

The Ayurvedic Model of Human Occupation

Venthan J. MAILLOO, BSc(Hons), MCSP, CertMgmt¹

¹Band 5 Rotational Occupational Therapist. Barnet Primary Care Trust, Finchley Memorial Hospital

Abstract: Ayurveda is an Eastern system of medicine that has been practised for over 5000 years. The relationship between occupations and health is a fundamental aspect of the ayurvedic health model. It could contribute a strong spiritual element to modern occupational therapy practice and may be more culturally appropriate for people with strong Hindu/Buddhist beliefs than modern occupational therapy models. The aim of this paper is therefore to introduce the ayurvedic model to occupational therapists that are unfamiliar with it. It describes assumptions underlying the ayurvedic model and related frames of reference that are relevant to occupational therapy. Yoga is the main occupational therapy intervention advocated by the model. The branches of yoga are described. Other traditional interventions are summarised but not described in detail. Sanskrit terminology has mostly been removed and concepts have been simplified for the ease of a general readership.

Key words: Ayurveda, yoga, Tantra, spirituality

(*Asian J Occup Ther* 6: 1–13, 2007)

Introduction

In the British Journal of Occupational Therapy Ilott *et al.* (2006, p.39) recently suggested “English is the language for science and occupational therapy”. Their statement arguably imposes occupational injustice on occupational therapists and researchers for whom English is not the first language. That it slipped through the review process of the British journal may be an indication of a cultural insensitivity or lack of cultural awareness pervading the profession in

Britain. Occupational therapy was practised in different forms by various cultures worldwide long before the term ‘occupational therapy’ was formally applied (Wilcock, 2001), and health models incorporating occupation existed before the English language. Two closely related (Frawley & Lad, 1988) examples of this are traditional Chinese medicine (Williams, 1999) and Ayurveda (ancient Indian medicine). Both of these feature occupational regulation for the maintenance of good health.

Modern Western occupational therapy has largely failed to embrace traditional Eastern concepts and could arguably be improved if it did so. Relatively recent advances in modern Western science, such as quantum physics Vicente *et al.* (2005) and psychoneuroimmunology (Mailoo, 2006b) are steadily bridging the gap between modern Western and traditional Eastern

Received: May 31, 2007, Accepted: September 16, 2007
Corresponding to: Venthan J. Mailoo, Band 5 Rotational Occupational Therapist. Barnet Primary Care Trust, Finchley Memorial Hospital, UK
phone: 447811251624 fax: 4420 8349 7504
e-mail: servantofvishnu@gmail.com

philosophies. Healthcare provisions based on these advances have exploited advantages the occupational therapy profession is largely yet to embrace. An example of this is Reverse Therapy (Eaton, 2006), a modern successful chronic fatigue treatment approach that parallels a much older Tantric frame of reference (a component of Ayurveda). As communication construction is culturally determined (Venth, 2007), if the occupational therapy profession imposes modern Western constructs onto traditional health systems when determining their quality as models, its understanding and growth may be adversely restricted. It would arguably be better to research established health models fully with an open mind, and understand them fully before judging them. This article is therefore intended to introduce one Eastern model to occupational therapists that are unfamiliar with it. The model is Ayurveda.

The term 'ayurveda' is derived from the Sanskrit words 'ayu' that means 'daily living' and 'veda' that means 'knowing'. Ayurveda has been practised for over 5000 years (Lad, 1985). The relationship between occupations and health is a fundamental aspect of the ayurvedic health model. It is comprised of three key frames of reference. These are the Three Humours, the Three Natures and the Tantric frame of reference.

Yoga is the main occupational therapy-relevant ayurvedic intervention. Mailoo (2005) provided a very brief introduction to yoga but Grieve (2006) suggested that if components of yoga are used without a proper understanding of their context, their value might be significantly diminished. One could compare this to a person with no knowledge of haemo-dynamics using a sphygmomanometer on a patient and then giving advice on salt consumption. This paper therefore covers the assumptions underlying the ayurvedic model, its three main frames of reference and the umbrella of yogic techniques. A thorough understanding of yoga or ayurveda would require a significant volume of reading with experiential learning and is beyond the scope of a journal article. This article does not therefore provide any technical information on diagnostic or therapeutic techniques; it merely describes the underlying framework to enable a contextual understanding

that learning can be built upon. This could be compared to reading about anatomy and physiology before trying to use a sphygmomanometer. Appendix recommends specific further reading and opportunities for experiential learning for occupational therapists interested in taking the ayurvedic model further. Sanskrit terminology has mostly been removed and concepts have been simplified for the ease of a general readership.

Assumptions

Assumptions about the universe

Everything is believed to have developed from a unified field termed 'Brahman'. This could be considered the collective consciousness of everything in the Universe (Sharma & Clark, 1998). The energy of this field generates matter. Everything the human mind can perceive is therefore just transient forms of energy. Nothing can exist forever in material form, but the underlying energy has always existed and always will exist. An example of this transience is birth and death. After death the outer-most material manifestations of humans (the material bodies) decay, but the underlying energy invariably re-manifests elsewhere (Jinpa *et al.*, 2006). The nature of re-manifestation depends entirely on the energy's reactions to its previous experiences. This may be interpreted as re-incarnation, heaven or hell.

A common belief in cultures following this philosophy is that material existence is a mistake resulting from misperception of the Universe and an illusion of individuality (Dalai Lama, 2006). The body and mind are seen as burdens to escape from. Many of the techniques used for escape fall under the umbrella term 'yoga'. Various schools of yoga are based on austerity, control of the senses and withdrawal from material experience, with the ultimate aim of returning to a state of unity with the Universe. The austerity usually involves abstinence from sexual activity, meat eating and alcohol consumption. This approach to wellbeing is unlikely to be culturally appropriate outside ascetic sub-cultures and has therefore been excluded from this article.

Table 1. The psyche (Adapted from True World Order, 2000).

Energy aspect	Experiences
Bliss	bliss, joy calmness, peace
Intellectual	higher reasoning, discrimination and decision making, individualism (ego)
Mental	sensations of sight, sound, smell, taste and touch, emotions, basic thought, memories
Vital	hunger, thirst, heat, cold
Physical	Birth, growth, decay and death

Ayurvedic psychology

According to ayurveda, on the deepest level each person is believed to be eternal and unchangeable (a fragment of Brahman). This is the true (spiritual) self. It is indistinguishable from the Universe and is in a constant state of bliss. In its pure inactive form it is unable to experience material existence. It manifests more superficial energies for this purpose. During gestation the superficial energies develop a body and mind in circumstances designed to meet the desires of the self (Redfield, 1994).

The self is unable to experience distress. The mind and body are simple tools for its use. The ego (in the intellectual aspect) can experience distress when it becomes active and identifies with the mind and body as an individual. “This sense of self is simply a mental construct, a mere label given to this cluster of dependently arising mental and physical events in dependence on their continuity” (Dalai Lama, 2006, p xvi). This type of identification leads to suffering, which indicates that the mind is not being used appropriately as a tool. Various Eastern religions are therefore based upon looking inwards to find the bliss aspect by transcending the ego, to escape from suffering.

Ayurveda identifies three broad performance components of thinking. These are sensate thinking, feeling and reasoning (Frawley, 1994). The sensate mind creates instinctive emotions such as desire, fear and anger and harbours likes, dislikes and personal opinions. It works through from the physical to intellectual aspects of the psyche but has no direct interaction with the bliss aspect. It is essential for survival of the material body. The feeling mind enables intuitive knowing and the reasoning mind discriminates between reality and illusion. The feeling mind generates

Table 2. The three humours

Sanskrit terminology	Metaphorical terminology
Vata Prana	Wind / air
Pitta Tejas	Fire
Kapha Ojas	Earth / water

the human will to live. The reasoning mind creates the ego but also ultimately guides it towards spiritual development. The feeling and reasoning components of the mind work through all five aspects of the manifest self from the physical to bliss aspects (Frawley, 1994). They are tools to guide the material body to fulfil the desires of the self.

Ayurvedic physiology

Ayurveda draws no clear distinctions between mind and body or physical and mental illness. These beliefs are congruent with those of Chinese medicine (Williams, 1999), modern advances in psychoneuroimmunology (Mailoo, 2006b) and some developing Western alternative therapy techniques (Gordon, 1999). The mind is not thought to reside in the brain, but in the energy that permeates the entire body. Health is believed to depend on a constant flow of that energy through the body. The energy flows according to consciousness through a complex system of channels and centres partially described by Sir Donald Woodruff when he translated original Sanskrit accounts in 1918 (Avalon, 1974).

Table 3. Earth symptoms and treatments (Lad, 1984, Frawley, 1994).

Signs of excessive earth	Treatment
Lack of drive, greed, attachment (hoarding behavior), envy, slow to learn but with good long-term memory, lethargy, obesity.	Breathing exercises, physical exercise, travel, stimulating leisure activities.
Signs of inadequate earth	Left nostril breathing, rest, meditation, control of sexual energy, regular routine, environmental adaptation (housing), facilitation of: acquisition of necessities, household tasks, economic life, religious devotion or faith occupations, informal and formal associations and relationships, love, intimate relationships
Emotional lability, fear, anxiety, restlessness, insomnia, nervous exhaustion, immunosuppression, infertility.	

Table 4. Wind symptoms and treatments (Lad, 1984, Frawley, 1994).

Signs of excessive wind	Treatment
Mental instability, rapid thought with good short-term but poor long-term memory, rapid speech, recklessness, indecisiveness, poor financial management due to compulsive spending, loss of confidence, anxiety, hyperventilation, insomnia, neurological weakness, intolerance of cold conditions, fatigue, emaciation, cracked tongue, brittle nails.	Rest, meditation, regular routine, environmental adaptation (housing), facilitation of household tasks and economic life.
Signs of inadequate wind	Breathing exercises, meditation, physical exercise, travel, music.
Lethargy, apathy	

Detailed knowledge of the energy channels is not required for occupational therapy, but energies are the basis of two frames of reference underlying the ayurvedic model. These are ‘the Three Humours’ and ‘the Three Natures’. The main energies considered in ayurvedic physiology are vata, pitta, kapha, prana, tejas and ojas (Frawley, 1994). Subtle differences between them are important for the medicinal aspects of ayurveda but they can be matched into pairs by occupational characteristics. For simplicity therefore, occupational therapists need only remember them as earth, wind and fire.

Frames of Reference

The three humours

This frame of reference works on 3 humours

that permeate the human being, metaphorically termed earth, wind and fire. For ideal health the three humours must be in perfect balance. They are influenced by diet, thoughts, habits and the environment. Of these, only the latter 3 are relevant to occupational therapy. Earth is necessary for functioning of the sensate mind. Table 3 shows symptoms of and treatments for earth imbalance.

Wind balance is essential for intuition. Table 4 shows symptoms of and treatments for wind imbalance.

Fire is essential for the functioning of the reasoning mind. It is associated with will power. Table 5 shows symptoms of and treatments for fire imbalance.

Diagnostic techniques for the three humours

Table 5. Fire symptoms and treatments (Lad, 1984, Frawley, 1994).

Signs of excessive fire	Treatment
Overly critical mind, dominating personality, paranoia, irritability, anger, hatred, burning headaches, food cravings for sweet and bitter tastes, moles and freckles, intolerance of heat or sunlight, excessive perspiration.	Conflict resolution, environmental adaptation.
Signs of inadequate fire	Right nostril breathing, clear honest communication, silence (avoiding unnecessary communication), yoga (for spiritual development), housing, environmental adaptation, stimulating leisure activities.
Cloudy perception, irrational judgement, confused speech, uncritical acceptance, passivity.	

Table 6. The three natures.

Nature	Human characteristic	Problems (if excessive)
essence	Purity: serenity, mental clarity.	Naivety, loss of libido, unsustainable self-sacrifice, obsessive-compulsive disorder, death.
activity	Passion: ambition and drive, attachment.	Lust, frustration, anger, hatred, violence, mania.
inertia	Ignorance: laziness, withdrawal.	Selfishness, loss of libido, depression, lethargy.

are beyond the scope of this article but were described in detail by Lad (1984).

The three natures

The material universe is characterised by three natures: essence, activity and inertia (Sharma & Clark, 1998). Essence is pure in nature and is the closest of the three to Brahman. In humans it is responsible for altruistic motivation, tolerance and compassion. Activity is the nature of passion. This nature underlies the drives that keep the material body alive and ambition for material achievement. Inertia is the nature of ignorance.

