment .....3 No transportation available ..4 Could not afford the cost for the transportation .....5 Did not know where to go....6 Too far to go.....7 Too shy to ask for help.....8 Did not want to go for help ..9 I was previously treated badly .....10 I tried but were denied health care .....11 I could not take time off work or had other Commitments.....12 I thought I was not sick enough .....13 Other reason (specify_____) 96	***Record code number, and → to I29***
I23	The last time you received treatment for an illness or injury during the last 12 months, where did you go? *(Multiple answers allowed -- circle all that apply)*	Public sector: central hospital 1 Public sector: provincial hospital .....2 Public sector: district hospital3 Public sector: commune health center.....4 Public sector: other public....5 Private medical: private hospital	

		.....6 Private medical: private clinic .....7 Private medical: home/office of trained health worker/nurse..8 Private medical: other private medical, including in home service .....9 Not medical sector: dedicated drug store .....10 Not medical sector: shop selling drugs/market .....11 Other _____96	
I24	***[do not ask, if proxy is interviewed]*** Overall, how satisfied were you with the services you received	Very satisfied .....1 Satisfied.....2 Neither satisfied nor dissatisfied.3 Dissatisfied.....4 Very dissatisfied.....5	
I25	Were there any costs for health care or medicines that had to be paid?	Yes .....1 No.....2	**2→ I29**
I26	Can you tell me who paid for these costs? *(Multiple answers permitted -- Circle all that apply.)* *Probe to determine if more than one person paid.*	I did .....1 Spouse.....2 Son .....3 Daughter.....4 Son in law .....5 Daughter in law.....6 Grand or great grandson.....7 Grand or great granddaughter 8 Other relative (specify)_____9 Friends/Neighbors..... 10 Other person (specify) _____.....11 By insurance.....12	***If only one person mentioned in I26, go to I28***
I27	Who paid **the most** over the past year?	I did .....1 Spouse.....2 Son .....3 Daughter.....4 Son in law .....5 Daughter in law.....6 Grand or great grandson.....7 Grand or great granddaughter 8 Other relative (specify)_____9 Friends/Neighbors..... 10 Other person (specify) _____.....11 By insurance.....12	

I28	***[do not ask, if proxy is interviewed]*** Would you say that there was enough money available to you to pay for the all the professional treatment and medicines you needed in the past year?	Enough .....1 Not enough.....2 Do not know/unsure 9	
I29	Did anyone help take care of you during your illnesses or injuries (i.e. taking you to a doctor, helping you take medicine, going shopping for you to get food or medicine, or helping you to do other things around the house because you were too sick?)	Yes .....1 No.....2	**1→ I31**
I30	Do you think that you needed such help?	Yes .....1 No.....2	**1>> I33**
I31	Can you tell me who helped you when you were ill or injured? *(Multiple answers permitted -Circle all that apply)*	Spouse .....1 Son .....2 Daughter.....3 Son in law .....4 Daughter in law.....5 Grandson .....6 Granddaughter.....7 Other relative .....8 Community member/ neighbor/friend.....9 Hired worker/care giver .....10 Health worker.....11 Other person (specify) _____.....96	***If only one person mentioned in I31, go to I33***
I32	Who helped **the most**?	Spouse .....1 Son .....2 Daughter.....3 Son in law .....4 Daughter in law.....5 Grandson .....6 Granddaughter.....7 Other relative .....8 Community member/ neighbor/friend.....9 Hired worker/care giver .....10 Health worker.....11 Other person (specify) _____.....96	
I33	Do you currently smoke cigarettes or equivalent (pipe)?	Yes .....1 No.....2	**2→ I36**
I34	How often do you smoke?	Occasionally.....1 One or twice a week.....2 Several times a week.....3 Every day 4	

I35	On average, on the days you smoke, how many cigarettes (or equivalent) per day do you smoke?	_____cigarettes	**→ I37**
I36	Did you smoke 'more than 5 packs of cigarettes (100 cigarettes)' in the past?	Yes .....1 No.....2	
I37	Have you consumed alcohol in the last 6 months?	Yes .....1 No.....2	**2→ I40**
I38	How often did you drink in the last 6 months?	None.....1 Less than once a month.....2 One a month.....3 2-3 times a month.....4 Once a week.....5 2-3 times a week .....6 4-6 times a week .....7 Once a day.....8 More than twice a day.....9	
I39	On the days you drank alcoholic beverages, how many drinks did you have on average? (show demonstration on the amount of drink – a cup of beer, wine equivalent to 40ml, or a glass equivalent to 330ml)	_____drinks	
I40	How would you best describe your memory at present?	Bad/very bad .....1 Moderate .....2 Good.....3 Very good.....4	
I41	Compared to 12 months ago with the present would you say your memory is now?	Worse .....1 The same .....2 Better.....3	

IP1	Assessment of interviewer about the level of external assistance for the interviewee in answering the question in this section.	Never……1 Some times……...2 Most of the time……3 This section was answered by the representative……...4	

[Interviewer instruction: If a proxy interview or someone other than the chosen respondent is providing most of the answers to this questionnaire because the respondent is unable to do so, skip I42 to I48]
Here are some statements about how people might feel. After I read the statement I would like you to tell me whether, in the **past week**, you have not felt this way, felt this way some of the time, or felt this way most of the time.

