科技部補助專題研究計畫成果報告
期末報告

社經弱勢和健康的性別差異：台灣低收入戶兒童少年追蹤調查(V02)

計 畫 類 別 ： 個別型計畫
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中 文 摘 要 ： 本研究使用性別正義框架(Gender Justice Framework)去檢驗男性女性兒童青少年是否有資源不平均的現象，和社經地位所造成的健康影響的性別差異。目前台灣對貧窮兒童少年的定義就是根據家庭收入，給予補助與福利，但是家庭收入對於兒童青少年發展而言，真的就是一個好的指標嗎?這是這個研究想要著墨的地方，我們認為雖然台灣的經濟狀態已非低收入國家，但是貧窮兒少需要用更廣泛的物質和非物質資源狀態來定義，因此計劃要使用主成分分析(principal components analysis)來訂製一個社經地位指標，並且使用軌跡分析(trajectory analysis)分類出長期趨勢。所有指標的訂製都會做出男性女性分開、和全部樣本的指標來做為比較。最後再利用這些指標去分析社經弱勢和健康相關的性別差異。本研究使用家扶基金會收集的台灣低收入戶兒童少年追蹤調查三年的資料做分析。此資料庫追蹤了3194個兒童和少年曾經接受家扶基金會補助的自填問卷，同時也包括他們父母親和社工的問卷資料。第一波收案為2009年，之後每兩年一次，共有三次資料公開釋出。這是台灣第一個使用大量的低社經地位兒童少年樣本去建立社經地位指標，這筆資料的分析就很重要，建構一個性別分開和全部樣本的可以測量和比較的指標是對了解兒少發展是重要的先決條件。本研究回應科技部性別與科技研究的重點主題「性別影響之研究」(V02)探討永續發展的社會和性別影響評估的計畫徵求。

中 文 關 鍵 詞 ： 青少年、資產指數、貧窮、社會經濟地位、福利政策

英 文 摘 要 ： Objectives
The social welfare policy for low-income families is often determined by the household monthly income; however, this index may not fully describe what children need. The aim of this study was to compare asset-based and monetary socioeconomic position (SEP) indices on whether they demonstrate an association between poverty and health status among adolescents from low-income families.
Methods
Data was utilized from the Taiwan Database of Children and Youth in Poverty, a national representative longitudinal survey, and analyzed those 12-18 years of age (n=2,529). The monetary SEP index was determined by household monthly income; the asset-based index was based on a set of weighted self-reported household conditions and resources derived from PCA. Multivariable logistic regression was conducted to examine the association between these two indices and the mental and physical health outcomes among adolescents.
Results
Health outcomes were significantly associated with the asset-based SEP index but not with the monetary index. The asset-based index showed social gradients in mental health, infections, injuries, allergies and dental problems. For example, adolescents in the poorest quintile of asset-based

index had 4.07 odds of reporting poorer mental health than their counterparts in the least poor quintile, followed by odds ratios of 2.26, 2.02 and 1.44 along with the poverty quintile scale.
Conclusions
An asset-based SEP index serves as a better index associated with a social gradient in health inequality among adolescents from low-income households. To prioritize giving funding and care to people in need, healthcare professionals and policymakers should consider including an assessment of household assets and resources, supplementary to the conventional monetary index.

英文關鍵詞：Adolescents; asset-based index; poverty; socioeconomic position; welfare policy

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本計畫除繳交成果報告外，另含下列出國報告，共 1 份：

□執行國際合作與移地研究心得報告

■出席國際學術會議心得報告

□出國參訪及考察心得報告

中　華　民　國　106　年　8　月　31　日

1. Introduction and background

Poverty is negatively associated with adolescents' mental and physical health (McLeod and Shanahan, 1993; Reading, 1997; Repetti et al., 2002). Evidence of the association between the socioeconomic position (SEP) and health outcomes was demonstrated in the literature (Muntaner et al., 2004; Reading, 1997). Studies of various health outcomes have demonstrated an inverse association between socioeconomic position and health (Williams and Collins, 1995), and the gap in health disparities exists among children and adolescents (Reiss, 2013). Reiss (2013) conducted a systematic review of 55 studies published between 1990 and 2011 and found that 52 studies indicated an inverse correlation between SEP and mental health problems among children and adolescents. Poor children and adolescents experience higher likelihood probabilities of developing mental health problems than those in higher SEP (Reiss, 2013). Another study also reported the social gradient in physical health inequity (Marmot and Bell, 2012).

The impact of disadvantageous SEP on health outcomes builds on the basis of social stratification theory, which refers to how social institutions generate social and economic inequality by restricting allocation of resources (Grusky, 1994). Grusky (1994) pointed out a few components of the stratification system, including how resources are defined by the institutional processes of the level of value, how the rules of allocation differ by the division of labor, and how the mechanism that links people and occupations in turn generates unequal control over resources. Higher classes maintain their status by keeping control of the resources and, hence, limit the mobility of lower classes. This exploitative relationship determines how each class is stratified in society. Along this line, public health researchers have investigated social inequalities and socioeconomic position gradients in health, and have used social stratification to explain health disparities across various classes (Lantz et al., 2001; Lynch and Kaplan, 2000; Marmot et al., 1997).

