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Studying successful ageing: A showcase of the Singapore Life Panel

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Studying Successful Ageing: A showcase of the Singapore Life Panel by ROSA's SGUnited Trainees

RESEARCH BRIEF SERIES 3

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CONTENTS

FOREWORD

In this special issue of the ROSA Research Brief Series, we showcase two aspects of the work being done at the Centre for Research on Successful Ageing (ROSA). Firstly, we showcase the capabilities of the Singapore Life Panel (SLP) and the data that the SLP is able to obtain and measure on a monthly basis. Secondly, we showcase the amazing work of the SGUnited Traineeship Programme's Research Assistants at ROSA who have proven themselves to be incredible assets in helping further ROSA's aims of enabling successful ageing in Singapore.

ROSA aims to measure well-being among older adults holistically in order to provide accurate recommendations to policy makers that would enable successful ageing. Developing and adopting the valid measures of well-being, as well as its determinants, is an important first step that ROSA has taken to do so. The first two articles in this issue showcase our efforts in this area by discussing the theoretical framework and measurements of well-being that ROSA has adopted and plans to include, as well as how the socio-economic status of our respondents, a crucial determinant of well-being, is measured in the Singapore Life Panel.

While the focus of ROSA's work is on older adults, the centre has also been cognizant of the issues faced by younger generations especially during the COVID-19 pandemic and has strived to make efforts to support younger Singaporeans during this time. Thus, when the SGUnited Traineeship initiative was launched to support fresh graduates in finding employment amidst the economic uncertainty of the pandemic, ROSA hired a total of 12 trainees as research assistants and made a commitment to develop their skills and prepare them to find employment once the pandemic was over. While they were all fresh graduates, our trainees have not failed to impress, and we are grateful for the opportunity to showcase their hard work in this special issue – all the articles in this issue are written by our trainees, and the 3rd and 4th articles showcase some of the analysis our trainees have conducted using the SLP data.

Thus, we hope that through the articles that are featured in this special issue, you will be able to gain a greater appreciation for the work being done at ROSA, as well as for our SGUnited Trainees whom we are immensely proud of and who have far exceeded our expectations.

Article 1

Well-Being & Successful Ageing in the Singapore Life Panel

INTRODUCTION

Purpose of Paper

Well-being as a concept and topic of discussion can be difficult to grasp and as such, even more difficult to define. However, in order to be able to measure how well people are doing both now and in the future, we need to be able to find dimensions from which we can explore well-being. Research into different areas of well-being, whether it be economic, psychological or even social has been growing since the 1970s, with significant breakthroughs. The Centre for Research on Successful Ageing ("***ROSA***"), as a research centre which hopes to inform government policy, focuses on ways to not only measure the impact of policies, but also of events. Measuring the well-being levels older adults are at and exploring the process this can be enhanced through the different dimensions is crucial. As such, this paper will go through the ways well-being has been studied, where it is at now, and where ROSA can pick up from.

Importance of Ageing Research in Singapore

With improvements in healthcare systems and technologies, the global life expectancy in the world has increased exponentially, from an average age of 47 in 1950 to 73.2 in 2020. Singapore impressively ranks top 5 in the world for average life expectancy at 84.1 years in 2020, even topping the chart in 2017[1]. By 2030, 1 in 4 Singaporeans will be 65 or older[2]. Though this is joyous news, there still remains a chasm between one's *lifespan* and *healthspan*. In a study by the Ministry of Health in 2017, it was

[1] United Nations Population Division Estimates <*https://www.worldometers.info/demographics/life-expectancy*>
[2] Ministry of Health (2016) Action Plan for Successful Ageing
<*https://sustainabledevelopment.un.org/content/documents/1525Action_Plan_for_Successful_Aging.pdf*>

found that Singaporeans spend 10.6 years in poor health over the course of their lives[3]. This is largely the result of age-driven problems, encompassing and stemming from areas beyond physical health, such as their overall well-being. As such, we should strive to research and handle these causes to ensure that Singaporeans can have a progressive quality of life alongside life expectancy.

What ROSA does

ROSA utilizes data from the Singapore Life Panel ("***SLP***"), a monthly internet-based longitudinal survey comprising of about 8,000 households with individuals aged 56 ~ 76 (in 2021), with plans to include a new cohort of adults (50 ~ 55) to track the impact of pre-retirement changes. The collected data under ROSA will then be analysed to answer important questions about overall well-being of the older population in Singapore, which can advise and refine policies in place for older adults. This is so as ensuring adequate satisfaction in the different domains is a precursor to obtaining successful ageing. ROSA adopts a holistic understanding of well-being and conceptualizes well-being as having 4 quadrants - *Economic*, *Mental*, *Physical* and *Social* Well-Being ("***EMPS***"). Research is done into each quadrant to pick out as many latent variables as possible, and modules of different instruments are created based on these variables to be added into the monthly survey in order to examine specific factors determining well-being in each quadrant. As a result, modules can be customized and fielded situationally as needed to obtain important data, a feature that is only possible in a high-frequency survey as flexible as the SLP. For instance, even with the sudden onset of COVID-19, and the announcement of the circuit breaker in March 2020, a COVID module was able to be crafted into the survey by the next month. This allowed us to obtain essential answers and insights regarding actions, attitudes and the impact of COVID-19 upon the older population such as the importance of familiarity with communication technology to lower their sense of social isolation, and what the government can do to help.

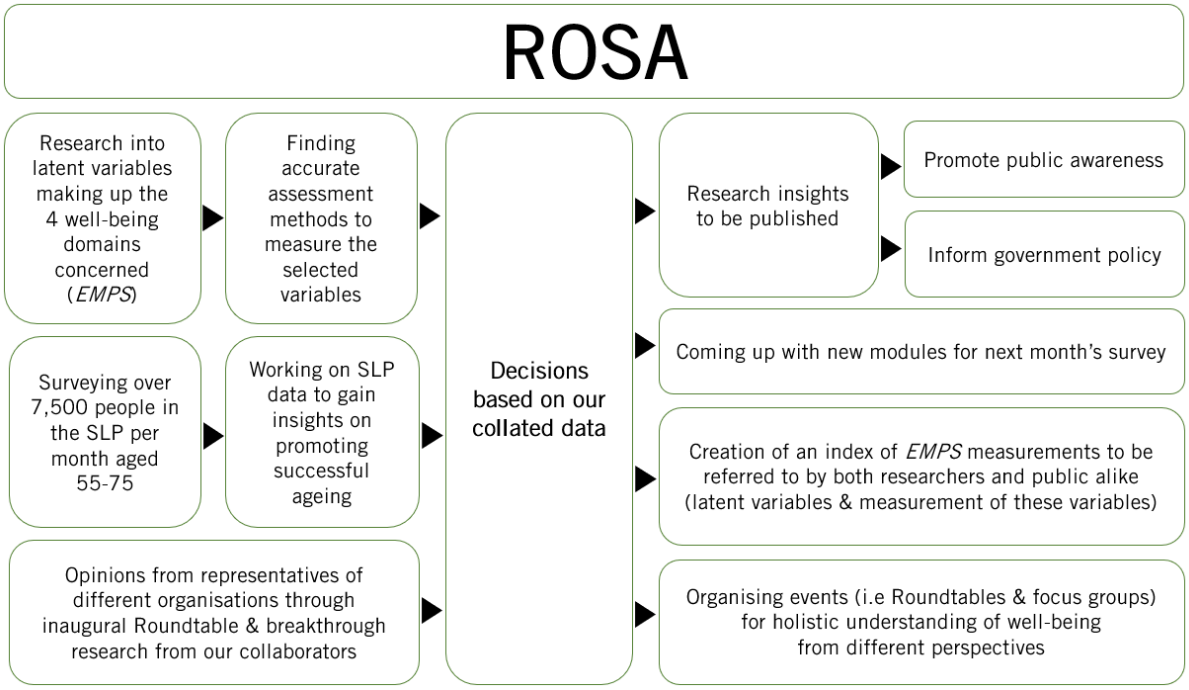
ROSA's Purpose

ROSA's goal is to enable successful ageing for all Singaporeans, in order for older adults to still remain integrated in society, be productive and feel valued. ROSA carries out various studies in order to meet that goal: Studying both past and current literature that make up well-being in older age, contextualized to Singapore; Deriving accurate measurements for the selected variables; Creating an index of these measurements that is easily understood by laypersons and researchers alike; Working on the data obtained and gaining insights, to then be used to promote awareness and make policy recommendations.

There is a need to understand how we can best empower older adults to contribute to society. To achieve this, we need to ensure their well-being in different domains and how levels of well-being can be measured, as a means to enable successful ageing. Our research team, comprising of experts in the field of psychology, sociology, economics and healthcare continuously contribute to existing research. We also welcome representatives from organisations to join our inaugural Roundtables, where we

[3] Ministry of Health (1990-2017) The Burden of Disease in Singapore. <*https://www.moh.gov.sg/resources-statistics/singapore-burden-of-disease-report-2017*>

discuss ageing issues that have come up during the year and invite contributions from their perspective to our research. All of this will be done with the goal of successful ageing in mind, differentiating us from the general indexes on well-being. With the urgency of the ageing issue and the countless research studies in the field, this compilation will make a useful step for future direction.



WELL-BEING RESEARCH & CHOICE OF WELL-BEING DOMAINS

GDP & its Issues

Gross Domestic Product ("***GDP***") has long been the chief measure of national success and national progress, as such, it was a way to judge the nation's well-being. However, GDP was never meant to assess the holistic well-being of citizens, but simply to measure economic growth and production capacity of the country, during a time of war. There are two main criticisms in terms of measuring holistic well-being. Firstly, GDP misses a lot of activity, both economic and other areas (unpaid household work, value of government programs such as health care provision, value of leisure etc.) if it is used to calculate well-being. Secondly, readily available alternative measures may reflect well-being far better, by taking into account factors such as educational achievement, health or subjective well-being. This ensures that other things of value in life, which cannot be fully captured by the GDP, can still be measured by other metrics of health, education, political freedom and the like[4].

Exploring Alternatives to GDP

[4] Joseph Stiglitz, Amartya K. Sen, Jean-Paul Fitoussi (2009) The measurement of economic performance and social progress revisited: Reflections and Overview. *hal-01069384*

In light of these issues, a study on the alternatives to GDP was commissioned, and a Report of the Commission on the Measurement of Economic Performance and Social Progress ("***CMEPSP***") was published in 2009[5]. The report made huge strides in rethinking the metrics countries used to measure well-being and societal progress. There had previously been discussion about the gaps in GDP as a welfare metric, for instance, the Human Development Index by the UN in 1990 was created to supplement GDP with measures on health and longevity, knowledge and income. With the 2008 financial crisis illustrating the deficiencies of the GDP as metric[6], the 2009 report led to wide advancements in well-being measurements by different global organizations. An example is the OECD's Better Life Initiative which began in 2011, following the recommendations of the report, consisting of extensive projects on measuring well-being. Another would be the UN's resolution on happiness and well-being in 2012, which called for countries to undertake steps to "pursue the elaboration of additional measures that better capture the importance of the pursuit of happiness and well-being in development with a view to guiding their public policies"[7].

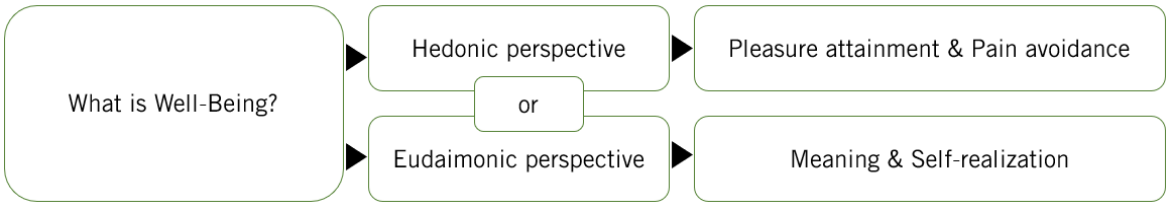
Approach to Well-Being Research in the Literature

Most research into the area will be derived from two general perspectives: - hedonic and eudaimonic well-being. The hedonic approach focuses on happiness and defines well-being in terms of pleasure attainment and pain avoidance. The eudaimonic approach focuses on meaning and self-realization and defines well-being in terms of the degree to which a person is fully functioning[8]. The two approaches clash as activities that can cause fulfilment such as work, can also subject one to pain, thus bringing up the debate as to what makes a person truly happy or gives at least the highest level of well-being one can achieve. Happiness, quality of life, general welfare, mental well-being, psychological well-being are often used interchangeably with well-being, which is understandable, considering how broad the conception of all these terms are, therefore the focus of the paper will just be on well-being itself.

There is no unified operational definition of eudaimonic well-being, although certain components appear in the conceptions of eudaimonic well-being. As such, various concepts have been included in it such as self-efficacy and control beliefs[9], beliefs of autonomy, self-acceptance and environmental mastery[10]. What should be noted is that since both hedonic and eudaimonic approaches treat well-being or happiness as a whole rather than segmenting it into different components or dimensions, concepts in eudaimonic well-being might overlap with concepts in other well-being domains. ROSA

[5] Stiglitz, Sen, Fitoussi (2009) Report of the Commission on the Measurement of Economic Performance and Social Progress.
[6] Joseph Stiglitz (2019) "It's time to retire metrics like GDP. They don't measure everything that matters" <*https://www.theguardian.com/commentisfree/2019/nov/24/metrics-gdp-economic-performance-social-progress*> Accessed 25 Mar 2021
[7] United Nations (2011) "Happiness should have greater role in development policy – UN Member States <*https://news.un.org/en/story/2011/07/382052*> Accessed 25 Mar 2021
[8] Ryan & Deci (2001) On Happiness and Human Potentials: A Review of Research on Hedonic and Eudaimonic Well-Being. *Annual Review of Psychology*
[9] Bandura (1997). Self-efficacy: The exercise of control. *W H Freeman/Times Books/Henry Holt & Co*.
[10] Keyes, Shmotkin & Ryff (2002) Optimizing well-being: The empirical encounter of two traditions. *Journal of Personality and Social Psychology* 82(6): 1007-1022

encompasses both by breaking down well-being into topics which we can then apply both perspectives.



Approach to Well-Being Research by Organisations

OECD's Better Life Index ("***BLI***") has an extensive and encompassing list of all indicators, listed by the dimension of well-being, in order to cater to its 37 members. It can almost be seen as a spreadsheet of almost every single well-being indicator and measurement that can be thought of. It should however, firstly, be noted that Singapore is not part of the OECD and thus excluded from their data collected from 37 member countries in the creation of the index. There are also indicators which may be less relevant to an ageing context, such as "Students' cognitive skills in reading, mathematics and science".

Ministry of Health Action Plan for Successful Ageing[11]

Singapore has risen to the challenge to be a society whose seniors age well. In 2016, the Ministerial Committee on Ageing launched a $3 billion Action Plan for Successful Ageing, with over 70 initiatives to help older adults lead healthy and active lives. There are also various objectives that have been listed on an individual, community and national level that the government plans to implement over the next decade. It contains useful information obtained from the comments from various communities and unions, discussing topics such as employability and lifelong learning. From this action plan, we are able to have a good framework of what direction the government is leading into for the future. By tracing backwards, we can understand the concerns of the people that led to the implementation of such actions, and study further ways to resolve it.