All three natures are required for human life. Table 6 illustrates disorders caused by imbalance of the natures. As material existence is impermanent and the ego is an illusion of individuality that hides a constant state of bliss, many have argued that life is pointless and we should try to escape from it. Inertia enables humans to suspend their disbelief and remain involved in life. Without it there would be no

motivation for life. Passion (activity) is required to motivate any achievement in the material world. Through the practice of yoga it is possible to leave the inertia and activity behind to reach constant awareness of the underlying bliss. This stage of yoga practice is termed ‘Turiya’. Once Turiya has been achieved, the human body can only survive for three days as the yogi has no motivation to maintain it (True World Order, 2000). Without essence the ego is motivated by activity and inertia alone. When this happens people are totally vulnerable to societal influences and act in ways incongruent with their inner selves. As the energy of material being originates from the self, it progressively weakens if it becomes incongruent with the self. This predisposes people to all manors of diseases and leads to the decay of the human mind and body.

Disorders of the Three Natures are self-perpetuating. A depressed person for example, may withdraw from activity (NICE, 2007) and view everything from a negative perspective

Table 7. The tantric frame of reference (Adapted from Kapke 2000)

Consciousness	Occupational needs	Examples of need fulfilling occupations.
Universal	Altruism	Heroism, charity, environmental conservation, passive being, dying.
Self	Following intuition	Reflection, meditation, action based on intuition.
Creative	Creative and communicative occupations.	Honest expression, information gathering, art.
Compassionate	Social occupations.	Building and maintaining social circles and family dynamics, pet care.
Egotistical	Vocational occupations and personal development.	Education, vocational skills and employment, social status building.
Bodily	Comfort and pleasure seeking occupations, sexual occupations, leisure.	Grooming, feeding (for pleasure), sexual activity and expression, exercise and relaxation, leisure.
Material	Survival occupations	Sleep, feeding, hygiene activities, dressing, essential housework and laundry, shopping, financial management, security occupations.

(Griffin & Tyrell, 1999), thus increasing his or her depression, while an angry person is likely to create conflict that provokes anger. Such disorders must therefore be treated with facilitated occupational change.

The tantric frame of reference

Tantra is a branch of yoga that values material existence (Isaacs, 2006). Its origins have been shrouded by politics (Lysebeth, 1995), but it has permeated through both the Hindu and Buddhist religions. Sexual intercourse, meat eating and alcohol consumption feature as spiritual practices in some aspects of Tantra (Frawley, 1994). The body and mind are seen as tools for spiritual development. For this reason, great care is taken of them. This is reflected by the popular saying “my body is a temple”. As the body and mind were designed specifically to achieve the needs of the self, they suffer undue stress if they follow any path not conducive to fulfilling those desires. Such stress renders one vulnerable to disease.

Consciousness is a continuum but for convenience this frame of reference divides it into 7 domains. A balance of consciousness between all 7 domains is essential for survival of the human

mind and body. People may sacrifice their needs for honest communication in order to maintain a sense of power (Revill, 2003; Page, 2006) though material success and hedonism if unbalanced are not protective of mental health (Stack, 1987; Read & Purse, 2006; Vaughn, 2007). This is likely to happen if intuition is not permitted to guide one to the altruistic motives of the self. Ultimate success with Tantra depends on this altruistic motivation (Dalai Lama *et al.*, 2005). At the other extreme advanced yogis may become incapable of survival due to excessive altruism, or may neglect their physical bodies in favour of spiritual pursuits. One aspect of Tantra utilises sexual energy to reach bliss consciousness (Gyatso, 1995), but this has poor generalisability and so will not be described in this paper.

It is important to remember that the significance of any occupation depends on individual interpretation (Paley *et al.*, 2006). Taking military bravery as an example, one soldier may undertake acts of courage to build social status for egotistical reasons. Another may undertake similar acts for altruistic reasons to satisfy universal consciousness.

Intervention Modalities

Ayurvedic concepts traditionally influenced government and societal rules, environmental planning and personal occupational routines. Yoga is the main occupational therapy-relevant ayurvedic intervention. Western occupational therapists have used yoga for mental health (Anderson & Winterbone, 1979; Eakin, 1979; Giles, 1985; Kluge, 2004), health services for older people (Batcheller, 2005), paediatrics (Behar, 2005; Bowen-Irish, 2005), neurology (Volz, 2002), occupational health (Taylor, 2001), and general physical rehabilitation (Cooney, 2005) specifically to treat autism (Behar, 2005) attention deficit disorder, Down syndrome and cerebral palsy (Klimas, 2003), multiple sclerosis (Volz, 2002), anxiety and respiratory disorders (Sabel & Gallagher, 2004), osteoarthritis and polio (Batcheller, 2005), reduced exercise tolerance (Bowen-Irish, 2005) and work-related injuries (Taylor, 2001). Reported benefits have included decreased anxiety (Sabel & Gallagher, 2004), improved digestion (Cantu, 2005), muscle tone, strength, flexibility (Bowen-Irish, 2005), lateral thinking and social integration (Batcheller, 2005), respiratory function (Proctor, 2004), joint control and posture (Volz, 2002). Yoga is a system of occupational regulation. It can be broken down into different branches, each more or less applicable to specific occupational domains and treatment approaches.

Karma yoga

Karma yoga is altruistic work (True World Order, 2000). This is the vocational rehabilitation element of the ayurvedic system and should be considered when the Tantric frame of reference reveals lacking altruistic occupations causing a lack of meaning in life. As the self is continuous with the Universe a sense of lasting fulfilment is unlikely unless one is contributing to the Universe in some way. Karma yoga can be used to reduce inertia and depending on the type of work chosen may reduce the earth humour. Excessive work can deplete earth and fire leading to excessive wind. Work-life balance should therefore be maintained ensuring that all of the seven domains of

consciousness specified in the Tantric frame of reference are occupationally satisfied. The type of work chosen should be according to an individual's intuition. Many people remain in jobs that make them unhappy due to social pressure. Adverse social pressures are remedied with Jnana Yoga.

Bhakti yoga

Bhakti yoga is any devotional religious activity (True World Order, 2000). It increases the earth humour but is only applicable to those individuals who feel it is important. People that value this area of occupation should be encouraged to keep protected time for it during their everyday routines as well as during convalescence. People of no religion may also practise bhakti with their own personal methods if they are devoted to a higher power.

Raja yoga

Raja yoga is a structured method for facilitating psychological and physical development. It consists of simple rules for ethical social conduct, postural exercises, breathing exercises and meditation (Taylor, 2003). The social conduct rules are: non-violence, non-stealing, non-lying, non-attachment and moderation of the senses (Cirone, 2005). These strengthen social congruence by increasing trust. Non-attachment prevents greed and envy, and moderation of the senses subdues the sensate mind thereby increasing clarity of intuition. This reduces the possibility of addictions and maladaptive changes that may lead to secondary anti-social behaviour.

Suppression or repression of any impulses or desires is believed to be harmful (Lad, 1984). For this reason moderation of the senses using will power alone is not advised. Breathing exercises and meditation used in yoga slow the sensate mind to a stop. As the physical body and sensate mind manifest from the self, deep meditation on any thoughts or desires from the sensate mind ultimately leads back to the self that is constantly content (Osho, 1998). This naturally dulls lust and the effects of society's influences on the mind. There are several breathing exercises and

meditation techniques used in yoga. Some of these work on specific humours and domains of consciousness. Description of the techniques is beyond the scope of this article. The breathing exercises were described in detail by Swami Vishnu-devananda (1988) and have been the subject of literature reviews (Shannahoff-Khalsa, 2001; Mailoo, 2006a). One-hundred and twelve simple meditations were described by Osho (1998) and more complex ones by the Dalai Lama *et al.* (2005).

Steady postures are used in raja yoga to improve concentration and maintain physical fitness. Particular postures are used to increase or reduce the influence of particular humours but this modality falls into the domain of physiotherapy (Taylor & Majmundar, 2000) rather than occupational therapy.

Jnana yoga

Jnana yoga is the process of study and critical analysis to determine the truth of all things (True World Order, 2000). This is the cognitive-behavioural element of ayurveda. Jnana yoga is used to discriminate between a person's true desire and the desires of the sensate mind that arise due to societal influences. Products of Jnana yoga include emotional release, detachment and preparation for death.

Emotional Release: Society exerts pressure on individuals to repress their natural drives though fear, guilt, and shame (Kapke, 2000). These feelings are processed by the ego. Identifying the impermanence of society, the ego and the feelings it generates and comparing it to the permanence of the self liberates one from these restraints.

Detachment: Society and the ego create psychological attachments that may make the will of the self impractical. Examples of these attachments may include addictions, interpersonal relationships (such as marriage), religious beliefs or material possessions (such as a mortgage). Attachment to financial debt due to consumerist behaviour has become a Western norm (Fincher, 1999; Healey, 2007). Once the impermanence of the material world is recognised and accepted, distressing attachments seem

illogical and are more easily left aside. Material experiences that are stressful with attachment can be enjoyed blissfully in the absence of attachment. This was illustrated well by Mendes (1999) with the narrative of a man who was very unhappy living a normal secure middle-class North American lifestyle but was able to find bliss (even in death) by detachment.

Dying: Many fear dying is a passive process. Death is a taboo subject in many cultures and no preparation is made for it. Jnana yoga identifies the impermanence of material existence and the inevitability of death. Death may be less devastating for individuals and families who are prepared for it. People who reflect on the inevitability of death may have preferences as to how it happens. This is not an indication for suicide, as Tantra views the human body as a sacred vehicle to be cared for, but when people are dying their experiences may feel less traumatic if their wishes are followed. Reflection on the certainty of death increases the appreciation of life and the motivation to live it well (Jinpa *et al.*, 2006). According to ayurveda ones desires at the end of life shape ones next incarnation. For this reason a main aim of yoga is attainment of a pure desire-less state of mind before death. This may require fulfilment of all desires during life or years of meditation.

Environmental interventions

Inner peace is difficult to find in cities due to imbalance between human and plant life (Redfield 1994) that leads to depletion of the wind humour (Frawley, 1994). For this reason serious yogis usually move to remote areas. This could be avoided if planning of cities accounted for better harmony with and tolerance of nature (Fig. 1).

Ayurvedic planning as carried out according to a process named 'vastu'. This takes into account the directions of sunlight and natural magnetic fields. Vastu is complex and beyond the scope of this article. A detailed explanation can be found in Sharma & Rao (2005). The adaptations used by modern Western occupational therapists to allow physically impaired people freedom of occupation can be applied using the Tantric frame of reference. Bathing and toileting equipment for



Destructive planning.

Conservative planning.

Fig. 1. Nature in city planning.

Figure 1 illustrates how planning to preserve the balance of the wind humour (right) would compare to the current planning (left) of a main road in Greater London (England). The functionality of road and amenities remains unaffected, but the psychological impact of their appearance is altered by coexistence with plant-life.

example may be needed to satisfy the material consciousness' need for hygiene occupations.

Political and social intervention

Societal pressures can discourage people from acting according to their own occupational needs (Wilcock, 2001), and social norms can cloud intuition, preventing people from identifying lifestyle changes that would benefit them (Vicente *et al.*, 2005). Internalised societal values may inspire unnatural occupational efforts. Common examples in modern societies are dieting or excessive exercise to compensate for body image dissatisfaction (Foltz-Gray, 2006). Occupational alienation may occur due to societal values or prejudice. Young people in the United Kingdom for example are alienated by the behaviour of adults (Redfield, 1994) and legislation restricting their engagement in paid employment and sexual activity. This limits their opportunities for occupations motivated by bodily and egotistical consciousness (Table 7). Homework given by schools teaches children to disregard occupational balance from an early age (Brown, 2007). Mismatches between occupational needs and opportunities may lead to maladaptive antisocial behaviour at individual (Johnson, 2006) or group (Balasingham, 2000) levels. In some Eastern

societies people traditionally engaged in productive and family roles at the ages when these instincts emerged rather than at artificially socially determined ages (Rasamandala, 1994; Osho, 2001). Another cause of occupational alienation in the United Kingdom is the over-standardised education system in which children are expected to learn- and are tested on an array of subjects regardless of personal interest. This can alienate people who might experience greater success with more vocational schemes. In Vedic culture yogis were responsible for advising politicians and teaching the youth. Modern occupational therapists may have to adopt similar roles in the future.

Limitations of this Paper

A thorough understanding of yoga or ayurveda would require several weeks of full-time study and is therefore beyond the scope of this journal article. The concepts presented here have been highly simplified and described without the authentic Sanskrit terminology. The terminology used in this paper is not suitable for professional communication with practitioners of authentic ayurveda, or service-users from cultural backgrounds familiar with these concepts.



Fig. 2. Bath-seat.

Figure 2 shows a stool used by Swami Prabhupada for simple environmental adaptation at Bhaktivedanta Manor, Letchmore Heath, England. Swami Prabhupada was the founder of the International Society for Krishna Consciousness (ISKCon: <http://www.iskcon.com/>). ISKCon teaches bhakti yoga, karma yoga and jnana yoga free of charge worldwide.

Aspects of the yoga, ayurveda and Tantra that cannot be easily generalised or applied to modern societies have been omitted, as they may not be relevant outside their historical context. This article is broad and lacks specific detail for each area of the subject matter covered. It was written this way to substantially reduce the time and effort required by occupational therapists to gain a contextual understanding of ayurveda and yoga. Appendix therefore provides recommended reading and networking opportunities for occupational therapists wishing to deepen their understanding of the concepts presented.