A standard measure of SEP, such as income and consumption expenditure, may not be a good index in several contexts; for example, it may be difficult to use and does not account for material resources in the household, especially in very poor populations (Vyas and Kumaranayake, 2006). Such monetary SEP index may also be limited in truly reflecting the long-term living asset standards (Montgomery et al., 2000). To complement the limitation of using a monetary index to measure SEP, other measures were applied in previous surveys to capture a full dimension of SEP, such as household ownership of durable assets, source of water, sanitation facility, and infrastructure (Vyas and Kumaranayake, 2006). Such an index that encompasses multidimensional SEP-related variables is used not only in poorer countries, but also in high-income countries such as in Canada (Vincent and Sutherland, 2013) and

European countries (Elgar et al., 2016). In British Columbia in Canada, the government developed a SEP index that combined economic and social position, such as educational attainment, unemployment rate, participation rate, median income, percent of occupied dwellings that are tenant-occupied, and the proportion of households with one occupant (Vincent and Sutherland, 2013). To measure SEP in Norway and six other Europe countries, they used the following indicators: owning a car, having their own bedroom, number of times traveling in the past year, number of computers at home, having a washing machine, and number of bathrooms at home (Elgar et al., 2016). Although there is still a lack of consensus regarding which asset-related variables should be included and whether the quality of assets should be taken into account (Falkingham and Namazie, 2002), asset-based information usually requires less effort to measure, and is considered to be more reflective of allocation of household resources (Filmer and Pritchett, 2001).

Some studies have indicated that asset-based index is more stable than that based on consumption expenditure (Filmer and Pritchett, 2001; Vyas and Kumaranayake, 2006); conversely, other studies have pointed out that there were no differences between these two kinds of measurement (Vyas and Kumaranayake, 2006). The comparison of these two indices is controversial (Howe et al., 2009). Moreover, comparison of the performance between a monetary index and an asset-based index in predicting adolescents' health outcomes were conducted only in low-income countries, such as Mali, Malawi, Mozambique and Côte d'Ivoire (Lindelow, 2006; Morris et al., 2000). One study suggested that the different indicators reflect differ dimensions of poverty and should be carefully analyzed (Lindelow, 2006). Based on these studies, little is known concerning which index can reflect a precise perspective about poverty and how these two indices perform in an impoverished population in high-income countries, such as Taiwan with a GDP of 22,540 USD (World Bank, 2017).

The aim of the present study was to compare an asset-based SEP index and the monetary SEP index in their ability to investigate the effect of poverty on health among adolescents from low-income families in Taiwan. With such information, healthcare professionals and policymakers may have evidence to warrant them using an appropriate SEP index to investigate health-related problems. First, we described the distribution of material and societal resources in the studied sample. Second, we constructed both an asset-based SEP index and a monetary SEP index. Third, we examined and compared the associations between two SEP indices and self-reported health outcomes stratified by gender.

2. Method

2.1.Participants

Data were retrieved from the Taiwan Database of Children and Youth in Poverty (TDCYP) study, a national representative longitudinal survey among children and adolescents from low-income families (Taiwan Fund for Children and Families, 2014). TDYCP was planned and executed by the Taiwan Fund for Children and Families (TFCF), a non-governmental organization (NGO), that subsidizes children and adolescents from impoverished families all over Taiwan. A total of 5,593 children and adolescents receiving financial support from TFCF were selected by systematic sampling method and were interviewed by trained interviewers from TFCF in 2009 and followed up every two years. In the baseline interview, parents of the children and adolescents and social workers from TFCF managing their cases were also interviewed. We utilized baseline data for this study. We included only an adolescent sample and excluded 2,901 children under 12 years of age or above 18 years of age. We then discarded 163 participants who did not have household income information. A sample of 2,529 adolescents 12-18 years of age was the final sample for analysis. This study protocol was approved by the Institutional Review Board at the National Chen Kung University, Tainan, Taiwan (IRB approval number: A-ER-105-065).

2.2.Measures

Mental health. Psychological symptoms were measured by the Brief Symptom Rating Scale (BSRS-5)(Lee et al., 1990), which measures five items including anxiety, depression, hostility, interpersonal sensitivity/inferiority and insomnia. The BSRS-5 is a well-validated and reliable assessment of psychological symptoms (Chen et al., 2005; Lee et al., 2003). With a five-point scale for each question, a higher score indicated worse psychological symptoms. We used a cut-off sum score greater than 14 to identify worse depressive symptom status (Chen et al., 2005).

Physical health. Physical health was assessed by a series of self-reported questions asking adolescents whether they had been diagnosed with the following health problems or whether they had any related symptoms in the past 3 months, including five categories: infections, injuries, allergies, visual problems, and dental problems. Health problems included upper respiratory infection, acute bronchitis, acute gastroenteritis, tuberculosis, pneumonia and otitis media; injuries included burns and falls; allergies included allergy in general and allergic rhinitis. Adolescents who reported having any of the symptoms or diseases diagnosed were coded as yes by each category.

Monetary SEP index. We used total monthly household wages as the monetary index, reported by the social worker.

Asset-based SEP index. The asset-based index was constructed using fourteen questions asking adolescents about their household infrastructure, sanitation and resources available. Infrastructure and sanitation questions were assessed by nine questions related to bad smell, dirty water, lots of rats and roaches, lots of mosquitos, crowded, noisy, and constantly without water or electricity in their living environment. Other resources-related questions included whether they had a stable place or enough light to do their homework in their house, whether they had a computer that could be used to surf the Internet, the number of pairs of shoes to wear, whether the main source of everyday clothing was via donation, and how much they spent on a cell phone monthly.

3. Statistical Analysis

We performed principal components analysis (PCA) of asset-related variables to construct an asset-based SEP index. PCA assigned a weight to each variable and reduced the variable dimensions to a limited number (Vyas and Kumaranayake, 2006). The weight of each variable was determined according to factor loading to create the asset-based SEP index. The asset-based SEP was computed as the sum of the product of the factor loading and the value of the variable.

The asset-based and monetary SEP indices were both tabulated in quintiles based on the distribution: poorest, poorer, poor, less poor and least poor. The consistency between the asset-based and the monetary SEP indices was tested using weighted Kappa (Cohen, 1968). We hypothesized that the consistency would be low because the two indices reflect different perspectives on poverty.

