

Considering that evaluation is a complex activity, involving perceptual, cognitive, and emotional elements (Kuller, 1991; Nagy, 1998), it is not surprising to find perception gaps between residents and caregivers. Furthermore, most existing studies adopt a quantitative approach utilizing quantitative measures by standardized scales and using standard statistical procedures. Others measure observable behavior and count frequencies of the occurred behavior (Lawton, 1994; Rabins, Kasper, Kleinman, Black, & Patrick, 1999). Many researchers aggregate all items to obtain an overall satisfaction score with the underlying assumption that satisfaction is a unidimensional concept (Chou, Boldy, & Lee, 2001). However, recently it has been recognized that satisfaction is best represented by a multidimensional model; the structure of those evaluations and the underlying conceptual systems reflected in subjects' responses have not been studied based on the facet approach nor analyzed by multidimensional scaling techniques.

Although there is a strong agreement for the need to collect data directly from the el-

derly in QOL and QOC assessments, there seems to be a lack of adapted instruments, especially those that are culture-sensitive, and difficulty in interpreting results because of different instruments and analysis methods (Paulus & Jans, 2005). Therefore, the first aim of the study was to examine, by adopting the facet approach, whether the same domains of QOL and QOC as identified in western literature (e.g., physical environment, meals, nursing) are perceived by Japanese subjects. The second aim was to compare the conceptual systems of residents and caregivers regarding QOL and QOC in residential aged care facilities in Japan, utilizing multidimensional scaling techniques.

Methods

Subjects

Individual structured interviews with 69 residents were carried out in five nursing homes in Tokyo. The study was approved beforehand by the ethical committee of Tokyo Metropolitan Institute of Gerontology. Data were collected from all residents who gave their consent to be in-

cluded in the study. Consent was also obtained from the families of the subjects. The interviews took, on average, 45 minutes. In some cases the interviews could not be completed on the same day but had to be divided in several occasions, due to the cognitive impairment and/or the resident's mental state on that day. Five residents had to be excluded from the analysis due to insufficient or unreliable answers. Thus, 64 residents were included in the data analysis. The mean age of the residents was 84.1 years and they had been living in the nursing home an average of 5 years.

Approximately two thirds were female (69%) and two-thirds had some degree of dementia (66%). The characteristics of the subjects can be seen in Table 1. The distribution of residents according to level of dementia can be seen in Table 2.

Furthermore, a questionnaire with exactly the same questions was administered to 122 caregivers at the same five nursing homes. The caregivers had been working at the present work place approximately 4 years. About two thirds were female (64%) and the largest age group was that of under 35

Table 1
Characteristics of the Respondents

| | Residents | Caregivers |
|-------------------------------|------------------|---|
| Number | 64 | 122 |
| Gender | | |
| Male | 20 (31%) | 37 (30%) |
| Female | 44 (69%) | 78 (64%) |
| No reply | 0 (0%) | 7 (6%) |
| Age | Mean: 84.1 years | <35 years = 75 (61%) 36 - 55 years = 35 (29%) 56 years < 8 (7%) No reply: 4 (3%) |
| Mean length of residence/work | 5.0 years | 3.9 years |
| Dementia | | |
| Yes | 42 (66%) | N/A |
| No | 21 (33%) | |
| No reply | 1 (1%) | |

Table 2
Subjects' Level of Dementia*

| Level | Description | Number/Percent of Residents |
|-------------|---|-----------------------------|
| Independent | Completely independent in every day living Non-dementia | 12 (19%) |
| I | Independent living is possible No care is necessary | 9 (14%) |
| II | Dementia symptoms not apparent Independent living with support is possible Slight difficulties with orientation | 26 (41%) |
| III | Mild dementia Some difficulties with every day living Impaired memory | 15 (23%) |
| IV | Moderate dementia Difficulties with every day living Needs care services | 1 (1.5%) |
| M (medical) | High-level dementia Requires institutional care Severe dementia | 0 |

* According to the Japanese independence scale of the Japanese Ministry of Health, Labor and Welfare.
Note: Data from one resident (1.5%) is missing.

years old (61%) (see Table 1).

Facet Approach

In the present study the facet approach was adopted. According to this approach, facets are the basic conceptual units into which an area of interest is broken down. These are the contents of the research defined before hand. The facets consist of a number of elements, which are a list of components, describing the variations within any facet (Brown, 1985; Canter, 1983, 1985). From the reviewed literature it has become evident that QOL and QOC scales are concerned with certain domains (aspects) of institutional living. Among those that were identified in western studies, the following have been found relevant for the study of QOL and QOC in Japanese nursing homes: physical environment, everyday living, meals, leisure activities, care/nursing, dignity/respect, and relationships/communication. These elements make up the domains of QOL and QOC in nursing homes facet. Another area of interest of the present research is how residents and caregivers think and feel about these QOL and QOC domains. Therefore, psychological re-

sponses to the above domains have been chosen as a further facet in the present study. Based on previous research on the three-component model of evaluation, the perception of the above aspects of institutional living and care as being provided (perceptual component), the possibility to control those aspects (cognitive component), and feelings towards those aspects of institutional living and care (emotional component) have been selected as the elements of the psychological responses facet.

Instrument Construction

Once the facets and their elements are identified, they can be arranged in a mapping sentence, which is a concise way of specifying the components of research area and the relationship between them using normal language (Brown, 1985). From this mapping sentence (Figure 1) questions can be constructed by combining one element from each facet into a sentence.

For example, from the combination of element 1 of Facet A (provision) and element 4 of Facet B (leisure activities) a profile, such as A1B4, can be constructed, from which the following question can be derived, "Are there leisure activities in this facility?" Similarly, combining element 2 of Facet A (control) with element 3 of Facet B (meals) will result in profile A2B3, from which the following question for the residents can be generated, "Can you eat as much as you want?" Another question for the same A2B3 profile, i.e., a combination of control and meals, can be, "Can you eat at any time you wish?" Respectively, the same questions for the caregivers will be, "Can the residents eat as much as they want?" and "Can the residents eat at any time they wish?" Since several questions for the same combination were possible to construct, altogether 44 questions were generated for the present study. Nine questions covered the environment, 10 covered every

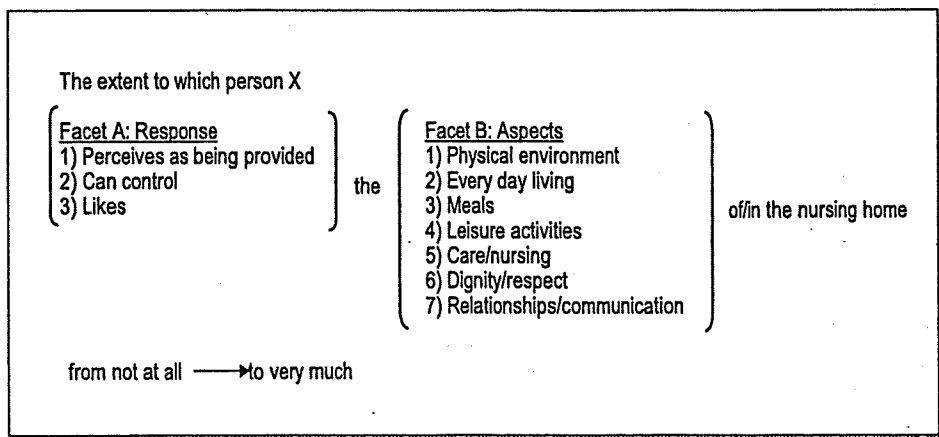


Figure 1. Mapping sentence for the study on residents' and caregivers' conceptualization of QOL and QOC in nursing homes.

ay living, 5 were about meals, 9 questions were concerned with activities, 4 with care, with dignity/respect, and 4 questions covered relationships. The answers were made on a 5-point scale where 1 was not at all and 5 was very much so.

Data Analysis

The scores of the questions were analyzed by multidimensional scaling technique (MDS). In the present study, smallest space analysis (SSA) was used for data analysis. The SSA is a non-metric multidimensional scaling procedure in which every item is correlated with every other item. When the program plots each of the items into a multidimensional space in such a way that the closer two points are in space, the higher the correlation between the items represented by the points (Brown, 1985). The analysis of the relationship between the items is done by partitioning of the space into separate regions of the plot, each region containing items that are similar in concept. A partition must yield a continuous region having a continuous boundary of whatever shape that does not intersect with the boundary of another region (Brown). In this way, the content and level of relationship between different concepts can be understood. This spatial representation and partitioning of items into regions makes it possible to analyze the structure of facets. Examples of partitioning can be seen in Figure 2.

Results

Domains of QOL and QOC in Nursing Homes Facet

As can be seen in Figure 3, the residents distinguished clearly among different domains of QOL and QOC in nursing homes, such as the physical environment, care, relations, everyday living, meals, bath, and leisure activities. These are generally the same as the domains identified in previous western literature and as the elements of the mapping sentence for this study. However, a new discovery was that the present residents distinguished bathing as a separate

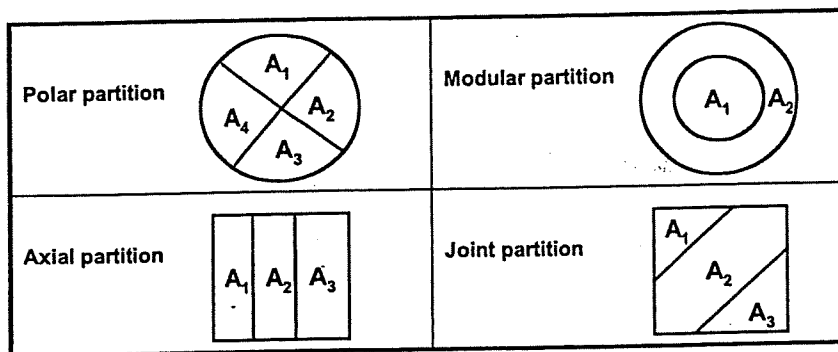


Figure 2. Patterns of partitioning of SSA plot (Levy, S., 1985).

domain, implying that for the present Japanese subjects, bathing was not simply a part of care or everyday life but an important part of their lives in the nursing home. Furthermore, the placement of bathing-related items between the region for meals and the region for leisure activities, both being thought to be pleasant aspects of life, implies that bathing was perceived by these residents as a pleasant part of life in the facility.