	Question	Code			
I42		Not at all	Some of the time	Most of the time	Do not know
	a. I did not feel like eating and my appetite was poor	1	2	3	8
	b. I felt sad or depressed	1	2	3	8
	c. I had difficulty sleeping	1	2	3	8
	d. I felt happy	1	2	3	8
	e. I felt lonely	1	2	3	8
I43	Who can you count on to console you when you are very unhappy or sad? *(Multiple answers permitted -Circle all that apply)*	No one.....0 Spouse.....1 Son.....2 Daughter.....3 Son in law.....4 Daughter in law.....5 Grandson.....6 Granddaughter.....7 Other relative.....8 Community member/ neighbor/friend.....9 Hired worker/care giver.....10 Health worker.....11 Other person (specify) _____12			

I am going to name some things that people are sometimes satisfied or unsatisfied with. For each, I would like you to tell me whether you are very dissatisfied, dissatisfied, satisfied, very satisfied, or neither satisfied nor dissatisfied.

	Questions	Code					
I44		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	satisfied	Very satisfied	Do not know
	a. The relationships you have with your family	1	2	3	4	5	8
	b. The amount of respect younger persons in your family have for older persons	1	2	3	4	5	8
	c. The amount of respect younger persons in your community have for older persons	1	2	3	4	5	8
	d. Overall how satisfied would you say you are with your life?	1	2	3	4	5	8

Ask only those who are currently married and living with spouse			
	Question	**Code**	**Skip**
I45	Did you have sexual intercourse in the last 6 months?	Yes..... 1 No 2	**2→ I48**
I46	Did you have sexual intercourse in the last month?	Yes..... 1 No 2	**2→ I48**
I47	How many times did you have sexual intercourse in the last month?	_____Times	**→ End**
I48	When was the last time you had sexual intercourse?	_____months ago _____years ago Does not remember……98 ***(Less than 12 months, record month)***	

THANK YOU FOR YOUR TIME!

Finished time (hour(s)/minutes) ____/____

Interviewer assessment

If the interview, fill in the following form:

P1.	Was the interview given by a representative (proxy) rather than the older person to whom the interview refers	Yes……..1 No……2	2→P4
P3	Reason to select this representative?	The older person is weak……1 The older person cannot speak…….2 The older person has hearing problem…….3 The older person has bad memory…….4 The older person does not cooperate……..5	
P3	Relation of the representative with the older person?	Spouse……1 Mother……..2 Father……3 Mother in-law……4 Father in-law……5 Sibling……..6 Brother/sister in-law……7 Children……8 Son in-law/daughter in-law…..9 Grandchild……10 Other relatives……11 Other acquaintance……12	
P4	Did other persons assist the older person (or proxy) in answering more than a few questions?	Yes……..1 No……2	2→P6
P5	Relation of the person(s) with the older person? *(Multiple answers permitted - Circle all that apply)*	Spouse……1 Mother……..2 Father……3 Mother in-law……4 Father in-law……5 Sibling……..6 Brother/sister in-law……7 Children……8 Son in-law/daughter in-law…..9 Grandchild……10 Other relatives……11 Other acquaintance……12	
P6	Did the older person (or proxy) have difficulties in understanding questions asked in the questionnaire?	Little or none……..1 Some but not a lot……..2 Quite a lot……..3	
P7	How cooperative was the older person (or proxy) in proving the interview?	Fully cooperative……1 Somewhat cooperative……..…….2 Not very cooperative……3	

REFERENCES

Adams, G. A., King, L. A., & King, D. W. (1996). Relationships of job and family involvement, family social support, and work–family conflict with job and life satisfaction. *Journal of applied psychology, 81*(4), 411.

Allman, J., Nhan, V. Q., Thang, N. M., San, P. B., & Man, V. D. (1991). Fertility and Family Planning in Vietnam. *Studies in family planning, 22*(5), 308-317. doi:10.2307/1966685

Angelini, V., Cavapozzi, D., Corazzini, L., & Paccagnella, O. (2012). Age, Health and Life Satisfaction Among Older Europeans. *Social Indicators Research, 105*(2), 293-308. doi:10.1007/s11205-011-9882-x

Badger, M., & Chappell, N. L. (1989). Social Isolation and Well-Being. *Journal of Gerontology, 44*(5), S169-S176. doi:10.1093/geronj/44.5.S169

Barraclough, B., & Pallis, D. (1975). Depression followed by suicide: a comparison of depressed suicides with living depressives. *Psychological Medicine, 5*(1), 55-61.

Bennett, N. G. (2017). A reflection on the changing dynamics of union formation and dissolution. *Demographic Research, 36*, 371-390.

Binh, N. T. (2012). The Division of Household Labor in Vietnamese Families at Present Time. *International Journal of Academic Research in Business and Social Sciences, 2*(5), 59.

Bjørnskov, C., Dreher, A., & Fischer, J. A. V. (2007). The bigger the better? Evidence of the effect of government size on life satisfaction around the world. *Public Choice, 130*(3), 267-292. doi:10.1007/s11127-006-9081-5

Booth, A. L., Coles, M. G., & Gong, X. (2007). Increasing returns to education: theory and evidence.

Botha, F. (2014). Life satisfaction and education in South Africa: Investigating the role of attainment and the likelihood of education as a positional good. *Social Indicators Research, 118*(2), 555-578.

Bouaissa, M. (2009). *Human capital theory, returns to education and on the job learning: evidence from the Canadian data.* Paper presented at the

Preliminary and Incomplete Version, CEA, 43rd Annual Conference, University of Toronto, Ontario.

Bourke-Martignoni, J. (2001). *Violence against women in Vietnam.* Paper presented at the Implementation of the Convention on the Elimination of All Forms of Discrimination against Women by Vietnam.