We used multivariable logistic regression to examine the relationship between health status and the two SEP indices in the total sample and then stratified by gender. Mental and physical health were used as dependent variables; quintiles of the SEP index were independent variables. We set the least poor group in SEP quintiles as the reference group. Odd ratios (ORs) and 95% confidence intervals (CIs) were presented. A test for linear trend was performed to examine the Mantel-Haenszel ORs adjusted for age between each health status and various poverty positions. All analyses were conducted in STATA 13 (StataCorp, 2013).

4. Results

A total of 2,529 adolescents with a mean age of 15.3 (47.0% males) were included in the examination of two indices. The characteristic description of the study group is shown in Table 1. Overall, 27-28% reported having lots of rats, roaches and mosquitos at home, 17% reported living in crowded space, and 10% reported bad smell in the household. Dirty water or not having water or electricity is the least

problem for household sanitation. About 20% of the adolescents reported not having a stable place to do homework at home or not having enough light when doing homework. On average, adolescents had 2.4 pairs of shoes to wear and for 1.1% the major source of clothing was donated from TFCF. Two thirds of the adolescents had a computer at home that could be used to surf the Internet. The average monthly cost on a cell phone equaled 7 U.S. dollars.

For mental health, 15% of the sample had depressive symptoms (Table 1). The highest reported physical health problem diagnosed in the past three months was visual problems (46%), followed by dental problems (33%) and allergies (32%). Almost 25% reported injuries and 16% reported infections in the past three months. Females had a significantly higher proportion of mental and physical health problems diagnosed in the past three months than males (all $p<0.05$).

Table 2 shows the comparison of the SEP quintile groupings categorized by the two SEP indices. The result of weighted Kappa index indicated that the individuals were in weak agreement in the two SEP rankings (weighted Kappa = 0.06, 95% CI= .04-.08, p=.002). It showed inconsistent ranking between the monetary SEP index and the asset-based SEP index.

In Table 3, we indicate the risk of having certain health problems within different SEP indices predicted by the asset-based and monetary SEP indices**.** After adjusting by age and gender, the proportion gradients exist in certain but not in all the health problems among the asset-based SEP index. An increased trend was shown in psychological symptoms, infections, injuries, allergies and dental problems when the regression was performed in the asset-based SEP index (p<.05); however, there was no such gradient shown in the monetary SEP index (p=0.3-0.9).

In Table 4, we further indicated the risk in worse health status by SEP quintile predicted by an asset-based SEP index stratified by gender in Table 4. The age-adjusted odds ratio of psychological symptoms, injuries and dental problems of males within the asset-based SEP index showed a gradient risk among the least poor group to the poorest group (p <.05). The poorer the socioeconomic position of the male adolescents, the worse they reported about their situations in the health problems. For females, there were increasing gradients in psychological symptoms and allergies. Poorer female adolescents had higher odds of having problems in mental health and allergies. There was no significant trend in visual problems among males or females.

5. Discussion

Our study demonstrated that an asset-based SEP index serves as a better index associated with social gradients in health outcomes among adolescents from low-income households than a monetary SEP index—even in high-income countries such

as Taiwan. It is possible that the need to create an asset-based index exists not only in low-income countries, but also in low-income populations in high-income countries. The social gradient of the association between SEP and health conditions exists when using the asset-based SEP index, but not a monetary-based SEP index. The asset-based index showed social gradients in mental health, infections, injuries, allergies and dental problems, but not in visual problems.

In our sample there was a low correlation between asset-based and monetary indices, which is similar to a previous study that also showed the correlation of household income and adolescent-reported material assets being weak to moderate (correlation=0.38) (Elgar et al., 2016). One reason that an asset-based index performs better in showing the association between poverty and health may be that adolescents can easily compare material resources they own with their peers, but may not be so aware of their household income relative to other adolescents' household income. Another study also showed that relative family affluence is more closely associated with adolescents' psychosomatic symptoms than an absolute family affluence index (Elgar et al., 2013). For adolescents, SEP inequality can result in a sense of deprivation, creating social hierarchies that further induces stress and results in poor mental and physical health (Elgar et al., 2017). To examine the health inequalities among adolescents in seven European countries, Elgar et al. (2017) compared four types of measure of socioeconomic position: measures of adolescents' self-reported material assets and subjective social status, and parent-reported material assets and household income (Elgar et al., 2016). The association between subjective social position and health inequalities was the most evident compared to other socioeconomic position indices (Elgar et al., 2016), demonstrating that the psychological pathway of social position comparison in adolescents exists.

The finding of this association provides important policy implications. Currently, low-income households that are qualified for social welfare subsidy in Taiwan are determined by the total household income, including real-estate, savings and investments (Ministry of Health and Welfare, 2017). For children and adolescents from low-income families, household income may not be a more direct index than an asset-based index that affects their mental and physical health. Hence, current criteria to determine low-income households could be misleading and leave adolescents with low material resources, such as not having a computer or enough space in the house, but not making the cut for low-income criteria not being able to receive governmental support. A more detailed assessment that includes household sanitation and asset conditions is needed to better determine households to receive welfare support.

The relationship between SEP and psychological outcomes has long been examined in the literature (Elgar et al., 2013; Muntaner et al., 2004; Murphy et al.,

1991). Family poverty has been associated with depression and anxiety in adolescence and young adulthood; moreover, higher frequencies of exposure to poverty in early lifetime have been associated with higher levels of poor mental health (Najman et al., 2010) and as high as two to three times the increased odds for socioeconomically disadvantaged children and adolescents to develop mental health problems (Reiss, 2013). In line with the literature, the social gradient of poverty reflected by the asset-based index used in our study was linked to mental health inequalities identified using the asset-based index in our study (Reiss, 2013).