It is interesting to note that the the resi-

dents' general satisfaction with life in the facility and their possibility to live freely just like they did at home, was closely related to the care they received, revealed by the fact that these two questions fell into the region of care. In other words, from the present plot it can be assumed that the residents felt that they were satisfied with their lives in the nursing home, only if proper care was provided. Also with proper care provided they could continue to live freely as they did at home.

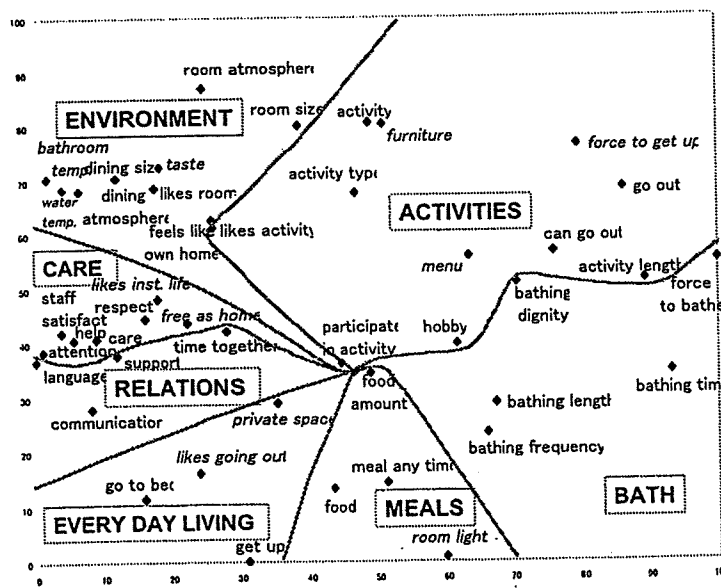


Figure 3. Domains of QOL and QOC in nursing homes facet: Residents' conceptualization. Three-dimensional SSA plot, dimension 1 plotted against dimension 2. Misplaced items hypothesized to belong to a different area are marked in underlined italics.

The comparison of resident and caregiver plots in Figure 4 shows that the caregivers distinguished the same domains as the residents. One difference is that a new region, comprising questions about force in the care, emerged in the staff plot. This suggests that caregivers were aware that they sometimes had to use force when waking or bathing residents, while residents did not seem to feel such a force. Another difference is the placement of the region for bath next to care and force on one side, and meals, or assistance with eating, on the other side in the caregiver plot. These can be seen as nursing-related aspects. This suggests that caregivers did not think of bathing as a pleasant activity but considered bathing as part of nursing where force was sometimes necessary.

One aspect not distinguished either by residents or caregivers in the present study is dignity/respect, although it was an important QOL domain in western literature. Although there were three questions regarding dignity/respect in the present study, they did not create a separate region but all fell

into different regions, i.e., bathing, care, and relations.

Psychological Responses Facet

Looking at Figure 5, it can be seen that three main areas were distinguished according to the hypothesized elements of psychological responses to different domains of QOL and QOC: the residents' feelings (emotional component), provision of care aspects (perceptual), and the residents' possibility to control aspects of life and care (cognitive component). Furthermore, the concentric shape of the regions suggests that there is an order of importance among the elements (Levy, 1985) with the emotional component in the core area having the highest order, i.e., the most central significance for the residents, followed by the perceptual, i.e., whether aspects of care are actually provided or not, and finally, the cognitive element, i.e., whether residents can control different aspects of life and care.

Comparing the conceptual systems of residents and caregivers in Figure 6, it can

be seen that caregivers did not distinguish clearly among the three elements of psychological responses. This is revealed by the fact that, although efforts to partitioning were made, no clear partitions could be made. Several items that fell into the feelings and control regions should belong to another region according to the original hypothesis (misplacements are marked in underlined italics in the plots).

The tentative partitioning suggests that the clearest region is that of care provision, implying that caregivers believed that their main or only task was to provide care to the residents, and they also seemed to believe that it was only care provision with which the residents were concerned. Nevertheless, for the residents, the emotional component seemed more important than the actual provision of care and everyday living. This difference in basic conceptualization both regarding content (e.g., bathing, force) and level of involvement (emotional, perceptual) may be an important reason why residents and caregivers evaluate care and life in nursing homes differently from each

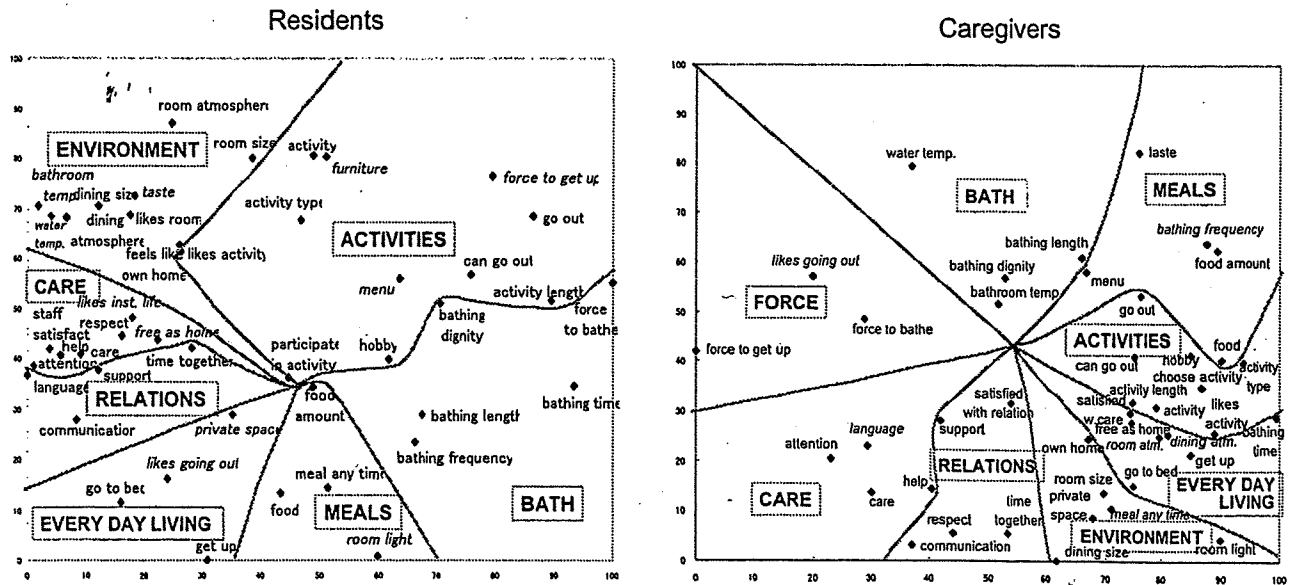


Figure 4. Comparison of residents' and caregivers' conceptualization with regard to Domains of QOL and QOC in nursing homes facet. Three-dimensional SSA plots, dimension 1 potted against dimension 2. Misplaced items hypothesized to belong to a different area are marked in underlined italics.

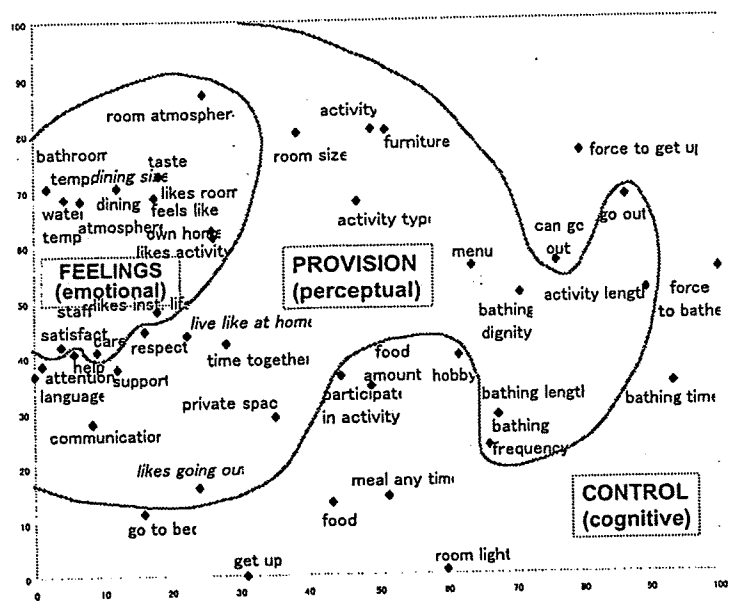


Figure 5. Psychological responses facet: Residents' conceptualization. Three-dimensional WSSA1 plot, dimension 1 potted against dimension 2. Misplaced items hypothesized to belong to a different area are marked in *underlined italics*.

confirmed most of the domains of QOL and QOC identified in previous western studies by different methods and also the elements of the mapping sentence developed for this study. Support for the three-way conceptualization of care in Bowers' et al. (2001) study could also be found, if we think of care, meals, activities, and everyday living domains in the present study as service-related aspects in their study, the relations domain in the present study as their relational aspects, and environment and bathing domains in this study as comfort related aspects in Bowers et al.'s study.

One major finding of the present study was that a new domain, bathing, was identified by both residents and care staff, implying that bathing was seen as more than just a necessary part of life and care in Japanese nursing homes. In fact, bath has always played a central role in the Japanese culture, and has been highly appreciated by the Japanese. There are numerous natural hot-springs (onsen) all over Japan and the building of public baths around them contributed to the present bathing culture. Bathing in Japan has not only the purpose of cleaning the body but, more importantly, it is a way

ther and why perception gaps often occur.