Boutayeb, A. (2007). Developing countries and neglected diseases: challenges and perspectives. *International Journal for Equity in health, 6*(1), 20.

Brannick, M. T. (2018). Path Analysis. Retrieved from http://faculty.cas.usf.edu/mbrannick/regression/Pathan.html

Bratu, C. (2011). Determinants of Subjective Well-Being. *Economics, 399*, 1.

Brown, C. R., Hambleton, I. R., Sobers-Grannum, N., Hercules, S. M., Unwin, N., Nigel Harris, E., . . . Group, T. U. S. C. A. f. H. D. R. (2017). Social determinants of depression and suicidal behaviour in the Caribbean: a systematic review. *BMC Public Health, 17*(1), 577. doi:10.1186/s12889-017-4371-z

Bui, H., & Morash, M. (2008). Immigration, masculinity, and intimate partner violence from the standpoint of domestic violence service providers and Vietnamese-origin women. *Feminist criminology, 3*(3), 191-215.

Campbell, A. (1981). *The sense of well-being in America: Recent patterns and trends*.

Caporale, G. M., Georgellis, Y., Tsitsianis, N., & Yin, Y. P. (2009). Income and happiness across Europe: Do reference values matter? *Journal of economic psychology, 30*(1), 42-51.

Carr, A. (2013). *Positive psychology: The science of happiness and human strengths*: Routledge.

Carr, C. M., & Wolchik, S. A. (2015). Marital Status, Divorce, and Child Development. In J. D. Wright (Ed.), *International Encyclopedia of the Social & Behavioral Sciences (Second Edition)* (pp. 518-524). Oxford: Elsevier.

Castriota, S. (2006). Education and happiness: A further explanation to the Easterlin Paradox?

Chen, F., & Short, S. E. (2008). Household context and subjective well-being among the oldest old in China. *Journal of family issues, 29*(10), 1379-1403.

Clark, A. E., & Oswald, A. J. (1994). Unhappiness and unemployment. *The Economic Journal, 104*(424), 648-659.

Cloutier, M.-H., Cockburn, J., & Decaluwé, B. (2008). Education and poverty in Vietnam: a computable general equilibrium analysis.

Committee for Government Organization and Personnel. (2001). *Thông tư của ban tổ chức cán bộ chính phủ số 19/2001/TT-BTCCBCP ngày 25 tháng 4 năm 2001 về việc hướng dẫn thực hiện Nghị Định số 71/2000/NĐ-CP ngày 23/11/2000 của chính phủ quy định việc kéo dài thời gian công tác của cán bộ, công chức đến độ tuổi nghỉ hưu [Circular of Committee for Government Organization and Personnel No. 19/2001 / TT-BTCCBCP dated April 25, 2001 guiding the implementation of Decree No. 71/2000 / ND-CP dated November 23, 2000 of the Government determine the extension of working time of cadres and civil servants to the retirement age]*. Ha Noi: Committee for Government Organization and Personnel.

Connell, R. W. (1987). *Gender and power : Society, the person and sexual politics*: Stanford, California : Stanford University Press, 1987.

Coplan, R. J., & Bowker, J. C. (2013). *The handbook of solitude: Psychological perspectives on social isolation, social withdrawal, and being alone*: John Wiley & Sons.

Cuñado, J., & de Gracia, F. P. (2012). Does education affect happiness? Evidence for Spain. *Social Indicators Research, 108*(1), 185-196.

Curran, E. (2017). Parts of Asia Will Grow Old Before Getting Rich, IMF Warns. Retrieved from https://www.bloomberg.com/news/articles/2017-05-09/parts-of-asia-will-grow-old-before-getting-rich-imf-warns

De Jong Gierveld, J., De Valk, H., & Blommesteijn, M. (2001). Living arrangements of older persons and family support in more developed countries.

De Walque, D. (2007). Does education affect smoking behaviors?: Evidence using the Vietnam draft as an instrument for college education. *Journal of health economics, 26*(5), 877-895.

del Mar Salinas-Jiménez, M., Artés, J., & Salinas-Jiménez, J. (2011). Education as a positional good: A life satisfaction approach. *Social indicators research, 103*(3), 409-426.

Denney, S. (2006). RELIGION AND DISSENT IN VIETNAM. *Journal of Interdisciplinary Studies, 18*.

Department of Health and Human Services. (2001). *Older Adults and Mental Health: Issues and Opportunities*. Retrieved from https://www.public-health.uiowa.edu/icmha/training/documents/Older-Adults-and-Mental-Health-2001.pdf

Diener, E. (1984). Subjective well-being. *Psychological bulletin, 95*(3).

Diener, E. (2006). Guidelines for national indicators of subjective well-being and ill-being. *Journal of happiness studies, 7*(4), 397-404.

Diener, E. (2009). Subjective well-being. In *The science of well-being* (pp. 11-58): Springer.

Diener, E., & Chan, M. Y. (2011). Happy people live longer: Subjective well‐being contributes to health and longevity. *Applied Psychology: Health and Well‐Being, 3*(1), 1-43.

Diener, E., Oishi, S., & Lucas, R. E. (2011). Subjective Well-being: The science of Happiness and Life satisfaction. In S. J. Lopez & C. R. Snyder (Eds.), *The Oxford Handbook of Positive Psychology*: Oxford University Press.

Diener, E., Suh, E., & Oishi, S. (1997). Recent findings on subjective well-being. *Indian journal of clinical psychology, 24*, 25-41.

Diener, E., & Suh, E. M. (2000). *Culture and subjective well-being*: MIT press.