Mechanisms for the pathway from household poverty to poorer physical health are more diverse. It could be that children and adolescents living in low-income households are deprived of the quality of material environment and experience more stressors in daily life (Elder Jr et al., 1985) that manifest inflammation responses that lead to poorer physical health (Fagundes et al., 2013; Miller et al., 2009). It could also be that parents in poverty may not have enough time or resources that result in children's poorer physical health: psychological distress on parents caused by economic pressure may directly or indirectly affect their parenting practices or their not being able to provide consistent care and response to children's needs (McLoyd, 1990).

Using an asset-based SEP index, our study demonstrated clear social gradients in certain physical health domains, such as infections, injuries, allergies and dental problems, but not in visual problems. It is likely that the prevalence of myopia among adolescents in Taiwan is high (Hung, 2001; Wu et al., 2010), and can start as early as lower grade primary school (Wu et al., 2010). In a sample of rural school children in Taiwan, 8% of first graders and 65% of sixth graders have myopia (Wu et al., 2010). An even higher prevalence of myopia was reported in an urban sample in Taiwan: 19% in first graders and as high as 76% in sixth graders (Cheng et al., 2013). In our sample, 46.2% were diagnosed with visual problems. A high prevalence of myopia in Taiwan may be related to susceptible genetic backgrounds shared by East Asian ethnicities (Chen et al., 2009; Ding et al., 2017; Wang et al., 2006), while some lifestyle factors may also play a role. Visual problems are usually diagnosed before entrance to junior high school, thus making this problem indifferently found in adolescents from all SEP strata.

A major strength of our study is that we conducted this research in a population with a universal health care plan. We eliminate the impact of high medical costs on access to care, which might limit children in poverty to be diagnosed with physical problems by healthcare providers. A national universal healthcare program was implemented in Taiwan by the Bureau of National Health Insurance in March 1995. More than 99% of the total population of 23 million citizens in Taiwan were enrolled

(National Health Insurance Administration, 2016), making unaffordable health care less a problem compared to countries without affordable healthcare insurance plans. However, we still need to take a close look at the social gradient of health inequalities in adolescents. Although universal healthcare plans close some gaps for health inequality by lowering financial burden for impoverished population, other barriers to access care await better policy solutions. For individuals that are economically deprived, even if living in high-income countries with a universal healthcare policy, reasons such as poor living conditions, poor interaction with healthcare providers, and difficulties getting around the healthcare system can still prevent them from maintaining good health (Loignon et al., 2015).

Test for trend showed that psychological distress was correlated with family socioeconomic strain in both genders, while a gender difference was well noted in the association between physical conditions and family socioeconomic strain. For males, the association between family SEP and injuries and dental problems are evident, while infections and allergies are evident in females. When resources are limited, parents may have selected attention and care for certain symptoms that differed by gender. Gender differences in the association between poverty and health in adolescents are evident in other studies (Elgar et al., 2017). A recent multi-nation longitudinal study showed that females but not males are sensitive to the magnitude and timing of early-life inequality in terms of negative effects on psychosomatic symptoms and life satisfaction (Elgar et al., 2017). Material resources can be an important indicator for health and reflect gender disparities, especially when resources are limited (Hernandez and Pressler, 2014; Kenney et al., 2015). Hernandez and Pressler (2014) used data from the National Longitudinal Study of Youth in the United States to examine the accumulation of childhood poverty in association with obese status in young adulthood (Hernandez and Pressler, 2014). Reoccurring exposure to childhood poverty was positively associated with overweight and obesity for white, black, and Hispanic women, but inversely associated for white men. Similarly in Australia, while socioeconomic inequity in obesity was evident in both men and women, women were particularly influenced, showing that the socioeconomic gap in a national cohort widened from 2.8 kg/m^2 at 15-24 years of age to 3.2 kg/m^2 by age 35-44 years (Feng and Wilson, 2015). People with lower neighborhood socioeconomic position experienced a higher body mass index (BMI) from younger adulthood; particularly for women, the inequity widened in the life course (Feng andWilson, 2015). Although mechanisms are yet clear, it is likely that for adolescents, males or females get higher attention in different aspects of health problems.

The present study represents an underexplored population of adolescents from low-income families in a middle- or high-income country. However, there are a few

limitations that should be taken into consideration. First, the asset-based index might not include all information of the entire aspects of SEP, such as level of education of the parents or the occupational status of the parents. Second, although this is one of the first studies among low-income families in high-income countries, our findings might not be applicable to other settings, such as countries without a public healthcare plan. Third, there might be other SEP indices that can better capture health problems or health inequalities in adolescents and that should be included in future studies, making a comprehensive view of poverty. Fourth, both mental and physical health status were reported by adolescents without validation of medical records. However, the self-reported history of diagnosis by healthcare providers that we used for physical health is likely a better measure than self-reported symptoms.

While a welfare decision based on household income is the norm for several countries, including Taiwan, it is necessary to reconsider the adequacy of the monetary index. The family in healthcare needs may potentially be missed by a SEP index based solely on monetary household incomes. Our study demonstrated that an asset-based SEP index serves as a better index than a monetary-based SEP index for social gradients in health among adolescents from low-income households. Healthcare professionals and policymakers should consider including an assessment of household assets and resources as a supplementary index to identify populations in need to receive appropriate care.