Acknowledgements

This paper does not represent the policies or practices of any National Health Service Trust.

This work was completed in respectful memory of Mailoo Jeyaratnam LL.B., M.Sc., M.I.F.S.T., M.I.Mgt., C.Chem., F.R.S.C., Homeopath, LLFCH 27/6/1929-29/6/2004

The author wishes to thank the Asian Journal of Occupational Therapy's anonymous reviewer(s) for their constructive feedback.

References

- Anderson, F., Winterbone, A. (1979). Yoga in a short stay psychiatric unit. *Br J Occup Ther.* **42**(8),191–193.
- Avalon, A. (1974). *The Serpent Power. The secrets of Tantric and shaktic yoga.* (7th edition), Mineola: Dover Publications.
- Balasingham, A. (2000). *The Politics of Duplicity.* Mitcham: Fairmax Publishing Ltd.
- Batcheller, L.J. (2005). The sitting mountain series. *Advance for Occupational Therapy Practitioners.* **21**(6), 46.
- Behar, M. (2005). Using yoga to treat autism. *Advance for Occupational Therapy Practitioners.* **21**(12), 27.
- Bowen-Irish, T. (2005). Bringing yoga into the classroom. *Advance for Occupational Therapy Practitioners.* **21**(8), 43.
- Brown, J. (2007, February 14). Damning verdict on the ordeal of growing up in Britain today. *The Independent.* 2–3.
- Cantu, C. (2005). We need evidence for yoga in pediatrics. Retrieved April 13, 2006 from <http://occupational-therapy.advanceweb.com/common/EditorialSearch/printerfriendly.aspx?CC=48544>
- Cirone, M.W. (2005). Yoga philosophy in yoga therapy: teaching the yamas and niyamas to

- women with cancer. Retrieved June 11, 2006 from <http://www.iayt.org/publications/ytip/sep05/woodscirone.htm>
- Cooney, D. (2005). Poses for all people. *Advance for Occupational Therapy Practitioners*. **19**(14), 22.
- Dalai Lama (2006). Introductory commentary. In: Jinpa T., Coleman G., Dorje G. *The Tibetan Book of the Dead*. (pp.xv-xxix) London: Penguin Books.
- Dalai Lama, Dzong-ka-ba, Hopkins J. (2005). *Yoga Tantra. Paths to Magical Feats*. Ithaca: Snow Lion.
- Eakin, P. (1979). Yoga (letter). *Br J Occup Ther*. **42**(11), 295–296.
- Eaton, J. (2006). *M.E., Chronic Fatigue Syndrome & Fibromyalgia. The Reverse Therapy Approach*. Authors Online: Hertford.
- Fincher, D. (1999). *Fight Club*. London: Twentieth Century Fox.
- Foltz-Gray, D. (2006, June). Happy in your own skin. *Yoga Journal*. **76–81**, 127–128.
- Frawley, D. (1994). *Tantric Yoga and the Wisdom Goddesses*. Delhi: Motilal Banarsidass.
- Frawley, D., Lad, V. (1988). *The Yoga of Herbs*. Twin Lakes: Lotus press.
- Giles, G.M. (1985). Anorexia nervosa and bulimia: an activity-oriented approach. *Amer J Occup Ther*. **39**(8), 510–517.
- Gordon, R. (1999). *Quantum-Touch: The Power to Heal*. Berkeley: North Atlantic Books.
- Grieve, C. (2006). Yoga [Letter to the editor] *Br J Occup Ther*. **69**(2), 93.
- Griffin, J., Tyrell, I. (1999). *Psychotherapy and the Human Givens*. Hailsham: The European Therapy Studies Institute.
- Gyatso, K. (1995). *Tantric Grounds and Paths*. (2nd impression), Ulverston: Tharpa Publications.
- Healey, R. (2007, May). How to find freedom. *Mensa Magazine*. 8–10.
- Ilott, I., Taylor, M.C., Bolanos, C. (2006). Evidence-based occupational therapy: it's time to take a global approach. *Br J Occup Ther*. **69**(1), 38–41.
- Isaacs, N. (2006, June). Tantra rising. *Yoga Journal*. **73–74**, 122–126.
- Jinpa, T., Coleman, G., Dorje, G. (2006). *The Tibetan Book of the Dead*. London: Penguin Books.
- Johnson, A. (2006, March 5). Lost boys of the black country. *Night & Day Live*. 16–20.
- Kapke, B. (2000). Energy medicine. Wheels of light: clearing, balancing & connecting chakras. *Massage & Bodywork*. **15**(6), 132–135.
- Klimas, N. (2003). Yoga for youngsters. Retrieved April 13, 2006 from <http://occupational-therapy.advanceweb.com/common/EditorialSearch/printerfriendly.aspx?CC=6568>
- Kluge, J. (2004). Yoga therapy. An integrative approach. *OT Practice*. **9**(17), 22–24.
- Lad, V. (1984). *Ayurveda: The Science of Self-Healing. A practical guide*. Wilmot: Lotus Press.
- Lysebeth, A. V. (1995). *Tantra: The Cult of the Feminine*. Boston: Weiser Books.
- Mailoo, V.J. (2005). Yoga: an ancient occupational therapy? *Br J Occup Ther*. **68**(12), 574–577.
- Mailoo, V.J. (2006a). Pranayama: potential tools to enhance occupational performance. *Asian J Occup Ther*. **5**, 1–10.
- Mailoo, V.J. (2006b). Psychoneuroimmunology and occupational therapy for inflammatory disorders. *Int J Ther Rehabil*. **13**(11), 503–510.
- Mendez, S. (1999). *American Beauty*. Universal City: DreamWorks SKG.
- NICE (National Institute for Health and Clinical Excellence) (2007) *Clinical Guideline 23 (amended) Depression: Management of depression in primary and secondary care*. National Institute for Health and Clinical Excellence: London.
- Osho (1998). *The Book of Secrets: 112 Keys to the Mystery Within*. New York: St. Martin's Griffin.
- Osho (2001). *Autobiography of a Spiritually Incorrect Mystic*. New York: St. Martin's Press.
- Page, B. (2006, May). Fighting for justice. *Mensa Magazine*. 8–11.
- Paley, J., Eva, G., Duncan, E.A.S. (2006). In-order-to analysis: an alternative to classifying different levels of occupational activity. *Br J Occup Ther*. **69**(4), 161–168.
- Proctor, S. (2004). Open up and say 'om'. Retrieved April 13, 2006 from <http://occupational-therapy.advanceweb.com/common/EditorialSearch/printerfriendly.aspx?CC=39929>
- Rasamandala dasa (1994). The Western educationalists' perspective on the Vedic tradition. *ISKCon Communications Journal*. **2**(2) Retrieved June 12, 2006 from http://www.iskcon.com/icj/2_2/rasamandala.html
- Read, K., Purse, M. (2006). Celebrities with bipolar disorder: A few words of introduction. Retrieved September 3, 2007 from <http://bipolar.about.com/od/celebrities/a/celebrities.htm>
- Redfield, J. (1994). *The Celestine Prophecy*. London: Bantam.
- Revill, J. (2003, May 11). Hospitals faking cuts in

- casualty wait times. *The Observer*. 1.
- Sabel, R., Gallagher, B. (2004). Restorative yoga. *Advance for Occupational Therapy Practitioners*. 20(21), 50.
- Shannahoff-Khalsa, D.S. (2001). Unilateral forced nostril breathing: Basic science, clinical trials, and selected advanced techniques. *Subtle Energies & Energy Medicine*. 12(2), 79–106.
- Sharma, H., Clark, C. (1998). *Contemporary Ayurveda: Medicine and Research in Maharishi Ayur-Veda*. New York: Churchill Livingstone.
- Sharma, G., Rao, D.P. (2005). *Teach Yourself Vaastu*. New Delhi: Lotus Press.
- Stack, S. (1987). Celebrities and suicide: A taxonomy and analysis, 1948–1983. *American Sociological Review*. 52(3), 401–412.
- Taylor, M.J. (2003). Yoga therapeutics: An ancient dynamic systems theory. *Techniques in Orthopaedics*. 18(1), 115–125.
- Taylor, M.J. Majmundar, M. (2000). Incorporating yoga therapeutics into orthopedic physical therapy. *Orthopedic Physical Therapy Clinics of North America*. 9(3), 341–360.
- Taylor, S. (2001). Introducing a yoga group in an acute inpatient psychiatric facility. *OT Practice*. 6(6), 22–23.
- True World Order, (2000). *Sivananda Yoga Teachers' Training Manual*. Val Morin: True World Order.
- Vaughn, C. (2007). Celebrities and disorders. Retrieved September 3, 2007 from <http://www.bellaonline.com/articles/art21256.asp>
- Venth (2007, August 21). Lost in translation: the troubled dependence of occupational therapy on narrative evidence. Retrieved September 3, 2007 from <http://www.metaot.com/blogs/venth>
- Vicente, M., Chasse, B., Arntz, W (2005). *What The Bleep Do We Know!?* London: Revolver Entertainment.
- Vishnu-devananda (1988). *The Complete Illustrated Book of Yoga*. New York: Three Rivers Press.
- Volz, D. (2002). Yoga for multiple sclerosis. Retrieved April 14, 2006 from <http://occupational-therapy.advanceweb.com/common/EditorialSearch/printerfriendly.aspx?CC=7109>
- Wilcock, A.A. (2001). *Occupation For Health Volume 1. A journey from self health to prescription*. London: BAOT COT.
- Williams, T. (1999). *Complete Chinese Medicine*. Bath: Mustard.

Appendix: Recommended Learning Resources

1. Vedic Perspectives of the Universe:
 - Vicente M., Chasse B., Arntz W (2005). *What The Bleep Do We Know!?* (DVD) London: Revolver Entertainment.
2. Vedic Psychology:
 - Basic: The three bodies, pages 8–9 in: Sivananda Yoga Vedanta Centre (1999) *Yoga Mind & Body*. London: Covent Garden Books.
 - Intermediate: Astral body, the mystery of mind, and extrasensory perception, Chapter 9, pages 256–285 in: Vishnu-devananda (1988) *The Complete Illustrated Book of Yoga*. New York: Three Rivers Press.
3. Vedic Physiology:
 - Basic: Ayurveda and yoga, pages 9–24 in: Frawley D., Kozak S.S. (2001) *Yoga for Your Type*. Twin Lakes: Lotus.
 - Intermediate: The absolute and evolution of Prakriti, Chapter 10, pages 286–299 in: Vishnu-devananda (1988) *The Complete Illustrated Book of Yoga*. New York: Three Rivers Press.
 - Advanced: Avalon A. (1974) *The Serpent Power. The secrets of Tantric and Shaktic yoga*. 7th edition, Mineola: Dover Publications.
4. The Three Natures (frame of reference):
 - Mental type according to the gunas, pages 15–18 in: Frawley D., Kozak S.S. (2001) *Yoga for Your Type*. Twin Lakes: Lotus.
5. The Tantric Frame of Reference:
 - Basic: Chopra D. (2006) *Kama Sutra*. London: Virgin Books.
 - Intermediate: Mailoo V., Wickham J., Bannigan K. (2006) OT and the tantric frame of reference. *Therapy Weekly* 33(3): 8–10.
 - Advanced: Kapke B. (2000) Energy medicine. Wheels of light: clearing, balancing & connecting chakras. *Massage & Bodywork*. 15(6): 132–135.
6. Assessment and Diagnostics:
 - Tantric: <http://www.electicenergies.com/chakras/chakratest.php>
 - General: Lad V. (1984) *Ayurveda: The Science of Self-Healing*. A practical guide. Wilmot: Lotus Press.
7. Raja Yoga:
 - Basic: Sivananda Yoga Vedanta Centre (1999) *Yoga Mind & Body*. London: Covent Garden Books.
 - Advanced: Vishnu-devananda (1988) *The Complete Illustrated Book of Yoga*. New York:

- Three Rivers Press.
8. Meditation:
 Basic: Osho (1998). *The Book of Secrets: 112 Keys to the Mystery Within*. New York: St. Martin's Griffin.
 Advanced: Gyatso K. (1995). *Tantric Grounds and Paths*. 2nd impression, Ulverston: Tharpa Publications.
 or Dalai Lama, Dzong-ka-ba, Hopkins J. (2005). *Yoga Tantra. Paths to Magical Feats*. Ithaca: Snow Lion.
9. Detachment:
 Basic: Mendez S. (2000). *American Beauty*. (DVD) Universal City: Dreamworks Home Entertainment.
 Intermediate: Eaton J. (2006) *M.E., Chronic Fatigue Syndrome & Fibromyalgia. The Reverse Therapy Approach*. Authors Online, Hertford.
 Advanced: Osho (1998). *The Book of Secrets: 112 Keys to the Mystery Within*. New York: St. Martin's Griffin.
10. Active Dying:
 Basic: <http://death-and-dying.org/>
 Intermediate: Conquest of death, Chapter 12, pages 308–323 in: Vishnu-devananda (1988) *The Complete Illustrated Book of Yoga*. New York: Three Rivers Press.
 Advanced: Jinpa T., Coleman G., Dorje G. *The Tibetan Book of the Dead*. London: Penguin Books.
11. Vastu:
 Sharma G., Rao D.P. (2005). *Teach Yourself Vaastu*. New Delhi: Lotus Press.
12. Practical Learning:
 It is not the author's intention to endorse any educational establishment. Readers may discuss training opportunities with occupational therapists experienced in yoga at these internet web-pages:
<http://www.dynamicsystemsrehab.com//directory.php>
<http://www.facebook.com/group.php?gid=2352527880>

Effects of Swallowing Posture Maneuvers on Swallowing Functions

Misako HIGASHIJIMA, PhD., OTR.¹

¹Department of Health Sciences, Graduate School of Biomedical Sciences, Nagasaki University

Abstract: Occupational therapists managing subjects with feeding or swallowing problems must determine appropriate swallowing postures for feeding, while considering risks and swallowing function. Few reports have addressed associations between trunk position and swallowing function, so this study aimed to provide basic data on such associations for practical use. Noninvasive procedures were used to assess the effects of different trunk positions on swallowing functions during voluntary swallowing in 17 healthy adult women. Water bolus transport was not recognized in the laryngeal movement latency of oral phases, and was recognized in the duration of laryngeal movement of pharyngeal phases. Significant differences were recognized only for duration of laryngeal movement between the 90° and 30° trunk positions. Swallowing saliva appears to be influenced by preceding water swallowing, in addition to visual input. Decisions regarding swallowing postures the subject should take during swallowing require integrated general data, including swallowing function status of laryngeal movements, consistency, gravity and internal pressures.