Do Thi Thanh Huyen. (2018). *Vietnam*. Retrieved from College of Population Studies, Chulalongkorn University:

Duggan, S. (2001). Educational Reform in Viet Nam: A Process of Change or Continuity? *Comparative Education, 37*(2), 193-212.

Easterlin. (2003). Explaining happiness. *Proceedings of the National Academy of Sciences, 100*(19), 11176-11183.

Easterlin, McVey, L. A., Switek, M., Sawangfa, O., & Zweig, J. S. (2010). The happiness–income paradox revisited. *Proceedings of the National Academy of Sciences*, 201015962.

Easterlin, R. A. (1995). Will raising the incomes of all increase the happiness of all? *Journal of Economic Behavior & Organization, 27*(1), 35-47. doi:https://doi.org/10.1016/0167-2681(95)00003-B

Ellison, C. G. (1991). Religious Involvement and Subjective Well-Being. *Journal of Health and Social Behavior, 32*(1), 80-99. doi:10.2307/2136801

EP-Nuffic Internationalising Education. (2015). The Vietnam education system described and compared with the Dutch system. 2nd edition January 2011-version 2, January 2015. Retrieved from https://www.nuffic.nl/en/publications/find-a-publication/education-system-vietnam.pdf

Ferrante, F. (2009). Education, aspirations and life satisfaction. *Kyklos, 62*(4), 542-562.

Friedman, J., Knodel, J., Cuong, B. T., & Anh, T. S. (2003). Gender dimensions of support for elderly in Vietnam. *Research on Aging, 25*(6), 587-630.

General Statistic Office. (2010). *The 2009 Vietnam Population and Housing Census: Completed Results*. Retrieved from General Statistic Office of Vietnam: http://www.gso.gov.vn/default_en.aspx?tabid=515&idmid=5&ItemID=10799

General Statistic Office. (2011a). *Fertility and Mortality in Vietnam: Patterns, Trends and Differentials*. Hanoi: Ministry of Planning and Investment.

General Statistic Office. (2011b). *Population change and Family Planning survey 1/4/2011: Major results*. Retrieved from Department of Population and Labor Statistics:

General Statistic Office. (2015). *Census of Population and Housing mid-term time 1/4/2014: Major findings*. Ha Noi: General Statistic Office.

General Statistic Office. (2016). *Vietnam Population Projections 2014-2049*. Ha Noi: Thong Tan Publisher.

General Statistic Office. (2017). *Statistical Summary Book of Vietnam "Niên giám thống kê 2017"*. Retrieved from https://www.gso.gov.vn/default.aspx?tabid=512&idmid=5&ItemID=18940

Giang, L. T., & Le, D. D. (2017). Working beyond the traditional retirement ages: How does chronic health condition influence older workers in Vietnam. *Ageing International*, 1-16.

Gigy, L., & Kelly, J. B. (1993). Reasons for divorce: Perspectives of divorcing men and women. *Journal of Divorce & Remarriage, 18*(1-2), 169-188.

Goh, R. B. (2005). *Christianity in Southeast Asia*: Institute of Southeast Asian Studies.

Goodkind, D. (1995). Rising gender inequality in Vietnam since reunification. *Pacific Affairs*, 342-359.

Goodkind, D. M. (1995). Vietnam's One-or-Two-Child Policy in Action. *Population and Development Review, 21*(1), 85-111. doi:10.2307/2137414

GSO. (2015). *Population and Employment. Statistical Yearbook of Vietnam 2015*. Retrieved from General Statistic Office:

Ha, T. T., & Harpham, T. (2005). Primary Education in Vietnam: Extra Classes and Outcomes. *International Education Journal, 6*(5), 626-634.

Hakkert, R. (2007). The demographic bonus and population in active ages. *Research Paper, 7*.

Hao, Y. (2004). Age-structural transitions: major policy implications for China. *AGE-STRUCTURAL TRANSITIONS: CHALLENGES FOR DEVELOPMENT*, 289.

Hartog, J., & Oosterbeek, H. (1998). Health, wealth and happiness: Why pursue a higher education? *Economics of Education Review, 17*(3), 245-256.

Haughton, J., & Haughton, D. (1995). Son Preference in Vietnam. *Studies in family planning, 26*(6), 325-337. doi:10.2307/2138098

Honigh-de Vlaming, R., Haveman-Nies, A., Bos-Oude Groeniger, I., de Groot, L., & van 't Veer, P. (2014). Determinants of Trends in Loneliness Among Dutch Older People Over the Period 2005-2010. *Journal of Aging and Health, 26*(3), 422-440. doi:10.1177/0898264313518066

Horowitz, A. (1985). Sons and daughters as caregivers to older parents: Differences in role performance and consequences. *The Gerontologist, 25*(6), 612-617.

Houser, B. B., & Beckman, L. J. (1982). The Consequences of Childlessness on the Social-psychological Well-being of Older Women1. *Journal of Gerontology, 37*(2), 243-250. doi:10.1093/geronj/37.2.243

Huong, P. L., & Fry, G. W. (2004). Education and Economic, Political, and Social Change in Vietnam. *Educational Research for Policy and Practice, 3*(3), 199-222. doi:10.1007/s10671-005-0678-0

Huy, N. N. (1998). The Confucian incursion into Vietnam. *Confucianism and the Family*, 91-104.