Discussion

The present study examined residents' and caregivers' conceptualization of care

and life in residential aged care facilities in Japan. The facet approach using multidimensional scaling techniques proved to be appropriate to study residents' and caregivers' conceptual systems. The results con-

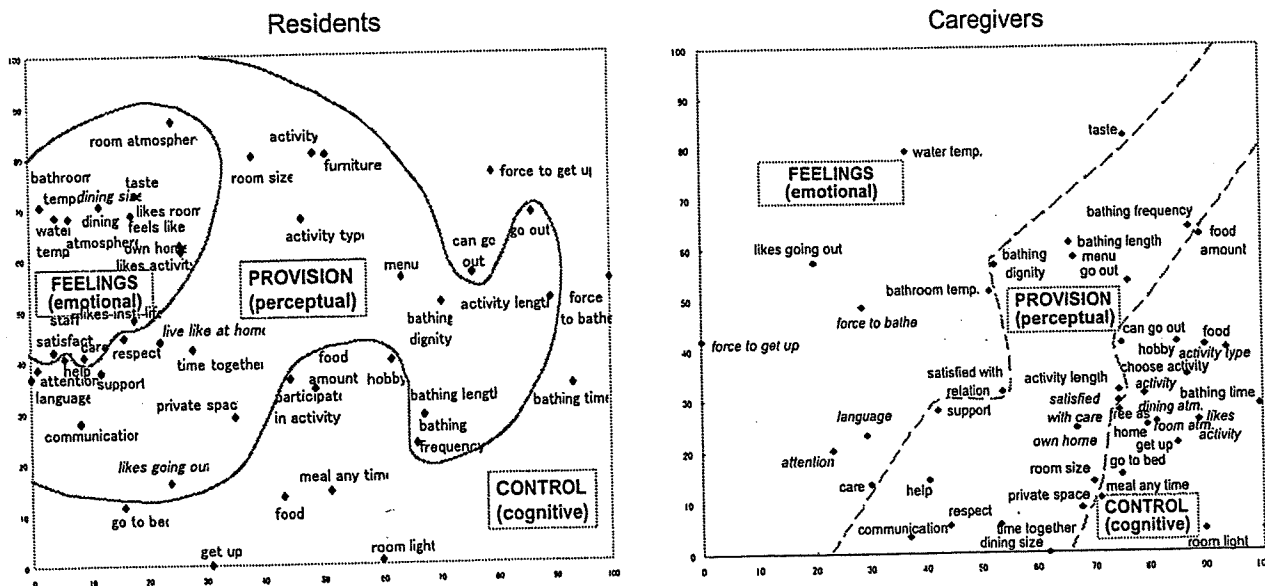


Figure 6. Comparison of residents' and caregivers' conceptualization with regard to psychological responses. Three-dimensional SSA plots, dimension 1 potted against dimension 2. Misplaced items hypothesized to belong to a different area are marked in *underlined italics*.

of relaxing. People wash themselves all over before they get into the pool, and then they enjoy the relaxation of soaking in the hot water (Benedict, 1989). Also the custom of bathing in a bathtub, which is also the usual way of bathing nursing home residents, is different in the Japanese culture compared with most western cultures, where a shower is often the main means of bathing residents. This tradition is reflected in the conceptualization of bathing as a distinct aspect of life in nursing homes made by both residents and caregivers, compared to western studies where bathing/showering is seen as part of personal care (Chou et al., 2001). However, while residents in the present study seemed to regard bathing as a pleasant part of life in the nursing home, also confirming a previous study by Nagy-Tanaka, Ito, and Takahashi (2007) in which 83% of residents in aged care facilities were looking forward to bathing, the present care staff seemed to think about bath as part of nursing.

Another major finding was that there was an order of significance among the elements of the residents' psychological reactions. This is in agreement with Kenny and Canter's (1981) findings that clearly show that psychological reactions are not a set of isolated dimensions that could be revealed by factor analysis, nor separate categories, that could be revealed by content analysis, but an ordered set of reactions, depicting level of involvement, which could be discovered only by the use of facet approach and multidimensional scaling techniques. The present finding about the existence of perceptual, cognitive, and emotional components supports previous studies (Kuller, 1991; Nagy, 1998) but the present order from the emotional component, i.e., feelings toward institutional living and care being most central, followed by the perceptual (actual provision) and finally the cognitive (control) element, is somewhat different from Nagy's study where the order was from the emotional toward cognitive and finally perceptual component. This

might be a matter of age difference. People in Japan have traditionally not been used to controlling their situation, but instead, adjusting themselves to the situation and enduring it. This is still the value system of old people in Japan and many elderly in aged care facilities are grateful to have been accepted as a resident, without wanting anything differently from what is being offered. However, the younger generation, as were the subjects of Nagy's study, has started raising their voices and requiring control over their situation. It is possible that an analysis of younger residents would show a different order. Another reason for the difference might be the fact that two thirds of the residents in the present study had some degree of dementia. Although several questions were asked repeatedly, sometimes by different interviewers, when resident interviews had to be divided into two or more occasions, and the answers were found having good consistency, impaired cognitive function might have led to less ability to understand the present situation, and less ability and wish to control it.

The fact that some items did not fall into their respective regions, i.e., where they were hypothesized to belong, could point to ambiguous questions difficult for the subjects to comprehend, or irrelevant to the respondents. Those questions are best to be omitted from further studies. However, some misplacements (marked in underlined italics in the plots) did give new insights. For example, the placement of bathroom temperature in the physical environment region revealed that temperature could be, in fact, seen as a physical feature of the environment, rather than an aspect of everyday living and related to bathing items, as it was hypothesized. Also the placement of private space in the everyday living area (originally hypothesized to be related to the environment) may point to the residents' basic need for some degree of privacy and private space for an acceptable life in the nursing home. Furthermore, the placement of force to get up in the leisure activities region

could point to the possibility that residents were woken by force in order to participate in activities. Such insights have practical implications for environmental design and care routines.

This study also revealed that there was a certain gap between residents and caregivers in their conceptualizations of QOL and QOC. However, it is important to point out that the present study was not concerned with a numerical perception gap, i.e., the size of gap between resident and caregiver perceptions but it revealed a perception gap on a conceptual level. This difference in basic conceptualization between residents and caregivers might explain their different evaluations of care, as well as the difficulty to provide the kind of care that residents wish. Since a smaller perception gap signifies that caregivers more accurately identify residents' needs and wishes (Mittal et al., 2007), it is important to help caregivers and administrators understand resident conceptualizations, in order to design care delivery programs and routines for everyday living that better suit the needs and preferences of residents.

These findings and discoveries could be made only due to the spatial representation of items shown by multidimensional scaling techniques, such as the SSA in the present study. Also the facet approach and analysis by multidimensional scaling techniques have demonstrated that original hypotheses can be validated or modified in the light of empirical observations and irrelevant aspects of study or unclear questions can be detected, facilitating refinement of the questionnaire. Furthermore, although comparison with western studies was not the main aim of the present study, the results suggest that this method is culture sensitive, and therefore, it is possible to study, for example, culture-specific, age-specific, or dementia-specific issues by comparing the conceptual systems of different populations. Finally, replication of these new discoveries by further studies can provide lawful rules in conceptualization of QOL and QOC, thus

facilitating theory construction.

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介護予防に対する医療関係者の役割

Participation with medical staffs in a preventive care

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介護予防は、日常生活自立機能、基本的日常生活動作、認知機能など多くの要素別の機能低下の多段階を理解し、何を予防するかを知ることから始まる。

介護予防は、慢性疾患のケアから、障害の段階の理解を経て、社会サービス受給への概念に変化した。

虚弱の進展因子として、疾患、液性因子、生活習慣と統一した概念としてホメオスタシス破綻などの考え方がある。これらの考え方を踏まえて、簡便な虚弱者のスクリーニング方法が開発されている。

介護予防の失敗は、地域の高齢者の自主的な参加要件である、高齢者自身の役割付与、予防の意義の説明、「選択と楽しみ」のいずれにも配慮がなかったことによる。

介護予防事業を根本的に改善するためには、医療関係者が協力して科学的アプローチを行うことが必要である。

key words

介護予防
評価
介入方法
医療関係者の役割
転倒予防

はじめに

介護保険におけるコンセプトは「地域における自立支援」と「地域で要介護者を支える」の2点に集約されてきた。介護保険制定後5年間に介護認定者が200万人から倍増し、特に要支援、要介護Iといった、「自立支援」を図るべき対象が激増し、「介護保険料の値上げ」が避けられなくなっていることが、「介護予防」の概念の導入に関係している。

改正の要点は、従来の要支援と要介護Iに対し、認知症や脳血管障害、症状の不安定な対象を除き、筋力トレーニングや活力賦活(アクティビティデイ)などを行う「要支援I、要支援II(新設)」を選別し、「介護予防事業」

で経費を賄うというものである。

新しい介護予防事業のサービスの選定根拠が十分科学的に担保されておらず、一部の少数例のデータによって、虫食的なサービスモデルが提唱されていることが最も危惧される点である。栄養、口腔ケア、筋力トレーニングなど重要な視点であることは間違いないが、高齢者の多様な病態と機能低下の学問的関連を、十分反映した施策が求められる。この点の不足は、介護予防プログラム参加者が悲惨なほど少ない現実によって証明された。本総説では、虚弱、要支援、要介護などの用語についても改めて歴史的な概念の変遷を整理し、医療チームが「どのような状態をどうやって予防するのか」という基本的な疑問を考える。

介護予防：何を予防するのか

1. 介護の多様性

介護保険の介護は、生活支援と身体介護に分けられる。

生活支援は、家事援助とも言い、独居あるいは、家族の家事代行が不十分な認定者に対して、買い物、掃除、洗濯、炊事、通院などを手助けするものであり、「手段的日常生活動作能力(IADL : Instrumental Activities of Daily Living)」(表1)の代行をしている。

