Mitsui Sumitomo Insurance Welfare Foundation
2021 Instructions for Report of Research Results and
Report of Utilisation of Research Grant
Singapore

MSIG

REPORT OF RESEARCH RESULTS

(a) **Title:** Lifelong learning and mental wellbeing of older adults in Singapore

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(c) **Summary:**

Our study explores whether attitudes towards lifelong learning are associated with the mental wellbeing among the elderly in Singapore. Through a primary survey of 300 individuals aged 65 and above, we develop a novel index to capture three different aspects of mental wellbeing, which are "Quality of Life", "Satisfaction with Life" and "Psychological Wellbeing". Utilizing both supervised and unsupervised machine learning techniques, we find that lifelong learning is associated with measures of wellbeing reflecting the "Quality of Life" and "Satisfaction with Life", but not "Psychological Wellbeing", which suggests that the relationship between lifelong learning and wellbeing is complex.

(d) Aim of Research:

In today's society where technology is advancing rapidly, lifelong learning has become increasingly important for older adults to adapt to changes and transitions that occur during the aging process. While the Singapore Government has recognized the importance of lifelong learning in promoting successful aging, the relationship between lifelong learning and mental wellbeing in older adults has yet to be fully explored. Our study aims to provide new insights into the relationship between lifelong learning and mental wellbeing among older adults in Singapore, and aid government agencies in creating an early warning system for identifying older adults at risk of mental health issues and provide evidence-based recommendations for promoting lifelong learning among the elderly population.

(e) Method of Research & Progression:

We conduct a primary survey on 300 senior residents aged 65 and above in Singapore to examine how their lifelong learning attitudes are associated with their mental wellbeing. We then employ a combination of supervised and unsupervised machine learning techniques to explore their associative relationship (if any). Specifically, we implement multiple correspondence analysis to visualize the association between subjective wellbeing and attitudes towards learning and construct decision trees to identify if lifelong learning is an important predictor of mental wellbeing.

(i) Primary Survey

To be specific, the survey questions can be categorized into three groups:

The first part of the survey collects demographic and socioeconomic data. Respondents were asked about their marital status, number of children, educational level, income level, whether they were working, whether they have any physical impediments such as mobility problems and disability, and the quality of their relationships with family and friends.

The second part of the survey collects information on the older adults' attitudes towards lifelong learning, lifelong leaing behaviours (participation, areas of study, and frequency of learning), as well as concerns in taking on lifelong learning (fees, course designs, and feasibility). Respondents were asked if they have participated in class activities such as singing, dancing, music, etc. or visited places such as a museum, library, educational institute, etc. Additionally, the survey asks about their attitudes towards lifelong learning, whether lifelong learning is important to them, why it is important (or otherwise), and the barriers they encounter in learning.

The third part of the survey collects information on various measures of subjective wellbeing, namely, "Quality of Life", "Satisfaction with Life", and "Psychological Wellbeing" so as to capture a comprehensive understanding of the older adults' subjective wellbeing.

(ii) Methodologies

For each set of subjective wellbeing measure ("Quality of Life", "Satisfaction with Life", and "Psychological Wellbeing"), we aggregate the survey responses into a single index called the **Multidimensional Wellbeing Index** (MWI). Let h indicate if MWI measures "Quality of Life", "Satisfaction with Life", and "Psychological Wellbeing", k_h be the number of questions related to subjective wellbeing measure h, and i be the index of the survey respondent. The MWI is constructed as

$$MWI_h^i = \frac{1}{2}\left(\sqrt{\frac{\sum_{j=1}^{k} d_{ijh}^2}{k_h}} + \left(1 - \sqrt{\frac{\sum_{j=1}^{k}(1 - d_{ijh}^2)}{k_h}} \right) \right)$$

where d_{ij} is given by

$$d_{ij,h} = \frac{A_{ij,h} - m_{j,h}}{M_{j,h} - m_{j,h}}$$

where m_j and M_j are the lower and upper bound of the survey response on the jth question related to wellbeing measure h.

(iii) Project milestones

- March 2022: IRB approval
- June – Sep 2022: Survey completed
- Nov 2022: Presentation made at the SMU ROSA Symposium on 1st Nov
- Dec 2022: First draft of manuscript done

(f)   Results of Research:

Due to space limit, we only provide three figures (in the end) to explain findings from the analysis. Figure 1 shows that the distribution of those who reported that the elderly should not be learning is skewed more towards the left, meaning that the respondents with a more negative attitude towards learning tend to report lower levels of wellbeing. This is more apparent when we consider the "Quality of Life" and "Satisfaction with Life" measures. However, for the "Psychological Wellbeing" measure, the distribution of wellbeing looks similar for the groups with positive or negative attitudes towards learning.