ILO. (2015). *Gender equality in recruitment and promotion practices in Vietnam*. Retrieved from ILO Country Office for Vietnam: https://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/---ilo-hanoi/documents/publication/wcms_349666.pdf

Institute of Social and Medical Studies. (2012). *Vietnam Aging Survey (VNAS) 2011: Key Findings*. Retrieved from Ha Noi:

Jones, N., Anh, N. N., & Presler-Marshall, E. (2010). *Mapping the Reform Process in the Public Delivery of Health Services in Viet Nam. Vietnam Human Development Report 2010*. Retrieved from Ha Noi: https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/7249.pdf

Jong-Gierveld, J. d., van Tilburg, T. G., & Dykstra, P. A. (2006). Loneliness and social isolation.

Keyes, C. L. (2006). Subjective well-being in mental health and human development research worldwide: An introduction. *Social Indicators Research, 77*(1), 1-10.

Kham, L. V. (2014). The situation of Vietnam Elderly Persons in nowadays society. *Journal of Social Science in Vietnam, 7*(80).

Khin, M. W. (2016). *Impact of social support on loneliness among the elderly in Myanmar.* (Doctor of Philosophy Program in Demography), Chulalongkorn University, Chulalongkorn University.

Khuong, L. Q., Vu, T.-V. T., Huynh, V.-A. N., & Thai, T. T. (2018). Psychometric properties of the medical outcomes study: social support survey among methadone maintenance patients in Ho Chi Minh City, Vietnam: a validation study. *Substance abuse treatment, prevention, and policy, 13*(1), 8.

Kim, H.-J., & Fredriksen-Goldsen, K. I. (2014). Living arrangement and loneliness among lesbian, gay, and bisexual older adults. *The Gerontologist, 56*(3), 548-558.

Klasen, S., & Lamanna, F. (2009). The impact of gender inequality in education and employment on economic growth: new evidence for a panel of countries. *Feminist economics, 15*(3), 91-132.

Knight, J., Lina, S., & Gunatilaka, R. (2009). Subjective well-being and its determinants in rural China. *China economic review, 20*(4), 635-649.

Knodel, J., Loi, V. M., Jayakody, R., & Huy, V. T. (2005). Gender roles in the family: Change and stability in Vietnam. *Asian Population Studies, 1*(1), 69-92.

Koenig, H. G., Kvale, J. N., & Ferrel, C. (1988). Religion and well-being in later life. *The Gerontologist, 28*(1), 18-28.

Krause, N. (2003). Religious Meaning and Subjective Well-Being in Late Life. *The Journals of Gerontology: Series B, 58*(3), S160-S170. doi:10.1093/geronb/58.3.S160

Langelett, G. (2002). Human capital: A summary of the 20th century research. *Journal of Education Finance, 28*(1), 1-23.

Le, D. D., Quashie, N. T., & Prachuabmoh, V. (2018). How Does Self-Rated Health Differ among Older Vietnamese Men and Women? *Journal of Population Ageing*. doi:10.1007/s12062-018-9223-9

Lee, G. R., & Ellithorpe, E. (1982). Intergenerational Exchange and Subjective Well-Being among the Elderly. *Journal of Marriage and Family, 44*(1), 217-224. doi:10.2307/351275

Leggett, A., Zarit, S. H., Nguyen, N. H., Hoang, C. N., & Nguyen, H. T. (2012). The Influence of Social Factors and Health on Depressive Symptoms and Worry: A Study of Older Vietnamese Adults: Aging and Mental Health. *Aging & mental health, 16*(6), 780-786. doi:10.1080/13607863.2012.667780

Lesthaeghe, R. J. (2007). Second demographic transition. *The Blackwell encyclopedia of sociology*.

Leung, P. K., & Boehnlein, J. K. (2005). Vietnamese Families. In M. McGoldrick, J. Giordano, & N. Garcia-Preto (Eds.), *Ethnicity and Family Therapy*: The Guilford Press.

Lim, L. L., & Kua, E.-H. (2011). Living alone, loneliness, and psychological well-being of older persons in Singapore. *Current Gerontology and Geriatrics Research, 2011*.

Lim, L. L., & Kua, E.-H. (2011). Living Alone, Loneliness, and Psychological Well-Being of Older Persons in Singapore. *Current Gerontology and Geriatrics Research, 2011*, 9. doi:10.1155/2011/673181

London, J. D. (2011). *Education in Vietnam*: Institute of Southeast Asian Studies.

Lou, V. W. Q. (2010). Life Satisfaction of Older Adults in Hong Kong: The Role of Social Support from Grandchildren. *Social Indicators Research, 95*(3), 377-391. doi:10.1007/s11205-009-9526-6

Magaziner, J., Cadigan, D. A., Hebel, J. R., & Parry, R. E. (1988). Health and living arrangements among older women: Does living alone increase the risk of illness. *Journal of Gerontology, 43*(5), M127-M133.

Maharaj, Z. (1995). A Social Theory of Gender: Connell's "Gender and Power". *Feminist Review*(49), 50-65. doi:10.2307/1395325

McFadden, S. H. (1995). Religion and well-being in aging persons in an aging society. *Journal of Social Issues, 51*(2), 161-175.

McGoldrick, M., Giordano, J., & Garcia-Preto, N. (2005). *Ethnicity and family therapy*: Guilford Press.

Meisenberg, G., & Woodley, M. A. (2015). Gender differences in subjective well-being and their relationships with gender equality. *Journal of happiness studies, 16*(6), 1539-1555.

Minas, H., Edington, C., La, N., & Kakuma, R. (2017). Mental health in Vietnam. In *Mental Health in Asia and the Pacific* (pp. 145-161): Springer.