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Table 1. Sociodemographic characteristic of adolescents from low-income families (N=2,529)

	Total	Male	Female	
	n=2,529	n=1,188 (47.0%)	n=1,341 (53.0%)	
Variable description	N (%) or mean (standard deviation)			*P-value*
Demographics				
Age	15.3 (1.6)	15.3 (1.5)	15.4 (1.6)	.02*
Monetary information				
Total household monthly income (NTD[1])	15912.5 (10435.9)	15539.8 (10508.7)	16242.7 (10363.7)	.09
Asset information				
Infrastructure and sanitation				
Bad smell	260 (10.3%)	109 (9.2%)	151 (11.3%)	.12
Dirty Water	33 (1.3%)	13 (1.1%)	20 (1.5%)	.36
Lots of rats and roaches	703 (27.8%)	303 (25.5%)	400 (29.8%)	.03*
Lots of mosquitos	690 (27.3%)	311 (26.2%)	379 (28.3%)	.28
Crowded	422 (16.7%)	166 (14.0%)	256 (19.1%)	<.001*
Noisy	351 (13.9%)	159 (13.4%)	192 (14.3%)	.43
Constantly without water or electricity	14 (0.6%)	7 (0.6%)	7 (0.5%)	.52
Stable place to do homework at home	2094 (82.8%)	993 (83.6%)	1101 (82.1%)	.39
Enough light when doing homework at home	2011 (79.5%)	980 (82.5%)	1031 (76.9%)	<.001*
Material condition				
Pairs of shoes to wear	2.4 (1.4)	2.1 (1.2)	2.7 (1.5)	<.001*
Major source of clothing was donated from the Taiwan Fund for Children and Families	28 (1.1%)	17 (1.4%)	11 (0.8%)	.10
Having a computer that can be used to surf the Internet	1648 (65.2%)	759 (63.9%)	889 (66.3%)	.15
Costs on a cell phone monthly[1]	205.9 (215.6)	188.6 (211.8)	221.2 (217.9)	<.001*
Mental health				
Depressive symptoms	381 (15.1%)	150 (12.6%)	231 (17.2%)	.01*
Physical health problems diagnosed in the past 3 months				
Infections	396 (15.7%)	153 (12.9%)	243 (18.1%)	.001*
Injuries	602 (23.8%)	305 (25.7%)	297 (22.2%)	.04*
Allergies	809 (32.0%)	330 (27.8%)	479 (35.7%)	<.001*
Visual problems	1169 (46.2%)	465 (39.1%)	704 (52.5%)	<.001*
Dental problems	834 (33.0%)	346 (29.1%)	488 (36.4%)	<.001*

[1]Currency: New Taiwanese Dollar (1 US= 31 NTD); For those without a cell phone, zero was used as the cost for calculating the mean.

*p<.05: bivariate tests for gender differences using t-tests or chi-squared tests.

Table 2: Comparison of SEP groupings using monetary index and asset-based index (N=2,529)

Monetary SEP index	Asset-based SEP index					
	Poorest	More Poor	Poor	Less Poor	Least Poor	Total
Poorest	117	99	114	104	86	520
More poor	111	112	94	95	82	494
Poor	93	105	99	106	112	515
Less poor	85	91	103	114	102	495
Least poor	101	98	96	101	109	505
Total	507	505	506	520	491	2,529

Weighted Kappa = 0.06
(95% CI= .04 - .08)

Table 3. Odds ratios (OR) and 95% confidence interval (CI) of health problems predicted by asset-based and monetary SEP indices adjusted for age and gender (N=2,529)

	Depressive symptoms		Infections		Injuries		Allergies		Visual problems		Dental Problems	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Asset-based SEP index												
Poorest	4.07***	(2.78-5.96)	1.44*	(1.05- 1.99)	1.47*	(1.10-1.97)	1.62***	(1.24-2.12)	1.11	(0.86-1.43)	1.42**	(1.09-1.85)
More poor	2.26***	(1.51-3.38)	0.98	(0.70-1.38)	1.20	(0.89-1.62)	1.28	(0.97-1.68)	1.04	(0.81-1.35)	1.20	(0.92-1.57)
Poor	2.02***	(1.34-3.04)	0.59**	(0.40-0.85)	1.21	(0.90-1.63)	1.25	(0.95-1.64)	1.05	(0.82-1.36)	1.09	(0.83-1.43)
Less poor	1.44	(0.94-2.20)	0.84	(0.59-1.19)	0.96	(0.71-1.31)	1.11	(0.84-1.46)	1.03	(0.80-1.32)	1.03	(0.79-1.36)
Least poor	1		1		1		1		1		1	
Test for linear trend	<0.001		0.008		0.003		<0.001		0.534		0.005	
	Depressive symptoms		Infections		Injuries		Allergies		Visual problems		Dental Problems	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Monetary SEP index												
Poorest	1.01	(0.72-1.41)	1.00	(0.70-1.43)	1.13	(0.85-1.51)	1.11	(0.85-1.45)	0.94	(0.73-1.20)	0.91	(0.70-1.18)
More poor	1.00	(0.71-1.40)	1.16	(0.82-1.64)	1.10	(0.82-1.48)	1.19	(0.91-1.55)	1.27	(0.98-1.63)	0.91	(0.70-1.18)
Poor	0.84	(0.59-1.18)	1.26	(0.90-1.77)	0.91	(0.67-1.23)	1.04	(0.79-1.35)	1.15	(0.90-1.48)	0.85	(0.65-1.11)
Less poor	0.88	(0.62-1.25)	1.22	(0.86-1.72)	1.32	(0.99-1.77)	1.07	(0.82-1.40)	1.29*	(1.00-1.67)	0.87	(0.67-1.13)
Least poor	1		1		1		1		1		1	
Test for linear trend	0.877		0.932		0.802		0.296		0.479		0.715	

Table 4. Gender stratified regression results of odds ratios (OR) and 95% confidence interval (CI) of health problems predicted by asset-based SEP index adjusted for age (N=2,529)

	Depressive symptoms		Infections		Injuries		Allergies		Visual problems		Dental Problems	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Male												
Poorest	7.53***	(3.58-15.8)	1.23	(0.73-2.05)	1.81*	(1.15-2.84)	1.69*	(1.09-2.63)	1.08	(0.73-1.61)	1.79**	(1.17-2.75)
More poor	4.11***	(1.93-8.75)	0.78	(0.46-1.33)	1.65*	(1.06-2.56)	1.33	(0.86-2.05)	0.96	(0.65-1.41)	1.43	(0.94-2.16)
Poor	3.65***	(1.71-7.79)	0.47**	(0.26-0.83)	1.50	(0.96-2.33)	1.61*	(1.06-2.46)	1.12	(0.77-1.64)	1.26	(0.83-1.91)
Less poor	1.72	(0.76-3.90)	0.65	(0.38-1.10)	1.07	(0.68-1.68)	1.36	(0.89-2.08)	1.05	(0.72-1.52)	1.10	(0.72-1.67)
Least poor	1		1		1		1		1		1	
Test for linear trend	<0.001		0.257		<0.001		0.054		0.924		0.003	