Figure 2 shows the results from the multiple correspondence analysis. Based on the factor map, we can see that the right-half of Dimension 1 is associated with poorer relationships with family and friends and poorer health. It is also associated with negative attitudes towards learning and poorer reported subjective wellbeing on all three measures. Therefore, the visualization reveals that negative attitudes towards learning are associated with poorer subjective wellbeing as well as poorer health and relationships.

Figure 3 shows results from the decision tree analysis. The results suggest that health is the most important predictor for determining overall wellbeing. Conditioning on those with good health, the next most important predictor is the attitude towards lifelong learning.

To conclude, from the primary data and machine learning analysis, we found that

- About 25% of the elderlies who perceived lifelong learning positively had not participated in any lifelong learning-related activity in the past 12 months.
- Health and family relationship are the most important determinants of subjective wellbeing of older adults in Singapore.
- After health and family relationship, attending class is the most important predictor for quality of life and psychological wellbeing; participation in activities is the most important predictor of satisfaction with life (while learning attitude is even more important for quality of life).

These results have implications for policymakers and practitioners, as it highlights the potential of lifelong learning for improving the quality of life of older adults. However, further research is needed to better understand the mechanisms underlying this relationship, and to determine whether our findings are generalizable to other populations.

(g)   Future Areas to Take Note of, and Going Forward

It is important to emphasize that our study only examines associative, not causative relationships. It is possible that individuals who have a better sense of being are more favorable towards learning. A possible approach to address this concern, based on an associative approach, is to consider the subsample of those who might have some negative physical conditions, such as disabilities. Since disabilities are associated with poorer subjective wellbeing, we may then conduct supervised segmentation to explore if lifelong learning may be associated with an increase in wellbeing even among these individuals. The idea is to reduce the effect of a possible confounder such as health, so that we may "partial out" this confounding effect when examining the association

between lifelong learning and wellbeing. Unfortunately, with a small sample size, we are unable to conduct this exercise here.

As a caveat, our findings are based on a specific sample of elderly individuals in Singapore and may not be generalizable to other populations. However, these findings highlight the importance of considering the role of lifelong learning in promoting wellbeing among the elderly and the need for further research in this area.