Mincer, J. (1974). Schooling. *Experience and Earnings, New York*.

Ministry of Education and Training. (2014). *Education for All 2015 National Review Report: Viet Nam*. Retrieved from UNESCO: http://unesdoc.unesco.org/images/0023/002327/232770e.pdf

Ministry of Education and Training. (2017). *Thông tư 08/2017/TT-BGDĐT ban hành quy chế tuyển sinh và đào tạo trình độ Tiến sỹ "The 08/2017/TT-BGDĐT circular promulgated the regulations on enrollment and education on doctoral degree"*. Ha Noi: The Socialist and Republic of Vietnam.

Ministry of Education and Vocational Training. (2016). *Education Financing in Vietnam, 2009-2013*. Retrieved from http://uis.unesco.org/sites/default/files/vietnam-nea-report.pdf

Ministry of Justice. (2009). *Law on the Elderly*. Vietnam: National Assembly of the Socialist and Republic of Vietnam Retrieved from http://www.ilo.org/dyn/natlex/natlex4.detail?p_lang=en&p_isn=84194&p_country=VNM&p_count=532.

Miskolczi M., & Cséfalvaiová K. (2013). *Process of Population Ageing and its dynamic*. Paper presented at the The 7th International Days of Statistics and Economics, Prague. https://msed.vse.cz/files/2013/121-Miskolczi-Martina-paper.pdf

Moock, P. R., Patrinos, H. A., & Venkataraman, M. (1998). Education and earnings in a transition economy (Vietnam).

Moussavi, S., Chatterji, S., Verdes, E., Tandon, A., Patel, V., & Ustun, B. (2007). Depression, chronic diseases, and decrements in health: results from the World Health Surveys. *The Lancet, 370*(9590), 851-858. doi:https://doi.org/10.1016/S0140-6736(07)61415-9

Mui, A. C. (1995). Caring for frail elderly parents: A comparison of adult sons and daughters. *The Gerontologist, 35*(1), 86-93.

Na, L. (2012). *An Introduction on Gary Becker's "Human Capital Theories"*, Berlin, Heidelberg.

Na, L., & Ying, Q. (2012). A Study on the Recent Application of the Human Capital Theories in China In M. Zhu (Ed.), *Business, Economics, Financial Sciences, and Management* (pp. 431-435): Springer.

Nguyen Huu Minh. (2014). *Gia đình Việt Nam trong công nghiệp hóa, hiện đại hóa và hội nhập từ cách tiếp cận so sánh [Vietnamese family in the modernization, industrialization and integration by comparison method]*: Vietnam Academy of Social Sciences, Institute of Family and Gender Studies.

OECD. (2013). *OECD Guidelines on Measuring Subjective Well-being*.

OECD Development Centre. (2017). Youth Well-being Policy Review of Viet Nam (EU-OECD Youth Inclusion Project). http://www.oecd.org/countries/vietnam/OECDYouthReportVietNam_ebook.pdf

Olaniyan, D., & Okemakinde, T. (2008). Human capital theory: Implications for educational development. *Pakistan Journal of Social Sciences, 5*(5), 479-483.

Oswald, A. J., & Powdthavee, N. (2008). Does happiness adapt? A longitudinal study of disability with implications for economists and judges. *Journal of public economics, 92*(5), 1061-1077.

Palmore, E., & Luikart, C. (1972). Health and Social Factors Related to Life Satisfaction. *Journal of Health and Social Behavior, 13*(1), 68-80. doi:10.2307/2136974

Perlman, D., & Peplau, L. A. (1981). Toward a social psychology of loneliness. *Personal relationships, 3*, 31-56.

Pinquart, M., & Sorensen, S. (2001). Influences on Loneliness in Older Adults: A Meta-Analysis. *Basic and Applied Social Psychology, 23*(4), 245-266. doi:10.1207/S15324834BASP2304_2

Powdthavee, N., Lekfuangfu, W. N., & Wooden, M. (2015). What's the good of education on our overall quality of life? A simultaneous equation model of education and life satisfaction for Australia. *Journal of Behavioral and Experimental Economics, 54*, 10-21. doi:https://doi.org/10.1016/j.socec.2014.11.002

Proctor, C. L., Linley, P. A., & Maltby, J. (2009). Youth Life Satisfaction: A Review of the Literature. *Journal of happiness studies, 10*(5), 583-630. doi:10.1007/s10902-008-9110-9

Ragheb, M. G., & Griffith, C. A. (1982). The contribution of leisure participation and leisure satisfaction to life satisfaction of older persons. *Journal of leisure research, 14*(4), 295-306.

Reder, M. W. (1967). Gary Becker's Human Capital: A Review Article. [Human Capital, Gary Becker]. *The Journal of Human Resources, 2*(1), 97-104. doi:10.2307/144593

Rees, G., & Main, G. (2016). Subjective well-being and mental health. *The well-being of children in the UK*, 123-148.

Rosenlee, L.-H. L. (2006). *Confucianism and Women : A Philosophical Interpretation*. Albany: State University of New York Press.

Ross, C. E., & Mirowsky, J. (2006). Sex differences in the effect of education on depression: Resource multiplication or resource substitution? *Social Science & Medicine, 63*(5), 1400-1413. doi:https://doi.org/10.1016/j.socscimed.2006.03.013

Ross, M., Eyman, A., & Kishchuk, N. (1986). *Determinants of subjective well-being.* Paper presented at the Relative deprivation and social comparison: The Ontario symposium.