身体介護には、寝返り、移動の介助や排泄支援、清拭などといった、「基本的日常生活動作能力(Basic Activities of Daily Living : BADL)」(表1)の介助と、床擦れ処置、オムツ交換、摂食介助などといった、褥瘡、尿失禁、

表1 基本的日常生活動作能力

| 生活支援 独居高齢者の生活自立要因 ＝手段的日常生活動作能力 | 身体介護 | |
|---|---------------------------------------|-----------------------------------|
| | 最低限の自立 (sADL) | 移動の介護 (mADL) |
| 交通機関の利用 買い物 金銭管理 料理 家事 洗濯 熱源の取り扱い 服薬管理 電話 | 食事 排尿・排便 入浴 整容 更衣 口腔衛生 | 寝返り 起立 歩行屋内 歩行屋外 階段昇降 |

[江藤文夫：ADL20. 日老医誌 29(11)：841-848, 1992]

嚥下障害などの「老年症候群のケア」が含まれる。

したがって、介護予防という概念は、IADL 依存の予防、BADL 低下予防、および老年症候群の発症・悪化予防という極めて幅の広い概念にならざるを得ない。

このことが、一般に介護予防の意味をわかりにくくし、一部は健康増進などの生活自立のみと捉えたり、一部は寝たきり予防という BADL 低下予防を念頭に置く傾向がみられる。

また、欠けている能力を賦活する介護サービスとして共同生活、リハビリテーションがあり、前者は手助けを受けながら共同で作業を行うことによって IADL を維持し、後者は BADL の改善・維持を主な目的としているが、認知症(認知症)やうつなどにも効果が期待され、「認知機能・情緒」といった精神機能に対する介護の形態を含んでいる。

このように、介護予防は、日常生活

自立機能、基本的日常生活動作、認知機能など多くの要素別の機能低下の多段階を理解することによって、はじめて、対象が「何を予防すべき」段階であるかを理解することになる。

2. 介護予防対象者に対する考え方の変遷

虚弱や要介護者という概念は1980年に以降に出現した比較的新しい概念である。それ以前の捉え方を振り返ると、「介護予防対象者」の全体像が見事に浮かび上がる。

高齢者の包括的な評価の創始者である Majorj Wallen は、要介護者に対し、1940年に「慢性疾患に対するケア」という概念を発表した¹⁾。その後、疾患一障害一能力低下一不利というリハビリテーションの基本的概念の中で、能力低下した対象が虚弱や要介護者という捉え方が広まり²⁾、介護保険の創設当時の最近まで通常の捉え方であったと思われる。1980年代には福祉サービ

スの発展や、医療ソーシャルワーカーの増加と社会的活躍により、虚弱者は、福祉的サービスの受給者であるという考え方も出てきた³⁾。

このように、疾患論的捉え方、障害論的捉え方、社会サービスの捉え方が、歴史的に「虚弱者」に対する概念の変遷と発展的積み重ねであり、これらを重層化した構造として、高齢者の QOL 構造が理解されるようになった。さらに、前虚弱者の早期発見というテーマが世界的に重要になってきた⁴⁾。すなわち、介護予防対象者は、臓器障害として医学的に評価され、運動器の機能低下が医学的に評価され、生活自立が評価されたうえで、支援内容や量が評価されなければならないことは自明である。

このなかで、サルコペニアは特に中核的所見として重要と考えられている。

介護予防-危険因子 (リスクファクター)の解析

1. ホルモン、液性因子

高齢患者の虚弱や障害、有害事象を反映する血清マーカーとして、テストステロン値の低下⁵⁾、DHEA 値の低下⁶⁾、早朝におけるコルチゾール・DHEA 硫酸塩比の上昇⁷⁾、高感度 CRP、IL-6 上昇⁸⁾、総コレステロールの減少⁹⁾、血清アルブミン値の低下¹⁰⁾など、多くの因子が指摘されている。

我々も、テストステロン値や DHEA 値の低下が ADL の低下と相関し、また認知機能や意欲とも正の相関をもち¹¹⁾、運動によって認知機能が改善する成績を得ている¹²⁾。

これらの指標は虚弱の指標として単独で提唱されている。しかし、神経、内分泌、栄養、動脈硬化、炎症など多角的視点のなかで総合的に捉える必要があるだろう。

2. 疾患要因

寝たきりの原因疾患の年代別解析では、65~74歳の前期高齢者では脳血管障害が最も重要な危険因子である。75~84歳の後期高齢者では、脳血管障害に認知症や転倒・骨折が加わり3大危険因子となる。85歳以上の超高齢者では、衰弱といった「疾患によらない要因」の重要性が急速に増す。

転倒・骨折を例にとると、我々が全国7都道府県の60歳以上2,162名の転倒率を調査した成績では、65歳以上で加齢とともに転倒率が上昇する¹²⁾(図1)。仮に30%以上の高頻度の転倒率をもつ

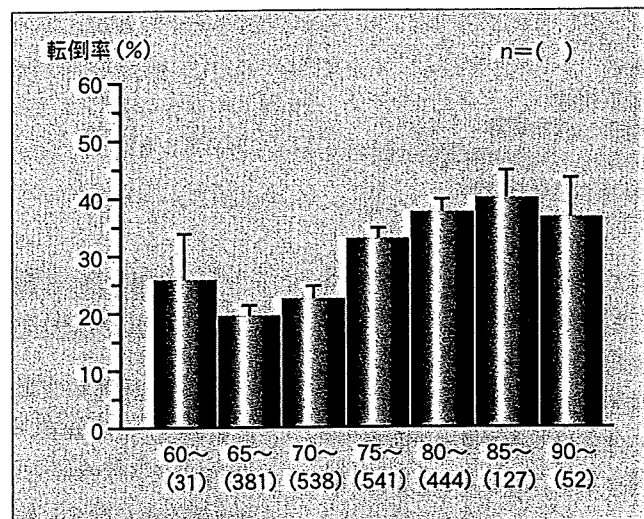


図1 高齢者(60歳以上)の過去1年における転倒率

集団に対して、転倒予防事業を行うならば、75歳以上の後期高齢者を対象とすればよいことがわかる。

3. 生活自立要因

BADL は年齢とともに低下するが年々改善し、縦軸に ADL をとり、横軸に年齢をとって折れ線グラフでつないだカーブは年々矩形化し、生命予後と同様、健康寿命は改善している¹³⁾。どのような活動度がより早期に低下するかについては、移動系では階段昇降、セルフケア系では入浴や排尿があげられ、食事は最後まで保たれる機能である¹²⁾。

前期高齢者では、階段昇降などの筋力アップが課題であり、後期高齢者では、入浴、排泄自立、超高齢者では、嚥下障害などに対する摂食嚥下が、自立要因の年齢別の低下に着目した視点といえる。

4. ハイリスクアプローチ

寝たきりになりやすい群を早期にスクリーニングすることが可能ならば、「ハイリスクグループ=高危険集団」として特定し、早期に介入しようとする考え方である。この考え方の原点は、生活習慣病におけるハイリスク集団の特定にある。前期高齢者の寝たきり原因の第1位である脳血管障害においては、高血圧、糖尿病などの疾患や加齢、男性など避け得ぬ要因と、日本酒に換算して2合以上の飲酒、喫煙などといったライフスタイルの要因が縦断研究によって明らかにされている。一方認知症では、代表的なアルツハイマー型認知症において、ApoE ε4 の遺伝的危険因子と高血圧が危険因子であることが明らかにされ、栄養学的にも、野菜不足、肉食過多などのライフスタイルの影響が目目を浴びている。

虚弱に対する最近の包括的アプローチ研究では、複数の生体システムに同

表2 高知県香北町における総合機能評価と介入事業

- 1) 健康関連アンケート調査(65歳以上全高齢者): ADL, 視力, 聴力, 老研式活動能力, うつ, 福祉サービス利用, QOL
- 2) 包括的機能健診(75歳以上全高齢者): 認知機能(MMSE), 歩行能力, 身体柔軟性, 指先巧緻性
- 3) 運動教室
- 4) 家庭血圧測定
- 5) 定期健診, 訪問看護
- 6) 保健・福祉・医療調整会議(現行のケアカンファランス)
- 7) 健康関連講演会(年2回)

時発生して虚弱を引き起こす障害に注目している。多数の生理的組織が症的、臨床的機能不全の限界に近づき、複数の系統において予備能力の限界を超えた結果生じる症状または症候群¹⁴⁾という考え方で、極めて老年症候群に近い考え方である。実際の測定方法としては、運動系機能として、握力、up & go テスト、トレッドミル、6分間歩行などを行い、認知機能として認知機能(MMSE)、バランス機能として片足立ち試験、栄養状態としてBMI、周囲径などがあげられている。これらは、「高齢者総合的機能評価ガイドライン」¹⁵⁾に推奨した方法と図らずも一致している。同様の考え方に、虚弱は自立と終末期の中間点とみなす考え方で、ハイリスクの因子として、75歳以上の高齢、ADLおよびIADL障害・依存状態、転倒・骨折、多剤投与、慢性病、認知機能低下、抑うつ、栄養障害を指摘している¹⁶⁾。これも、老年症候群に対する総合的機能評価がハイリスクグループの検出に有効な指摘である。

介護予防-介護予防はなぜ失敗したのか

介護保険制度創設前の成功事例(香北町研究)によれば、健康予防活動(表2)による介入によって、基本的日常生活活動の増大と老人医療費の抑制という、理想的な結果が得られているが、介護予防開始後の自治体の特定高齢者事業の参加者率の低さは目を覆わんばかりである。

医療関係者が予防の意義を熱心に説明することにより、介護予防事業参加者が5倍になった成績も得ている。地域の高齢者が自主的に参加するためには、役割を付与し、予防の意義を十分に説明することが必要であり、「選択と楽しみ」がない予防事業は失敗している。

新しい介護予防の ランドデザイン

寝たきり予防介入研究による検証 -問題点は何か?