ROSA Choice of Well-Being Domains

Other international organizations have explored the concept of well-being to an extensive degree. The 1946 preamble of the World Health Organization's ("***WHO***") constitution is one of the best-known definitions of health, a state of "*complete physical, mental and social well-being and not merely the absence of disease or infirmity*". The domains chosen by ROSA (*EMPS* Well-Being) follow from this, identified and commonly accepted as critical areas of life that help a person age well. Although there are many categories of well-being domains out there, these selected ones cover the scope of important issues older adults face, such as retirement adequacy, declining mental and physical health,

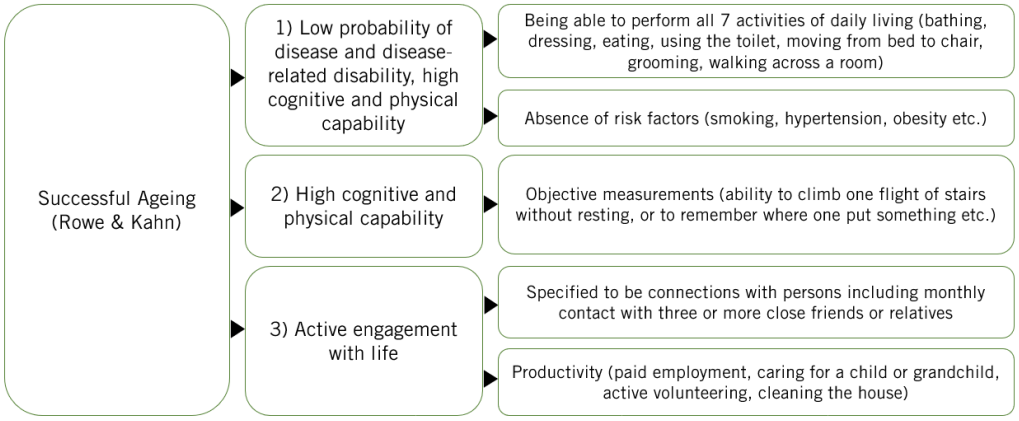
[11] Ministry of Health (2016) "I feel young SG: Live well, age well" <*https://www.moh.gov.sg/ifeelyoungsg/about/what-is-the-action-plan-about*> Accessed 25 Mar 20201

and shrinking social networks as friends age and pass on. It is still important that we explore the way other organizations have interpreted well-being and how to measure it, in order to learn from and augment the current ways we're studying and measuring well-being. At ROSA, we focus on the 4 main aspects chosen, adopted as the initial starting point and relate it to the other insights we've gathered from organisations, to ensure that the centre of the research will always be on successful ageing.

SUCCESSFUL AGEING & WELL-BEING

Rowe and Kahn's Framework

Rowe and Kahn's (1997) definition of successful ageing has been the most widely used and popularized, and emphasizes the large role that lifestyle and environmental changes play in the prevention of age-related deficits, rather than the inevitability of age-related decline. Their conceptualization of successful ageing views decline and functional loss as modifiable through an individual's own actions[12]. They define successful ageing as "including three main components: low probability of disease and disease-related disability, high cognitive and physical capability, and active engagement with life". Low-probability of disease and disease-related disability included being able to perform all 7 activities of daily living (bathing, dressing, eating, using the toilet, moving from bed to chair, grooming, or walking across a room), and absence of risk factors such as smoking, hypertension and obesity. High cognitive and physical capability includes different objective measurements, such as the ability to climb one flight of stairs without resting, or to remember where one put something. Lastly, active engagement with life is specified to be connections with persons including monthly contact with three or more close friends or relatives. Rowe & Kahn further included an item for productivity[13] under this label, which could be any of the following - paid employment, caring for a child or grandchild, active volunteering or cleaning house. However, these are measuring only objective indicators. The importance of subjective indicators to capture a holistic framework has been emphasized in studies, as will be discussed below.



[12] Stowe & Cooney (2014) Examining Rowe and Kahn's Concept of Successful Aging: Importance of Taking a Life Course Perspective. *The Gerontologist* 55(1): 43-50

[13] Rowe & Kahn (1998). *Successful Aging. New York: Pantheon. SAS Institute, Inc. (1996)*

Criticisms of Rowe & Kahn: Objective Measurements

There have been two major criticisms - 1) objective measurements, and the 2) overt focus on individual agency and behavioural change. More and more research studies have started recognizing the importance of subjective measures of well-being. Self-evaluated health has been shown to predict mortality even while controlled for other risk factors, with the possible explanation of it being a self-fulfilling prophecy[14]. Fatalism has often been explored as a risk factor for health, as individuals with low self-efficacy might not take the necessary precautions to get proper health screening.[15] There are also other outliers that prevent objective measurements in being the only measure of "success". For instance, a significant number of people living with prevalent chronic conditions, which disqualifies them from Rowe and Kahn's definition, still rate themselves as ageing successful, similarly, a significant number of people, although lacking such conditions, would rate themselves as not ageing successfully[16]. This suggests that successful ageing cannot simply be characterized by objective measurements alone.

Criticisms of Rowe & Kahn: Focused on Individual Agency

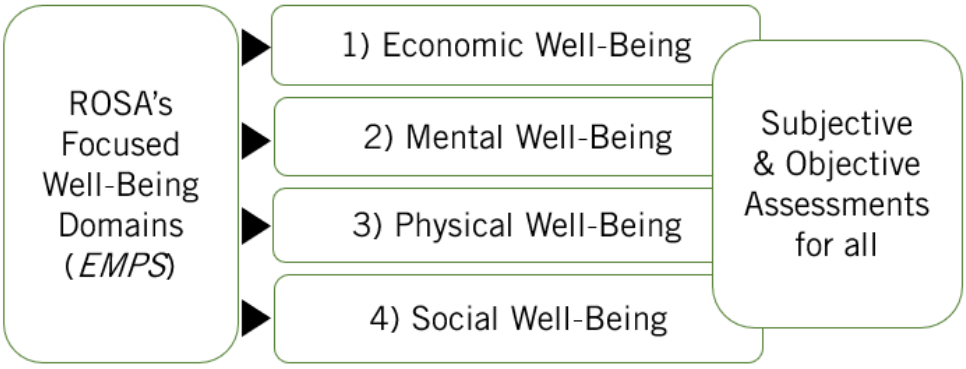
Although the emphasis on personal agency was welcome in the late 20th century as ageing then was thought to be accompanied by inevitable and irreversible loss and decline[17], it is important to remain cognizant of extrinsic or structural constraints outside of one's control that also shape the ageing process. For instance, there have been studies to show how childhood vulnerability and risk exposure such as economic disadvantage in childhood could significantly predict adult health, even if current socioeconomic status had changed[18]. There have also been studies on the impact of childhood influences (e.g parental abuse) and factors in adulthood (e.g smoking) that have found both influences were found to have comparable strength in predicting disease-free status[19]. As such, it is crucial to observe the different domains of well-being throughout one's life in order to gain a realistic picture of where interventions and programs should be targeted.

ROSA's Research Framework

ROSA's adopted research framework expands on that proposed by Rowe and Kahn. This model of well-being has been expanded upon to include four encompassing domains in which variables can be included: *Economic well-being, Mental well-being, Physical well-being and Social well-being* (EMPS).

[14] Cleary (1997) Subjective and Objective Measures of Health: Which is Better When?. *Journal of Health Services Research & Policy* 2(1): 3-4
[15] Straughan & Seow (1998) Fatalism reconceptualized: A concept to predict health screening behavior. *Journal of Gender, Culture and Health* 3(2): 85-100
[16] Strawbridge et al. (2002) Successful Aging and Well-Being: Self-Rated Compared With Rowe and Kahn. *The Gerontologist* 42(6), 727-733
[17] Stowe & Cooney (2014) Examining Rowe and Kahn's Concept of Successful Aging: Importance of Taking a Life Course Perspective. *The Gerontologist* 55(1): 43-50
[18] Brandt, Deindl & Hank (2012) Tracing the origins of successful aging: the role of childhood conditions and social inequality in explaining later life health. *Soc Sci Med*. 74(9):1418-25.
[19] Schafer & Ferraro (2012) Childhood misfortune as a threat to successful aging: avoiding disease. *The Gerontologist*. 52(1):111-120.

Within each domain, both objective and subjective indicators of well-being will be observed. This deals with the original criticisms towards Rowe and Kahn. Variables are still very much linked between domains; however, this provides for a clearer way to conceptualize and analyze the links between them. Successful ageing thus can be achieved through the development and promotion of these different domains of well-being.



ECONOMIC WELL-BEING

Economic Well-Being in the Literature

Economic well-being at the individual level is conceptualised as the assessment of access to economic resources and their capacity to contribute to an individual's needs and aspirations and ability to cope with financial implications of risks (health-care costs, loss of income through unemployment or sudden onset of unfortunate events etc.). Measuring economic well-being is deceptively simple, however it requires the most localization out of the other domains of well-being measurement. Issues being laid out and solutions proposed must be heavily contextualized in order for it to move forth, since any decision made could potentially take away from another area financially.

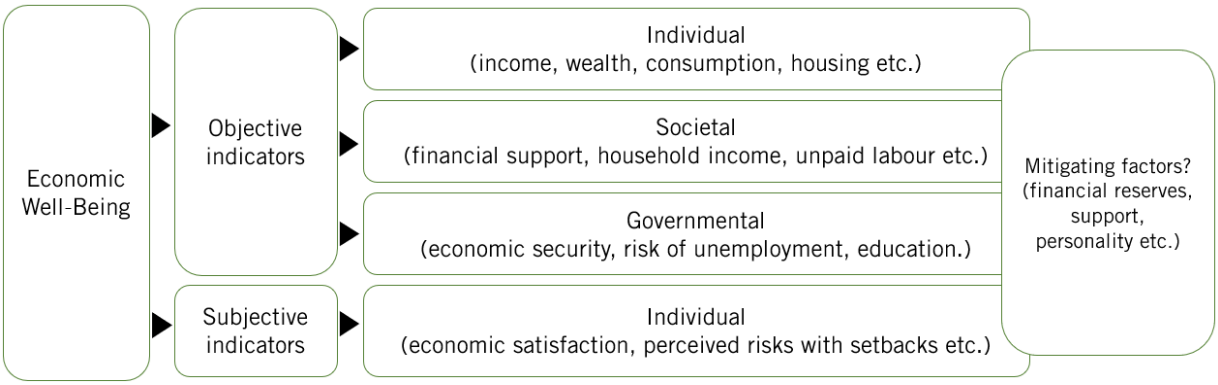
One of the most well-known economic well-being indices is the Index of Economic Well-being ("IEWB")[20], by the Center for the Study of Living Standards, using data from mainly Canada and 14 other OECD countries, continually coming out with papers on the estimates of economic well-being indexes for these countries. They include 4 variables for their conceived index of economic well-being: consumption flows; wealth accumulation; income equality and economic security[21]. Although it does not include subjective measurements, we can clearly see the differences between the actual (objective) and the perceived (subjective). One might not think that subjective economic variables account for one's economic well-being, however, if one overestimates their economic abilities, they might not save up for the future. In the same breath, if one underestimates their economic situation, they might not spend on important matters such as doctor appointments.

[20] Centre for the Study of Living Standards (1995) "Index of Economic Well-Being" <*http://www.csls.ca/iwb.asp*>. Accessed 25 Mar. 2021

[21] Lars Osberg (1985) The measurement of economic welfare. *Approaches to Economic Well-Being*, Vol. 26. University of Toronto Press, Toronto

ROSA's Economic Well-Being Framework

Other than a focus on holistically including both objective and subjective indicators, there are many layers of perspectives, whether it be on an individual, societal or country level, playing into one's economic well-being that should be considered as well. Objective indicators of economic well-being include financial quantities (income, wealth, consumption, housing etc.), complementary measures (time use etc.) and personal characteristics (education etc.). Objective measurements are much more clear-cut, relying on how accurate the dataset and the information gathered is. Subjective indicators include self-reports of economic satisfaction, as well as perceived risks (subjective probabilities) associated with events or stressors such as ill-health and unemployment. ROSA further looks at the impact of these risks and the extent to which it can be mitigated by factors such as liquid financial reserves, family support or even personal characteristics that influences an individual's resilience. SLP's high-frequency longitudinal data will enable the estimation of trajectories of subjective well-being following a shock to health or employment.

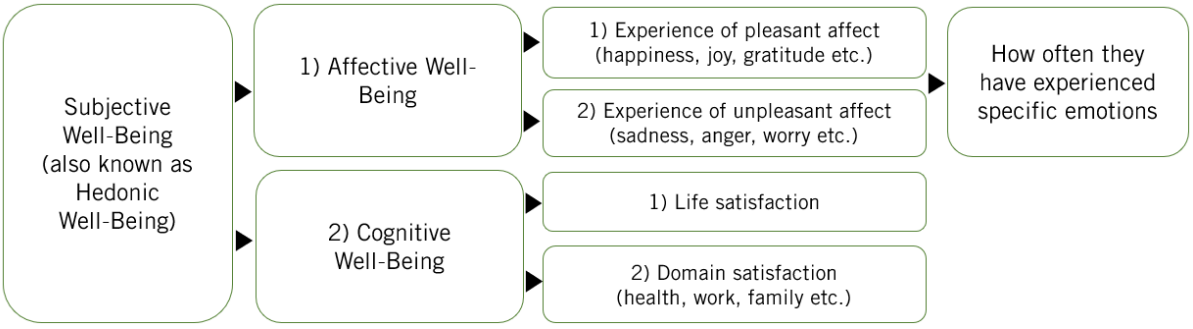


MENTAL WELL-BEING

Mental Well-Being in the Literature

The concepts of hedonic and eudaimonic well-being are very closely linked to that of a person's mental state and fulfilment and has been explored above. In the literature, subjective well-being is also referred to as hedonic well-being[22]. Subjective well-being consists of affective well-being and cognitive well-being. Affective well-being refers to the experience of pleasant and unpleasant feelings, as such it is typically assessed by asking respondents how often they have experienced specific emotions (e.g happiness, joy, contentment, sadness, anger, worry). It can also be split into two further groups - experience of pleasant affect and experience of unpleasant affect. On the other hand, cognitive well-being is based on an evaluation of how one's life (e.g their goals, desires, standards) is being fulfilled by the current conditions. It is commonly assessed by measures of life satisfaction or satisfaction with specific areas of life such as health, work and family, also known as domain satisfaction. As such, cognitive well-being can be split into two further groups - life satisfaction and domain satisfaction.

[22] Diener (1984). Subjective well-being. *Psychological Bulletin* 95(3): 542-575



WHO Well-Being Index (WHO-5)

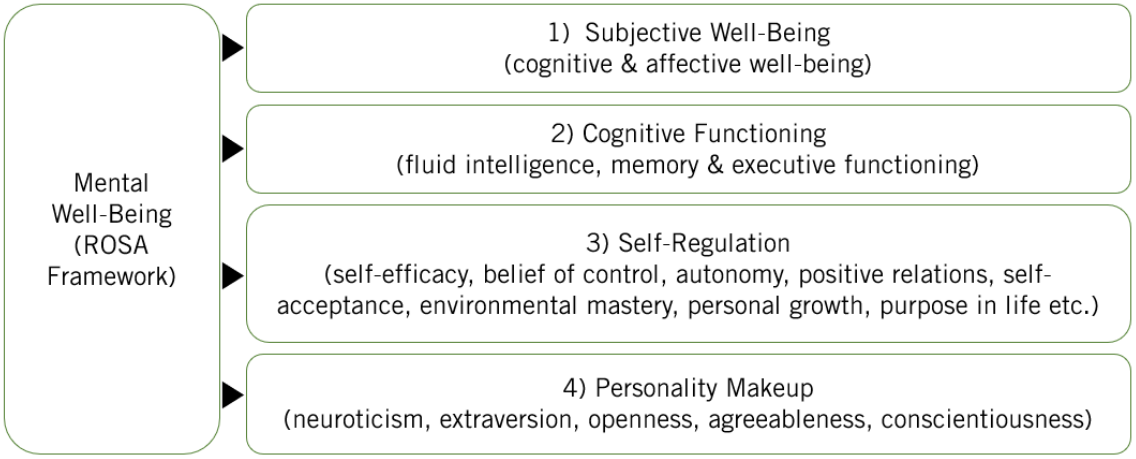
Since its publication in 1998, the WHO Well-Being Index (WHO-5) questionnaire has been widely used to assess subjective psychological well-being. Not only are the questions simple enough for adequate understanding across multiple translations in different countries and age groups, but they are also non-invasive. The phrasing of the questions have been useful in wording our own surveys, such as "I have felt cheerful in good spirits" or "My daily life has been filled with things that interest me". It is suitable for all countries, however, there are many ways to assess mental well-being that can be further explored and utilized as well. Different events impact countries differently, and these impacts should be weighed locally to obtain an accurate assessment.