(h)   Means of Official Announcement of Research Results

1. Results were presented in the SMU Second Annual ROSA Symposium on Successful Ageing on 1st Nov 2022
    https://rosa.smu.edu.sg/events/second-annual-rosa-symposium-successful-ageing
2. The paper was Submitted to "CEPAR INTERNATIONAL CONFERENCE 2023 Population Ageing: Causes, Consequences and Responses" to be held on 3-5 Jul 2023, UNSW Sydney/Australia
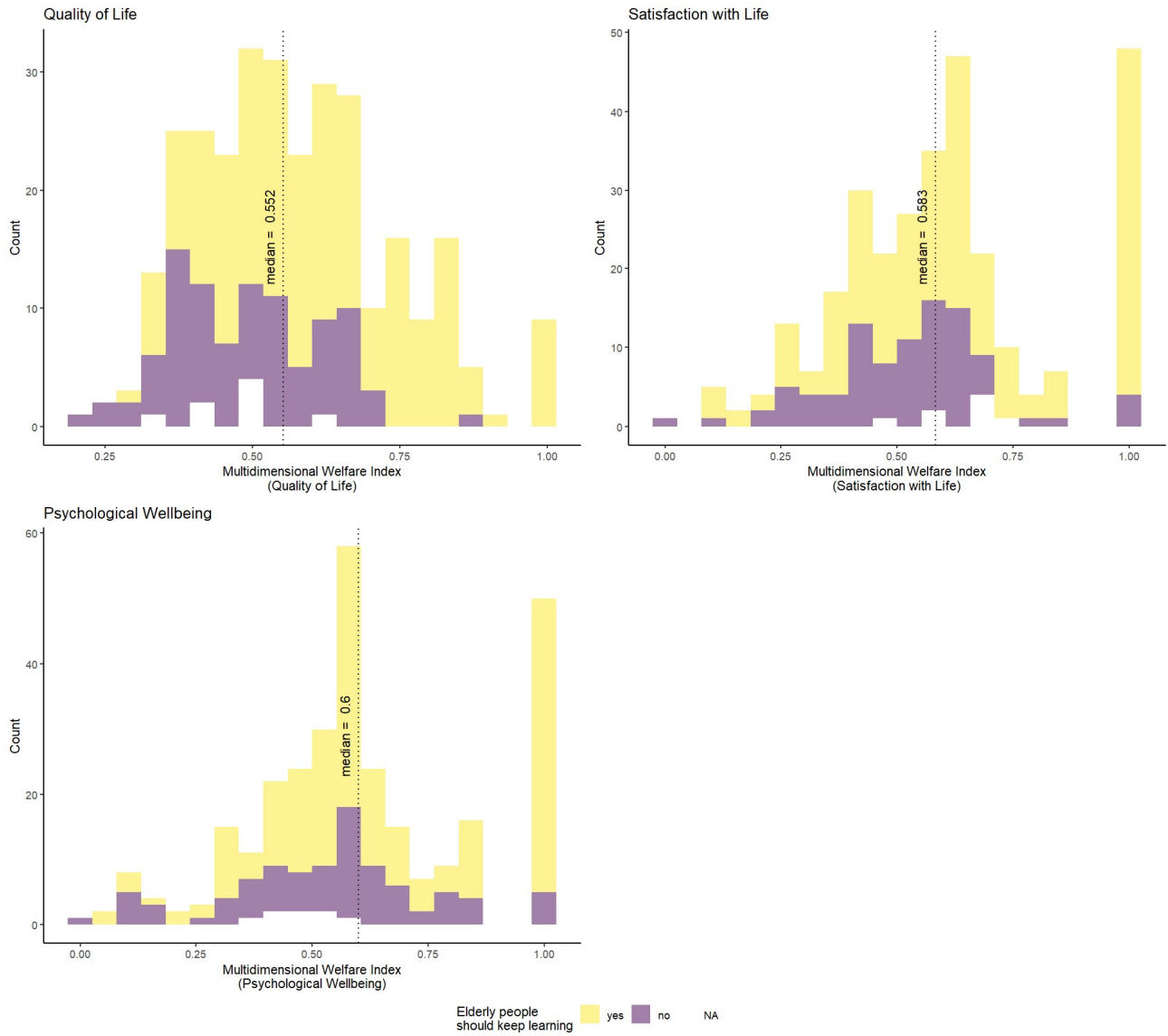3. The paper to be submitted to a journal soon
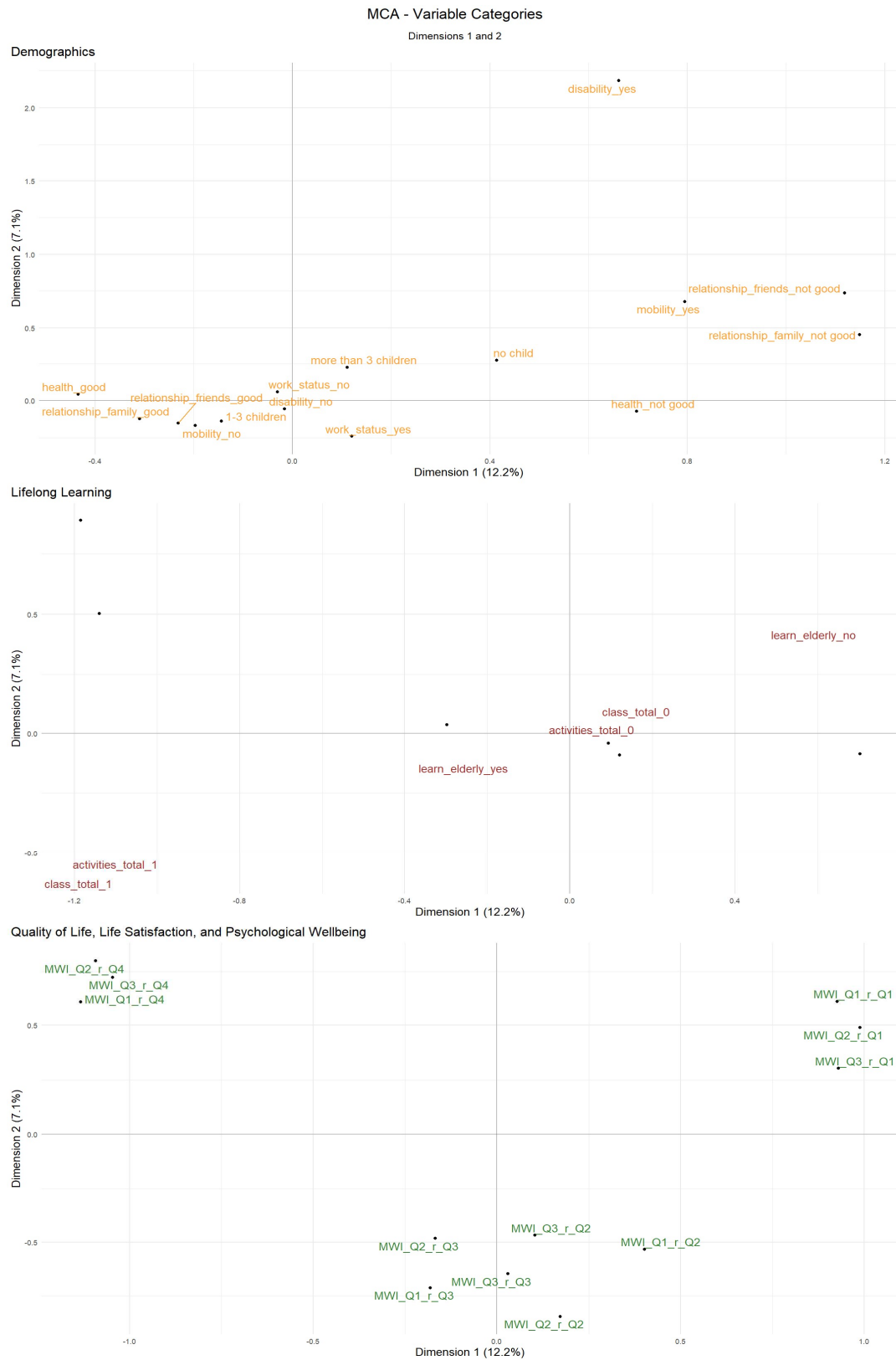
Figure 1: Wellbeing and Lifelong Learning