Key words: swallowing posture, swallowing function, swallowing water, healthy adults

(Asian J Occup Ther 6: 15–21, 2007)

Introduction

A major role of occupational therapists (OTs) in managing subjects with feeding or swallowing problems includes providing support in holding food and feeding these patients. Moreover, following improvements in swallowing function with training, patients need to take an appropriate

swallowing posture for feeding. Such swallowing postures may help to prevent aspiration in these patients. Determination of optimum swallowing posture must be made considering cervical and trunk positions. Cervical position angles of 45° (Buckley, 1976) and 20° flexion (Zimmermann, 1981) have been advocated, while trunk positions of 30° inclination (Fujishima, 1995) and 90° (i.e., upright seated position) (Zimmermann, 1981) have been described. Some reports have advocated a case-by-case approach in deciding trunk positions (Logemann, 1983). However, few studies have depicted the effects of different trunk positions on swallowing. To evaluate swallowing functions and examine treatment outcomes, we

Received: June 15, 2006, Accepted: April 20, 2007

Corresponding to: Misako Higashijima; Department of Health Sciences, Graduate School of Biomedical Sciences, Nagasaki University, 1–7–1 Sakamoto, Nagasaki 852-8520, Japan

phone: 81-95-849-7939 fax: 81-95-849-7996

e-mail: higajima@net.Nagasaki-u.ac.jp

attempted further investigation of a non-invasive method we recently established, for which the reliability and validity have already been reported (Higashijima, 2002).

Our aim was to provide basic data for practical use regarding appropriate swallowing posture for deglutition in subjects with feeding or swallowing problems. The present study used our noninvasive method to investigate the effects of different trunk positions on swallowing functions during voluntary swallowing in healthy adults.

Literature Review

Postural maneuvering for swallowing is a compensatory technique employed during feeding training. After 3 weeks of applying compensatory methods, the need for functional training is re-evaluated (Logemann, 1983). Swallowing postural maneuvering is for patients who display trouble transporting a bolus. In other words, swallowing postural maneuvering is appropriate for patients experiencing difficulty during the oral phase of swallowing. Such methods use gravity to overcome difficulties in transporting the bolus. In a physiological sense, this oral phase of swallowing involves a voluntary first half and a reflexive second half, continuous with the reflexive (involuntary) pharyngeal phase. An appropriate swallowing posture is determined based on swallowing function, physiological mechanisms and anatomical characteristics. We examined different cervical position angles and angles of trunk position to determine appropriate swallowing postures. General consensus agrees that cervical position angle should display slight flexion (Ekbeng, 1986; Saitou, 1987; Fujishima, 1995), but many opinions seem to suggest that trunk positions should be decided on a case-by-case basis (Zimmenman, 1981; Fujishima, 1995; Logemann, 1983). This could explain the paucity of evidence-based studies addressing variations in trunk positions in relation to swallowing functions.

Method

Subjects

Students in the third year of an Occupational

Therapy course at Kawasaki Medical Welfare University were given background information on the proposed study, and were then allowed to apply to be a subject in the study. The study protocol was explained verbally to all participants and written documentation was provided. Informed consent was then obtained from 17 healthy Japanese women with a mean age of 22.4 ± 2.2 years (range, 21–24 years). Subjects did not have a past history of swallowing disorders associated with respiratory or neuromuscular disease.

Apparatus

Subjects were familiarized with the experiment protocol, after which 3 sensors were attached. Furthermore, the subject took a pre-test swallowing of water.

The TR-751T respiration pickup sensor (Nihon Kohden, Tokyo, Japan) was placed to monitor respiratory movements of the chest wall. An MP100 transducer (AD Instruments, USA) was attached at the thyroid cartilage to record back-and-forth movements of the thyroid cartilage during swallowing. A TR-762 thermistor respiration pickup sensor (Nihon Kohden) was placed in the left nasal cavity of each subject to monitor nasal airflow and temperature differences between inspired and expired air. Three sensors were used to identify organic movement change and movement persistence while not determining amplitude.

Subjects with the 3 sensors attached were instructed to sit on an extension-type reclining wheelchair for which trunk positions could be adjusted. Cervical position angle was always kept at a constant 20° flexion (Fig. 1).

Procedure

To limit assessment to swallowing function during the oral and pharyngeal phases while excluding masticatory function during the preparatory phase, subjects were instructed to swallow water. To investigate differences in swallowing function with and without water, subjects were also instructed to swallow air.

The procedure was performed in a room at a constant temperature of 23°C , and involved

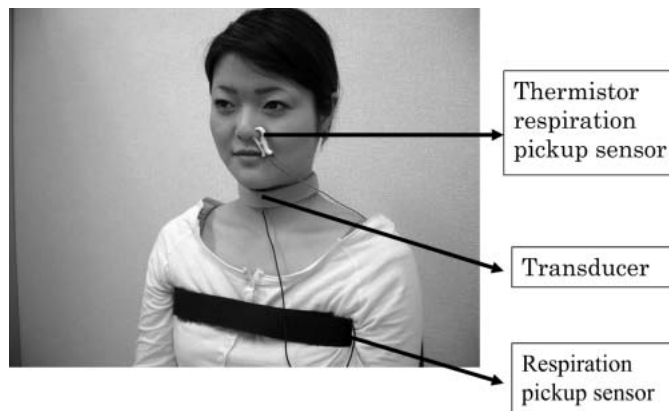


Fig. 1. 3 sensors attached to subject

injection of 10 ml of water at 10°C into the oral cavity of each subject. Subjects were instructed to keep this liquid in the mouth until a red lamp signal (trigger) was seen. When the chart recorder indicated the end of an expiratory phase of respiratory movement, the red lamp signal was given to the subject to completely swallow the water bolus. After this, resumption before a trigger of respiratory movement wave on the chart recorder was confirmed. After confirmation, since two-wave respiratory movement was over on the chart recorder, a signal to swallow air (saliva) was given when subject indicated the end of the expiratory phase again. Water swallowing was performed 3 times. This experimental procedure was repeated with different trunk positions of 90° (seated upright), 60°, and 30° flexion. The subject rested for 15 min with every change of trunk position.

Data analysis

Data were recorded during the procedure using both a chart recorder and a digital audio tape recorder (sampling rate, 100 mm/s). At a later date, these data were read by a computer using a Power Lab data analysis system (AD Instruments, USA), and analyzed using Chart version 4.0 software (AD Instruments). During water bolus and air bolus swallowing, 4 parameters were compared between trunk positions (Fig. 2): time interval from red lamp signal (trigger) to start of

thyroid cartilage movement (laryngeal movement latency; Fig. 2a); duration of thyroid cartilage movement (duration of laryngeal movement; Fig. 2b); duration from lamp signal (trigger) to end of air ventilation (apnea latency; Fig. 2c); and duration of apnea (Fig. 2d). Analysis was performed using one-way analysis of variance (ANOVA) followed by post hoc Tukey test. The level of statistical significance was set at $P < 0.05$ unless otherwise noted.

Results

Swallowing of water bolus

Mean values (\pm standard deviation) of the 4 parameters recorded during swallowing of the water bolus for the 3 trunk positions are shown in Fig. 3.

Significant differences in duration of laryngeal movement were recognized only between the 90° (2.21 ± 0.57 s) and 30° (1.72 ± 0.41 s) trunk positions ($F=3.877$, $P < 0.05$).

Swallowing of air (saliva)

Mean values (\pm standard deviation) of the 4 parameters recorded during swallowing of saliva in the 3 trunk positions are shown in Fig. 4.

Significant differences in duration of laryngeal movement were recognized between the 90° (2.16 ± 0.58 s) and 30° (1.61 ± 0.47 s) trunk positions and between the 90° (2.16 ± 0.58 s) and

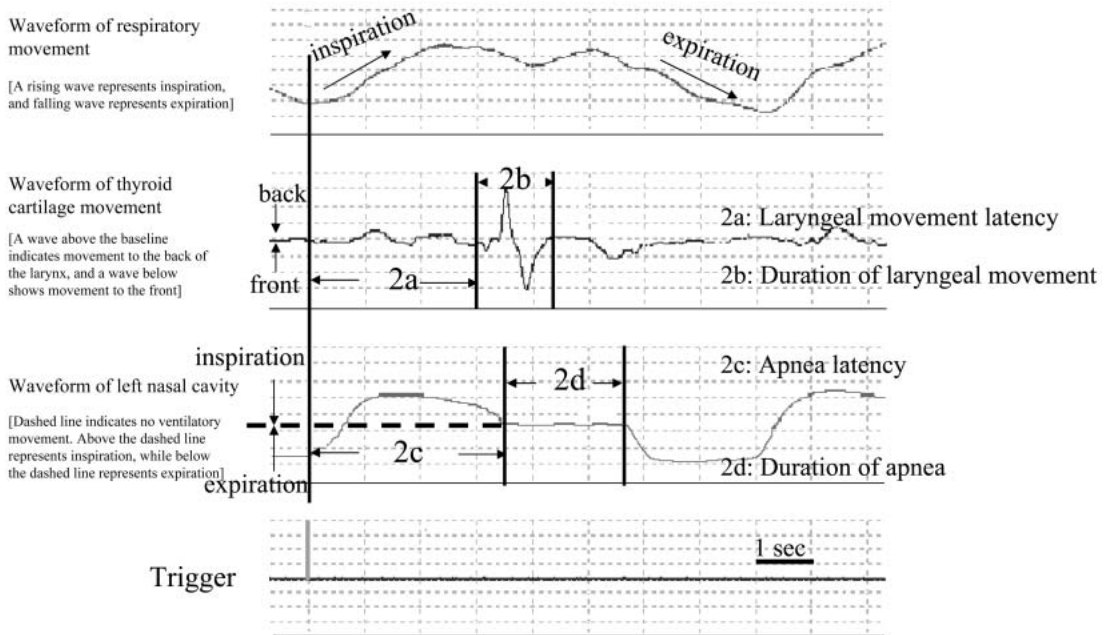


Fig. 2. Parameter and instrumentation range

Laryngeal movement latency: Interval from trigger to start of thyroid cartilage movement, Duration of laryngeal movement: Duration of thyroid cartilage movement, Apnea latency: Interval from trigger to end of air ventilation.

60° (1.69 ± 0.41 s) trunk positions ($F=6.128$, $P<0.05$).

Discussion

Swallowing of water bolus

Water bolus transport was not recognized in the laryngeal movement latency of oral phases, and was recognized in the duration of laryngeal movement of pharyngeal phases. Significant differences were recognized only for duration of laryngeal movement between 90° and 30° trunk positions.