ROSA's Mental Well-Being Framework

Mental well-being as such is not simply the absence of mental illness; it also consists of a state of well-being in which a person is able to function in daily life, including engaging in productive work, maintaining fulfilling social relationships, and coping with everyday challenges[23]. There are four key indicators of mental well-being included within - cognitive capacity, self-regulation, personality makeup and subjective well-being. While subjective well-being is entirely based on how an individual feels, cognitive functioning is concerned with the objective ways one's cognitive abilities have fared. Researching and understanding how to prevent deterioration of cognitive functioning also means that there will be less fear about ageism or a preconceived bias that older adults are unable to pick up new skills. Self-regulation covers one's ability to control one's thoughts, feelings, and behaviors to achieve valued goals. It also has a lot of overlap with domains in terms of the terms used. "Positive relations" ties into social well-being in terms of the quality of social ties having a positive effect on mental health. "Self-efficacy" and "belief of control" also ties in with the behavioural traits affecting an individual's physical health, such as fatalism or having initiative in preventive health measures. Though there are overlaps, it is important to recognize these terms used in mental well-being literature in order for potential further study. Lastly, personality has a direct effect on ageing in terms of how an older adult behaves across a range of situations. Throughout one's life, they will likely face a host of challenges, and even more so as they age. Personality traits such as resilience or the willingness to be flexible plays greatly into measuring the state of one's mental well-being. Research into how personality can

[23] US Department of Health and Human Services [HHS], 1999; WHO, 2018

still develop can also break the stereotype that older adults are rigid, or their personalities are impossible to change after a certain age[24].



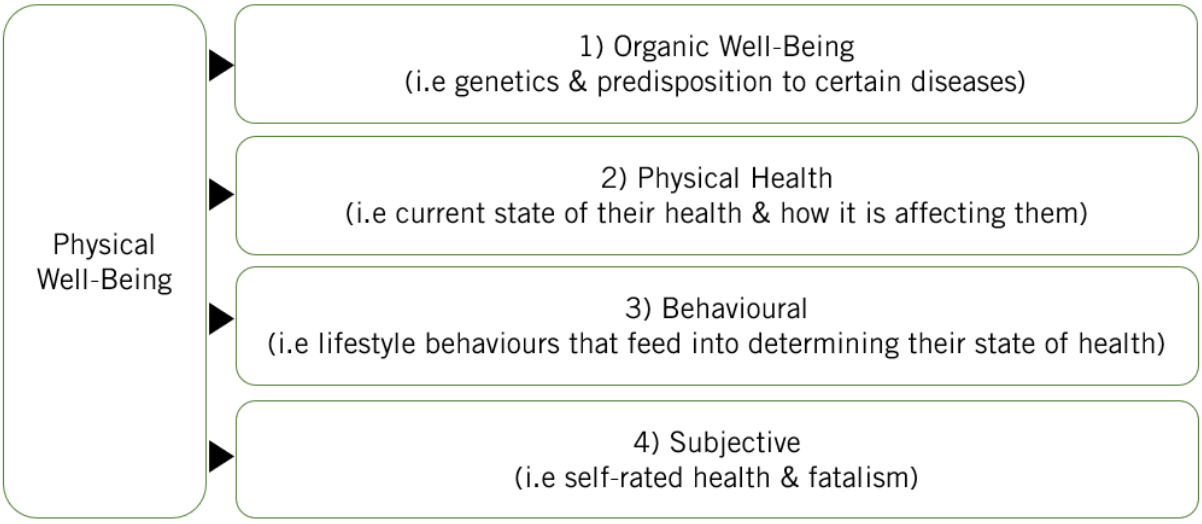
PHYSICAL

Physical Well-Being in Literature

The 1946 preamble of the World Health Organization's (WHO) constitution is one of the best-known definitions of health, a state of "*complete physical, mental and social well-being and not merely the absence of disease or infirmity*". Physical well-being, especially for that of older adults, can be essential in determining their overall well-being. It is highly correlated to all the other domains of well-being. If someone is in pain or disabled from a debilitating disease, it will impair his capacity to work (economic), cause distress and the possibility of a depressive state (mental) and affect his ability to upkeep his social circle (social). These symptoms resulting out of poor health can further deteriorate the individual's condition. There are 3 main ideas when looking at physical well-being literature. Firstly, one's genetics and predisposition to certain diseases (organic well-being). Secondly, the current state of their health and how it affects them (physical health). Lastly, the behavioural, where their lifestyle behaviours will feed into determining their health (behaviour and lifestyle). Additionally, the concept of optimism or positive thinking's influence on one's health has been studied as well, finding that it may be a protective factor that significantly influence physical well-being in terms of coping strategies, and is an angle to be looked at as well (subjective physical health)[25].

[24] Allemand, Zimprich & Hertzog (2007) Cross-sectional age differences and longitudinal age changes of personality in middle adulthood and old age. *Journal of Personality* 75(2): 323-358

[25] Conversano et al. (2010) Optimism and Its Impact on Mental and Physical Well-Being. *Clin Pract Epidemiol Ment Health* 6:25-29



ROSA's Physical Well-Being Framework

Physical well-being of older adults is assessed with regard to its functional and its organic components. Functional well-being is measured using validated measures of limitations in activities of daily living (ADL) and instrumental activities of daily living (iADL). Organic well-being is measured using disease checklists as established for instance in the 1995 Health and Retirement Study[26]. The incidence and management of chronic diseases, and how they impact overall quality of life is a crucial component of well-being in later life. With average life expectancy increasing, there is also concern with the weight it has on the healthcare system. As such, other than their physical health, this will also include tracking health care utilization behaviour with established instruments, as well as lifestyle behavioural patterns. Such lifestyle behavioural patterns (participating in health screenings, regular physical exercise, attention to a balanced diet, and to regular sleep patterns etc.) may prevent or delay onset of chronic diseases. Other than one's objective physical health, ROSA also explores look at older adult's satisfaction with their state of health.

SOCIAL

Social Well-Being in the Literature

Besides the conventional framework for social well-being by Keyes, which will be explored below, there is a need to be cognizant of changes in social behaviour that technology has brought forth. The use of technology may mean that face-to-face interactions are increasingly being substituted with social media and communication devices. This can be even more crucial for older adults who are unfamiliar with these applications, and there is a need to bridge the technological divide. As individuals grow older, social ties are immensely important for social engagement, social support and

[26] Wallace & Herzog (1995) Overview of the Health Measures in the Health and Retirement Survey. *The Journal of Human Resources*.

connectedness. It has direct influences on the physical and mental health of older adults[27], in terms of having people around to look out for them, as well as participate with or invite them out for activities. Understanding the social network of older adults is pivotal in understanding the points of intervention, as well as examining not only the quantity of social ties, but the quality as well. Marital happiness and marital stability especially, play large roles in one's social well-being[28]. Other areas of concern within the sphere of older adults and wider society includes the mistreatment of seniors in nursing homes, as well as the infrastructure being senior-friendly, which is essential in ensuring they are still able to remain active and not confined to their homes.

ROSA's Framework of Social Well-Being

Keyes' definition[29] is used as the framework for guiding our research into the social domain of well-being. He defines it as "the appraisal of one's circumstance and functioning in society", identifying a constellation of factors such as social integration, social contribution, social coherence, social actualization and social acceptance. We use this general framework and apply it to the specific sociocultural background of Singapore, for instance in assessing the quality of social ties one has with their neighbours, which can be said to be quite crucial due to the close living quarters of Singapore.
In order to assess social well-being, we have to look at each component. Social integration is the extent to which individuals feel that they are a part of society, therefore, it is subjective in terms of whether they feel they belong. Social contribution is the evaluation of one's social value, including the belief that one is a vital member of society, with something of value to give to the world. It reflects whether, and to what degree, people feel that whatever they do is contributing to and valued by society. Social coherence is rooted in perception, being able to understand the world around them, seeing their personal lives as meaningful and coherent[30], and involves appraisals that society is discernible, sensible and predictable. Social actualization is the belief in the evolution of society and its potential through its institutions and citizens. One can be said to be socially healthier if they are hopeful about the future of society and can even envision that they are potential beneficiaries of social growth. Social acceptance is two-fold, trusting others and believing others are capable of kindness, as well as feeling good about their own personalities and accepting themselves. From this framework, we have a pathway we can start to explore in terms of understanding how to assess social health. Besides these variables, efforts are being made to find more contextually suitable factors that can be utilized to assess the social health of Singaporeans.

[27] Portero & Olivia (2007) Social support, Psychological Well-being, and Health Among the Elderly. *Educational Gerontology* 33(22): 1053-1068
[28] Waite, Luo & Lewin (2009) Marital happiness and marital stability: Consequences for psychological well-being. Social Science Research: 38(1): 201-212
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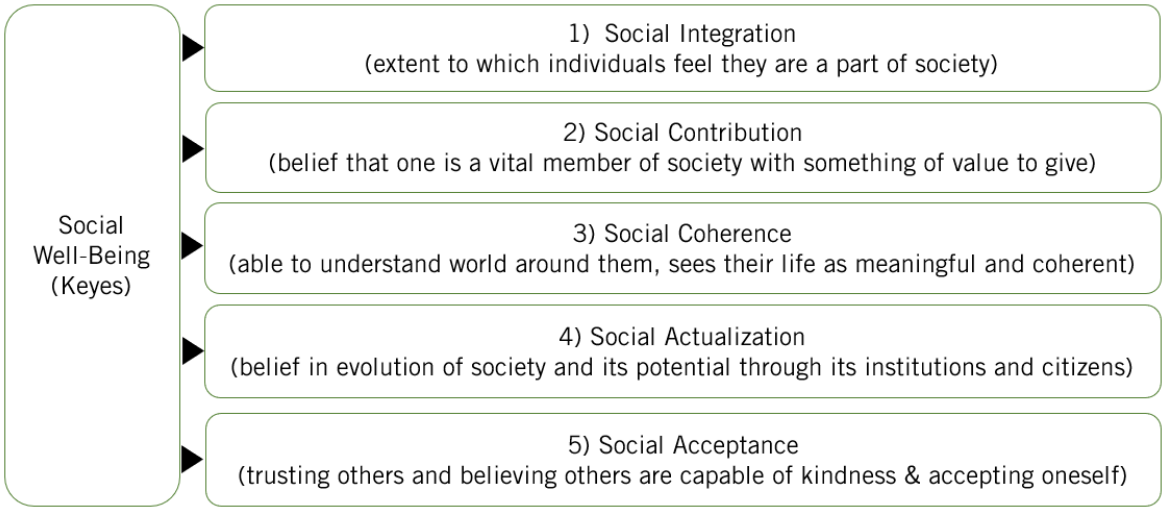
[30] Ryff (1989) Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology* 57(6): 1069-1081



FUTURE PLANS FOR ROSA (AS OF 2021)

Moving forward, additional modules that aim to capture various aspects of well-being in its different dimensions as presented above, as well as its determinants, will be included. In March 2021, a module examining frailty and intrinsic capacity, an essential dimension of the physical health capital of older adults, was included to observe how these are predictive of (and predicted by) various social, economic, and psychometric measures. In the following month of April 2021, a module examining attitudes towards gender roles was added to help ROSA understand how older adults feel about relative income differences between spouses. For example, gender role attitudes may influence how husbands feel about having lower or higher income than their wives. The module was included as a means to better examine sociocultural determinants of well-being among older adults. ROSA will also be conducting a study of the impact between the routineness of older Singaporeans' job tasks, and their well-being/job satisfaction in May 2021. The data from this module will be used to validate the international scale of routineness (the Routine Task Intensity (RTI) in a Singapore context, using the local occupational and industry classifications (SSCO & SSCI). The modules that ROSA has run over just the span of a few months illustrates the multi-disciplinary nature of the work at ROSA and the desire for the centre to study well-being among older adults holistically.

In the long run, these modules will work towards helping researchers at ROSA achieve the centre's overall goal of developing an index to measure well-being that spans the four interlinked domains: the economic, social, mental, and physical. Such a multi-domain approach to well-being distils the intricate matrix that contributes to the overall perception of well-being and facilitates the analysis of the interdependencies of these domains. In developing such an index and field testing it, we will be able to derive a better understanding of Singapore's ageing population and contribute to policy formation to mitigate the challenges of ageing. If successful, such an index will also enable researchers across the world to conceptualize well-being more broadly and empower the successful ageing movement internationally.

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Article 2

Capturing Socioeconomic Status in the Singapore Life Panel

INTRODUCTION

ROSA's effective use of the SLP's data is dependent on its researchers' ability to understand and analyse the information before them. In efforts to develop this ability, this report aims to provide future researchers with a detailed guideline on how to conceptualise and measure socioeconomic status (SES).

In this report, we begin with a reference to theoretical foundations of social class utilising Marxian class theory and Weber's three-component theory of stratification: class, status, and party. For Marx, class is stratified according to a group's ownership of means of production – it follows that all societal processes and social relations are determined purely by economic forces (Quah et al., 1991). Weber, however, propounded that stratification is not based solely on ownership of property or capital, but should include power and prestige. Stratification is thus determined by class, referring to ownership and economic resources; status, referring to prestige, community ranking, and honour (Liberatos, Link, & Kelsey, 1988); and power embedded in a political context. Researchers often use three variables to measure SES – occupation, income, and education – based on Weber's class and status domain (Liberatos et al., 1988). While there is no single best indicator of SES suitable for all study aims, these three common indicators measure different but related aspects of socioeconomic stratification. For the purposes of this report, SES will be defined as the social and economic divisions across a society which can be understood in terms of both individual and area level measures. Individual level measures of SES include individual employment status, vehicle ownership status, monthly household income, and being a recipient of financial aid. Area level measures

of SES included whether the resident was living in a block predominantly composed of public rental units. It is understood that the main effect of area SES can be independent of individual level SES, age, and education, highlighting that the area level effect was not merely the manifestation of compositional differences across neighbourhoods (Chan, Lee, and Low, 2018).

Although well-established, these SES measures are context dependent – they vary across different cultural, ethnic, and demographic groups. The study of Singapore's older adult population is not exempt from this: what may be a salient determinant SES factor during young adulthood or active professional life, may not be relevant during retirement. According to Galobardes and colleagues (2006), demographic relevance is implicated in measuring SES: occupation may be less salient during the retirement period because individuals' employment choices may be dictated by other means apart from livelihood, such as leisure and a desire to remain mentally active. However, we also consider the case where members of the older adult population are compelled to work out of necessity, especially under long hours with low remuneration. Under these circumstances, occupation may be indicative of an individual's SES. Contextual relevance is also considered: in the case of Singapore, we consider how housing may be deeply embedded in the national way of life, since more than 80% of Singaporeans live in public housing (Public Housing – A Singapore Icon, 2020). Amongst public housing dwellers, further stratification occurs along income brackets: lower-income individuals receive heavily subsidized public rental housing, which researchers have taken to be a marker of low SES. Furthermore, low area SES was associated strongly with poorer cognitive function and cognitive impairment in studies of community-dwelling older adults in Singapore (Chan et al., 2018). It is therefore befitting that housing is considered as an indicator of SES in Singapore. Where social security schemes such as the Silver Support Scheme, Matched Retirement Savings Scheme, and Central Provident Fund (CPF), are available to older adults, one must also include these sources of savings under income for a Singaporean older adults.