我々の研究班では、寝たきり予防介入研究によって以下の介入効果と課題を得ている¹⁵⁾。

1. 転倒予防の効果的な方策は何か

我々は、認知症患者240名を対象に転倒の特異的に多い時間帯にスタッフ配置の工夫と個別ケアプラン充実による転倒予防の試みを行い、転倒および骨折の半減効果を認めた。また、我々は、運動を定期的に行っている地域在住中高年者4,500名において転倒予防に役立つ運動の性質、頻度、時間を解明した。

2. 在宅維持条件の解明

高橋は、地域在住高齢者全3,097名について、5年間(1999~2004年)の追跡調査を行い、男性のCOPD、変形性関節症、女性の糖尿病、膝関節疾患など、従来寝たきりの直接疾患と考えられていなかった慢性疾患が、軽微なADL低下を起こすことを指摘し、医療関係者に注意を喚起している。

3. 介護予防対象者をどう選ぶべきかを解明

地域(高橋:大三島町1,838名)で軽度介護者、施設(鳥羽:特養など1,200名)でもJ2~A2レベルの高齢者において自立度が縦断的に低下する率が高いことを確認した。要支援レベル以下でも介護予防の重要性が示唆される成績である。

4. 注目されている小規模介護施設の課題を解明

山田らは、グループホームの高齢者を対象にADL低下を6ヵ月まで縦断的に確認し、新しい小規模多機能施設における課題(リハビリテーションや

運動療法の導入の必要性)を解明した。運動介入がグループホームの介護予防に効果的であることがはじめて明らかになった。

5. 従来の介護保険制度における介護事業の強化が介護予防に有効な対象者の特徴を明らかにした

松田らは、ケアプランや自治体レベルの施策で、移動介助の例では、介護力強化が寝たきり予防に効果があることを横断調査により解明した。

6. より早期の介護予防 —パワーリハビリテーションの問題点

松田らは、マシンを用いたいわゆるパワーリハビリは、短期的には改善効果が期待できるが、リハビリ専門職による対象者のコンプライアンスも含めた筋力トレーニングの可否、介入中に生じ得るリスク評価が必要であり、また、1回2～3時間で8～10名程度の高齢者に筋力トレーニングを提供するのが限界であり、またリスク管理の点から1台に1人のスタッフが付くという体制を取ることが望ましい。そのためコスト的には非常に高いものになることを指摘している。

7. 運動継続の効果を検証

我々は、均整柔軟体操の効果を大規模縦断的に検証した。そして自立高齢者を増やし、要支援への移行を予防阻止する観点(介護予防)から、開発した虚弱者の活力を測定する機能評価表を

用いて調査したところ、体操教室の全国的組織(体操三井島システム：2,600名：18～84歳)に対する大規模縦断研究1年目の成績で、運動による活力度(IADL、交流、運動機能、健康意識、うつ)の向上を示した。このなかで、後期高齢者では週2～3時間程度の運動最適時間も示している。また、1年以上継続した例では、転倒率が30%から15%に減少し、この効果は7年間の運動継続者でも転倒率の程度が変わらなかった¹²⁾。

以上の総括から、運動介入に関しては、「個人が楽しめる運動」を「年齢に適した運動強度と時間」を設定することにより、持続可能な介入となり、理想的な早期介護予防が実現される。

欧米に比べ、安価で楽しめるスポーツの場所、種類の豊富さが少ないわが国の現状に対し、「介護予防は高齢者の余暇文化水準を図る物差し」との考え方が重要で、安易にどの自治体でも新しい施設にトレーニングマシンが並び、数年後に誰も使用しなくなる悪夢だけは避けなくてはならない。

転倒・骨折は高齢者における寝たきり要因の第3位であり、大腿骨頸部骨折はその90%以上が転倒によって生ずる¹⁾。転倒は、骨折しなくても意欲やADLを低下させる²⁾。地域住民におけるADL依存の危険因子として、転倒は約2倍のリスク³⁾であり、転倒予防は寝たきり予防に重要である。

転倒予防

地域・施設共通の寝たきりの危険因

子である転倒予防について述べる。

従来、転倒危険因子の抽出は、特定のフィールドでの横断的、あるいは縦断的解析によってなされているが、抽出された危険因子は、身体的脆弱性、歩行機能の低下など共通の危険因子がある一方、めまいや痴呆などについては成績が一致していない。従来の転倒危険因子は、病歴、現症、血液検査、生活能力などの簡便な検査、専門調査員による測定検査、特殊な機器を用いた検査などが統一性なく調査され、一般健康診断に適應できるかどうかの観点到著しく欠けていた。その欠点を補うため厚生労働省研究班「転倒ハイリスク者の早期発見の評価方法作成ワーキンググループ」によって簡易な「転倒スコア」が完成し、実用に付されている(表3)。

おわりに

介護予防のコンセプトは、生活習慣病によるイベント予防が不十分で、脳梗塞や骨折が増加し、これらによる機能低下のエビデンスの構築はようやくここ数年で重要な学問として市民権を得てきた状況である。

従来の医学では、イベントがエンドポイントでそれ以降の医療やケアに無関心なほとんどの臓器別の専門医から、イベント後のADL低下者や認知機能の低下者は、少なくとも一部では「病院での厄介者」扱いされてきた。これらに対して老年医学やリハビリテーション医学が真剣に対応してきたといっても過言ではない。介護予防はど

表3 転倒スコア

- 1) 過去1年に転んだことがありますか
「はい」の場合、転倒回数(回)
- 2) つまづくことがありますか
- 3) 手すりを使わないと階段の上り降りができませんか
- 4) 歩く速度が遅くなってきましたか
- 5) 横断歩道を青のうちに渡りきれませんか
- 6) 1キロメートルくらい続けて歩けませんか
- 7) 片足で5秒くらい立つことができませんか
- 8) 杖を使っていますか
- 9) タオルは固く絞れませんか
- 10) めまい・ふらつきはありますか
- 11) 背中が丸くなってきましたか
- 12) 膝が痛みますか
- 13) 目が見えにくいですか
- 14) 耳が聞こえにくいですか
- 15) 物忘れが気になりますか
- 16) 転ばないかと不安になりますか
- 17) 毎日、お薬を5種類以上飲んでいませんか
- 18) 家の中で歩くとき、暗く感じますか
- 19) 廊下・居間・玄関によけて通る物がありますか
- 20) 家の中に段差がありますか
- 21) 階段を使わなくてはなりませんか
- 22) 生活上、家の近くの急な坂道を歩きますか

使用方法：質問項目で「はい」の項目数を合計する。「はい」の項目数が増加すると転倒率が高くなる。10項目以上で、感度・特異度とも70%で転倒を予測可能。各項目は、転倒危険者に対するケアプランにも使用する(図2)

| 評価 | 看護 | 理学療法士・リハ医師 | 一般医師 |
|----|--|-----------------------------------|---|
| | つまづきの有無 立ち上がる様子 移動の時間 タオルを絞れる 猫背 コミュニケーション めまい 服薬遵守 | 歩行観察 つま先の上がり UP&Go 試験 握力 | 異常歩行 R/O 麻痺 筋強剛 下腿周囲径 CT/DEXA 認知能 血圧変動 睡眠薬 抗不整脈 |
| 予防 | 転倒場面による ケアプラン 歩行・移動支援 見守り | 転倒予防体操 靴の処方 | 趣味の運動 履物チェック 栄養指導 骨粗鬆症薬 ビタミンD |

図2 チーム医療・看護・介護の共通言語=老年症候群 CGA/老年症候群を通じたチーム医療の一例(転倒)

のような機能の段階においても機能低下防止が図られなくてはならない。

医療関係者は、情報を多職種で共有し、臓器の壁を超えて介護予防に務めなければならない。

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Productive Roles, Gender, and Depressive Symptoms: Evidence From a National Longitudinal Study of Late-Middle-Aged Japanese

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Using three waves of panel data collected from a national sample of Japanese adults between the ages of 55 and 64 years, we examined the relationship between productive roles and depressive symptoms. Our particular emphasis was on multiple roles, role transitions, and gender differences. We found that, among men, engaging in more hours of paid or volunteer work was related to fewer depressive symptoms. Although men who lost their paid work role reported more depressive symptoms, volunteer work attenuated the negative effect of losing their paid work role. For women, none of the productive roles examined in this study were found to be independently linked with depressive symptoms. However, engaging in multiple productive roles, in comparison with doing only housework, was related to fewer depressive symptoms. These findings suggest the psychological benefits of paid and volunteer work for retirement-aged men in Japan, and the need to be attentive to gender differences in the impact of productive roles.

Key Words: Depressive symptoms—Productive roles—Volunteer work.

RECENTLY, engagement in productive roles that produce goods or services, whether paid or not (e.g., paid work, housework, and volunteer work), has been emphasized as one of the main factors leading to successful aging (Herzog & House, 1991; Rowe & Kahn, 1997) as well as the contribution of older adults to society (Bass, Caro, & Chen, 1993; Butler & Gleason, 1985). Previous studies using longitudinal data have found that paid work (Luoh & Herzog, 2002; Rushing, Ritter, & Burton, 1992) and unpaid housework (Menec, 2003) have protective effects against subsequent functional decline and death; that volunteer work is related to greater longevity (Lum & Lightfoot, 2005; Luoh & Herzog; Musick, Herzog, & House, 1999; Oman, Thoresen, & McMahan, 1999; Sabin, 1993), slower functional decline (Lum & Lightfoot; Luoh & Herzog; Menec; Moen, Dempster-McClain, & Williams, 1992; Morrow-Howell, Hinterlong, Rozario, & Tang, 2003), and increased psychological well-being (Lum & Lightfoot; Morrow-Howell et al.; Musick & Wilson, 2003; Thoits & Hewitt, 2001; Van Willigen, 2000); and that engagement in particular types of productive roles is associated with lower risks of mortality (Glass, Mendes de Leon, Marottoli, & Berkman, 1999) and dementia (Wang, Karp, Winblad, & Fratiglioni, 2002).