	Depressive symptoms		Infections		Injuries		Allergies		Visual problems		Dental Problems	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Female												
Poorest	3.06***	(1.95-4.82)	1.61*	(1.07-2.42)	1.25	(0.85-1.84)	1.58**	(1.12-2.22)	1.13	(0.81-1.57)	1.23	(0.88-1.72)
More poor	1.67*	(1.02-2.74)	1.13	(0.73-1.77)	0.91	(0.60-1.38)	1.28	(0.89-1.82)	1.13	(0.81-1.59)	1.06	(0.74-1.51)
Poor	1.49	(0.90-2.48)	0.68	(0.42-1.11)	1.02	(0.68-1.54)	1.02	(0.71-1.47)	1.00	(0.71-1.40)	0.99	(0.69-1.41)
Less poor	1.44	(0.87-2.41)	1.01	(0.64-1.59)	0.91	(0.60-1.39)	0.95	(0.66-1.37)	1.00	(0.71-1.41)	1.02	(0.71-1.46)
Least poor	1		1		1		1		1		1	
Test for linear trend	<0.001		0.014		0.305		0.002		0.459		0.222	

科技部補助專題研究計畫出席國際學術會議心得報告

日期：106 年 8 月 14 日

計畫編號	MOST 105-2629-B-006-004-		
計畫名稱	社經弱勢和健康的性別差異：台灣低收入戶兒童少年追蹤調查		
出國人員姓名	莊佳蓉、 梁雅綸	服務機構及職稱	國立成功大學醫學系公共衛生科暨研究所
會議時間	106 年 3 月 29 日 至 106 年 4 月 1 日	會議地點	聖地亞哥，美國
會議名稱	(中文)第三十八屆行為醫學會議報告 (英文) The 38th Annual Meeting & Scientific Sessions of the Society of Behavioral Medicine		
發表題目	(中文)社經弱勢和健康的性別差異：台灣低收入戶兒童少年追蹤調查 (英文) Comparison of Socioeconomic Status Indexes in Predicting Health Outcomes in Adolescents from Low-Income Families in Taiwan		

一、參加會議經過

這次參加的會議是第三十八屆行為醫學會議報告，地點在美國的聖地牙哥，會議時間是 2017/3/29 到 2017/4/1。這次出國參加會議是我第一次帶我的助理雅綸去。

二、與會心得

This is the first time I brought a student to present our work in international conferences. I think we both were very much rewarded from the conference. People came to our poster, which give the student a chance to explain our work in English. She did a great job. Yet, the funding is not enough to cover both our expenses. I will need to reconsider this in the future.

三、發表論文全文或摘要

Objectives
The aim of this study was to compare asset-based and monetary socioeconomic position (SEP) indices on whether they demonstrate an association between poverty and health status among adolescents from low-income families.
Methods
Data of those 12-18 years of age (n=2,529) was utilized from the Taiwan Database of Children and Youth in Poverty. The monetary SEP index was determined by household monthly income; the asset-based index was based on a set of weighted self-reported household conditions and resources. Multivariable logistic regression was conducted to examine the association between these two indices and the mental and physical health outcomes among adolescents.
Results
Health outcomes were significantly associated with the asset-based SEP index but not with the monetary index. The former showed social gradients in mental health, infections, injuries, allergies and dental problems.
Conclusions
An asset-based SEP index serves as a better index associated with a social gradient in health inequality among adolescents from low-income households. To prioritize giving care to people in need, healthcare policymakers should consider including an assessment of household assets and resources, supplementary to the conventional monetary index.

四、建議

Recommendations for the SBM conference: This conference covers a large variety of topics, but with the short conference meeting time, many sessions were overlapped and shared the same timeframe. In the future, the conference could consider extend the meeting time and have the sessions more spread out. Also, there are not many Taiwanese in the conference, but there are several Taiwanese Americans or Taiwanese researchers who currently work in the U.S. It would be helpful if someone can initiate a social meeting next time.

There should be more researchers in Taiwan working on interventions, instead of just analysis health insurance database.

五、攜回資料名稱及內容

無

六、其他：海報

D244

Comparison of Socioeconomic Status Indexes in Predicting Health Outcomes in Adolescents from Low-Income Families in Taiwan

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Introduction

- Social welfare policy for low-income families is often determined by the household monthly income, however, this index may not fully identify children in need.
- An index determined by the available resources for children in poverty may better represent their poverty status and further predict their health status.

Aim of the study:

To compare asset-based socioeconomic status (SES) index derived from the principle component analysis (PCA) and the monetary-based SES index to investigate the effect of poverty on health among adolescents from low-income families.