It is with these considerations that we set the basis for selecting our four SES variables: occupation, income, education, and housing. This report aims to expound on each variable by justifying its relevance in measuring SES, classifying it under the 'social' or 'economic' aspect of SES, and highlighting questions from the Singapore Life Panel (SLP) survey that can be used to capture each variable. In the following paragraphs, we highlight that despite the wide array of literature and relatively robust data set, caveats and considerations do need to be addressed in order to effectively calculate the SES level of the individual reflected in the SLP.

INCOME

The first variable, income, is one of the most widely used SES measures classified under Weber's class domain. Income is a crucial measure of SES because it influences an individual's access to resources – opportunities for education, the ability to afford different lifestyles, prestige, and power (Barber, 1968). Many researchers have argued that income constitutes the material aspect of SES: an individual with higher income may have higher purchasing power, being able to purchase better food, better housing, live in safer environments, and have better access to healthcare. In other words, differential income highlights economic stratification and thus, socioeconomic position. It encapsulates all sources of revenue available to an individual: income from employment, investments, monetary transfers from family and friends, and money received through social programs or financial assistance (Baker, 2014).

The SLP covers this by asking "What is your household's current gross income per month?", "Did you (and your spouse) receive any money from family members, relatives, or friends in the last month?", and "Did you or your spouse receive any income from Workfare, ComCare Assistance, or other similar government welfare assistance schemes in the last 12 months?".

As a determinant of SES, income is straightforward, robust, and the best single indicator of material living conditions (Galorbades et al., 2006). However, this does not preclude the measure from having its own limitations. In a literature review, Liberatos et al. (1988) highlights that income may be unstable over time, with income volatility being marked by changes in one's financial circumstances due to inability to work, loss of spouse, or even decisions to take a lower paying job. With the added age-dependent nature of income, we also bear in mind that individuals generally experience increases in income throughout one's occupational career but suffer declines after retirement. Comparison between the income level of older versus younger adults may therefore be erroneous when it comes to evaluating SES. What researchers may do to resolve this issue is to assess the effect of income within a certain age group, instead of across different groups (Liberatos et al., 1988).

Currently, the SLP uses household income as a measure of economic welfare, with questions such as "What is your household's current gross income per month?" and "Was the total combined family income during the past 12 months more or less than $20,000?". Specifically, household income in the SLP is calculated as follows:

Monthly Household Income = i007zw + i002zw + i004zw + i005zw

The table below specifies income components measured by these 4 variables:

Household Income	**i007zw**: "How much would that other income amount to in total before taxes and other Deductions?"
	i002zw: "How much was your total income from work in the month of [last month], before taxes and other deductions? If you had more than one job then please report the total from all jobs."
	i004zw: "How much was your spouse's total income from work in the month of [last month] before taxes and other deductions? If your spouse had more than one job then please report the total from all jobs."
	i005zw: "Did [you or your spouse] receive any money from family members, relatives or friends in the month of [last month]?"

However, this report recommends the use of individual income or per capita income as opposed to household income to overcome the issues pertaining to comparability. Household income on its own does not account for the allocation of income amongst family members and the costs of living unique to each household. This is corroborated by Datta (1980), which concluded that household income *per capita* is a more precise measure of economic well-being and that the two measures should not be taken to be synonymous in analyses of economic welfare.

To illustrate: a family of 4 members with a sole breadwinner earning $4,000 a month may have higher household income than a single individual earning $1,200. However, when distribution is accounted for, members of the first family end up having a lower per capita income than the single individual. Where the aim of a study is to discern differences in SES, use of household income per capita may better account for an income distribution which reflect differences in welfare (Datta, 1980). However, it is important to note that income only partially captures economic status and is not inclusive of other assets such as inherited wealth, ownership of homes, and even ownership of motor vehicles.

EDUCATION

The second variable that captures SES is education. Under Weberian theory, this variable may be classified under the class domain, providing individuals with the qualifications required to acquire occupations and income (Liberatos et al., 1988). However, it may also be situated within Weber's status domain, as a factor that influences behaviours and practices through the establishment of lifestyles and social networks. As Mirowsky and Ross (2003) have shown, education is the primary and first marker of SES because it influences other measures of SES – occupation, earnings, and wealth, to name some.

Since education often provides the qualifications to acquire certain occupations and income, it is also used as a proxy measure for variables in the economic domain (Liberatos et al., 1988). Education is an indicator of both class and status. As on an individual level completed education generally precedes employment and the ability to earn income, it may influence social position in a powerful way (Berkman & Macintyre, 1997).

Operationally, education can be measured as a continuous variable (years of completed education), or as a categorical variable by assessing educational credentials or degree earned (Ross & Mirowsky, 1999). The continuous measure assumes that every year of education contributes similarly to a person's attained SES and that time spent in education has greater importance than educational achievements, whereas the latter assumes that specific achievements are important in determining SES (Liberatos et al., 1988). The SLP covers both questions, specifically "How many years of schooling did you complete?" and "What is the highest education qualification that you have?".

When it comes to education, we bear in mind that high school and college educational attainment today is much higher than any previous period (Liberatos et al., 1988). The implication when using education to evaluate SES amongst older adults is that we expect them to have lower levels of educational attainment and less variance. Given this, education should be measured by categorical variables (i.e., No formal education, primary education, or higher education).

OCCUPATION

Our third SES variable, occupation, is related to income as it includes material rewards associated with one's occupation (Baker, 2014; Liberatos et al., 1988) – here, we situate occupation within Weber's class domain. However, occupation may also be construed as a measure of social standing and can shape an individual's capital – social networks, for example (Baker, 2014). Class aside, occupation may also be situated in Weber's status domain: occupations that provide a greater sense of control and autonomy, and allow for greater creativity, are often associated with a higher social standing (Baker, 2014).

As an observable variable, occupation is widely used due to the ease with which researchers can collect this information. While there may be many variations of occupational markers – longest occupation held, for instance – researchers usually use current occupation (Berkman & Macintyre, 1997). This, however, may present some difficulties when it comes to the older adult population, where current occupation may not be an accurate reflection of lifetime or usual occupation. Specifically, older adults may choose to engage in incidental work for leisure, instead of working to fulfil their pecuniary needs. This leaves open the issue of how best to measure occupational status for this group.

Some have suggested that occupational status be based on longest job held. The limitation with this method, however, is that it may not capture variation in social standing and available resources among older adults who have retired (Baker, 2014). While other researchers have suggested using an individual's last position held prior to retirement (Hollingshead, 1975), this does not rectify the issue that older adults may take on fewer demanding jobs or see work as supplemental to a retirement lifestyle (Morgan, 1983; Kitagawa & Hauser, 1973). With these limitations in mind, we agree that as per Galobardes and colleagues (2006), occupation may be a less salient indicator of SES. Thus, we recommend that occupation be evaluated holistically with other variables – wealth, savings, and ownership (e.g., home) – as well as usual occupation.

HOUSING

The final variable we consider is Housing. In Singapore, home ownership is a key local indicator of SES. The type of housing an individual resides in is often strongly correlated with other factors such as income and occupation while also alluding to their overall well-being levels quite accurately. About 5.3% of resident households in Singapore reside in public rental housing. To be eligible for public rental housing at highly subsidized rates, the total household gross income must be very low and not exceed S$1,500 per month (Low, 2016). Therefore, public rental housing is a good area-level measure of SES in Singapore. Furthermore, older adults are particularly vulnerable to neighbourhood SES as their social space shrinks due to decreased mobility, limiting their interactions to their immediate community. This increases the significance of housing as an SES indicator and allows us to evaluate its impact on an individual's health and health behaviours. The walkability of a neighbourhood, perceived safety, and availability of areas to exercise, are associated with higher quality neighbourhoods and better health (Baker, 2014).

Local studies carried out till date show that staying in public rental housing was found to be associated with poorer health status and outcomes. Residents in public rental housing had had lower participation in health screening, preferred alternative medicine practitioners to western-trained doctors for primary care, and had increased hospital utilization (Chan et al., 2018). However, just distinguishing between public rental housing and non-public rental housing may not be thorough enough for this analysis of area level SES. Even within the general public housing of Singapore, commonly dubbed as HDB, there are various tiers of housing which again will point towards the general well-being of the individual. Previous studies such as Ernest et al. (2015), chose to calculate the proportion of individuals who lived in 3-room HDBs and below. ROSA could choose to do the same and by doing so derive three distinct levels of housing standards: Public rental housing, public housing with 3-rooms and below and the remaining respondent population. By doing so, possible trends could be better analysed and correlations that are hinted at in other papers might be confirmed.

The SLP provides us with data on the type of housing and the number of individuals the respondent is living with. This data would directly tie in to the three distinct levels of housing we have highlighted above and as such we recommend using it to gauge the SES level of the respondent as it would provide a good overview to their current well-being status.

However, a caveat that must be addressed is that some older adults may have decided to downsize their residential households with family members moving out and as such have greater spending ability whilst living in a smaller household. Such anomalies are currently not accounted for in the SLP and as such, while we do recommend using housing as a SES indicator, it should be bolstered by the other indicators we have introduced above to get a more accurate picture of the respondent's true social economic status.

CONSTRUCTING AN SES INDEX

In tabulating an individual's SES level, we cannot just take the arbitrary values of the indicators stated above and hope to get an accurate understanding of the situation. Rather, like many of the other studies have done, we too need to formulate an index that best reflects ROSA's goals and by doing so, effectively calculate an individual's level of SES.

Below, we have a table that depicts possible indices we could use for this purpose. These indices are extensively detailed in papers written by Earnest and colleagues (2015), and Bell, Schuurman and Hayes (2007).

Approach	Principle Component Analysis (PCA)	Order Weighted Index based Multi-Component Analysis (OWA based MCA)
Necessary Components for Index	• Variables from the SLP that cover the 4 aspects mentioned above. • Creation of a Socioeconomic Disadvantage Index (SEDI) using the necessary variables. • Creation of a Socioeconomic Advantage Index (SAI) using the necessary variables.	• Variables from the SLP that cover the 4 aspects mentioned above. • A weighing system that assigns specific weights to each variable that best suit the researcher's needs.
Benefits of Index	• Variables needed are readily available in the SLP. • Detailed process outlined in previous papers that can be	• The index's weightage is flexible, allowing researchers to finetune their findings

	replicated for ROSA's context with relative ease. • Cultural context of Singapore is already present in the creation of the index making it more viable for use.	according to their needs. It is not a one-size fits all solution. • Can be altered to fit either a more sociological approach or economic approach to SES depending on how the variables are weighted.
Detriments of Index	• Does not account for economic and social deviations due to older adult-specific phenomena such as retirement.	• Determining and subsequently validating the weightages assigned to each variable might become more complicated than the study they are being used for.

Table 1.1: PCA vs OWA based MCA.

Based on the above table, the recommendation of this report is that the Principal Component Analysis (PCA) be used in the short-term for ROSA's immediate projects with the possible implementation of the Order Weighted Index based Multi-Component Analysis (OWA based MCA) in the future which would help to fill in the gaps that the PCA might have.

However, researchers should be aware about the considerations highlighted in the previous variable paragraphs and include or omit the necessary data points to get the most accurate picture regarding the target demographic of Singaporean older adults.

In conclusion, we see that despite the ready availability of data and literature which help to theoretically ground the tabulation and subsequent analyses of SES, the presence of caveats and considerations do make the process of formulating an effective index slightly challenging. However, we believe that through effective discussion and cautious planning, these caveats and considerations can be addressed and worked around during the index formulation stages. As such, with the support of the literature cited here, along with the questions/data highlighted from the SLP we believe that researchers at ROSA will gain a clearer idea on how to conceptualise and measure the SES of older adults in Singapore. By doing so, this report also hopes to provide the basis upon which the well-being (in accordance with ROSA's four quadrants) of these individuals can be attributed to their SES.

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Article 3

Caregiving among Older Adults – An Exploration of the Effects of Caregiving on the Well-being of Older Adults

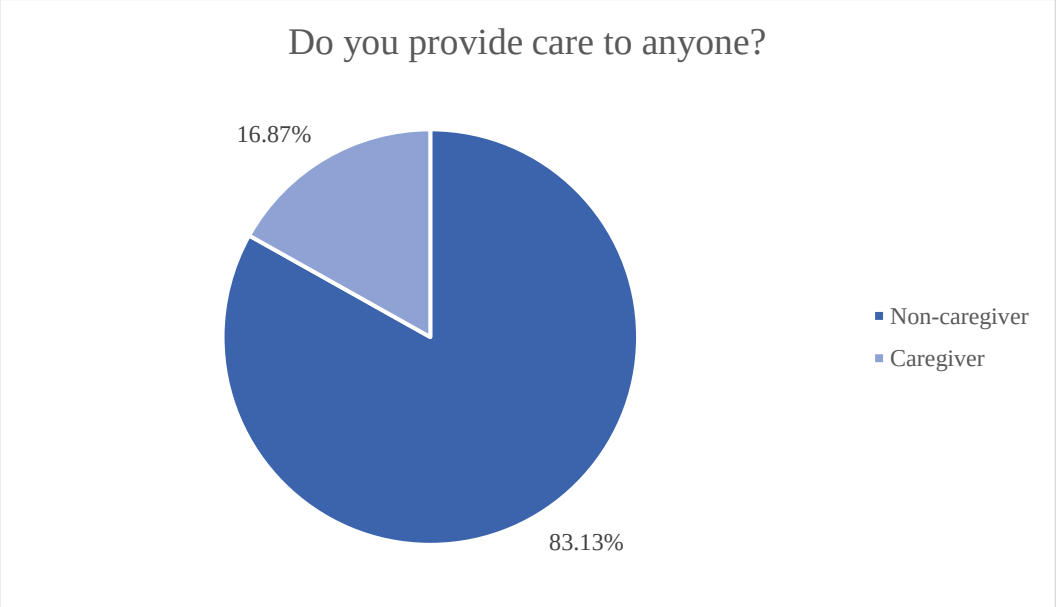
INTRODUCTION

In the August 2020 run of the Singapore Life Panel (SLP), a caregiving module was fielded to get a better understanding of the caregiving environment in Singapore. A wide variety of questions were asked spanning areas such as time spent providing care, the impact of COVID-19 and the 'Circuit Breaker' on provision of care, and attitudes towards caregiving. This research brief presents the descriptive findings from the module and some preliminary analysis of these findings. For wave 61 of the SLP that ran in August 2020, there were about 7,500 responses from Singaporeans aged 55 to 75 (See Table A1 under Annex A for a profile of the respondents).

DESCRIPTIVE STATISTICS

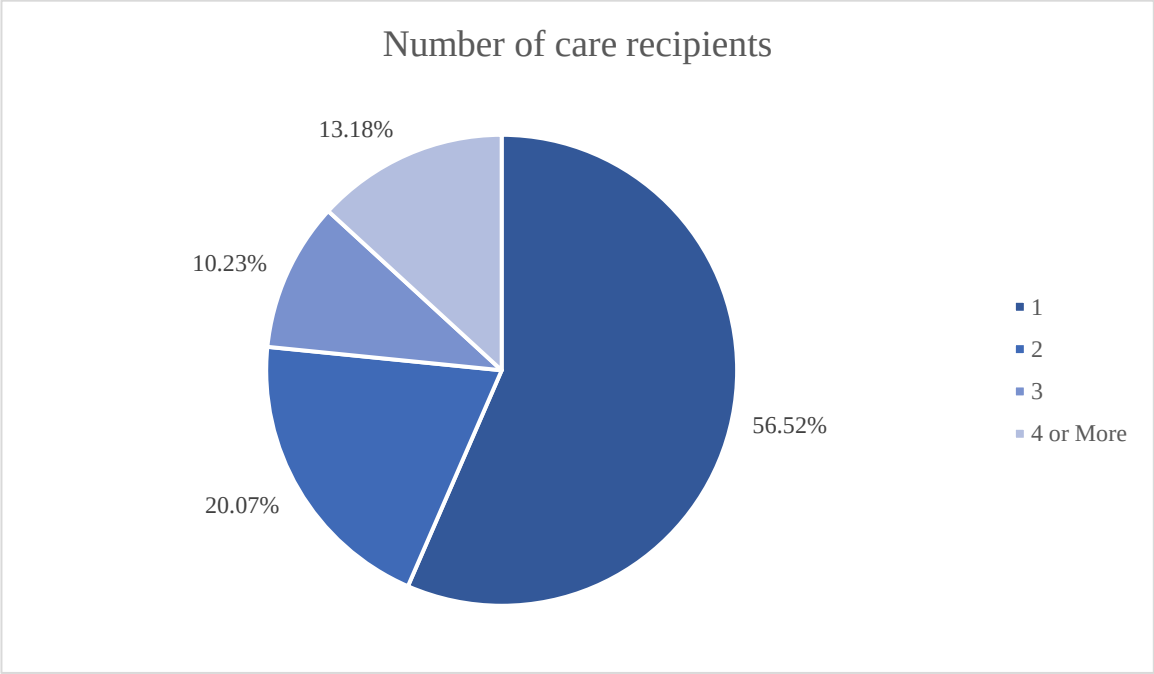
Findings from the caregiving module revealed that 1320 respondents, or 16.87% of respondents, were informal caregivers. Caregivers are defined as persons who are not paid for the provision of care or the active participation in making of care or treatment decisions on behalf of someone who is unable to do so because of health or physical conditions.