In the past, bolus transport has been viewed as a function of the oral phase (Ekbeng, 1986; Saitou, 1987; Fujishima, 1995; Zimmenman, 1981; Logemann, 1983). However, the results were reflected in duration of laryngeal movement, not laryngeal movement latency (Fig. 2). As suggested by Saitou (1987) and Logemann (1983), this could be because the bolus taken comprised of non-viscous water. Dodds *et al.* (1989) reported

that when subjects were instructed to hold food in their mouth and swallow on a signal, some subjects held food at the bottom of the oral cavity (dipper type), while others held food on the tongue (tipper type). In this study, subjects were instructed to hold food in the mouth and swallow on a signal. Differences in laryngeal movement latency may thus have resulted from subjects holding the water in a different place to where they held food. Furthermore, apnea latency was shortened for the 30° trunk position compared to the 90° trunk position. Some water may thus have flowed down the pharynx while the subject waited for a signal. Water bolus transport was thus not recognized in the laryngeal movement latency of oral phases.

Significant differences were recognized only for duration of laryngeal movement between 90° and 30° trunk positions.

Yamada (2001) reported that in terms of bolus transport, negative pressure caused by relaxation of the inferior constrictor muscles of the

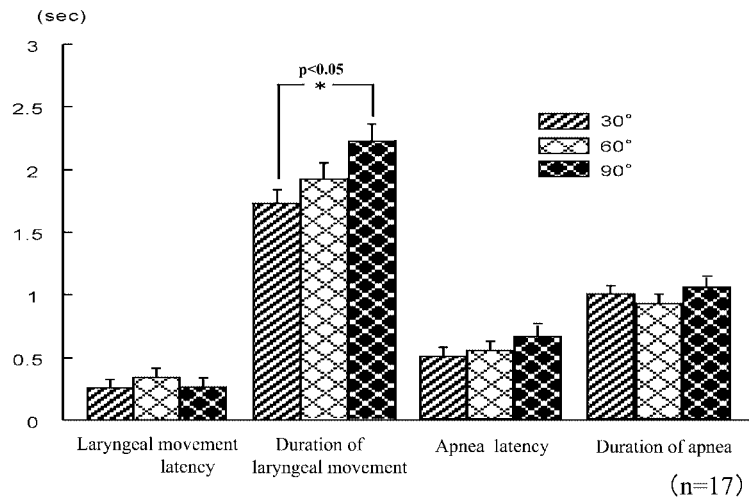


Fig. 3. Water (4 parameters from 3 postures)

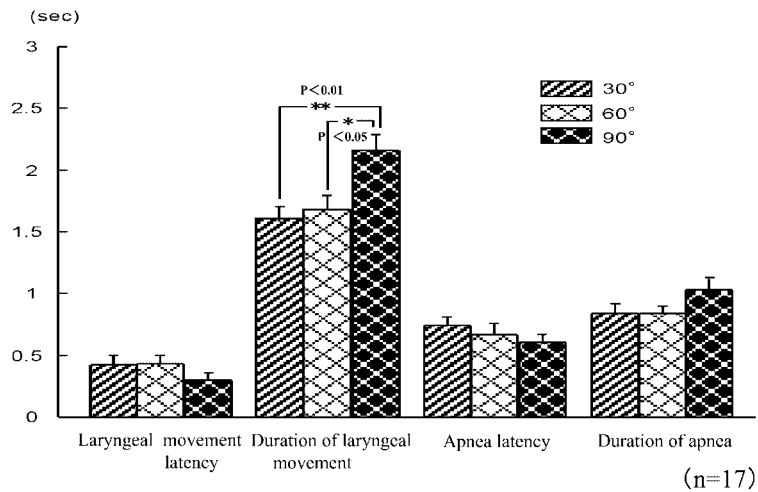


Fig. 4. Saliva (4 parameters from 3 postures)

pharynx draws the bolus from the large pharyngeal entrance to the small pharyngeal exit facilitating transport through the esophagus. Fujishima (1995) reported the influence of gravity on transport. Both pharyngeal and esophageal phases receive equal influence with 90° trunk posture, but the pharyngeal phase was accelerated in the 30° trunk position and the esophageal phase was unaffected. Kogoe (1995) examined swallowing

posture using ultrasonography, finding that a lowered trunk position during swallowing facilitates bolus transport through the pharynx and increases length of the soft palate, but increases the risk of aspiration.

In future, decisions regarding which swallowing postures a subject should take during swallowing will require integration of general data, including functional status of the pharynx,

organic position, gravity, internal pressure, consistency and volume of the food bolus.

Swallowing of saliva

Similar results were recognized for laryngeal movement during water swallowing. Swallowing of saliva in this study appears to have been influenced by activity of the earlier deglutition of the water bolus.

Leopold (1983) stated that this early phase allows determination of safe bolus volume and programming of the swallowing reflex based on previous feeding experiences. Ekberg (1986) reported greater activity in the limbic system and cerebral cortex during this early phase of swallowing as compared to other stages. Sumi (1972) stated that reverberating circuits are formed between the reticular formation and cerebrum, and diverse sensory information is processed and relayed to the cerebrum, resulting in activation. In that study, subjects were instructed to swallow water and then air. Given the above-mentioned reasons, the study was influenced by the following 3 systems: a stereotypical organoleptic limbic system informing the body that swallowing is safe under the same conditions as swallowing 10 ml of water (certain shape swallowing movements that were induced by sensory input, and this partially overlaps the brainstem system); a sensory-motor field neocortical system based on cognitive behaviors for external stimuli (swallowing movements based on discriminating behaviors for sensory stimuli); and a brainstem system forming the basic reflexive circuit for eating behaviors (Michael, 1996). In addition, Bach-y-Rita (1980) used a sensory-motor field neocortical system as described by Michael (1996) and similarly reported that while some neurological mechanisms, such as respiration, are reflexive and do not require much learning or experience, other neurological mechanisms, such as swallowing during the oral and laryngeal phases, are designed to incorporate new programming in the short term. Since subjects in the present study were healthy individuals, this theory may have played some role. Furthermore, an explanation for discrepancies between water and air swallowing between the present study and previous

investigations could be that visual information regarding "no food presence" plays a dominant role.

The first reason for setting a swallowing posture in clinical situations is to allow consistent comparison of bolus swallowing parameters with reference to trunk angle. The second reason is in consideration of the degrees of oral and pharyngeal dysfunctions. Appropriate evaluation of swallowing function and swallowing posture settings on the basis of test results will help to prevent aspiration in clinical situations.

Conclusions

Using non-invasive investigative methods, we analyzed the effects of different body postures on swallowing functions during swallowing in healthy adults. Water bolus transport did not affect laryngeal movement latency of oral phases, but did affect duration of laryngeal movement of pharyngeal phases. Significant differences were recognized only for duration of laryngeal movement between 90° and 30° trunk positions. Swallowing of saliva seems to be influenced by preceding swallowing dynamics and information from visual input. Decisions on trunk position during swallowing should be made on the basis of swallowing function, bolus consistency and gravity. In future, we would like to investigate relationships between body position and bolus consistency using the same parameters used in this study.

References

- Bach-y-Rita, P. (1980). *Recovery of Function: Theoretical Considerations for Brain Injury Rehabilitation*. Baltimore: University Park.
- Buckley, J., Addicks, C., Maniglia, J. (1976). Feeding patients with dysphagia. *Nursing Forum*. **15**, 69–85.
- Dodds, W.J. (1989). Tipper and dipper types of oral swallows. *American Journal of Roentgenology*. **153**, 1197–1199.
- Ekberg, O. (1986). Posture of the head and pharyngeal swallowing. *Acta Radiologica Diagnosis*. **27**, 691–697.
- Fujishima, I. (1995). *Rehabilitation for Swallowing*

- Disorders associated with Stroke*. Tokyo: Ishiyaku, Publishers (in Japanese).
- Higashijima, M., Tubahara, A., Koga, T., Kobashi, M. (2002). Establishment of non-invasive method procedure of a swallowing pattern and study about correlation with electrogastrogram. *Grant-in-Aid for Scientific Research reports* (in Japanese).
- Kogoe, C., Saito, H. (1995). Effect of Position on swallowing. *Journal of Japanese Association of Occupational Therapists*. **14**, 216–223 (in Japanese).
- Logemann, J. (1983). *Evaluation and Treatment of Swallowing Disorders*. Austin, Texas: Pro Ed.
- Leopold, N.A., Kagel, M.C. (1983). Swallowing ingestion and dysphagia. *Arch Phys Med Rehabil*. **64**, 371–373.
- Michael, E.G., Fujishima, I. (1996). *Dysphagia Diagnosis and Management*. Tokyo: Ishiyaku, Publishers (in Japanese).
- Saito, E. (1987). About dysphagia and posture and correlation of food configuration. *Monthly Nursing*. **7**, 1244–1246 (in Japanese).
- Sumi, T. (1972). Role of the pontine reticular formation in the neural organization of deglutition. *Japanese Journal of Physiology*. **22**, 295–314 (in Japanese).
- Steeffel, S.J. (1981). *Dysphagia Rehabilitation for Neurologically Impaired Adults*. Charles C: Thomas, Publishers.
- Yamada, Y. (2001). *The understanding of oral and swallowing function*. Tokyo: Ishiyaku, Publishers (in Japanese).
- Zimmerman, J.E. (1981). Swallowing dysfunction in acutely ill patients. *Physical Therapy*. **61**, 1755–1763.

Self-Efficacy and Outcome Expectancy: Analysis of Theory and Measurement in Occupational Therapy

Kayoko TAKAHASHI, MS, OT¹

ScD Candidate in Doctoral Program in Rehabilitation Sciences, Sargent College of Health and Rehabilitation Sciences, Boston University

Abstract: Occupational therapy seeks to effectively change clients' behavior to result in better quality of life by both focusing on tasks that clients find purposeful and meaningful and by enhancing clients' sense of competence. *Self-regulatory system* theory similarly demonstrates that behaviors are best predicted by the combined influence of one's competence to perform a task (*self-efficacy*) and the purposefulness and meaningfulness of a task (*outcome expectancy*). In this paper, twenty-four scales for self-efficacy and outcome expectancy for older adults were reviewed. However, these scales were found not to be validly following the theoretical framework. Furthermore, in clinical contexts, therapists rarely evaluate clients' states using scales; rather they observe clients' nonverbal and verbal behavior. This observational assessment is not only found to be reliable but also helps to develop a strong working alliance and better rehabilitation outcome. Research is currently underway to develop a systematic method to identify which of the clients' cues are valid and reliable expressions of self-efficacy and outcome expectancy.

Key words: measurement, outcome expectancy, self-efficacy, self-regulatory system, theory

(*Asian J Occup Ther* 6: 23–34, 2007)

Introduction

Occupational therapists focus on tasks that their clients find personally purposeful and meaningful and for which the clients have positive

expectations related to potential outcomes of the tasks. The philosophical assumptions that drive rehabilitation practice include the link between task performance and sense of competence (Gage & Polatajko, 1994): Successful completion of a task that a person finds purposeful and meaningful can lead to an increase in the person's sense of competence and in the person's willingness to engage in other tasks. Research in occupational therapy has been done to support this philosophical assumption (Bakshi, Bhambhani, & Madill, 1991; Dickerson & Fisher, 1997; Ferguson & Trombly, 1997; Kircher, 1984; Miller &

Received: August 24, 2007, Accepted: October 30, 2007
Corresponding to: Kayoko Takahashi, ScD Candidate in Doctoral Program in Rehabilitation Sciences, Sargent College of Health and Rehabilitation Sciences, Boston University, 635 Commonwealth Ave. # 553 Boston, MA 02215 U.S.A.
Phone: 1-617-627-4591 fax: 1-617-627-4824
e-mail: kayo@bu.edu

Nelson, 1987; Morton, Barnett, & Hale, 1992; Murphy, Trombly, Tickle-Degnen, & Jacobs, 1999; Riccio, Nelson, & Bush, 1990; Takahashi, 2002; Thibodeaux & Ludwig, 1988; Trombly, 1993, 1995, 2002; Yoder, Nelson, & Smith, 1989).

In order to facilitate task performance, occupational therapists not only choose a task that clients find purposeful and meaningful, but also set a goal to increase the client's sense of competence (Christiansen, 1991; McAuly, 1993; Trombly, 1993). Enhancing the client's sense of competence has been an important focus of occupational therapy from its early days. Adolph Meyer (1922), a founder of occupational therapy, described the value of feeling the satisfaction and achievement that is associated with successful completion of a project. Robert White (1971), a scholar of motivation and human behavior, stressed that occupational therapists need to be aware of a client's sense of competence. By both focusing on the task that clients find purposeful and meaningful and enhancing the client's sense of competence, occupational therapy seeks to effectively change a client's behavior to result in a better quality of life.

However, occupational therapy does not have a specific theoretical framework to support this philosophical assumption. Putting clinical phenomena into a theoretical framework helps practice in two ways. First, it helps in a retrospective way, to systematically understand the condition of a client. Second, it helps in a prospective way, to systematically guide effective treatment planning for the client. One theoretical framework that is highly consistent with occupational therapy practice is the self-regulatory system model (Bandura, 1977, 1986, 1991, 1997) demonstrating the conditional relationship between cognition and behavior involved in human actions.