Rutz, W., von Knorring, L., Pihlgren, H., Rihmer, Z., & Wålinder, J. (1995). Prevention of male suicides: lessons from Gotland study. *The Lancet, 345*(8948), 524.

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of personality and social psychology, 57*(6), 1069.

Savikko, N., Routasalo, P., Tilvis, R. S., Strandberg, T. E., & Pitkälä, K. H. (2005). Predictors and subjective causes of loneliness in an aged population. *Archives of Gerontology and Geriatrics, 41*(3), 223-233. doi:https://doi.org/10.1016/j.archger.2005.03.002

Schiller, D., & Liefner, I. (2007). Higher education funding reform and university–industry links in developing countries: The case of Thailand. *Higher Education, 54*(4), 543-556. doi:10.1007/s10734-006-9011-y

Schueller, S. M., & Seligman, M. E. (2010). Pursuit of pleasure, engagement, and meaning: Relationships to subjective and objective measures of well-being. *The Journal of Positive Psychology, 5*(4), 253-263.

Schultz, T. W. (1961). Investment in Human Capital. *The American Economic Review, 51*(1), 1-17.

Shao-hui, L. (2009). The Impact of Confucianism on Vietnam Culture: Dissemination and Clash. *Journal of PLA University of Foreign Languages, 6*, 025.

Shields, M. A., & Price, S. W. (2005). Exploring the economic and social determinants of psychological well-being and perceived social support in England. *Journal of the Royal Statistical Society: Series A (Statistics in Society), 168*(3), 513-537.

Siddiqui, K. (2013). Heuristics for sample size determination in multivariate statistical techniques. *World Applied Sciences Journal, 27*(2), 285-287.

Singh, A., & Misra, N. (2009). Loneliness, depression and sociability in old age. *Industrial Psychiatry Journal, 18*(1), 51-55. doi:10.4103/0972-6748.57861

Singhal, S. (2018). Early life shocks and mental health: The long-term effect of war in Vietnam. *Journal of Development Economics*. doi:https://doi.org/10.1016/j.jdeveco.2018.06.002

Siu, O.-L., & Phillips, D. R. (2002). A study of family support, friendship, and psychological well-being among older women in Hong Kong. *The International Journal of Aging and Human Development, 55*(4), 299-319.

Snyder, C. R., & Lopez, S. J. (2009). *Oxford handbook of positive psychology*: Oxford University Press, USA.

Stoller, E. P. (1983). Parental Caregiving by Adult Children. *Journal of Marriage and Family, 45*(4), 851-858. doi:10.2307/351797

Takahashi, K., Thuy, N. T. M., Poudel, K. C., Sakisaka, K., Jimba, M., & Yasuoka, J. (2011). Social capital and life satisfaction: a cross-sectional study on persons with musculoskeletal impairments in Hanoi, Vietnam. *BMC Public Health, 11*(1), 206. doi:10.1186/1471-2458-11-206

Taylor, P. (2004). *Social inequality in Vietnam and the challenges to reform*: Institute of southeast asian studies.

Teerawichitchainan, B., Pothisiri, W., & Long, G. T. (2015). How do living arrangements and intergenerational support matter for psychological health of elderly parents? Evidence from Myanmar, Vietnam, and Thailand. *Social Science & Medicine, 136-137*, 106-116. doi:https://doi.org/10.1016/j.socscimed.2015.05.019

Thai, T. T., Jones, M. K., Harris, L. M., Heard, R. C., Hills, N. K., & Lindan, C. P. (2018). Symptoms of depression in people living with HIV in Ho Chi Minh City, Vietnam: prevalence and associated factors. *AIDS and Behavior, 22*(1), 76-84.

Thi, T. T. M. (2016). Prevalence and Patterns of Divorce inVietnam: Tradition, Modernity, and Individualism. *Journal of Literature and Art Studies, 6*(3), 298-316.

Thurnher, M., Fenn, C. B., Melichar, J., & Chiriboga, D. A. (1983). Sociodemographic perspectives on reasons for divorce. *Journal of Divorce, 6*(4), 25-35.

Tran, N. T., Bachani, A. M., Pham, V. C., Lunnen, J. C., Jo, Y., Passmore, J., . . . Hyder, A. A. (2012). Drinking and driving in Vietnam: public knowledge, attitudes, and practices. *Traffic injury prevention, 13*(sup1), 37-43.

Treas, J., & VanHilst, A. (1976). Marriage and remarriage rates among older Americans. *The Gerontologist, 16*(2), 132-136.

Trost, J. E. (1984). Remarriage in Sweden. *Family Relations*, 475-481.

Truc, D. N. H., Chankrajang, T., & Yen, T. H. N. (2017). Patterns and Trends of Single Motherhood in Vietnam in 1999 and 2009. *Journal of Demography, 33*.

Truong, S. A., Bui, T. C., Goodkind, D., & Knodel, J. (1997). Living arrangements patrilineality and sources of support among elderly Vietnamese. *Asia-Pacific Population Journal, 12*(4), 69-88.