Figure 1. Breakdown of Caregivers & Non-Caregivers



As shown in Figure 2, among the 1320 respondents who were caregivers, the number of individuals that respondents cared for varied greatly. Most caregivers provided care to only 1 care recipient (56.52%), followed by caregivers who provided care to 2 care recipients (20.07%).

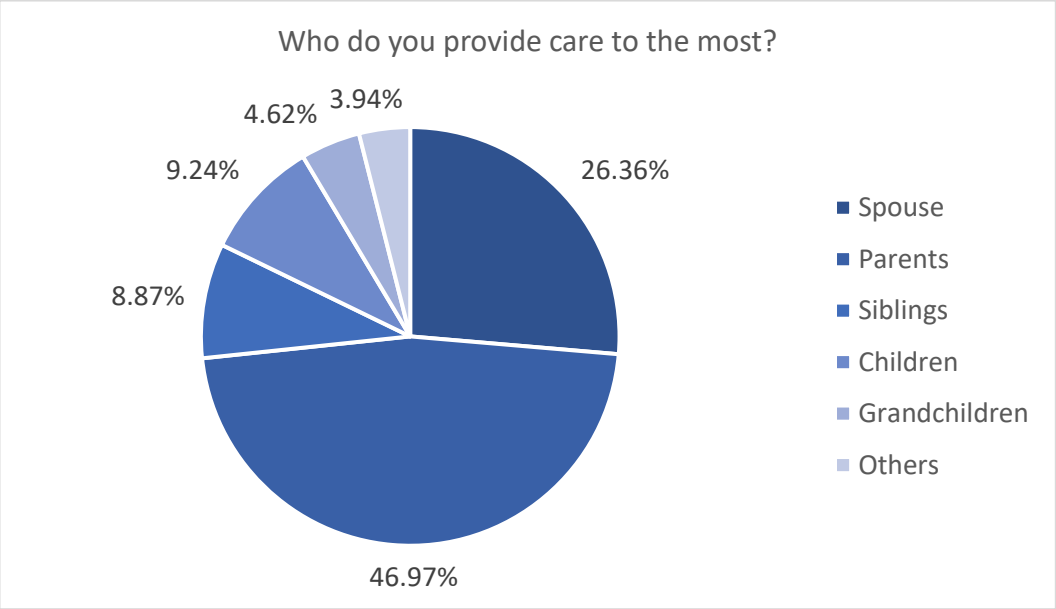
Figure 2. Number of Care Recipients



In terms of the categories of person respondents who were caregivers reporting taking care of, the category of individuals that received the most care were parents, followed by spouses. Parents

made up 46.97% of primary care recipients, while spouses made up 26.36% of primary care recipients. Other notable care recipients included siblings, children, and grandchildren. Figure 3 provides a full breakdown of who received the most care.

Figure 3. Breakdown of Who Receives the Most Care



WHO IS MORE LIKELY TO BE A CAREGIVER?

Initial analysis of the data showed that there were a greater proportion of female caregivers as compared to male caregivers – 17.51% of females were caregivers as compared to 15.90% of males who were caregivers. This data is represented in figure 4.

The findings also reveal that respondents were more likely to be a caregiver if they were younger: 20.77% of respondents aged 55 to 59 were caregivers, while the proportion of caregivers aged 70 to 74 falls to 13.29% among respondents within this age range. Figure 5 shows the full breakdown caregivers and non-caregivers across the 4 age ranges.

With regards to marital status, respondents were more likely to be a caregiver if they were single and never married - 19.14% of respondents who were single and never married reported that they were currently providing care for someone. In contrast, only 10.42% of respondents who were separated also reported that they were currently providing care for someone. Figure 6 provides a full breakdown of caregivers and non-caregivers across the different marital statuses.

Figure 4. Breakdown of Caregivers and Non-Caregivers by Gender

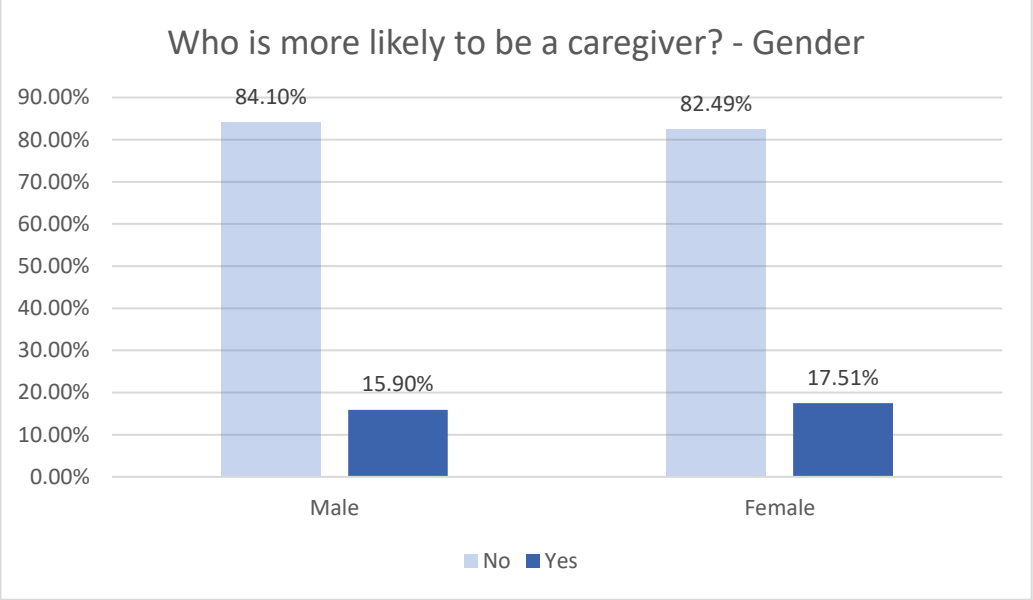


Figure 5. Breakdown of Caregivers and Non-Caregivers by Age

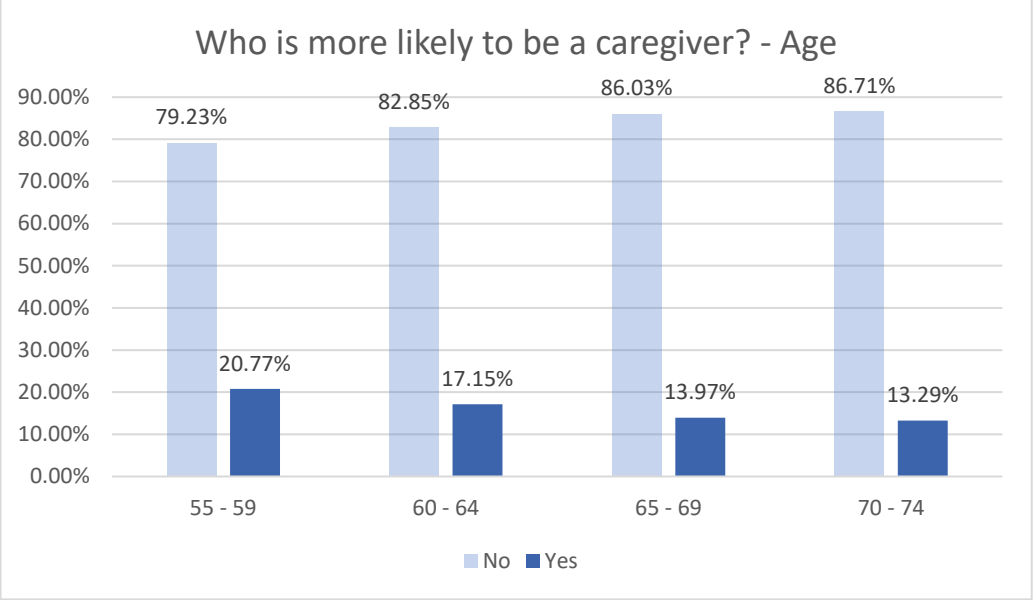
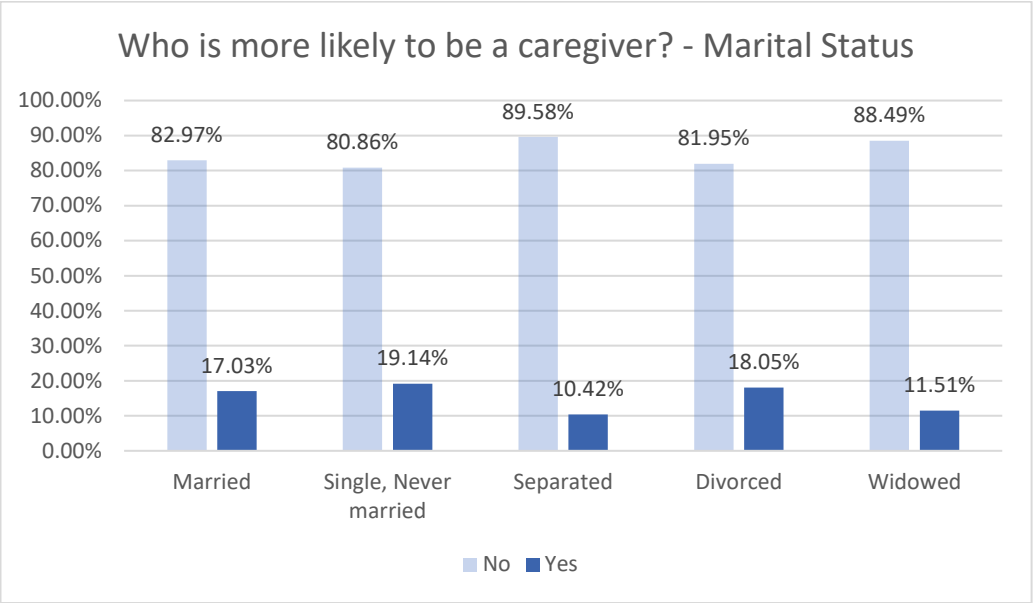


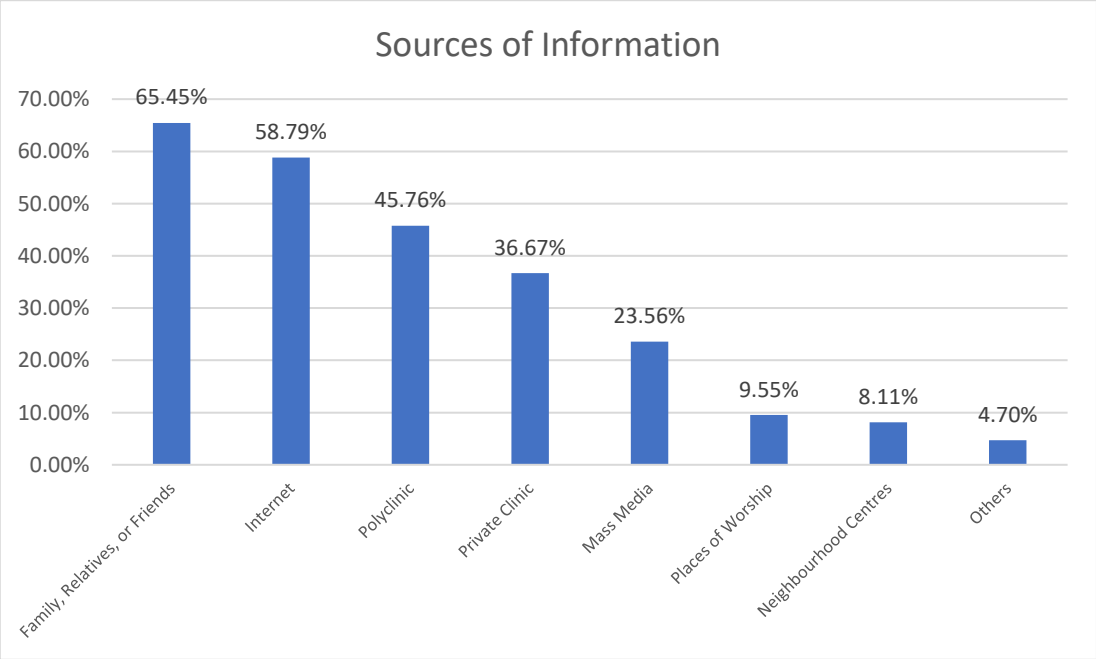
Figure 6. Breakdown of Caregivers and Non-Caregivers by Marital Status



SOURCES OF INFORMATION

The caregiving module also explored the sources of information caregivers relied on when they sought information related to caregiving. Most caregivers (65.45%) indicated that they would be comfortable turning to family, relatives, and friends as a source of information to help in caring for their care recipient. This was followed by the internet, which 58.79% of caregivers indicated they were comfortable using. A full breakdown of the sources of information that caregivers would be comfortable using can be found in figure 7.

Figure 7. Breakdown of Sources of Information Caregivers would use



CAREGIVER PREPAREDNESS

Caregiver preparedness was another aspect of caregiving explored in the module fielded. Caregiving preparedness was measured using the Preparedness for Caregiving Scale (Archbold et al., 1990). For the purposes of this scale, preparedness is defined as the domain-specific readiness that caregivers had for various domains such as "providing physical care, providing emotional support, setting up in-home support services, and dealing with the stress of caregiving" (Archbold et al., 1990). This is an 8-item self-rated assessment that aims to examine how well-prepared caregivers feel they are for various areas of caregiving. These areas include providing physical care, providing emotional support, and handling the stress that comes with providing care. Responses were recorded on a scale of 1 to 5, where 1 was "*not at all prepared*" and 5 was "*very well prepared*". Scoring was done by obtaining the mean score of responses across all 8 items, with a higher mean score indicating better caregiver preparedness. Examples of questions asked include "How well prepared are you to take care of this person's (*CR's*) physical needs?" and "How well prepared are you for the stress of caregiving?". The mean score of these respondents was 3.101, showing a moderate level of preparedness among caregivers. The full scale used can be found under table A3 of Annex A.

Table 1. Mean Scores for *Preparedness for Caregiving* scale

Scale	Mean	SD
Preparedness for Caregiving	3.101	0.875

Using multivariate regression modelling to examine the relationship between caregiver preparedness and Overall Life Satisfaction[31], it is observed that caregiver preparedness positively predicts life satisfaction. This implies that as caregiver preparedness increases, one's life satisfaction increases as well (See Table A3 under Annex A for the full results).

FAMILY SUPPORT FOR CAREGIVERS & CAREGIVER ESTEEM

Family support was another area that was explored in the caregiving module. This was measured using the Caregivers Reaction Assessment (Given et al., 1992; Malhotra et al., 2012), a 21-item assessment that examines how different domains of one's life interacts with the caregiver. Responses were recorded on a scale of 1 to 5, where 1 was "*strongly disagree*" and 5 was "*strongly agree*". Two of the domains examined were family support for caregivers and caregiver esteem.