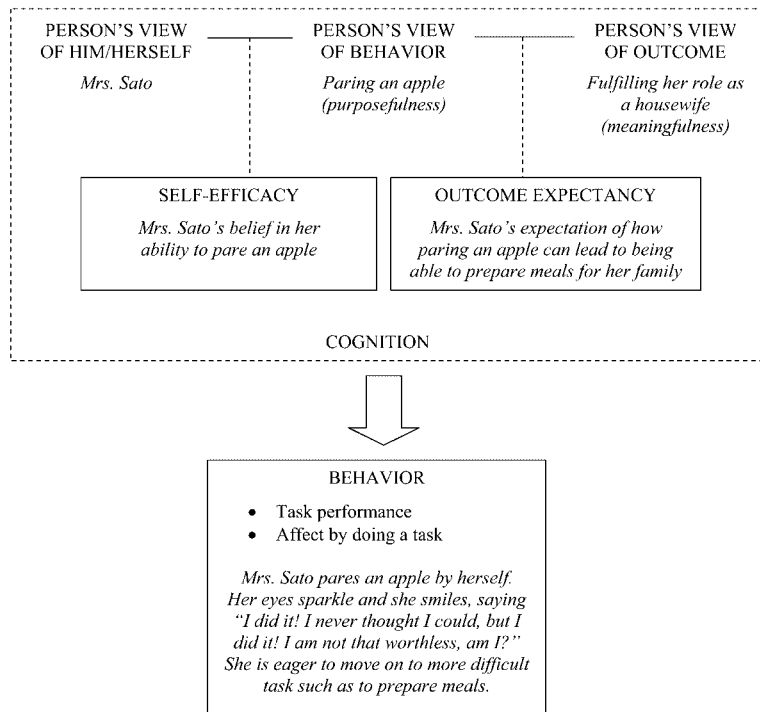
Moreover, only a few measurement tools used in healthcare fields precisely follow a theoretical framework. Having a measure is not only the first step for a therapist to understand client's condition, but also to see the outcome of the intervention so that a therapist can provide a better and more effective intervention for each client.

The purpose of this paper is first to analyze one of the theories by Bandura about people's behavioral change via a self-regulatory system, with a specific focus on measurements derived from the theory that have been used in rehabilitation research with older adults. A discussion will then go further into a clinical application of how occupational therapists can assess the theorized factors to better understand behavioral change.

The Self-regulatory System as a Theoretical Framework

According to Bandura's framework, human action is a *self-regulatory system*, in which self-regulation is defined as self-directed change influenced by the environment. Bandura (1977, 1986, 1991, 1995, 1997) states that behavior and self-regulation processes are best predicted by the combined influence of one's belief in the ability to perform a task (*self-efficacy*) and the results one anticipates from having performed these tasks (*outcome expectancy*). Both self-efficacy and outcome expectancy are part of the cognitive process prior to one's action, because self-efficacy is a perception of oneself capably performing a behavior and outcome expectancy is a perception of the purposefulness and meaningfulness of doing that behavior. These two types of cognitive perception then influence the person's actual behavior of doing a task. Self-efficacy influences the choices people make, their aspirations, how much effort they put into achieving the task, and how long they persevere in the face of difficulties (Bandura & Adams, 1977). Outcome expectancy influences the amount of effort they put into achieving the task, but also influences the amount of satisfaction they feel in achieving the task and eagerness to move on to a similar or more difficult task.

To apply Bandura's framework, Fig. 1 presents an example of an occupational therapy client and how self-efficacy and outcome expectancy enter into her own motivation to do a task. Mrs. Sato is a 67-year-old homemaker with Parkinson's disease. She lived with her 45-year-old daughter who was a busy lawyer, and three



Adapted from *Self-efficacy: The exercise of control* (p. 22), by A. Bandura, 1997, New York: W.H. Freeman and Company.

Fig. 1. Self-regulatory system. The conditional relationship of self-efficacy and outcome expectancy to an actual behavior

grandchildren (10-year-old girl, 14-year-old boy, and 17-year-old boy). She was in charge of the entire household and cares for the grandchildren. In the first session of occupational therapy, she was depressed that she could not perform her role as a homemaker, given a severe tremor. Following the philosophical assumption of occupational therapy that performing tasks clients find meaningful will increase their motivation and positive rehabilitation outcomes, the therapist decided to work on a task related to household chores. Therefore, the therapist showed her how to pare an apple controlling for a tremor, and with this guidance she did so successfully. Her eyes sparkled and she smiled, saying “I did it! I never thought I could, but I did it! I am not that worthless, am I?” After this successful experience, she became eager to try cooking using strategies to control a tremor, and to move on to more difficult

tasks related to her role as a homemaker.

Figure 1 contains the example of Mrs. Sato in italic font. Self-efficacy in this example is how confident Mrs. Sato is about her ability to pare an apple despite a tremor, and outcome expectancy is her expectation of the degree to which paring an apple successfully can change her role in the family “If I could pare an apple, I would be able to cook meals for my family and fulfill my role as a homemaker, which is wonderful.” In order to achieve the actual behavior, which is to pare an apple, Mrs. Sato needs not only to feel confident enough about her ability to actually pare an apple, but also to have a positive outcome expectancy about what being able to pare an apple means to her. After the therapy session, she became eager to try other tasks because she then had both high self-efficacy and positive outcome expectancy toward tasks related to her role in her family as a

Table 1. The effects of different patterns of self-efficacy and outcome expectancies on behavior and affective states

		Outcome expectancy	
		Negative	Positive
Self-efficacy	Low	<p>(A) Apathy Disinterest</p> <p><i>Mrs. Sato does not feel confident about her ability to pare an apple, and does not expect anything from being able to pare an apple, then she may not care and not try to pare an apple.</i></p>	<p>(B) Hopelessness Despondency/Depression</p> <p><i>Mrs. Sato does not feel confident about her ability to pare an apple, yet thinks it is an important path to her goal, then she may feel depressed about her situation. She may try to pare an apple, but will not do a good job (impair the quality of the performance).</i></p>
	High	<p>(C) Protest Resistance</p> <p><i>Mrs. Sato feels confident about her ability to pare an apple, but does not expect anything from being able to pare an apple, then she may resist paring an apple and protest to do other task or leave OT session.</i></p>	<p>(D) Hopefulness Aspiration</p> <p><i>Mrs. Sato feels confident about her ability to pare an apple, and thinks it is an important path to her goal, then she may be eager to try cooking meals despite of tremor. She may feel satisfied for achieving the performance.</i></p>

Adapted from *Self-efficacy: The exercise of control* (p. 20), by A. Bandura, 1997, New York: W.H. Freeman and Company.

homemaker.

The interactive effects of self-efficacy and outcome expectancy

Self-efficacy and outcome expectancy work interactively to change behavior toward and emotional responses to the task. Table 1 shows the effects of different patterns of self-efficacy and outcome expectancies on behavior and affective states. Different patterns of self-efficacy and outcome expectancy are hypothesized to have different psychosocial and emotional effects. In Table 1, high self-efficacy and a positive outcome expectancy are shown as (+), and low self-efficacy and negative outcome expectancy are shown as (-). The four cells show the effect of different combinations of self-efficacy and outcome expectancy.

Cell A *Apathy* of the table shows that if people have both low self-efficacy and negative outcome expectancy, they may become apathetic and resigned to a self-perceived unsatisfying life and not put effort into the task. For Mrs. Sato, she may believe she cannot pare an apple, and if she also does not expect anything positive from being able to pare the apple, she might feel apathetic, be disinterested to the task and not try to pare an apple.

Cell B *Hopelessness* of the table shows the pattern in which people perceive themselves as ineffectual but have a positive expectation of what the outcome can bring. This situation is apt to give rise to self-disparagement and depression (Bandura, 1997). For Mrs. Sato, this problem might have been what was happening to her before she had her occupational therapy session. She did

not feel confident about her ability to pare the apple and, yet thought paring an apple was an important task, she was feeling depressed at not being able to perform the task. She may try to pare an apple, but loss of self-efficacy may impair the quality of the performance and she may not do a good job.

Cell C *Protest* of the table shows that if people have high self-efficacy but negative outcome expectancy, people will not do the task, since they believe they cannot gain a valued outcome. For example, if Mrs. Sato does not value the future outcome of being able to pare an apple, she would not find paring an apple as an important task for her to achieve, and she may resist paring an apple and protest to do other task or leave OT session.

Cell D *Hopefulness* of the table shows that high self-efficacy and positive outcome expectancy promotes productive engagement in tasks and produces satisfaction and fulfillment. As an example, Mrs. Sato, having achieved the task successfully in the occupational therapy session, she felt satisfied for achieving the task, and regained her self-efficacy about preparing food. As a result, she became eager to try paring an apple despite of tremor.

Some studies in public health (Grembowski, Patrick, Diehr, & Durham, 1993; Schuster, Petosa, & Petosa, 1995; Schwarzer & Fuchs, 1995) support this idea that there is an interactive effect of self-efficacy and outcome expectancy. For example, Grembowski et al. (1993) found both self-efficacy and outcome expectancy are negatively associated with health risk behavior, and Schuster et al. (1995) found a similar effect on intentional exercise. Schwarzer et al. (1995) used a hierarchical regression analysis of self-efficacy, outcome expectancy, and vulnerability to predict intention to engage in cancer screening behavior for older females (age from 40 to 70). A significant interaction between self-efficacy and outcome expectancy was found in older females ($\beta = -.19, p < .01$), suggesting that positive outcome expectancy may help to raise the intention to screen for cancer in women of lower self-efficacy.

As shown, self-efficacy and outcome expectancy are not only a factor of one's behavior

by itself, but also work interactively to change behavior toward and emotional responses to the task. To understand a person's behavior and affective state and predict his or her future performance, it is important to understand both self-efficacy and outcome expectancy and their interactions.

Analysis of Measurements

This paper reviews measures specifically focused on older adults, because that group is one of the main populations of occupational therapy (Rijken & Dekker, 1998), and a group that will show rapid growth over the next decade or two (Kinsella & Velkoff, 2001). Some scales have already been developed specifically for self-efficacy or outcome expectancy related to rehabilitation with older adults. In this part, measurements for self-efficacy and outcome expectancy are analyzed separately.

Analysis of self-efficacy measures used in older adults

A search of the literature using PsychINFO and OVID database, with the keywords of "self-efficacy," "scale," "rehabilitation," and "older adults" retrieved 22 scales. Of the 22 retrieved scales, 17 measure task-specific self-efficacy, and five measure general self-efficacy. The task-specific self-efficacy scales measure people's beliefs about their ability to do a specific task, such as "touch and hold the snake with gloved hand" in a specific situation, such as "during participating in a research study" (Bandura & Adams, 1977). General self-efficacy is overall confidence in dealing with life challenges, not just confidence in doing a specific task, such as "I can always manage to solve difficult problems if I try hard enough" (Schwarzer & Jerusalem, 1995). Five scales were found that measure this type of self-efficacy (Burger & Cooper, 1979; Sakano & Tohjoh, 1986; Schwarzer & Jerusalem, 1995; Sherer & Maddux, 1982; Tipton & Worthington, 1984). However, Bandura (1997) cautions that general self-efficacy scales "violate the basic assumption of the multidimensionality of self-efficacy beliefs" (p. 48) and some researchers also

Table 2. Task-specific self-efficacy scales used in older adults

	Instrument	Task domains						Authors (year)
		BADL	Mobility	Symptom	Emotion	Exercise	IADL	
1	Self-efficacy scale	X	X	X	X	X	X	Lorig et al. (1996)
2	Rheumatoid Arthritis Self-efficacy (RASE) scale	X	X	X	X	X	X	Hewlett et al. (2001)
3	Depression Coping Self-Efficacy Scale (DCSES)	X		X	X	X	X	Perraud (2000)
4	Arthritis Self-efficacy scale	X	X	X	X			Lorig et al. (1989)
5	Self-Efficacy Gauge	X	X	X			X	Gage et al. (1994b)
6	Self-Efficacy for Participation in Rehabilitation Scale	X	X					Resnick (1998)
7	Self-Efficacy Measures			X	X	X	X	Fry et al. (2001)
8	Health care self-efficacy scale (KI-SE)			X	X			Krantz et al. (1980)
9	Self-efficacy scale				X	X		Montgomery et al. (1994)
10	Health care self-efficacy scale (HSE)				X	X		Smith et al. (1984)
11	Self-Efficacy in Leisure-time physical activity scale						X	Stevens et al. (2001)
12	The Fall Efficacy Scale	X						Tinetti et al. (1990)
13	Physical Self-Efficacy (PSE) Scale		X					Ryckman et al. (1982)
14	Occupational Self-Efficacy Index (OSEI)						X	Fletcher et al. (1992)
15	Self-efficacy scale						X	Moore (1992)
16	Self-Efficacy for Functional Ability Scale						X	Resnick (1999)
17	Self-Efficacy for Exercise scale (SEE)						X	Resnick et al. (2000)

BADL=basic activities of daily living, Comm.=communication, Emotion=emotional well being, IADL=instrumental activities of daily living

have shown the limitation of general self-efficacy scales (Tipton & Worthington, 1984; Wang & Richarde, 1988). Therefore, this review focused only on the task-specific self-efficacy and its scales.