Although previous research generally has indicated that involvement in productive roles is beneficial for older adults' well-being, there are still some issues remaining. First, much of the work on productive roles is North American, and little is known about non-Western people such as the Japanese. Because the context in Japan concerning productive roles such as paid and volunteer work differs from that in the West (as subsequently described), the relationships between productive roles and well-being among older adults in Japan may differ from the results of previous studies carried out in North America.

Second, most prior studies have been confined to investigating only the independent effect that a specific productive role might have on older adults' well-being, and few studies have investigated any joint effects or possible interactions of various productive roles. Researchers often use concepts from role theory such as "role strain" and "role accumulation" to explain the impact that playing a productive role might have on health and well-being. The role-strain hypothesis suggests that most people engage in several roles and that the different types of role demands cause conflict, overload, and strain, resulting in poor well-being (Goode, 1960; Merton, 1957). In contrast, the role-accumulation hypothesis states that accumulated roles enhance status security, social privileges, valuable resources, and ego gratification and that multiple roles attenuate the stressful impact of any single role, which in turn benefits well-being (Marks, 1977; Sieber, 1974). These theories refer to the relationships between multiple roles and well-being, essentially how multiple roles interact with each other. Although prior studies on productive roles and well-being often refer to these multiple-role theories, little research has investigated the joint effects of particular role combinations. Nevertheless, there is a large body of research attempting to explain the relationships between involvement in multiple roles and well-being. However, earlier studies of multiple roles generally have focused on earlier adulthood, especially the effect that occupational, marital, and parental roles might have on women's well-being in their early to middle years of adulthood (Stephens, Franks, & Townsend, 1994). Relatively little is known about how specific role combinations might affect the well-being of late-middle-aged to older adults and whether there is any gender difference there.

In addition, the interactions between roles can be observed not only when individuals adopt multiple roles simultaneously

but also when their roles change; for example, a particular role could moderate the potential negative impact caused by the loss of another role. Late middle age is a time of life when major roles such as carrying out paid work reach their term. Although there is a lot of research on the psychological consequences of retirement in the United States, the empirical evidence is inconsistent. Several studies suggest that how retirement affects psychological well-being depends on the specific contexts in which retirement occurs (e.g., Kim & Moen, 2002; Szinovacz & Davey, 2004). For example, an early study shows that mandatory retirement is associated with lower retirement satisfaction because the retirement transitions generally occur under circumstances that leave individuals little choice (Hardy & Quadagno, 1995). Because most Japanese companies adopt a mandatory retirement system, it is therefore quite possible that retirement may lead to reduced well-being for retirement-aged Japanese, though so far, to our knowledge, little research has investigated the effects of retirement on well-being in Japan.

In contrast, the literature suggests that unpaid work, especially volunteer work, may substitute for role loss such as that which exists in retirement (Chambré, 1984). An existing study shows that volunteering moderates the negative impact of having more major role-identity absences on older adults' psychological well-being (Greenfield & Marks, 2004). Because volunteerism tends to increase among older adults in Japan, volunteering may provide alternatives to paid work for retirement-aged adults, and it may moderate the potential negative impact on well-being caused by the loss of the paid work role.

In this study we examine the relationships between productive roles and depressive symptoms by using data from a national longitudinal study of late-middle-aged Japanese. Specifically, we aim to advance the understanding of productive roles and depressive symptoms by addressing the following research questions: First, what relationships exist between the various types of productive roles (i.e., paid work, volunteer work, and unpaid work at home) and depressive symptoms among late-middle-aged Japanese? Second, what are the relationships between specific productive role combinations and depressive symptoms? Third, what are the relationships between transitions in the paid work role and depressive symptoms? Fourth and finally, how does carrying out volunteer work moderate the relationship between the loss of a paid work role and depressive symptoms? In this study we also focus on possible gender differences in these relationships. Because men and women generally have different role opportunities and role experiences, the meanings of roles may vary with gender.

With regard to model specification, we referred to the theoretical model of productive aging by Sherraden, Morrow-Howell, Hinterlong, and Rozario (2001), which consists of the following categories: sociodemographics, individual capacity, public policy, institutional capacity, productive behavior, and outcome. Although those researchers emphasize the importance of public policy and institutional capacity (i.e., the ability of social institutions such as businesses, social civic clubs, and families to offer productive roles for older adults), in our study we did not investigate these factors. Therefore, we analyzed the models by including only sociodemographic variables (age, marital status, and education), individual capacity (income, physical health, and previous scores on the Center for

Epidemiologic Studies–Depression scale), productive roles, and outcome.

Contexts of Productive Roles Among Late-Middle-Aged Japanese

Most companies in Japan adopt a mandatory retirement (*teinen taisyoku*) system, which requires most wage employees to retire by about the age of 60 years. However, many Japanese continue to work beyond that age. The participation of this later-life labor force is higher in Japan than in other industrialized countries. The labor force participation rate of men aged between 60 and 64 in 2004 was 70.7% in Japan, compared with 57.0% in the United States and 37.7% in Germany. Even men aged between 65 and 69 had a participation rate of 45.6% in Japan, compared with 32.6% in the United States and 7.2% in Germany (International Labor Organization, 2004). Especially, elderly Japanese men are highly motivated to work. A cross-national research shows that Japanese men aged 60 and older desire to work longer than their counterparts in the United States and Germany (Cabinet Office, 2002). Even though workers' pay and status after *teinen* is normally reduced, the higher work participation levels among elderly men in Japan are seen as a reflection not only of economic factors (Seike & Yamada, 2004) but of cultural values (Bass, 1996; McCallum, 1988; Shibata, 1998). Bass (1996) and Shibata (1998, 2002) suggest the importance of the Japanese concept of *ikigai* (purpose or meaning in life) for understanding the value of work and productivity in Japan. They suggest that many Japanese men find their *ikigai* in their work roles. From these high levels of later-life labor force participation and work ethics in Japanese men, it appears possible that paid work may have an important effect on Japanese men's psychological well-being. Despite this, because they have to leave their job when they reach a certain age, retirement may lead to even more psychological distress among elderly men in Japan than among those in Western countries.

Recently, Japanese policy makers have focused on volunteering to help retain *ikigai* in later life after retirement (Cabinet Office, 2005). Since the time when many volunteers from all over the country came to help victims of the Great Hanshin Earthquake in 1995, there has been a growing interest in volunteerism in Japan (Economic Planning Agency, 2000). According to a time-use survey, the overall rate of volunteering in Japan was 28.9% (of people aged 10 years and older) in the period from 2000 to 2001, up 3.6 percentage points from the previous survey 5 years earlier (Ministry of Internal Affairs and Communications [MIAC], 2001). Although volunteering had recently become popular in Japan, the volunteerism rate was still lower than that in the United States (44% of people over the age of 21 volunteered; see Independent Sector, 2001). Therefore, the beneficial effect of volunteer work on the psychological well-being of older adults may not be as great in Japan as in the United States. However, volunteer work tends to increase with age among middle-aged and older men in Japan (MIAC). This increase in volunteering with age among men may be an indication that volunteer work will become increasingly important to elderly Japanese men. In contrast, volunteer work among Japanese women tends to decrease with age because women often volunteer in or through their

children's school; once their children mature, they no longer have the opportunity to volunteer as much as before.

Women carry out more unpaid work at home, such as housework and caregiving, than men do (MIAC, 2001). Although household labor is productive, it can be a burden because it is more routine, is less likely to be appreciated, and provides lower levels of work fulfillment than do other productive roles (Bird, 1999). In addition, women in their fifties are most likely to care for frail family members, and about 10% of them are caregivers in Japan (MIAC, 2001). The literature suggests that caring for elderly relatives compounds emotional exhaustion in female caregivers (Sugihara, Sugisawa, Nakatani, & Hougham, 2004). Although late-middle-aged women make an important contribution by doing unpaid work at home, this may not lead to increased psychological well-being.

METHODS

Data

In this study we used data from a three-wave panel study, that is, the Japanese Health and Retirement Study (Sugisawa & Shibata, 2003), of late-middle-aged adults in Japan. Using a stratified two-stage random-sampling procedure, researchers identified 4,000 men and 2,000 women aged 55 to 64 years from the nationwide resident registration, and they interviewed them in 1999. The baseline response rate was 63.3% ($n = 2,533$) among the male sample and 72.0% ($n = 1,440$) among the female sample. The follow-up interviews were conducted in 2001 (2,074 men and 1,214 women participated) and in 2003 (1,896 men and 1,113 women participated). All interviews were conducted face to face in participants' homes. This study did not obtain data from married couples.

Measures

Productive roles.—Although there are significant differences in the definition of productive roles in the existing literature (Hinterlong, Morrow-Howell, & Sherraden, 2001), many empirical studies have defined a productive role as engagement in any activity that produces goods or services, whether paid or not, including paid work, unpaid work at home, or volunteer work (e.g., Glass, Seeman, Herzog, Kahn, & Berkman, 1995; Herzog, Kahn, Morgan, Jackson, & Antonucci, 1989; Morrow-Howell, Hinterlong, Sherraden, & Rozario, 2001). We adopted this operational definition.

Paid work.—Participants were first asked if they were doing any paid work at the present time. Participants who answered in the affirmative were then asked how many hours per week they had worked on average during the past month.

Unpaid work at home.—Participants were asked if they had carried out any unpaid housework, home maintenance, yard work, or taken care of children or frail family members, in the past year. Participants who responded in the affirmative were then asked about the average frequency in which they engaged in those activities during the past year, based on the following categories: every day, 4 to 6 days a week, 1 to 3 days a week,

1 to 3 days a month, or a few times a year. Participants who reported 1 day or more per month were then asked about the average number of hours spent on the activity per day. We converted the frequency category into the number of days per week (i.e., 7 days a week, 5 days a week, 2 days a week, 0.5 days a week), and we obtained the average number of hours spent on the activity per week by multiplying the number of days a week and the number of hours a day.