[31] Overall Life Satisfaction is measured on a 5-pt Likert Scale from (1 Very dissatisfied – 5 Very Satisfied)

Examples of questions that were asked in the **lack of family support subscale** include "My family (brothers, sisters, children) left me alone to care for (*name of care recipient (CR)*)." and "It is very difficult to get help from my family in taking care of (*name of CR*)". A higher mean score on the lack of family support subscale meant that the respondents were lacking more support from their families. The mean score for respondents was 2.213. This was slightly below the middle, which meant that generally caregivers were receiving, and not lacking, support.

Examples of questions that were asked in the **caregiver esteem subscale** include "I feel privileged to care for (*name of CR*)" and "Caring for (*name of CR*) is important to me". A higher mean score on the caregiver esteem questions meant that there was a more positive effect of caregiving. The mean score of the 890 respondents was 3.650. This was well above the middle, which meant that generally caregivers had high esteem when it comes to providing care to their care recipients. These results are represented in the table 2 below.

Table 2. Mean Scores for *Lack of Family Support* and *Caregiver Esteem* Subscales

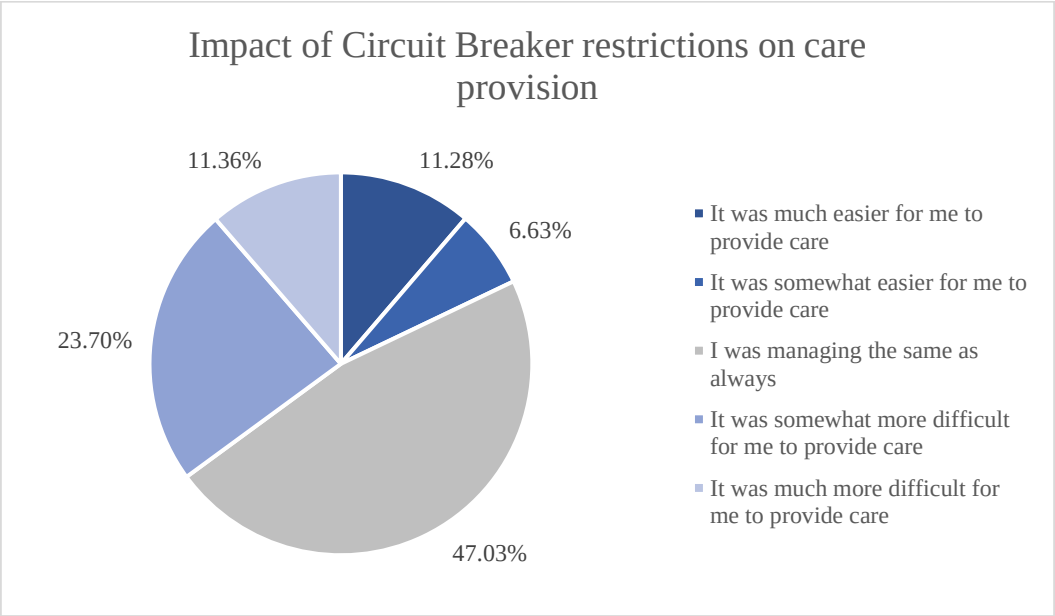
	Mean	SD
Lack of Family Support	2.213	0.775
Caregiver Esteem	3.650	0.731

Using multivariate regression modelling to examine the relationship between lack of family support and life satisfaction, we see that lack of family support negatively predicts life satisfaction. This means that as respondents lacked more family support, they would have lower life satisfaction as well. On the contrary, when using regression modelling to examine the relationship between caregiver esteem and life satisfaction, we see that caregiver esteem positively predicts life satisfaction. This means that as respondents have higher caregiver esteem, they would have higher life satisfaction as well. Both these areas could be potential areas where targeted policies may be implemented to improve caregiver life satisfaction (See Table A3 under Annex A for the full results).

EFFECT OF CIRCUIT BREAKER ON THE PROVISION OF CARE

The impact of COVID-19 on the provision of care was also explored. As expected, there were more respondents who said that COVID-19 restrictions made providing care somewhat more difficult (23.70% of caregivers) as compared to respondents who said providing care became somewhat easier (6.63% of caregivers). This was to be expected with the implementation of social distancing measures by the Singapore government. These measures made it more difficult for family members who did not stay in the same residence or outside help to provide care to their care recipients. Figure 8 shows a summary of these values.

Figure 8. Impact of Circuit Breaker Restrictions on Care Provision



POLICY RECOMMENDATIONS

The results from the caregiving module showed that there were certain aspects of caregiving that influenced life satisfaction. Specifically, in the areas of support from family members and caregiver preparedness. Caregivers that received more support from family members had higher life satisfaction as compared to caregivers who received lesser or lacked support from family. Additionally, as caregivers start to perceive themselves as more prepared to provide care to their care recipients, their life satisfaction increased as well.

In terms of support from family, the focus of policy implementations should be on helping individuals who do not receive as much support from their family as compared to others. By providing more support to these individuals, such policies would assist in bridging the gap between the life satisfaction experienced by both groups of individuals. In terms of caregiving preparedness, policy implementations can focus on providing caregivers with the necessary skills to provide optimal levels of care to their care recipients.

Currently, MOH only has support groups for caregivers of care recipients with dementia. This could be expanded to cover a wider range of caregivers. One possible recommendation that could be implemented could thus be for more assistance to be provided in facilitating the formation of support groups for these other caregivers. These support groups would be made up of caregivers (both current and new caregivers) and could act as informal 'safe spaces' for less experienced caregivers to get assistance on difficult situations that they might run into. These support groups would also be able to fill the gap that some caregivers encounter where family members are either absent or unable to assist them with the provision of care.

The Agency for Integrated Care currently organizes courses that help strengthen caregiver preparedness. Examples of courses include Basic Eldercare Courses, Basic Home Care Skills, and Basic Skills in Caregiving. Further assistance includes the Caregiver Training Grant, a $200 subsidy that is provided annually to caregivers to offset course fees. However, this grant is tied to the care recipient and not the caregivers. This means that there could be possible situations where not all caregivers are able to attend these courses as the caregivers must split the $200 among themselves. Course fees currently range from $60 to $1155.20. One possible recommendation would be to reassess how these grants are given to caregivers. Grants could be given out as a proportion of the course fees rather than a fixed annual amount. This would give more flexibility for caregivers to attend courses that they deem important to them, and lead to higher caregiver preparedness and thus higher life satisfaction.

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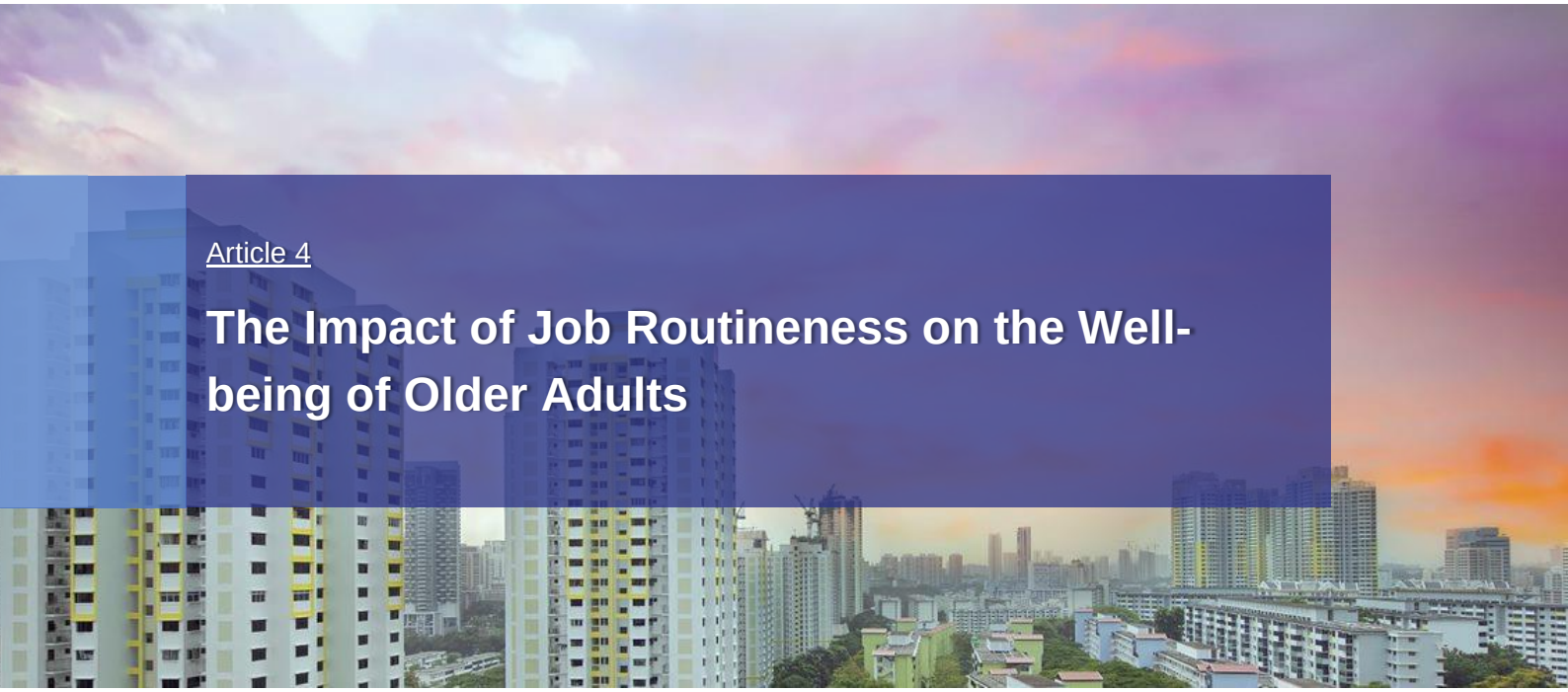

Article 4

The Impact of Job Routineness on the Well-being of Older Adults

INTRODUCTION

The relationship between an individual's level of routineness in their occupation and their overall well-being has been analysed in a variety of disciplines. The following brief aims to understand how the respondents of the Singapore Life Panel (SLP) fare in this context. It first presents the related literature, breaking down how the different measurements of job routineness came about and evolved to what they are today. These measures center around Routine Task Intensity (RTI) index and its components which measure how 1) Routine / Non-Routine; 2) Manual / Analytic, and 3) Personal / Impersonal a job is. While the current paper discusses findings based on the RTI due to its utilization in the SLP, the RTI's successor, the Routine Intensity Indicator (RII), was fielded in May 2021 and will be followed up on in a separate brief. As such, the RII will only be briefly introduced here. This brief will dive into the methodology, analysis and subsequent results that were derived from the SLP data. This brief finds that job routineness and well-being have an inverse correlation, the specifics of which are expanded upon below.

LITERATURE REVIEW

Most literature suggests that greater job routineness results in lower levels of well-being, a result of increased boredom, isolation and lesser motivation which can lead to poor performance at work (references here). All these directly impact various aspects of well-being. Considering the increasingly important role work plays in the lives of individuals as the world gets more competitive, it is important to take first steps into exploring job routineness and tracking satisfaction in different areas with the data that we have from the Singapore Life Panel (SLP).

Since the seminal paper introducing Routine Task Intensity (RTI) (Autor & Murnane, 2003) as a way to measure the routineness of jobs, RTI and its components has since been the standard mainly used in literature regarding measurements of task routineness. Job tasks are looked at in three dimensions: 1) Routine / Non-Routine; 2) Manual / Analytic and 3) Personal / Impersonal. It defines and differentiates five task measures, which are then utilized to calculate a final score for how routine one's job is.

DEVELOPMENT AFTER AUTOR 2003

Following the development of the RTI index, it was paired with the Dictionary of Occupational Titles (DOT). Many have then followed suit with Autor's RTI index, characterizing the five components based on the occupational databases that contextually fit them or as required. For instance, Goos, Manning & Salomons' (2014) work in mapping RTI into the International Standard Classification of Occupations 1988 (ISCO-88) system, has been continually utilized in papers studying the role of routine-biased technological change (RBTC) for changes in occupation features. They utilized the European Union Labour Force Survey (ELFS), which contained data such as employment status, weekly hours worked and the two-digit ISCO codes. Weekly hours worked were used as the measure of employment, rather than by persons employed.

RTI CRITICISM: ASSIGNMENT OF SCORES & NRA TASKS

Since classifications are often based on the judgement of experts assigning scores to different indicators characterising the occupations, rather than asking individuals about the real content of their daily work, this leads to less precise identification of routine intensive tasks. One of the main criticisms of Autor is the use of occupational features (skills and job requirements) to determine routineness of the job, rather than the actual activities done in the job itself. Other indexes have tried to deal with this element by collecting further subjective information. Since classifications are often based on the judgement of experts assigning scores to different indicators characterising the occupations, rather than asking individuals about the real content of their daily work, this leads to less precise identification of routine intensive tasks. Another criticism concerns non-routine analytical tasks being identified as mathematical skills. However, mathematically intensive tasks can nowadays be codified and moved abroad, as it happens for instance with data mining.

ROUTINE INTENSITY INDICATOR (RII)

One of the most comprehensive indices of the routine content of occupations was done by Organisation for Economic Cooperation and Development (OECD) in 2016, termed as the RII (Marcolin, Miroudot & Squicciarini, 2016). It was built on data from the OECD Programme for the International Assessment of Adult Competencies (PIAAC) survey. PIAAC data contains information on both the worker's sector of employment and type of occupation while existing literature only links tasks to their occupation only.

The RII creates an index of routine scores out of data from PIAAC. They specifically score on 4 parts in order to judge level of routineness (see Figure 1), as well as still include the existing literature definition, which includes the non-routine interactive tasks characterized by Autor 2003.

They are then grouped into 4 routine-intensity classes / occupations: 1) Non-routine, 2) Low routine-intensive (LR), 3) Medium routine-intensive (MR) and 4) High routine-intensive (HR). It should be noted that although tested and promoted by the OECD as a novel way to test routine intensity in jobs, papers after the period of 2016 have still utilized the tried and tested method of RTI, most likely due to how scores have been previously mapped to different occupational indexes. For instance, an IMF Working Paper published after the fact (Das & Hilgenstock, 2018) investigating how routinization has affected the labor market for economies still utilizes RTI due to it having been classified with the DOT.