Method

- **Dataset**: Taiwan Database of Children and Youth in Poverty
  - A national representative longitudinal survey among children and adolescents from low- income families in Taiwan in 2009.
  - A sample of 2,529 adolescents aged 12-18 in junior high school and above was included into analysis.
- **Monetary-based SES index**: household monthly income
- **Asset-based SES index**: weighted score derived from a set of self-reported household conditions and resources available

Result

Table 1. Characteristic description

Variable description	Male n=1,188 (47.0%)	Female n=1,341 (53.0%)	Total n=2,529	
	Mean (Sd) N (%)	Mean (Sd) N (%)	Mean (Sd) N (%)	P-value
Demographics				
Age	15.3 (1.5)	15.4 (1.6)	15.3 (1.6)	.02*
Monetary information				
Total household monthly income (NTD: New Taiwanese Dollar)	15539.8 (10508.7)	16242.7 (10363.7)	15912.5 (10435.9)	.09
Asset information				
Infrastructure and sanitation				
Bad smell	109 (9.2%)	151 (11.3%)	260 (10.3%)	.12
Dirty Water	13 (1.1%)	20 (1.5%)	33 (1.3%)	.36
Lots of rats and roaches	303 (25.5%)	400 (29.8%)	703 (27.8%)	.03*
Lots of mosquitos	311 (26.2%)	379 (28.3%)	690 (27.3%)	.28
Crowded	166 (14.0%)	256 (19.1%)	422 (16.7%)	.00*
Noisy	159 (13.4%)	192 (14.3%)	351 (13.9%)	.43
Constantly without water or electricity	7 (0.6%)	7 (0.5%)	14 (0.6%)	.52
Stable place to do homework at home	993 (83.6%)	1101 (82.1%)	2094 (82.8%)	.39
Enough light when doing homework at home	980 (82.5%)	1031 (76.9%)	2011 (79.5%)	<.001*
Material condition				
Pairs of shoes to wear	2.1 (1.2)	2.7 (1.5)	2.4 (1.4)	<.001*
Source of the clothing was donated from the Taiwan Fund for Children and Families	17 (1.4%)	11 (0.8%)	28 (1.1%)	.10
Having a computer that can be used to surf the Internet	759 (63.9%)	889 (66.3%)	1648 (65.2%)	.15
Costs on a cell phone monthly (NTD)	188.6 (211.8)	221.2 (217.9)	205.9 (215.6)	<.001*
Mental health				
Psychological symptoms	150 (12.6%)	231 (17.2%)	381 (15.1%)	.01*
Physical health problems diagnosed in the past 3 months				
Infections	153 (12.9%)	243 (18.1%)	396 (15.7%)	0.001*
Injuries	305 (25.7%)	297 (22.2%)	602 (23.8%)	0.04*
Allergies	330 (27.8%)	479 (35.7%)	809 (32.0%)	<.001*
Visual problems	465 (39.1%)	704 (52.5%)	1169 (46.2%)	<.001*
Dental problems	346 (29.1%)	488 (36.4%)	834 (33.0%)	<.001*

Table 2: Comparison of SES groupings using monetary-based index and asset- based index

	Asset- based SES index					
Monetary-based index	Poorest	More Poor	Poor	Less Poor	Least Poor	Total
Poorest	117	99	114	104	86	520
More Poor	111	112	94	95	82	494
Poor	93	105	99	106	112	515
Less Poor	85	91	103	114	102	495
Least Poor	101	98	96	101	109	505
Total	507	505	506	520	491	2529

Weighted Kappa κ = 0.06 (95% CI, .04 - .08) P= .002*

Table 3. Odds ratios of predicted health outcome with SES index adjusted for age (95% CI)

	Quintiles of SES indexes				
Asset index					
	Poorest	More Poor	Poor	Less Poor	Least Poor
Mental health	4.1 (2.8-6.0)*	2.2 (1.5-3.3)*	2.0 (1.3-3.0)*	1.4 (0.9-2.1)	1
Infections	1.5 (1.1-2.0)*	1.0 (0.7-1.4)	0.6 (0.4-0.8)	0.8 (0.6-1.2)	1
Injury	1.5 (1.1-2.0)*	1.2 (1.0-1.6)*	1.2 (0.9-1.6)	1.0 (0.7-1.3)	1
Allergies	1.6 (1.2-2.1)*	1.3 (1.0-1.6)*	1.2 (0.9-1.6)	1.1 (0.8-1.4)	1
Visual problems	0.9 (0.7-1.1)	1.0 (0.8-1.3)	1.0 (0.8-1.3)	1.0 (0.8-1.3)	1
Dental problems	0.7 (0.5-0.9)*	0.8 (0.6-1.1)	0.9 (0.7-1.2)	1.0 (0.8-1.3)	1
Monetary Index					
	Poorest	More Poor	Poor	Less Poor	Least Poor
Mental health	1.0 (0.7-1.4)	1.0 (0.7-1.4)	0.8 (0.6-1.2)	0.9 (0.6-1.3)	1
Infections	1.0 (0.7-1.4)	1.2 (0.8-1.6)	1.3 (0.9-1.6)	1.2 (0.9-1.7)	1
Injury	1.1 (0.9-1.5)	1.1 (0.8-1.5)	0.9 (0.7-1.2)	1.3 (0.9-1.8)	1
Allergies	1.1 (0.8-1.4)	1.2 (0.9-1.5)	1.0 (0.8-1.4)	1.0 (0.8-1.4)	1
Visual problems	1.1 (0.9-1.4)	0.8 (0.6-1.0)	0.9 (0.7-1.1)	0.8 (0.6-1.0)	1
Dental problems	1.1 (0.9-1.4)	1.1 (0.9-1.4)	1.2 (0.9-1.5)	1.1 (0.9-1.5)	1

Table 4. Asset-based SES index adjusted for age OR (95% CI)