Volunteering.—Participants were asked if they had given informal support to friends or neighbors or carried out any of the following volunteer work in the past year: engaging in an environmental arrangement, participating in social welfare activities, supporting community activities, and engaging in other volunteer work or helping others. We obtained the average number of hours spent in volunteer work per week through the same calculation process as we used for unpaid work at home.

Depressive symptoms.—We used the Japanese version of the Center for Epidemiological Studies–Depression scale (CES-D; Radloff, 1977) in this study (Shima, Shikano, Kitamura, & Asai, 1985). A previous study using confirmatory factor analysis has confirmed that the original four-factor structure of the CES-D was successfully replicated for Japanese elderly persons (Yatomi, Liang, Krause, & Akiyama, 1993). The CES-D is a 20-item self-report measure used to examine the frequency of mood and behavioral symptoms that occurred during the previous week. Frequency of behavior is rated on 4-point scales ranging from 0 (rarely or none of the time) to 3 (most of the time). Positive items are reverse coded. Example items include "I felt depressed," "I felt that people dislike me," and "I felt hopeful about the future." Total scores could range from 0 to 60, with higher scores indicating more depressive symptoms. Internal consistency for this measure throughout the research ranged from .73 to .76.

Control variables.—Control variables include age (in years), marital status (coded 1 if currently married, 0 if not married), education, income, physical health, and previous levels of depressive symptoms. We coded educational attainment as 1 = junior high school, 2 = high school, and 3 = college degree or more. Annual income was the total gross income of the participants and their spouses, which we coded as 1 = less than 3 million yen (1 Japanese yen = approximately 0.01 U.S. dollar), 2 = 3 to 5 million yen, 3 = 5 to 10 million yen, and 4 = 10 million yen or more. Physical health is captured by the number of serious or chronic diseases as follows: hypertension, stroke, angina pectoris or myocardial infarction, bronchitis or pneumonia, asthma, stomach or duodenal ulcer, hepatitis or liver cirrhosis, kidney disease, diabetes, arthritis or rheumatism, and cancer.

Statistical Analysis

In this study we used the generalized estimating equations (GEE) approach to control for within-subject correlated error across waves (Diggle, Heagerty, Liang, & Zeger, 2002). We specified an ordinary least squares approach with bootstrapped standard errors and an unstructured form for the working correlation matrix in all analyses. We constructed a data set

Table 1. Characteristics of Study Participants by Gender at Wave 1

| Item | Men | Women | <i>p</i> |
|--|-------------|-------------|----------|
| Paid work: <i>M</i> (<i>SD</i>) | 36.1 (22.4) | 18.4 (21.6) | <.001 |
| Volunteer work: <i>M</i> (<i>SD</i>) | 0.7 (3.4) | 0.9 (3.5) | .039 |
| Unpaid work at home: <i>M</i> (<i>SD</i>) | 4.6 (8.9) | 26.7 (23.3) | <.001 |
| Age: <i>M</i> (<i>SD</i>) | 59.5 (2.9) | 59.5 (2.9) | .878 |
| Married: % | 92.7 | 81.9 | <.001 |
| Educational attainment: % | | | <.001 |
| Junior high school | 37.7 | 40.0 | |
| High school | 40.7 | 45.2 | |
| College degree or more | 21.6 | 14.8 | |
| Annual income: % | | | <.001 |
| ≤2.99 million JP | 23.7 | 36.7 | |
| 3–4.99 million JP | 30.0 | 29.8 | |
| 5–9.99 million JP | 32.2 | 23.1 | |
| ≥10 million JP | 14.0 | 10.4 | |
| No. of serious or chronic diseases: <i>M</i> (<i>SD</i>) | 0.4 (0.7) | 0.4 (0.6) | .917 |
| CES-D score: <i>M</i> (<i>SD</i>) | 11.0 (5.5) | 11.7 (6.3) | <.001 |

Note: Numbers for women and men are as follows: women, $n = 1,440$; men, $n = 2,533$. All work items are shown as hours per week. JP = Japanese yen (1 JP \approx 0.01 U.S. dollar); CES-D = Center for Epidemiologic Studies–Depression scale. For *p* values, we used *t* tests for continuous variables and chi-square tests for categorical variables to compare differences in characteristics between men and women.

with individual person-time observations that incorporated time-dependent variables. In this study, we regressed the dependent variable (depressive symptoms at Waves 2 or 3) on levels of productive roles taken from the same wave as the dependent variable, controlling for level of depressive symptoms taken from the previous wave of data. (If depressive symptoms at Wave 2 were used for outcome, we included depressive symptoms at Wave 1 as control in the analyses. If depressive symptoms at Wave 3 served as outcome, we controlled for depressive symptoms at Wave 2.) The other control variables apart from depressive symptoms were taken from the same wave as the dependent variable. Pooling the observations in this manner resulted in a sample size of 3,970 for men and 2,327 for women.

Regarding missing values of some study variables, we used multiple imputation methods through the Markov chain Monte Carlo method (Schafer, 1997) to create five data sets with no missing value. Among the imputed variables, income had the highest percentage of missing values (11.1%). We analyzed each imputed data set separately by GEE, and we combined the results to arrive at final estimates of parameters and their standard errors. We executed GEE analyses by using the GENMOD procedure and multiple imputation methods through the MI and the MIANALYZE procedures of SAS version 9.1.

We tested our hypotheses in four models separately by gender. In Model 1, we regressed depressive symptoms on the activity time of each productive role. In Model 2, we entered specific combinations of three productive roles. We operationalized the role combinations as follows. First, we coded respondents as paid workers if they reported devoting some time per week to paid work, and we applied the same coding manner to both volunteer work and unpaid work at home. Next, we categorized the specific combinations of roles held by respondents (e.g., paid work only, paid work and volunteer

Table 2. Regression Coefficients of Productive Roles and Role Combinations for Depressive Symptoms Estimated by GEE Among Late-Middle-Aged Japanese Men and Women

| | Model 1 | | Model 2 | |
|-----------------------|-----------|-----------|-----------|-----------|
| | Men | Women | Men | Women |
| Intercept | 11.394*** | 11.747*** | 9.752*** | 11.842*** |
| Paid work | −0.018*** | −0.008 | | |
| Volunteer work | −0.059* | −0.023 | | |
| Unpaid work at home | 0.011 | −0.007 | | |
| Age | −0.052* | −0.078* | −0.037 | −0.078* |
| Married | −1.143** | −0.721* | −1.179*** | −0.778* |
| Education | −0.283** | −0.004 | −0.237* | 0.067 |
| Income | −0.186* | −0.360* | −0.173 | −0.382** |
| No. of diseases | 0.477*** | 0.713*** | 0.421*** | 0.728*** |
| CES-D (previous wave) | 0.439*** | 0.470*** | 0.429*** | 0.457*** |
| No roles | | | 2.254*** | 0.266 |
| PW only | | | Ref. | −1.175* |
| VW only | | | −0.882 | 2.105 |
| UWH only | | | 1.087*** | Ref. |
| PW and VW | | | −0.438 | −1.933 |
| PW and UWH | | | 0.009 | −0.212 |
| VW and UWH | | | −0.266 | −0.808* |
| All three roles | | | −0.306 | −0.908* |

Notes: All work items are shown as hours per week. GEE = generalized estimating equations; CES-D = Center for Epidemiologic Studies–Depression scale; Ref. = reference category; PW = paid work; VW = volunteer work; UWH = unpaid work at home.

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.

work, and all three roles). In Model 3, we examined the associations between changes in paid work status and depressive symptoms. For changes in paid work status, we pooled the information both between Waves 1 and 2 and between Waves 2 and 3, and we classified respondents according to whether they moved from working to nonworking, nonworking to working, nonworking at both waves, and working at both waves. Finally, in Model 4, we added the interactions between volunteer status and changes in paid work status to test whether volunteering moderated any effects of changes in paid work status on depressive symptoms.

RESULTS

Table 1 shows baseline characteristics of the participants by gender. There were clear gender differences in hours of paid work (36.1 hours a week for men, 18.4 hours for women) and unpaid work at home (4.6 hours a week for men, 26.7 hours for women). For volunteer work, women devoted a little more time to such work than men did (0.9 hours a week vs 0.7 hours).

Model 1 in Table 2 shows the relationship between each productive role and depressive symptoms. The increase in hours of paid and volunteer work was related to fewer depressive symptoms ($B_{\text{paid work}} = -0.018, p < .001$; $B_{\text{volunteer work}} = -0.059, p < .05$) for men, but not for women. Unpaid work at home was not significantly related to depressive symptoms for either men or women. Because previous studies in the United States had suggested the nonlinear relationship between working hours and well-being, we conducted a post hoc analysis by including dummy variables that differentiated the amount of work (e.g., for paid work among men, ≤ 10 hours/week, 10–40 hours/week,

Table 3. Regression Coefficients of Paid Work Transitions and Interactions With Volunteering for Depressive Symptoms Estimated by GEE Among Late-Middle-Aged Japanese Men and Women

| | Model 3 | | Model 4 |
|------------------------------------|-----------|-----------|-----------|
| | Men | Women | Men |
| Intercept | 10.180*** | 11.468*** | 9.463*** |
| VW (dummy) | -0.769*** | -0.634** | -0.274 |
| UWH (dummy) | -0.179 | -0.072 | -0.174 |
| Age | -0.042 | -0.076* | -0.033 |
| Married | -1.119** | -0.747* | -1.133*** |
| Education | -0.208* | 0.043 | -0.217* |
| Income | -0.206* | -0.356* | -0.177* |
| No. of diseases | 0.463*** | 0.727*** | 0.436*** |
| CES-D (previous wave) | 0.437*** | 0.461*** | 0.438*** |
| Changes in PW status | | | |
| Working to nonworking: Change 1 | 1.023*** | 0.534 | 1.703*** |
| Nonworking at both waves: Change 2 | 1.006*** | 0.188 | 1.278*** |
| Nonworking to Working: Change 3 | -0.219 | -0.550 | 0.068 |
| Change 1 × VW | | | -2.358*** |
| Change 2 × VW | | | -0.957* |
| Change 3 × VW | | | -0.722 |

Notes: GEE = generalized estimating equations; CES-D = Center for Epidemiologic Studies-Depression scale; PW = paid work; VW = volunteer work; UWH = unpaid work at home. For changes in PW status, the reference category is working at both waves.