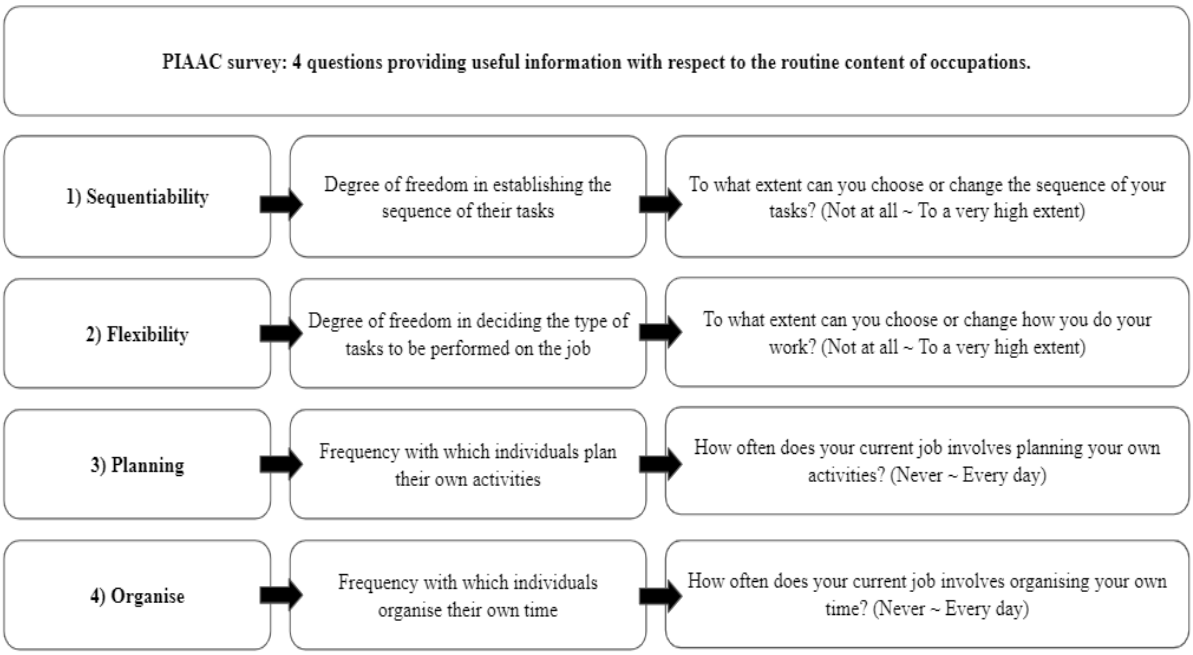

Figure 1: PIACC Question Classification

JOB ROUTINENESS AND WELL-BEING

Understanding the relationship between job routineness and well-being provides researchers with a clearer perspective of the topic at hand. As mentioned earlier, literature regarding this relationship highlights the trend that a more routine a job is, the lower the well-being of the individual involved in that job. Zooming this analysis in onto the Asian context, it can be observed that the trend remains similar with some key takeaways that should be highlighted.

Firstly, we see that job routineness is heavily dependent on an individual's skill specialisation and obedience. Studies show that the Asian workforce is more obedient due to cultural factors and as such sees its workers sticking to routines without questioning them and abiding by structures more strictly than their western counterparts (World Values Survey, n.d.). This translates to a large proportion of the workforce having a greater propensity to work in jobs that are more routine. It was also observed that workers in these more routine jobs tend to be highly specialised in that type of work. While we may be inclined to conclude that being more specialised would mean lesser work hours due to the optimisation of workflow, studies of the Asian workforce show that overall, they still tend to have longer, more rigid workhours compared to the West. Therefore, the conclusion being made in this case is that because of the obedience trait and greater skill specialisation, there is a greater level of job routineness among occupations in the Asian context.

This leads on to the next point that the Asian workforce is generally unwell due to a greater focus on financial stability as compared to emotional or mental well-being (Yeung and Johnston 2019). In other words, in general, the Asian workforce tends to prioritize financial stability and security over their own emotional or mental well-being when it comes to work. The focus on financial stability acts as a

motivating force for increased routineness in various job sectors which subsequently reduces the workforce's well-being in non-economic domains due to a poor work-life balance. This, coupled with the fact that the current workplace wellness market in Asia provides limited coverage, means that Asian workers are not as cared for as compared to their western counterparts.

Workplace wellness is still not a widespread concept in Asia. Currently, the concept primarily only benefits those working for multinational corporations and in knowledge-intensive industries, and those living in the region's wealthiest countries/cities. In 2017, Asia's workplace wellness market is estimated at $9.3 billion, about 20% of global market. However, only about 5.2% of all employed workers in Asia benefit from some form of workplace wellness program. This yet again highlights the disproportionate ways in which the Asian workforce's well-being is poor (Yeung and Johnston 2019).

Acknowledging and recognising this as the status quo for the Asian context allows us to analyse and discern the data derived from the SLP regarding job routineness of the elderly in Singapore. It also allows us to draw parallels and possible divergences from the trends stated above. By doing so, we would be able to better comprehend the data and as such precisely tabulate the relationship between job routineness and well-being for ROSA's needs.

DATA

We use data from the SLP to conduct the empirical analysis. Started in July 2015, the SLP is a monthly longitudinal survey of a nationally representative sample of 50–70-year-old Singaporeans and their spouses. This sampling feature of the SLP resembles that of the U.S. Health and Retirement Study. About 8000 respondents participate in the SLP survey on a monthly basis. The data used for our first round of analysis was collected in September 2017, when we first fielded questions pertaining to respondents' occupational characteristics. For well-being indicators, we look at different satisfaction variables and economic indicators available in the SLP dataset, which are classified into the four quadrants of well-being as defined in socioeconomic well-being studies (economic, social, physical and mental). They are classified as follows in Figure 1.

Note that most of the well-being indicator variables are derived from survey questions that implement a 5-point Likert scale, with responses ranging from 1: Very satisfied to 5: Very Dissatisfied. For self-reported health, the responses range from 1: Excellent to 5: Poor, while total household expenditure is expressed in Singapore dollars (see Appendix A).

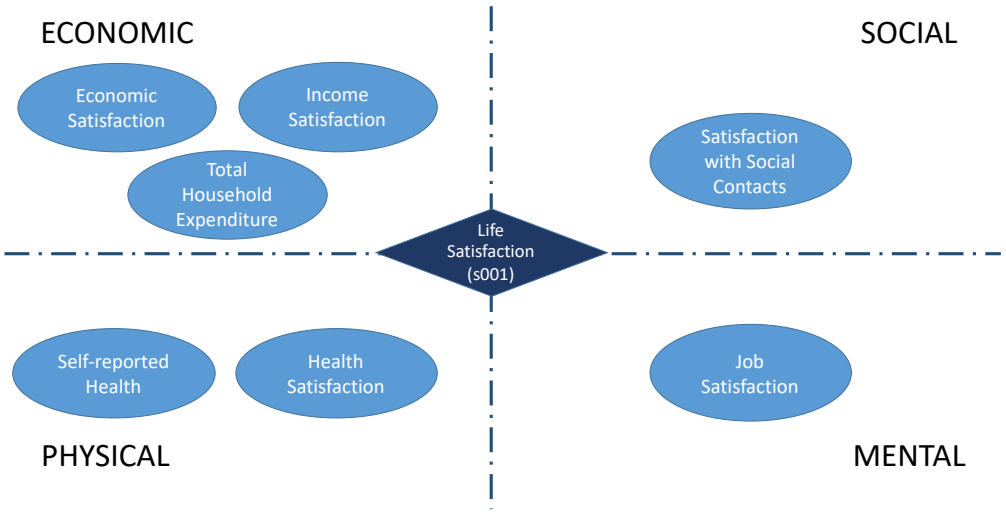

Figure 2: Classification of variables in well-being quadrants

We derived the respondents' occupations from the SLP dataset as well, with each occupational type represented by a 5-digit code in accordance with the Singapore Standard Occupational Code (SSOC) method of classification. For the routineness level of each occupational type, we first obtained job routineness scores as computed by Mihaylov and Tijdens (2019) and assigned to different occupational codes under the International Standard Classification of Occupations (ISCO'08) system. This is done by first assigning the tasks of each occupation to one out of 5 task types: non-routine analytic (NRA), non-routine interactive (NRI), non-routine manual (NRM), routine cognitive (RC) and routine manual (RM) as described in Spitz-Oener (2006) (for a description of each task type, see Appendix B). Routine task intensities of each task type for each occupational type are then computed by dividing the number of tasks from each task type category by the total number of tasks (Antonczyk, Fitzenberger and Leuschner (2009)):

$$Score_{jk} = \frac{Number\ of\ tasks\ of\ category\ j\ in\ occupation\ k}{Total\ number\ of\ tasks\ in\ occupation\ k}$$

where *Score* is the task content, *j* indicates the five routine categories non-routine analytic, non-routine interactive, routine cognitive, routine manual and non-routine manual, and *k* stands for an occupation. The five $Score_{jk}$ indexes range between zero and one - whereas a score of zero indicates that there are no tasks classified in category *j* in occupation *k*, and a score of one means that all tasks of occupation *k* are classified into category *j*.

To derive an index that encompasses all aspects of job routineness, as well as to account for any potential misclassification of tasks (see Mihaylov and Tijdens (2019)), we combine the five routine tasks indices into a single measure of routine task intensity, which we refer to as the RTI index, via the following equation:

$$RTI_k = RC_{jk} + RM_{jk} - NRA_{jk} - NRI_{jk} - NRM_{jk}$$

where *RTI* indicates routine task-intensity of occupation *k*, and *RC, RM, NRA, NRI* and *NRM* stand for the five task categories routine cognitive, routine manual, non-routine analytic, non-routine interactive and non- routine manual, respectively. *RTI* increases in the use of routine cognitive and manual tasks, and decreases in the use of non-routine analytic, interactive and manual tasks. Aggregation of this type is expected to reduce classification error of the first and second type, since the signs of the scores correspond to whether they were routine or non-routine (+ for routine, - for non-routine), respectively. It is unclear, though, whether and how aggregation would impact on classification error of the third type, where routine tasks are classified as non-routine and vice versa. The *RTI* index ranges between 1 and -1, whereas 1 indicates that occupation *k* contains only routine tasks, and - 1 indicates that occupation k contains only non-routine tasks. Figure 2 below shows how the SSOC codes were merged with the corresponding routineness scores.

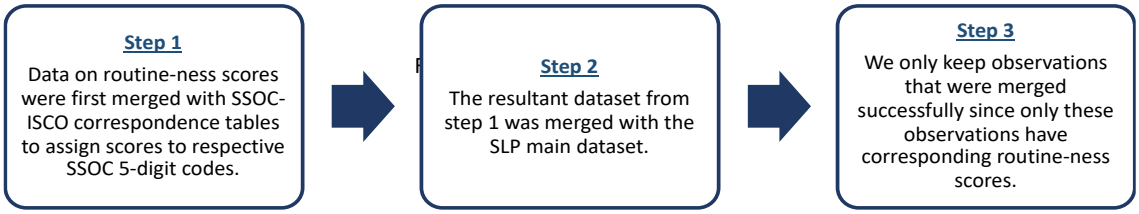

Figure 3: Data Merging Process

RESULTS

Breakdown of Occupational Types

From our dataset, we were able to capture occupational types from all 9 major occupational groups as defined in the SSOC 2015 guide (represented by the first digit of the SSOC code). Going deeper, we were able to capture 37 out of 43 sub-major groups (represented by the first 2 digits in the SSOC code), 121 out of 143 of the minor groups, and 283 out of 415 of the unit groups (for the sample size of each occupational group, refer to Table 1).

Table 1: Breakdown of Major and Sub-major Occupational Groups, with Sample Size

Major Occupational Group	Sub- major Occupational Group	Sample Size
1 Legislators, Senior Officials and Managers (859)	11 Legislators, Senior Officials and Chief Executives	155
	12 Administrative and Commercial Managers	358
	13 Production and Specialised Service Managers	275
	14 Hospitality, Retail And Related Services Managers	71
2 Professionals (811)	21 Science and Engineering Professionals	208
	22 Health Professionals	72
	23 Teaching and Training Professionals	164
	24 Business and Administration Professionals	223
	25 Information and Communications Technology Professionals	67
	26 Legal, Social and Cultural Professionals	60
	29 Other Professionals	17
3 Associate Professionals and Technicians (662)	31 Physical and Engineering Science Associate Professionals	204
	32 Health Associate Professionals	31
	33 Business and Administration Associate Professionals	307
	34 Legal, Social, Cultural and Related Associate Professionals	29
	35 Information and Communications Technicians	21
	36 Teaching Associate Professionals	70
	39 Other Associate Professionals	0
4 Clerical Support Workers (633)	40 Clerical Supervisors	20
	41 General and Keyboard Clerks	345
	42 Customer Services Officers and Clerks	83
	43 Numerical and Material-Recording Clerks	170
	44 Other Clerical Support Workers	15
5 Service and Sales Workers (551)	51 Personal Service Workers	136

	52 Sales Workers	270
	53 Personal Care Workers	46
	54 Protective Service Workers	88
	59 Others	11
6 Agricultural and Fishery Workers (9)	61 Agricultural Workers	9
	62 Fishery Workers	0
7 Craftsmen and Related Trade Workers (144)	71 Building and Related Trades Workers, Excluding Electricians	49
	72 Metal, Machinery and Related Trade Workers	33
	73 Precision, Handicraft, Printing and Related Trades Workers	13
	74 Electrical and Electronic Trades Workers	17
	75 Food Processing, Woodworking, Garment, Leather and Other Craft and Related Trades Workers	32
8 Plant and Machine Operators and Assemblers (451)	81 Stationary Plant and Machine Operators	36
	82 Assemblers and Quality Checkers	20
	83 Drivers and Mobile Machinery Operators	395
9 Cleaners, Labourers and Related Workers (438)	91 Cleaners and Related Workers	257
	92 Agricultural, Fishery and Related Labourers	1
	93 Labourers and Related Workers	52
	94 Food Preparation and Kitchen Assistants	67
	96 Waste And Recyclables Collection Workers and Other Elementary Workers	61

Summary Statistics

Routineness indicators by Occupational Category

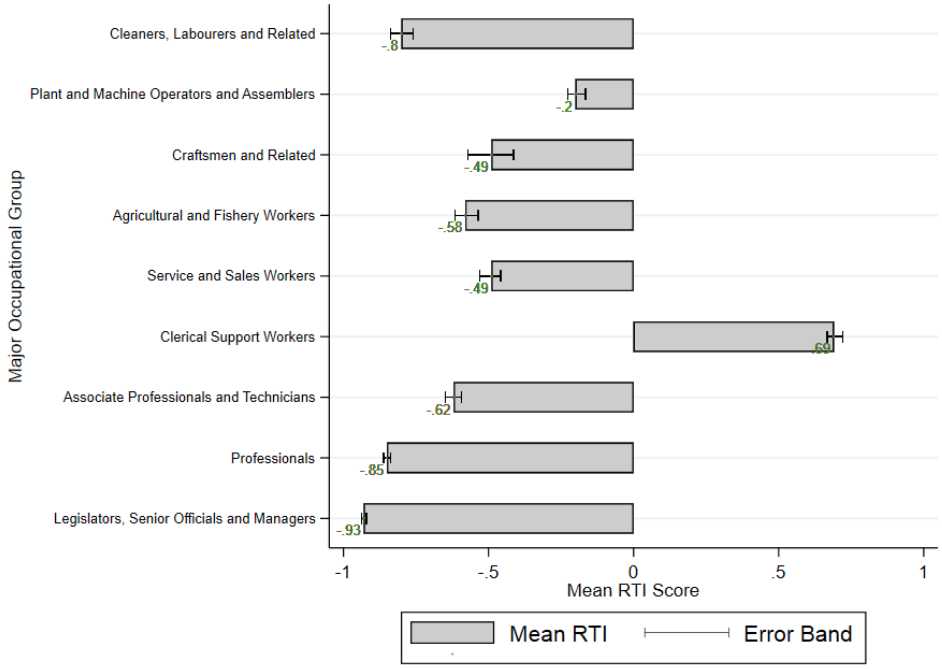

Figure 4: Average RTI Score for each Major Occupational Group

From figure 4, we observe that in general, most occupational categories have a negative average RTI score, indicating that most jobs are considered to be non-routine according to the RTI. While we observe from figure 3a that there are significant differences in the average RTI scores among the major occupational groups, we also observe from figure 5 that even within each major occupational group, the RTI scores vary a lot among the different occupations, particularly those that are not of the first 3 major occupational groups. As such, we do not draw any clear links between occupational group type and job routineness.