Quintiles of asset-based SES index					
Male					
	Poorest	More Poor	Poor	Less Poor	Least Poor
Mental health	7.5 (3.6-15.8)*	4.1 (1.9-8.8)*	3.6 (1.7-7.8)*	1.7 (0.8-3.9)	1
Infections	1.2 (0.7-2.0)	0.8 (0.5-1.3)	0.5 (0.3-0.8)*	0.6 (0.4-1.1)	1
Injury	1.8 (1.1-2.8)*	1.6 (1.1-2.6)*	1.5 (1.0-2.3)*	1.1 (0.7-1.7)	1
Allergies	1.7 (1.1-2.6)*	1.3 (0.9-2.0)	1.6 (1.1-2.5)*	1.4 (0.9-2.1)	1
Visual problems	0.9 (.62-1.4)	1.0 (0.7-1.5)	0.9 (0.6-1.3)	1.0 (0.7-1.4)	1
Dental problems	0.6 (0.4-0.9)*	0.7 (0.5-1.1)	0.8 (0.5-1.2)	0.9 (0.6-1.4)	1
Female					
	Poorest	More Poor	Poor	Less Poor	Least Poor
Mental health	3.1 (1.9-4.8)*	1.7 (1.0-2.7)*	1.5 (0.9-2.5)	1.4 (0.9-2.4)	1
Infections	1.6 (0.1-2.4)	1.1 (0.7-1.8)	0.7 (0.4-1.1)	1.0 (0.6-1.6)	1
Injury	0.3 (0.8-1.8)	0.9 (0.6-1.4)	1.0 (0.7-1.5)	0.9 (0.6-1.4)	1
Allergies	1.6 (1.1-2.2)*	1.3 (0.9-1.8)	1.0 (0.7-1.5)	1.0 (0.7-1.4)	1
Visual problems	0.9 (0.6-1.2)	0.9 (0.6-1.2)	1.0 (0.7-1.4)	1.0 (0.7-1.4)	1
Dental problems	0.8 (0.6-1.1)	0.9 (0.7-1.3)	1.0 (0.7-1.4)	1.0 (0.7-1.4)	1

Conclusion

- Asset-based SES index serves as a better index for social gradient in health among adolescents from low-income households than monetary-based index.
- Healthcare professionals and policy makers should consider including an assessment of household asset and resources as a supplementary index to identify population in need to receive appropriate care.

105年度專題研究計畫成果彙整表

計畫主持人：莊佳蓉	**計畫編號：**105-2629-B-006-004-
計畫名稱：社經弱勢和健康的性別差異：台灣低收入戶兒童少年追蹤調查（V02）	

成果項目					量化	單位	質化 （說明：各成果項目請附佐證資料或細項說明，如期刊名稱、年份、卷期、起訖頁數、證號...等）
國內	學術性論文	期刊論文			0	篇	
		研討會論文			0		
		專書			0	本	
		專書論文			0	章	
		技術報告			0	篇	
		其他			0	篇	
	智慧財產權及成果	專利權	發明專利	申請中	0	件	
				已獲得	0		
			新型/設計專利		0		
		商標權			0		
		營業秘密			0		
		積體電路電路布局權			0		
		著作權			0		
		品種權			0		
		其他			0		
	技術移轉	件數			0	件	
		收入			0	千元	
國外	學術性論文	期刊論文			0	篇	
		研討會論文			1		Liang, Y., Tsai, M., Lin, C. & Strong, C. (2017, March). Comparison of Socioeconomic Status Indexes in Predicting Health Outcomes in Adolescents from Low-income Families in Taiwan. Poster presented at the 38th Annual Meeting and Scientific Sessions of the Society of Behavioral Medicine, San Diego, CA.
		專書			0	本	
		專書論文			0	章	
		技術報告			0	篇	
		其他			0	篇	
	智慧財產權及成果	專利權	發明專利	申請中	0	件	
				已獲得	0		

			新型/設計專利	0		
		商標權		0		
		營業秘密		0		
		積體電路電路布局權		0		
		著作權		0		
		品種權		0		
		其他		0		
	技術移轉	件數		0	件	
		收入		0	千元	
參與計畫人力	本國籍	大專生		1	人次	梁雅綸
		碩士生		0		
		博士生		0		
		博士後研究員		0		
		專任助理		1		梁雅綸
	非本國籍	大專生		0		
		碩士生		0		
		博士生		0		
		博士後研究員		0		
		專任助理		0		
其他成果 （無法以量化表達之成果如辦理學術活動、獲得獎項、重要國際合作、研究成果國際影響力及其他協助產業技術發展之具體效益事項等，請以文字敘述填列。）				文章已完成 正在投稿中		

科技部補助專題研究計畫成果自評表

請就研究內容與原計畫相符程度、達成預期目標情況、研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）、是否適合在學術期刊發表或申請專利、主要發現（簡要敘述成果是否具有政策應用參考價值及具影響公共利益之重大發現）或其他有關價值等，作一綜合評估。

1. 請就研究內容與原計畫相符程度、達成預期目標情況作一綜合評估
   ■達成目標
   □未達成目標（請說明，以100字為限）
   　□實驗失敗
   　□因故實驗中斷
   　□其他原因
   說明：

2. 研究成果在學術期刊發表或申請專利等情形（請於其他欄註明專利及技轉之證號、合約、申請及洽談等詳細資訊）
   論文：□已發表　■未發表之文稿　□撰寫中　□無
   專利：□已獲得　□申請中　■無
   技轉：□已技轉　□洽談中　■無
   其他：（以200字為限）

3. 請依學術成就、技術創新、社會影響等方面，評估研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性，以500字為限）
   技術創新：這是台灣第一個研究低收入兒童和青少年的國家代表性樣本的研究。主要成分分析使我們能夠包括廣泛的社會經濟地位措施，這個對收入較低的人口很重要。

   學術成就：這也是第一個模擬性別特異性SES指數與整體SES指數進行比較的研究。「性別司法框架」為我們提供了推動社會資源分配和對健康結果的影響的結構。

   社會影響：社會福利政策旨在縮小社會經濟差距，在小時候實施可以更好的解決問題。這項研究將對終止貧困的社會政策產生影響，並同時解決性別不平等。

4. 主要發現

本研究具有政策應用參考價值：□否 ■是，建議提供機關內政部,衛生福利部,

（勾選「是」者，請列舉建議可提供施政參考之業務主管機關）

本研究具影響公共利益之重大發現：■否 □是

說明：（以150字為限）