Table 2 shows the details of the 17 task-specific self-efficacy scales. All scales were found to have a similar structure: items ask “how confident are you to do (target task)?” using a Likert scale, which is the format Bandura and Adams (1977) used in their original study. Only one scale (Gage et al., 1994) out of the 17 scales was used in occupational therapy research. The only difference across these 17 scales was the uniqueness of target tasks; each scale had a different target task and age group. However, they did not all precisely follow the theoretical framework of Bandura. Bandura and Adams (1977) postulated three parameters of self-efficacy; magnitude, strength and generality. “Magnitude” refers to the level of difficulty of the task that is rated from easy to difficult, “strength” refers to the degree to which people believe they can succeed at a given level of task difficulty

(magnitude), and “generality” of self-efficacy refers to the degree to which the person’s self-efficacy for one task transfers to other similar or different tasks. By measuring all three parameters, an investigator would be able to predict the participants’ future performance. Unfortunately, all of the 17 scales were found to be only measuring the level of self-efficacy parameter (strength), and did not include magnitude or generality. If a scale is not validly following the theoretical framework, using that scale can result in a misunderstanding of the phenomenon.

Analysis of outcome expectancy measures used in older adults

A search of the literature using PsychINFO and OVID and the keyword of “outcome expectancy,” “scale,” “rehabilitation,” and “older adults” retrieved only two outcome expectancy scales related to Bandura’s self-regulation theory, both from the same study conducted in the field of nursing research. Resnick (1998) developed two self-efficacy scales and two outcome expectancy scales in her study of patient education for older

adults. Her *Outcome Expectation for Functional Ability* (OEFA) scale had six items, such as “How strongly do you believe that doing your own bathing and dressing, rather than having others do it for you, will improve your strength and ability?” The *Outcome Expectation for Participation in Rehabilitation* (OEPR) scale had three items, such as “How confident are you that participating in 3 hours of therapy a day will help you increase your ability to take care of yourself?” Each item is rated on a 5-point Likert scale ranging from 1 (*not at all*) to 5 (*a great deal*).

However, the terminology Resnick used in the OEFA may have biased the answers. She implied the research hypothesis in the phrasing of the item, such as “How strongly do you believe that doing your own bathing and dressing, rather than having others do it for you, will improve your strength and ability?” This phrase could imply the hypothesis that “doing your own bathing and dressing, rather than having others do it for you, will improve your strength and ability.” Asking clients how much they agree with this sentence is a leading question. Rosenthal and Rosnow (1991) caution the artifacts that may result when demand of the researcher is too clear. Rosenthal and Rosnow and other studies in social psychology (Brehm, 1966; Wicklund, 1974) have found that, when demand characteristics are too clear, a person typically attempts to acquiesce to the demand, although some attempt to do the opposite of what is demanded. It is important to make sure that participants are blind to the hypothesis. Moreover, the outcome one expects from doing the task (outcome expectancy) may vary with each individual. As Resnick’s items explicitly state a specific outcome expectation, she does not allow participants to express their unique expectancies related to doing the task.

Analysis of studies focused on the interaction of self-efficacy and outcome expectancy in older adults

Resnick (1998) used these two outcome expectancy scales reviewed in the last section and other two task-specific self-efficacy scales to examine the impact of self-efficacy and outcome expectations on older adults in a rehabilitation

program. She found that, based on an exploratory regression analysis, OEFA at baseline was shown to be an important contribution (R^2 change = .06, $p < .05$) to the prediction of the variance in the older adults’ level of functioning after rehabilitation.

However, Resnick’s study did not address the interaction between self-efficacy and outcome expectancy. Similar to this study, other studies in public health (Grembowski et al., 1993; Schuster et al., 1995) also have examined both outcome expectancy and self-efficacy, but examined them separately, looking at whether each affects and predicts behavior. In Bandura’s self-regulatory system, self-efficacy and outcome expectancy affect task performance interactively (see Table 1). The interaction between self-efficacy and outcome expectancy may have affected the results, and not examining the interaction could yield only a partial understanding of motivation and behavior. Given the lack of available instruments, new measurement tools are needed that can measure both self-efficacy and outcome expectancy and their interactions.

Self-efficacy and Outcome Expectancy in a Clinical Context

In this section, the discussion is about how theory and measures in this area have been applied to a clinical context in occupational therapy. In a clinical context, the interaction of self-efficacy and outcome expectancy is rarely and possibly never evaluated, even though many scales have been developed specifically to measure self-efficacy. In the clinical reasoning process, a therapist automatically evaluates a client’s motivation without using scales. A therapist observes clients’ non-verbal and verbal behavior to identify their experience as related to the four conditions of Table 1. This evaluation process is called “conditional reasoning” (Fleming, 1994).

As an example, this conditional reasoning process can be applied to the occupational therapy session of Mrs. Sato. From the interaction with Mrs. Sato, the therapist understood that Mrs. Sato felt depressed (the motivational state of Hopelessness in Table 1), based on her affect and her statement that she could not perform her

important and meaningful roles of homemaker. Likewise, watching the sparkle in Mrs. Sato's eyes with her smile and positive comments after she succeeded in paring the apple, the therapist sensed that her level of self-efficacy increased and that she was ready to move on to more difficult tasks (the motivational state of Hopefulness in Table 1). By tying behavior to Mrs. Sato's possible affect, the therapist could understand that she has positive outcome expectancy for the household task and that she has low or high self-efficacy on that task.

Recent studies in occupational therapy support that this conditional reasoning is a reliable way to understand the client's affect and motivation (DeGroat, Lyons, & Tickle-Degnen, 2006; Lyons, Tickle-Degnen, Henry, & Cohn, 2004; Lyons, Tickle-Degnen, & DeGroat, 2005; Tickle-Degnen & Lyons, 2004). Lyons and colleagues (2004) found an association between the judged personality by therapists during a clinical interview and the clients' self-described personality and mood. This finding supported the idea that therapists can accurately pinpoint a client's affect and motivation through both verbal and nonverbal behavior during open-ended clinical interviews.

Moreover, using an open-ended qualitative questioning process, rather than structured and standardized scales, promotes a natural flow of intervention. Take Mrs. Sato as an example. It may interrupt Mrs. Sato's occupational performance if a therapist keeps asking her to score her level of self-efficacy on a Likert scale each time she performs a task. Also, since an occupational therapy session usually lasts 20 to 30 minutes, there is not enough time to sit down and fill out scales every time. In a limited time frame like that involved in a clinic intervention, it may not be very beneficial to use a structured scale.

In addition, conditional reasoning also helps the therapist to respond in a way that will develop a strong working alliance with the client (Cox, Holbrook, & Rutter, 1981; Cox, Rutter, & Holbrook, 1981; Cruz & Pincus, 2002; Eisenthal, Koopman, & Lazare, 1983; Lustig, Strauser, Rice, & Rucker, 2002; Roter & Hall, 1992; Safran & Muran, 1998). *Working alliance* is defined as collaboration between a client and a counselor

based on the development of an attachment bond (Bordin, 1979). The development of strong working alliance is found to result in better outcomes for a variety of rehabilitation interventions (Al-Darmaki & Kivlighan, 1993; Connors, Carroll, DiClemente, Longabaugh, & Donovan, 1997; Cruz & Pincus, 2002; Goering, Wasylenki, Lindsay, Lemire, & Rhodes, 1997; Kivlighan & Shaughnessy, 2000; Kokitovic & Tracy, 1990; Mallinckrodt & Nelson, 1991). Although no studies on working alliance have been done in occupational therapy area which may limit the implication in other disciplines, here again, using an unstructured interaction is likely to be more flexible way to assess a client in a clinical setting than use of a paper-and-pencil rating scale.

Implications for Practice

The self-regulatory system model explains the interactive effect of self-efficacy and outcome expectancy on behavior (Bandura, 1977, 1986, 1991, 1997), and this model is highly consistent with philosophical assumptions in occupational therapy practice. However, Bandura's self-regulatory model has not yet been integrated systematically into occupational therapy clinical practice (Gage, Noh, Polatajko, & Kaspar, 1994), and the importance of outcome expectancy has not been recognized in the occupational therapy literature. This lack of integration of the model into practice may be due to occupational therapists' lack of awareness of the constructs of self-efficacy and outcome expectancy, and to the lack of useful assessment tools for measuring these constructs (Gage et al., 1994).

In clinical settings, therapists often make judgments about clients' motivational state quickly and spontaneously throughout clinical interaction. However, the process of this identification is so automatic that it is not well-articulated and is thought to be "art." Clear understanding of self-efficacy and outcome expectancy is important because those are the factors influencing the actual task performance. The studies reviewed showed that current methods of assessing the client's motivational states involve self-report measures which do not enable

therapists to quickly and spontaneously make their judgment. By observing a client's behavior and affective states during an open-ended clinical interview, therapists may be able to identify rapidly whether the person has positive or negative outcome expectancies and high or low self-efficacy, and quickly adjust their intervention to be more effective. For example, for a client who is apathetic or protesting, the therapist can change the activity to increase the client's positive outcome expectancy. If the client was resisting paring an apple, it might be better to change the activity to which the client finds it meaningful such as ironing a shirt. Likewise, for a client who is hopeless, the therapist can help the client to increase self-efficacy on that activity. If the client could not pare an apple easily, the therapist would demonstrate strategies such as stabilizing the apple and using an adaptive equipment to perform the activity successfully therefore increase the client's self-efficacy. Though a limitation of using the self-regulatory system model could be that there may be other factors affecting people's behaviors such as physical dysfunction or pain, conditional reasoning can be used to understand the factors why the client is in a specific motivational state and adjust the intervention accordingly.

Research is currently underway to develop a systematic method for identification of what client cues are valid and reliable expressions of self-efficacy and outcome expectancy. Once we are able to measure these expressions reliability and validly, we may be able to improve the intervention to specifically address each motivational state.

Acknowledgment: The author thanks Dr. Linda Tickle-Degnen, Ph.D., OTR/L, FAOTA, Dr. Patricia Nemeck, Psy.D., C.R.C., C.P.R.P. and Dr. Nancy K. Latham, Ph.D., PT for their comments on earlier drafts of this paper. This paper was completed in partial fulfillment of the requirements for the author's doctoral degree in rehabilitation sciences.

References

- Al-Darmaki, F., & Kivlighan, D. M. (1993). Congruence in client-counselor expectations for relationship and the working alliance. *Journal of Counseling Psychology*, **40**, 379–384.
- Bakshi, R., Bhambhani, Y., & Madill, H. (1991). The effects of task preference on performance during purposeful and nonpurposeful activities. *Am. J. Occup. Ther.*, **45**, 912–916.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, **84**, 191–215.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Upper Saddle River, NJ: Prentice-Hall.
- Bandura, A. (1991). Social cognitive theory of self-regulation. *Organizational Behavior and Human Decision Processes*, **50**, 248–287.
- Bandura, A. (1995). *Self-efficacy in changing societies*. New York: Cambridge University Press.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W.H. Freeman.
- Bandura, A., & Adams, N. E. (1977). Analysis of self-efficacy theory of behavioral change. *Cognitive Therapy and Research*, **1**, 287–310.
- Bordin, E. S. (1979). The generalizability of the psychoanalytic concept of the working alliance. *Psychotherapy: Theory, Research & Practice*, **16**, 252–260.
- Brehm, J. (1966). *A theory of psychological reactance*. New York: Macmillan.
- Burger, J. M., & Cooper, H. M. (1979). The desirability of control. *Motivation and Emotion*, **3**, 381–393.
- Christiansen, C. (1991). Occupational therapy: Intervention for life performance. In C. Christiansen & C. Baum (Eds.), *Occupational therapy: Overcoming human performance deficits* (pp. 3–43). Thorofare, NJ: SLACK.
- Connors, G. J., Carroll, K. M., DiClemente, C. C., Longabaugh, R., & Donovan, D. M. (1997). The therapeutic alliance and its relationship to alcoholism treatment participation and outcome. *Journal of Consulting and Clinical Psychology*, **65**, 588–598.
- Cox, A. C., Holbrook, D., & Rutter, M. (1981). Psychiatric interviewing techniques: VI. Experimental study: Eliciting feelings. *British Journal of Psychiatry*, **139**, 144–152.
- Cox, A., Rutter, M., & Holbrook, D. (1981). Psychiatric interviewing techniques: V. Experimental study: Eliciting factual information. *British Journal of Psychiatry*, **139**, 29–37.
- Cruz, M., & Pincus, H. A. (2002). Research on the