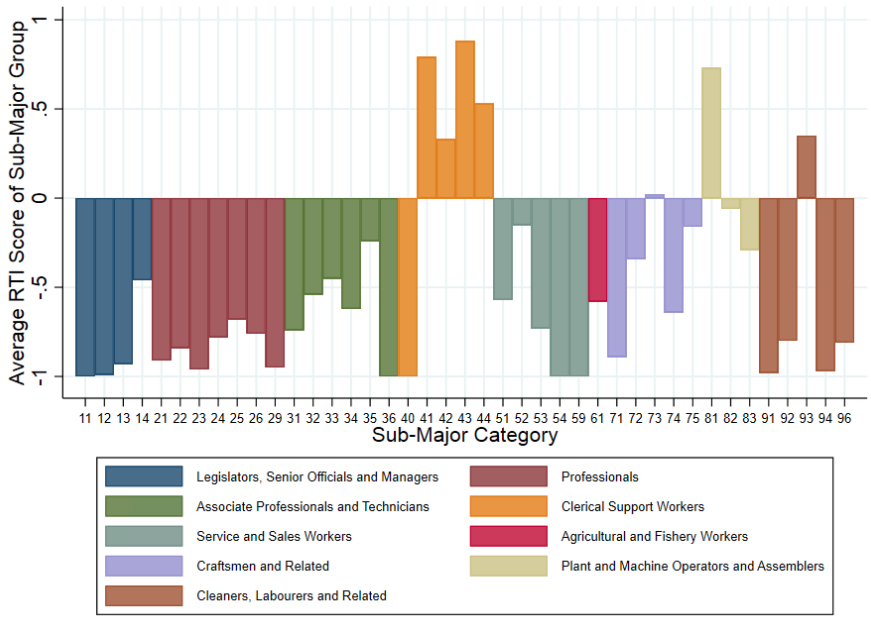

Figure 5: Average RTI Score for each Sub-Major Occupational Group

Delving deeper into the component routineness scores, we observe more consistency in the average routineness scores of the occupations within each major occupational group for the NRA and NRM scores, even after further breakdown (see Appendix C for the summary statistics). For the NRA scores, we observe that occupations from the "Legislators, Senior Officials and Managers", "Professionals" and "Associate Professionals and Technicians" groups tend to consistently score higher (greater proportion of non-routine analytic tasks) than those from the other major occupational groups. For the NRM scores, we observe that occupations from the "Legislators, Senior Officials and Managers", "Professionals" and "Associate Professionals and Technicians" groups tend to consistently score lower than those from the other major occupational groups (smaller proportion of non-routine manual tasks).

Well-being indicators by Occupational Group

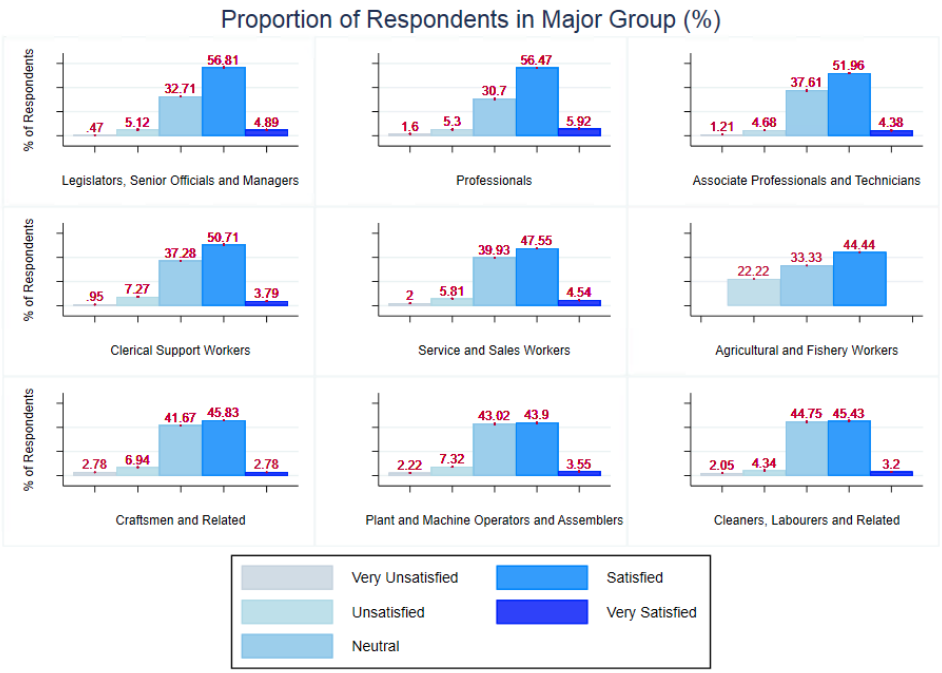

Figure 6: Distribution of Life Satisfaction Responses by Major Occupational Category

Figure 4 shows the distribution of responses by respondents in each of the 9 major occupational groups for the question on the overall life satisfaction variable. We observe from the chart that in the major occupational groups “Legislators, Seniors Officials and Managers” and “Professionals”:

- A larger proportion of respondents answered “Very Satisfied” or “Satisfied” compared to in other major occupational groups.
- A smaller proportion of respondents answered “Very Dissatisfied” compared to in other major occupational groups.

We note these findings when doing the analysis for the other well-being indicator variables as well (see Appendix D). To assess the statistical significance of this difference, we divided respondents into 2 groups (those from the first 3 major occupational groups and those from the other major groups) and conducted pairwise difference-in-mean tests between the 2 groups (see Appendix E). We noted that for all well-being indicators, the difference in mean between the 2 groups are statistically significant.

From the above analysis, we assess that there is some merit in controlling for the major occupational group in which the respondent belongs to. This is particularly so if the respondent belongs to any of the first 3 major occupational groups.

Correlation analysis between job routineness indicators and well-being indicators

Well-being Quadrant	Well-being Indicator	Pearson
Life	Overall Satisfaction	0.0463
Social	Social Satisfaction	-0.0535
Economic	Economic Situation Satisfaction	0.0449
	Income Satisfaction	-0.0401
Mental	Job Satisfaction	-0.0463
Physical	Self-reported Health	-0.0701
	Health Satisfaction	-0.0433

Table 2: Correlation Coefficients for Life Satisfaction and RTI Score

Table 1 shows the correlation coefficient estimates obtained when correlating the RTI scores of respondents against their responses to the well-being variable questions. We observe the following: (i) the correlation coefficients are statistically significant and largely negative, thus implying that higher job routineness levels correspond with lower levels of satisfaction; and (ii) there is little correlation between the RTI score and the well-being indicators (the magnitudes of the correlation estimates range from 3% – 8%).

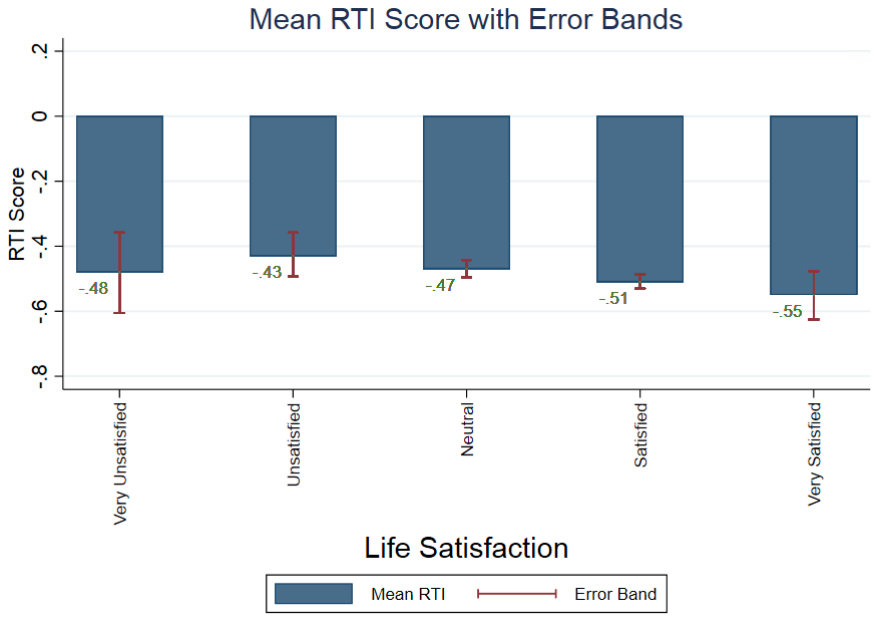

Figure 7: Average RTI scores for each response category for overall life satisfaction

Taking a closer look at the average RTI scores for each response category for each well-being variable, we note that the low correlation strength between the RTI and well-being indicators could possibly be attributed to 2 factors: (i) higher variation in RTI scores among respondents whose responses lie at either end of the spectrum ("Very Satisfied" or "Very Dissatisfied" for the satisfaction questions, "Excellent" or "Poor" for the question on self-reported health), and (ii) no clear correspondence between the magnitude of the average RTI score and the ordering of the responses to the well-being questions (see Figure 5 for the graphs for the overall life satisfaction variable, and Appendix F for the other well-being indicators).

Next, we conducted the correlation analysis for the component routineness scores. We noted that while the magnitudes of the correlation estimates are generally still not significant enough to ascertain a high correlation between the routineness measure and the well-being indicators, we do observe slightly higher correlation estimates when we use the non-routine components (NRA, NRI, NRM) as the routine-ess measures. By analysing the average RTI scores for each response category for each well-being variable, we also noted the following: (i) the variation in RTI scores among respondents whose responses lie at either end of the spectrum is still relatively to high compared to the other

Figure 8: Average component routineness scores for each response category for overall life satisfaction

response categories, and (ii) there is a clearer correspondence between the magnitude of the average scores of the non-routine indicators and the ordering of the responses to the well-being questions. Particularly, we see that the average NRA and NRI scores increase consistently as the responses vary from "Very Dissatisfied" to "Very Satisfied", and the average NRM score decreased consistently as the

responses vary from “Very Dissatisfied” to “Very Satisfied”. The above results imply a possibility that the level of “non-routineness” of the tasks conducted by an occupation could be slightly related to different well-being aspects. However, at this point, we require further analysis to affirm any form of causal relationship between job routineness and well-being.

REGRESSION ANALYSIS

Table 3 shows the regression results when we do not control for whether the respondents belong to a professional occupational group or not. We observe that RTI does not show a statistically significant relationship with overall life satisfaction. We do notice however, that the while the all the non-routine scores show statistically significant relationships with overall life satisfaction, the NRA and NRI scores have odds ratios greater than 1 and the NRM score’s odd ratio is less than 1. This implies that higher NRA and NRI score imply a higher likelihood for overall life satisfaction to be more positive while it is inverse in the case of NRM.

When controlling for the professional occupational group variable, we notice that the odds ratio is NRA is no longer statistically significant while the NRI and NRM are still significant. This implies that after accounting for occupation social class, a higher NRI implies a higher likelihood for overall life satisfaction to be more positive, while a higher NRM score implies a lowerr likelihood for overall life satisfaction to be more positive. We see similar trends across all the other satisfaction variables (reflected in Appendix H). This allows us to conclude that occupations with a greater proportion of Non-Routine Interactive tasks tend to lead to higher levels of life satisfaction among the SLP respondents, while occupations with a greater proportion of Non-routine Manual tasks tend to lead to lower levels of life satisfaction.

DISCUSSION AND CONCLUSION

The level of routineness experienced in an occupation can affect a person’s well-being through different channels such as creating boredom, isolation and reducing motivation. By using a range of routine and non-routine intensity indices, namely the RTI index and its constituents, to quantify job routineness from a task-based perspective, our paper aims to analyse how different dimensions of job routineness are correlated with different aspects of well-being as self-reported by people in the labour force. We note the following two main themes. Firstly, there is no direct link between job routineness and occupational classification, but occupations that fall under managerial, professional or governance roles tend to report more positive well-being outcomes on average. Next, we observe that the greater the proportion of non-routine analytic and interactive tasks assumed by an occupation, the more positive the well-being outcome self-reported by a respondent, and the greater the proportion of non-routine manual tasks assumed by an occupation, the less positive the well-being outcome self-reported. Finally, after controlling for whether the occupation falls under a managerial, professional or governance category, the effect of the proportion of non-routine analytic tasks becomes less statistically significant, while the effects of the proportions of non-routine interactive

and non-routine manual tasks still remains apparent. We conclude that, by introducing more non-routine interactive and less non-routine manual tasks into a job, we could improve workplace well-being.

Table 3: Ordered Logistic Regression results – overall life satisfaction against job routineness indicator

	Dependent Variables (Well-being Indicators)													
	Overall Satisfaction	**Social Satisfaction**	**Economic Satisfaction**	**Income Satisfaction**	**Job Satisfaction**	**Health Satisfaction**	**Self-Reported Health**	**Overall Satisfaction**	**Social Satisfaction**	**Economic Satisfaction**	**Income Satisfaction**	**Job Satisfaction**	**Health Satisfaction**	**Self-Reported Health**
RTI	0.951 (0.0429)	0.911* (0.0420	0.967 (0.0424)	0.992 (0.043)	0.921 (0.0413)	0.940 (0.0421)	0.854*** (0.0378)	1.011 (0.0514)	0.964 (0.0502)	1.038 (0.0513)	1.058 (0.0523)	0.967 (0.0489)	0.980 (0.0495)	0.890* (0.0445)
NRA	1.356** (0.150)	1.351** (0.154)	1.294* (0.140)	1.268* (0.139)	1.270* (0.140)	1.287* (0.142)	1.566*** (0.169)	1.181 (0.186)	1.122 (0.182)	1.029 (0.158)	1.079 (0.167)	1.053 (0.165)	1.174 (0.184)	1.493** (0.230)
NRI	1.594** (0.238)	1.686*** (0.258)	1.643*** (0.239)	1.501** (0.219)	1.697*** (0.252)	1.555** (0.230)	1.997*** (0.290)	1.435* (0.229)	1.504* (0.246)	1.462* (0.228)	1.364* (0.213)	1.553** (0.247)	1.451* (0.230)	1.818*** (0.284)
NRM	0.745** (0.0697)	0.802* (0.0766)	0.738*** (0.0673)	0.732*** (0.0671)	0.815* (0.0762)	0.799* (0.0743)	0.769** (0.0708)	0.794* (0.0793)	0.874* (0.0891)	0.793* (0.0770)	0.770** (0.0751)	0.877 (0.0874)	0.841 (0.0835)	0.837 (0.0825)
RC	0.891 (0.0864)	0.807* (0.0799)	0.905 (0.0854)	0.985 (0.0931)	0.838 (0.0808)	0.869 (0.0837)	0.711*** (0.0677)	1.010 (0.110)	0.905 (0.101)	1.044 (0.110)	1.125 (0.119)	0.930 (0.100)	0.946 (0.102)	0.777* (0.0831)
RM	1.000 (0.239)	0.997 (0.246)	1.147 (0.273)	0.987 (0.230)	0.918 (0.222)	0.986 (0.236)	0.857 (0.205)	1.080 (0.260)	1.084 (0.269)	1.248 (0.299)	1.055 (0.248)	0.987 (0.240)	1.045 (0.251)	0.936 (0.225)
Controls								✓	✓	✓	✓	✓	✓	✓

The regression coefficient estimates were obtained by regressing the dependent variable against each routineness index at any one time. Main numbers in the table are odds ratio estimates, where a number greater than 1 implies an increase in probability of moving towards the more positive side of the spectrum (i.e. responses tending towards "Very satisfied") and the number less than 1 implies a decrease in probability. Numbers in parentheses are the standard errors. Note that we include the following control variables: age, total household income, and highest education attained.

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ABOUT THE CENTRE FOR RESEARCH ON SUCCESSFUL AGEING (ROSA)

ROSA is a multidisciplinary research centre based in SMU. It was established with an MOE Tier 3 social sciences research grant, as well as the generous support of the Ngee Ann Kongsi foundation. Research at ROSA seeks to define and measure a holistic construct of well-being and to identify the factors that impact Singaporeans' well-being as they progress through the later phases of life. Through close collaboration with government and other partner agencies, ROSA also aims to translate research insights into policy innovations that advance the well-being of older adults holistically and promote successful ageing in Singapore. ROSA brings together a diverse team of leading international and local researchers in ageing and age-related issues from various disciplines. Through empirical evidence derived from a longitudinal methodological approach, the multidisciplinary and multi-institutional research team advances propositions that promote successful ageing in Singapore.

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