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.

40–48 hours/week, or ≥ 48 hours/week) and examined whether any beneficial amount of work hours on depressive symptoms could be observed. The results using dummy variables were similar (i.e., linear relationship) to those using continuous variables of working hours (data not shown).

Next, we examined the relationships between specific role combinations and depressive symptoms (Table 2, Model 2). Among the pooled observations used in the analyses, the distribution of role combinations was as follows: no roles (6.8% of men, 3.9% of women); paid work (PW) only (20.3% of men, 2.9% of women); volunteer work (VW) only (1.4% of men, 0.9% of women); unpaid work at home (UWH) only (15.8% of men, 37.3% of women); PW and VW (4.6% of men, 0.6% of women); PW and UWH (30.6% of men, 28.2% of women); VW and UWH (7.4% of men, 16.5% of women); and all three roles (13.1% of men, 9.7% of women). For men, we found that no role ($B=2.254, p < .001$) and UWH only ($B=1.087, p < .001$) were significantly related to more depressive symptoms compared with PW only, but we did not find any evidence that men who held multiple productive roles reported fewer depressive symptoms than PW-only men. In contrast, for women, being involved with multiple productive roles such as VW and UWH ($B=-0.808, p < .05$) and all three roles ($B=-0.908, p < .05$) was significantly related to fewer depressive symptoms compared with being involved with only household work.

Next, we examined whether changes in PW status might have an impact on depressive symptoms (Table 3, Model 3). The distribution of changes in PW status was as follows: from working to nonworking (12.6% of men, 10.3% of women), nonworking at both waves (18.6% of men, 48.3% of women), nonworking to working (4.3% of men, 4.0% of women), or working at both waves (64.5% of men, 37.5% of women).

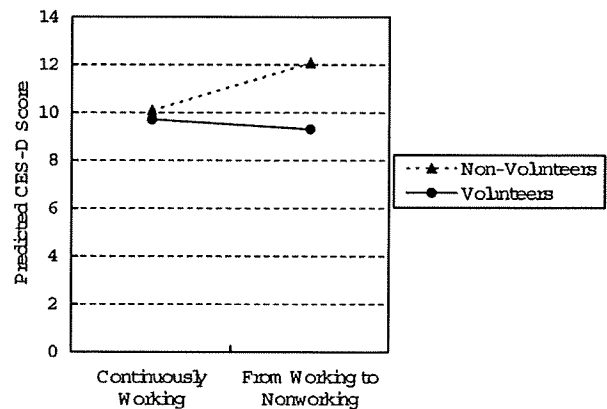


Figure 1. Predicted values of depressive symptoms for changes in paid work status by volunteer status among late-middle-aged Japanese men (CES-D = Center for Epidemiologic Studies-Depression scale).

Those men who shifted from working to nonworking ($B = 1.023, p < .001$) or those men who were continuously not working over both waves of the survey ($B = 1.006, p < .001$) reported more depressive symptoms than did those men who were continuously working. For women, however, none of variables for paid work transitions exerted a significant main effect on depressive symptoms.

In the final analysis we examined whether VW might moderate the impact of changes in PW status on depressive symptoms. Because changes in PW status had a statistically significant effect on depressive symptoms only for men, we examined changes for men but not for women. Model 4 in Table 3 indicates that there was a significant interaction between loss of the PW role (from working to nonworking) and volunteer status ($B = -2.358, p < .001$) for men's depressive symptoms. To ease interpretation of this interaction, we calculated predicted scores of CES-D for changes in PW status by VW status. As Figure 1 demonstrates, for nonvolunteers, the loss of the PW role was related to an increase in depressive symptoms. However, for volunteers, the loss of the PW role was not associated with a substantial change in levels of depressive symptoms. In addition, the continuously nonworking group also showed the trend that VW might moderate the negative impact of not working (figure not shown).

DISCUSSION

We examined four research questions in order to elucidate the relationship between productive roles and depressive symptoms later on in life. First, we examined the relationship between productive roles and depressive symptoms among late-middle-aged men and women in Japan. Consistent with empirical evidence on older Americans, the findings indicated that both PW and VW were associated with reduced depressive symptoms for Japanese men in their late fifties and sixties, even after we controlled for preexisting depressive symptoms and other potential confounding factors. However, the findings also revealed that there were gender differences in the relationship between productive roles and depressive symptoms. For Japanese women of this generation, none of the three

productive roles examined in this study showed any significant link with depressive symptoms.

Several studies have identified gender as the critical context that determines whether roles are beneficial or not (Danigelis & McIntosh, 1993; Herzog & Morgan, 1992; McIntosh & Danigelis, 1995). Gender is closely related to the norms governing behavior. The literature suggests that people are most likely to feel distress when their role repertoire departs from the norms of their age and gender (Menaghan, 1989). Social norms of productivity generally tend to be more emphasized in men than women. The finding that PW is associated with reduced depressive symptoms in Japanese men but not women makes sense if one considers that Japanese women of that generation are not as strongly oriented toward PW as men.

Although VW does not seem to be as greatly influenced by gender role or social norms as PW, as with PW, our findings show that there was a gender difference in the relationship between VW and depressive symptoms. This gender difference might be more attributable to the fact that men have more to lose when they retire rather than differing social norms. Chambré (1984) suggests that VW may replace loss of role in later life. If Chambré's hypothesis is correct, then the beneficial effect of volunteering would be more pronounced in men than women because late-middle-aged men tend to experience more drastic role transitions, such as retirement, than late-middle-aged women do.

Another possible explanation for the lack of a significant relationship between women's productive role and depressive symptoms might be attributed to the high rates of depression among women. Because the statistical models in this study controlled for prior levels of depressive symptoms, the variables might merely be describing changes in the variance of depressive symptoms during the period between waves. Because women tend to report more depressive symptoms than men do, changes in the variance of depressive symptoms among women may have been relatively small.

Several U.S. studies looking at how much involvement is necessary to benefit well-being suggest that a modest degree of role involvement may be sufficient. For example, researchers have found that the impact of volunteerism is maximally beneficial when it totals 1 to 3 hours per week (Morrow-Howell et al., 2003; Musick et al., 1999; Van Willigen, 2000). Contrary to the findings on older Americans, this study indicates that the relationship between activity level of PW or VW and depressive symptoms is a linear function of the amount of time spent doing it. The degree of involvement in PW tends to decrease after a person reaches his or her late fifties, and there is not much VW in Japan generally. The reason why we found activity level to be linearly inversely related to depressive symptoms in this study might be because only a few people worked sufficiently long hours for it to become problematic.

Second, we examined the relationships between specific productive role combinations and depressive symptoms, based on role-strain and role-accumulation hypotheses. Of the two hypotheses, the role-accumulation hypothesis has received greater support from empirical analyses (e.g., Adelman, 1994a, 1994b; Rushing et al., 1992; Thoits, 1986). The findings of this study generally tend to support the role-accumulation hypothesis for women. Women who were involved in VW, in addition to UWH, and women who held all three productive roles

reported fewer depressive symptoms than those who did only UWH. Although PW and VW might not have independent effects on the depressive symptoms of women, engaging in multiple productive roles might be related to fewer depressive symptoms in comparison with doing only UWH.

For men, in contrast, we could not find any evidence to show that the level of depressive symptoms decreased with an increasing number of productive roles. Although engaging in PW was associated with fewer depressive symptoms of men compared with having no role and doing only UWH, engaging in multiple productive roles in addition to PW was not necessarily related to fewer depressive symptoms compared with doing only PW. This finding would be useful information for public health programs and policies designed to maintain well-being in later life, because it tells them that just having a specific productive role such as PW or VW may be sufficient to exert a positive effect on a person's well-being.

Third, we examined the relationship between changes in PW status and depressive symptoms. The findings suggest that a loss of the PW role is related to higher levels of depressive symptoms for late-middle-aged Japanese men but not for late-middle-aged Japanese women. Researchers suggest that many Japanese men tend to find their *ikigai* in PW (Bass, 1996; Shibata, 1998, 2002). Because of this work ethic in Japanese men, a loss of the PW role might lead to psychological distress. In addition, the mandatory retirement system in Japan may also be associated with higher levels of depressive symptoms among men who lost their PW role, because individuals are forced to quit work and have no say in the matter.

Most prior studies investigating how changes in PW status might impact psychological well-being focused on men's retirement, with little investigation of women's experiences. This study's findings suggest that the relationship between changes in PW status and depressive symptoms may vary by gender in Japan. Because of gender differences in expectations, opportunities, and experiences for PW, women of this generation may not be as severely affected by the loss of PW status as men. However, women's participation in the workforce has been increasing. Such demographic trends warrant further attention in future research. Changes in PW status may soon become more important for women's depressive symptoms, as is presently the case with men.

Finally, we examined whether the relationship between loss of PW status and depressive symptoms might be influenced by taking on VW. The results suggest that VW can protect retirement-aged men from the negative effects of lacking PW status. Using the concept of role context, researchers have suggested that VW might have differential benefits on well-being according to subgroup variations within the older adult population. For example, Musick and colleagues (1999) found that taking on VW provides a greater protective effect on mortality for older adults with lower levels of social contact than for those with higher levels. Because PW tends to be associated with increased social contact, loss of PW status may lead to decreased social contact, especially for men. Taking into account the findings of Musick and colleagues, we find that VW may reduce the negative impacts of decreased social contact that often accompany the transition to retirement among men. Meanwhile, for women, loss of PW status may not be associated with lower social contact because women often tend