- influence that communication in psychiatric encounters has on treatment. *Psychiatric Services*, **53**, 1253–1265.
- DeGroat, E. J., Lyons, K. D., & Tickle-Degnen, L. (2006). Favorite activity interview as a window into the identity of people with Parkinson's disease. *OTJR: Occupation, Participation and Health*, **26**, 56–68.
- Dickerson, A. E., & Fisher, A. G. (1997). Effects of familiarity of task and choice on the functional performance of younger and older adults. *Psychology and Aging*, **12**, 247–254.
- Eisenthal, S., Koopman, C., & Lazare, A. (1983). Process analysis of two dimensions of the negotiated approach in relation to satisfaction in the initial interview. *Journal of Nervous and Mental Disease*, **171**, 49–54.
- Ferguson, J. M., & Trombly, C. A. (1997). The effect of added-purpose and meaningful occupation on motor learning. *Am. J. Occup. Ther.*, **51**, 508–515.
- Fleming, M. H. (1994). Conditional reasoning: Creating meaningful experiences. In C. Mattingly & M. H. Fleming (Eds.), *Clinical reasoning: Forms of inquiry in a therapeutic practice* (pp. 197–235). Philadelphia: F.A. Davis.
- Fletcher, W. L., Hansson, R. O., & Bailey, L. (1992). Assessing occupational self-efficacy among middle-aged and older adults. *Journal of Applied Gerontology*, **11**, 489–501.
- Fry, P. S. (2001). Predictors of health-related quality of life perspectives, self-esteem, and life satisfactions of older adults following spousal loss: An 18-month follow-up study of widows and widowers. *Gerontologist*, **41**, 787–798.
- Gage, M., & Polatajko, H. (1994). Enhancing occupational performance through an understanding of perceived self-efficacy. *Am. J. Occup. Ther.*, **48**, 452–461.
- Gage, M., Noh, S., Polatajko, H. J., & Kaspar, V. (1994). Measuring perceived self-efficacy in occupational therapy. *Am. J. Occup. Ther.*, **48**, 783–790.
- Goering, P., Wasylenki, D., Lindsay, S., Lemire, D., & Rhodes, A. (1997). Process and outcome in a hostel outreach program for homeless clients with severe mental illness. *American Journal of Orthopsychiatry*, **67**, 607–617.
- Grembowski, D., Patrick, D., Diehr, P., & Durham, M. (1993). Self-efficacy and health behavior among older adults. *Journal of Health and Social Behavior*, **34**, 89–104.
- Hewlett, S., Cockshott, Z., Kirwan, J., Barrett, J., Stamp, J., & Haslock, I. (2001). Development and validation of a self-efficacy scale for use in British patients with rheumatoid arthritis (RASE). *Rheumatology*, **40**, 1221–1230.
- Kinsella, K., & Velkoff, V.A. (2001). *An aging world: 2001*. Washington, DC: U.S. Government Printing Office.
- Kircher, M. A. (1984). Motivation as a factor of perceived exertion in purposeful versus nonpurposeful activity. *Am. J. Occup. Ther.*, **38**, 165–170.
- Kivlighan, D. M. J., & Shaughnessy, P. (2000). Patterns of working alliance development: A typology of client's working alliance ratings. *Journal of Counseling Psychology*, **47**, 362–371.
- Kokitovic, A., & Tracy, T. (1990). Working alliance in the early phase of counseling. *Journal of Counseling Psychology*, **37**, 16–21.
- Krantz, D. S., Baum, A., & Wideman, M. V. (1980). Assessment of preferences for self-treatment and information in health care. *Journal of Personality and Social Psychology*, **39**, 977–990.
- Lorig, K., Chastain, R. L., Ung, E., Shoor, S., & Holman, H. (1989). Development and evaluation of a scale to measure perceived self-efficacy in people with arthritis. *Arthritis and Rheumatism*, **32**, 37–44.
- Lorig, K., Stewart, A. L., Ritter, P., Gonzalez, V., Laurent, D. D., & Lynch, J. (1996). *Outcome measures for health education and other health care interventions*. Thousand Oaks, CA: Sage Publications.
- Lorig, K. R., Ritter, P., Stewart, A. L., Sobel, D. S., Brown, B. W., Jr., Bandura, A., et al. (2001). Chronic disease self-management program: 2-year health status and health care utilization outcomes. *Medical Care*, **39**, 1217–1223.
- Low, M. (2002). Assessing roles and competence. In C. A. Trombly & M. V. Radomski (Eds.), *Occupational therapy for physical dysfunction* (5th ed., pp. 31–45). Philadelphia: Lippincott Williams & Wilkins.
- Lustig, D. C., Strauser, D. R., Rice, N. D., & Rucker, T. F. (2002). The relationship between working alliance and rehabilitation outcomes. *Rehabilitation Counseling Bulletin*, **46**, 24–32.
- Lyons, K. D., Tickle-Degnen, L., Henry, A., & Cohn, E. (2004). Impressions of personality in Parkinson's Disease: Can rehabilitation practitioners see beyond the symptoms? *Rehabilitation Psychology*, **49**, 328–333.
- Lyons, K. D., Tickle-Degnen, L., & DeGroat, E. J.

- (2005). Inferring personality traits of clients with Parkinson's disease from their descriptions of favourite activities. *Clinical Rehabilitation*, **19**, 799–809.
- Mallinckrodt, B., & Nelson, M. L. (1991). Counselor training level and the formation of the psychotherapeutic working alliance. *Journal of Counseling Psychology*, **38**, 133–138.
- McAuley, E. (1993). Self-efficacy, physical activity, and aging. In J. R. Kelly (Ed.), *Activity and aging: Staying involved in later life* (pp. 187–205). Thousand Oaks, CA: Sage.
- Meyer, A. (1922). The philosophy of occupational therapy. *Archives of Occupational Therapy*, **1**, 1–10.
- Miller, L., & Nelson, D. L. (1987). Dual-purpose activity versus single-purpose activity in terms of duration on task, exertion level, and affect. *Occupational Therapy in Mental Health*, **7**, 55–67.
- Montgomery, E. B., Jr., Lieberman, A., Singh, G., & Fries, J. F. (1994). Patient education and health promotion can be effective in Parkinson's disease: A randomized controlled trial. PROPATH Advisory Board. *American Journal of Medicine*, **97**, 429–435.
- Moore, E. J. (1992). The relationship among self-efficacy, health knowledge, self-rated health status, and selected demographics as determinants of health promoting behavior in older adults (Doctoral dissertation, University of Akron, 1992). *Dissertation Abstracts International*, **53**, 1788.
- Morton, G. G., Barnett, D. W., & Hale, L. S. (1992). A comparison of performance measures of an added-purpose task versus a single-purpose task for upper extremities. *Am. J. Occup. Ther.*, **46**, 128–133.
- Murphy, S., Trombly, C., Tickle-Degnen, L., & Jacobs, K. (1999). The effect of keeping an end-product on intrinsic motivation. *Am. J. Occup. Ther.*, **53**, 153–158.
- Nakamura, H. (1995). Overuse and misuse in occupational therapy (in Japanese). *The Japanese Journal of Occupational Therapy*, **29**, 336–337.
- Oka, S. (1995). Overuse and misuse in psychiatry (in Japanese). *The Japanese Journal of Occupational Therapy*, **29**, 346.
- Okumura, N. (2003). Experimental study of overuse in treatment plan for changing the dominant hand (in Japanese). *Kitasato University Journal of Occupational Therapy*, **6**, 101–103.
- Perraud, S. (2000). Development of the Depression Coping Self-Efficacy Scale (DCSES). *Archives of Psychiatric Nursing*, **14**, 276–284.
- Prochaska, J. O., DiClemente, C. C., & Norcross, J. C. (1992). In search of how people change: Applications to addictive behaviors. *American Psychologist*, **47**, 1102–1114.
- Resnick, B. (1998). Efficacy beliefs in geriatric rehabilitation. *Journal of Gerontological Nursing*, **24**, 34–44.
- Resnick, B. (1999). Reliability and validity testing of the self-efficacy for functional activities scale. *Journal of Nursing Measurement*, **7**, 5–20.
- Resnick, B., & Jenkins, L. S. (2000). Testing the reliability and validity of the Self-Efficacy for Exercise scale. *Nursing Research*, **49**, 154–159.
- Riccio, C. M., Nelson, D. L., & Bush, M. A. (1990). Adding purpose to the repetitive exercise of elderly women through imagery. *Am. J. Occup. Ther.*, **44**, 714–719.
- Rijken, P. M., & Dekker, J. (1998). Clinical experience of rehabilitation therapists with chronic diseases: A quantitative approach. *Clinical Rehabilitation*, **12**, 143–150.
- Rosenthal, R., & Rosnow, R. L. (1991). *Essentials of behavioral research: Methods and data analysis* (2 ed.). Boston: McGraw-Hill.
- Roter, D. L., & Hall, J. A. (1992). *Doctors talking with patients/patients talking with doctors: Improving communication in medical visits*. Westport, CT: Auburn House.
- Ryckman, R. M., Robbins, M. A., Thornton, B., & Cantrell, P. (1982). Development and validation of a physical self-efficacy scale. *Journal of Personality and Social Psychology*, **42**, 891–900.
- Safran, J. D., & Muran, J. C. (1998). *The therapeutic alliance in brief psychotherapy: General principles*. In J. D. Safran & J. C. Muran (Eds.), *The therapeutic alliance in brief psychotherapy*. (pp. 217–229). Washington DC: American Psychological Association.
- Sakano, Y., & Tohjoh, M. (1986). The General Self-efficacy Scale (GSES): Scale development and validation (in Japanese). *Japanese Journal of Behavior Therapy*, **12**, 73–82.
- Schuster, C., Petosa, R., & Petosa, S. (1995). Using social cognitive theory to predict intentional exercise in post-retirement adults. *Journal of Health Education*, **26**, 14–21.
- Schwarzer, R., & Fuchs, R. (1995). Changing risk behaviors and adopting health behavior: A role of self-efficacy beliefs. In A. Bandura (Ed.), *Self-*

- efficacy in changing societies* (pp. 259–287). New York: Cambridge University Press.
- Schwarzer, R., & Jerusalem, M. (1995). Generalized Self-efficacy Scale. In S. Weinman, S. Wright, & M. Johnston (Eds.), *Measures in health psychology: A user's portfolio. Causal and control beliefs* (pp. 35–37). Windsor, UK: nferNelson.
- Sherer, M., & Maddux, J. E. (1982). The Self-Efficacy Scale: Construction and validation. *Psychological Reports*, **51**, 663–671.
- Smith, R. A. (1984). Measuring desire for control of health care processes. *Journal of Personality and Social Psychology*, **47**, 415–426.
- Stevens, M., Bakker-van Dijk, A., de Greef, M. H. G., Lemmink, K. A. P. M., & Rispens, P. (2001). A Dutch translation of a questionnaire assessing self-efficacy in leisure-time physical activity. *Journal of Aging and Physical Activity*, **9**, 223–232.
- Takahashi, K. (2002). Effects of added-purpose activities on mental concentration assessed by subjective time estimation and incidence of Fm0 wave (in Japanese). *Kitasato University Journal of Occupational Therapy*, **5**, 156–169.
- Thibodeaux, C. S., & Ludwig, F. M. (1988). Intrinsic motivation in product-oriented and non-product-oriented activities. *Am. J. Occup. Ther.*, **42**, 169–175.
- Tickle-Degnen, L., & Lyons, K. D. (2004). Practitioners' impressions of patients with Parkinson's disease: The social ecology of the expressive mask. *Social Science & Medicine*, **58**, 603–614.
- Tinetti, M. E., Richman, D., & Powell, L. (1990). Falls efficacy as a measure of fear of falling. *Journals of Gerontology*, **45**, 239–243.
- Tipton, R. M., & Worthington, E. L. (1984). The measurement of generalized self-efficacy: A study of construct validity. *Journal of Personality Assessment*, **48**, 545–548.
- Trombly, C. (1993). Anticipating the future: Assessment of occupational function. *Am. J. Occup. Ther.*, **47**, 253–257.
- Trombly, C. (1995). Occupation: Purposefulness and meaningfulness as therapeutic mechanisms. *Am. J. Occup. Ther.*, **49**, 960–972.
- Trombly, C. (2002). Occupation. In C. Trombly & M. V. Radomski (Eds.), *Occupational therapy for physical dysfunction* (4th ed., pp. 255–281). Philadelphia: Lippincott Williams & Wilkins.
- Wang, A. Y., & Richarde, R. S. (1988). Global versus task-specific measures of self-efficacy. *Psychological Record*, **38**, 533–541.
- White, R. W. (1971). The urge towards competence. *Am. J. Occup. Ther.*, **25**, 271–280.
- Wicklund, R. A. (1974). *Freedom and reactance*. Potomac, MD: Erlbaum.
- Yoder, R. M., Nelson, D. L., & Smith, D. A. (1989). Added-purpose versus rote exercise in female nursing home residents. *Am. J. Occup. Ther.*, **43**, 581–586.