Truong, T., xa, Thuy, xa, & Hang. (2008). Women’s Leadership in Vietnam: Opportunities and Challenges. *Signs, 34*(1), 16-21. doi:10.1086/588432

UNFPA. (2016). *Brief information: The rapid population aging in Viet Nam: Challenges and opportunities*. Retrieved from http://vietnam.unfpa.org/sites/default/files/pub-pdf/PD_Factsheet_rapid%20population%20ageing%20in%20VNM_printed%20in%202016_Tieng%20Viet.pdf

UNICEF. (2011). *Mental health and psychosocial wellbeing among children and young people in selected provinces and cities in Viet Nam*. Retrieved from UNICEF Vietnam: https://www.unicef.org/vietnam/sites/unicef.org.vietnam/files/2018-07/Study%20on%20Mental%20Health-Full%20Report_ENG.pdf

United Nations. (2014). World Economic Situation and Prospects 2014. Country classification. *World Economic Situation and Prospects.* Retrieved from http://www.un.org/en/development/desa/policy/wesp/wesp_current/2014wesp_country_classification.pdf

United Nations. (2015). *World Population Ageing*. Retrieved from http://www.un.org/en/development/desa/population/publications/pdf/ageing/WPA2015_Report.pdf

United Nations, Department of Economic and Social Affairs, Population Division. (2002). *World Population Ageing 1950-2050*. Retrieved from United Nations:

United Nations, Department of Economic and Social Affairs, Population Division. (2017). *World Population Prospects: The 2017 Revision, Volume II: Demographic Profiles (ST/ESA/SER.A/400)*. Retrieved from https://esa.un.org/unpd/wpp/Publications/Files/WPP2017_Volume-II-Demographic-Profiles.pdf

United Nations Development Programs. (2014). *Women delegates in the Vietnam National Assembly: From participation to representation*. Retrieved from http://www.vn.undp.org/content/dam/vietnam/docs/Publications/Paul%20Report%20En%202014%2008%2026.pdf

United Nations Population Fund. (2011). *The aging population in Vietnam: Current status, prognosis, and possible policy responses*. Retrieved from Vietnam:

United Nations Population Fund, & HelpAge International. (2012). *Executive Summary Ageing in the Twenty-First Century: A Celebration and A Challenge*. Retrieved from www.unfpa.org/sites/default/files/pub-pdf/Ageing%20report.pdf

Valenzuela, S., Park, N., & Kee, K. F. (2009). Is there social capital in a social network site?: Facebook use and college students' life satisfaction, trust, and participation. *Journal of computer-mediated communication, 14*(4), 875-901.

Vanassche, S., Swicegood, G., & Matthijs, K. (2013). Marriage and Children as a Key to Happiness? Cross-National Differences in the Effects of Marital Status and Children on Well-Being. *Journal of happiness studies, 14*(2), 501-524. doi:10.1007/s10902-012-9340-8

Vietnam National Assembly. (1998). *Education Law*. Ha Noi: The 10th Vietnam National Assembly Retrieved from http://moj.gov.vn/vbpq/en/lists/vn%20bn%20php%20lut/view_detail.aspx?itemid=1263.

Vietnam National Assembly. (2005). *Education Law*. Ha Noi: The 11th Vietnam National Assembly Retrieved from http://www.moj.gov.vn/vbpq/en/lists/vn%20bn%20php%20lut/view_detail.aspx?itemid=5484.

Vu, T. T. (2018). Meanings of Marriage to Young People in Vietnam. *Marriage & Family Review, 54*(6), 531-548.

WHO. (1946). Constitution of The World Health Organization. Retrieved from http://www.who.int/about/mission/en/

WHO. (2011). Global health and aging. *Geneva: World Health Organization*, 1-32.

WHO. (2012a). Healthy life expectancy (HALE) at birth (years). Retrieved from http://data.un.org/Data.aspx?q=hale&d=WHO&f=MEASURE_CODE%3AWHOSIS_000002

WHO. (2012b). Life expectancy at birth (years). Retrieved from http://data.un.org/Data.aspx?q=life+expectancy+at+birth&d=WHO&f=MEASURE_CODE%3aWHOSIS_000001

WHO. (2018). *World Health Statistics 2018: Monitoring health for the SDGs*. Retrieved from World Health Organization: http://apps.who.int/iris/bitstream/handle/10665/272596/9789241565585-eng.pdf?ua=1

WHO Viet Nam. (2018). Child health. Retrieved from http://www.wpro.who.int/vietnam/topics/child_health/factsheet/en/

Williams, L., & Guest, M. P. (2005). Attitudes toward marriage among the urban middle-class in Vietnam, Thailand, and the Philippines. *Journal of Comparative Family Studies*, 163-186.

Witter, R. A., Okun, M. A., Stock, W. A., & Haring, M. J. (1984). Education and Subjective Well-Being: A Meta-Analysis. *Educational Evaluation and Policy Analysis, 6*(2), 165-173. doi:10.3102/01623737006002165

World Bank. (2005). Education in Vietnam: Development history, Challenges and Solutions. Retrieved from https://siteresources.worldbank.org/EDUCATION/Resources/278200-1121703274255/1439264-1153425508901/Education_Vietnam_Development.pdf

World Health Organization. (2002). *Active Ageing: A Policy Framework*. Paper presented at the Second United Nations World Assembly on Ageing, Marid, Spain.

World Health Organization. (2011). *Global Health and Ageing*. Retrieved from World Health Organization:

World Health Organization. (2017). Fact sheets on sustainable development goals: health targets. Noncommunicable diseases. In.

Worldometers. (2018). Vietnam Population (Live). Retrieved from http://www.worldometers.info/world-population/vietnam-population/

Zhang, H. X., & Locke, C. (2002). Contextualising reproductive rights challenges: The Vietnam situation. *Women's Studies International Forum, 25*(4), 443-453. doi:https://doi.org/10.1016/S0277-5395(02)00281-9

Zhuang, J. (2011). *Poverty, Inequality, and Inclusive Growth in Asia: Measurement, Policy Issues, and Country Studies*: Anthem Press.

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