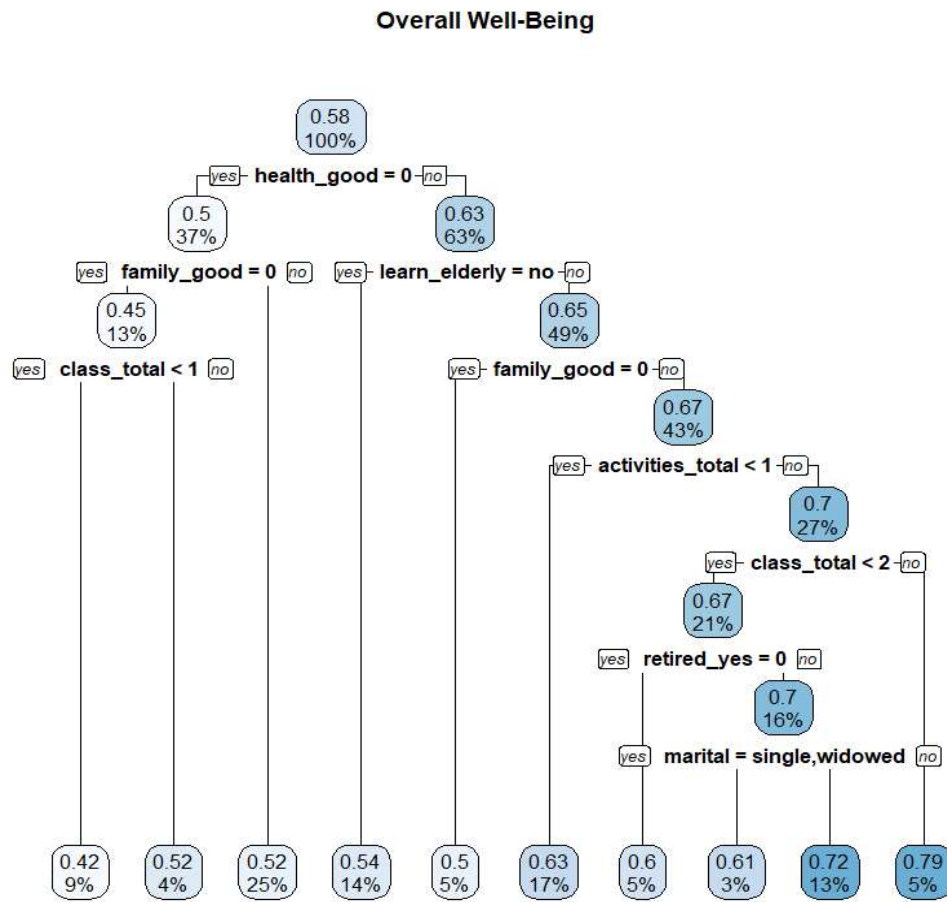**Figure 2**: Factor Maps on Dimensions 1 and 2

Overall Well-Being

Figure 3: Overall MWI as a Target