Occupation and the Relevance of Primatology to Occupational Therapy

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The adaptive functions of occupation during the phylogenetic history of the human species and the ontogenetic development of individual primates are examined through a review of relevant research of wild and captive nonhuman primates. This review suggests that the effectiveness of occupation as a therapeutic medium throughout life span development is fundamentally tied to humankind's phylogenetic history. It is accordingly argued that there is considerable justification to maintain occupational therapy's historical commitment to therapeutic occupation as the profession's primary treatment modality. To support this commitment, questions to guide practice and research are identified that emanate from the primate literature and that are highly germane to the therapeutic process in occupational therapy. These questions address: (a) the relationship between the press of the various environments in which occupational therapists practice and subsequent opportunities availed to patients for engagement in occupation; (b) the relationship between the extent to which patients are or are not empowered to exert real control over their use of time and their eventual development of disabling conditions; and (c) the therapeutic efficacy of occupation as compared with other treatment approaches that are not comparably holistic.

Occupational science was formally established as a unique academic discipline in 1989 at the University of Southern California. Although rooted in the traditions, technology, and theoretical perspectives that have emanated from more than 70 years of practice in occupational therapy, occupational science differs from occupational therapy in that it is a basic, as opposed to an applied, discipline. Occupational science consequently embraces ideas from other academic disciplines that contribute to a fully orbited study of the human as an occupational being to establish a knowledge base that may ultimately serve clinical practice (Clark et al., 1991; Yerxa et al., 1989). This paper accordingly represents the beginning integration of knowledge derived from primatology into occupational science's understanding of humans. By focusing on the core concept of occupation, its fundamental purpose is to elucidate the relevance of primatology to occupational therapy.

Primatology may be defined as the "study of the biology, evolution, distribution, classification and behavior of primates" (Fedigan, 1992, p. 4). Although a critical analysis of primatology's proper relationship to occupational therapy has yet to surface within our professional literature, at least three important exchanges between the fields have already occurred. First, Dian Fossey, the primatologist portrayed in the movie Gorillas in the Mist, was a 1954 graduate from San Jose State College with a degree in occupational therapy and an experienced occupational therapist who practiced for 10 years with disabled children in Kentucky (Mowat, 1987). It is therefore reasonable to assume that Fossey's background in occupational therapy prepared her for, and later informed, her pioneering study of the endangered mountain gorillas in Rwanda, Africa (Yerxa, 1989).

Second, Jane Goodall (1986), the world renowned researcher of wild chimpanzees, thematically organized much of her classic tome, The Chimpanzees of Gombe: Patterns of Behavior, around the most prevalent occupational behaviors of chimpanzees, for example, their grooming, ranging, feeding, hunting, and tool-using behaviors. In her most recent book, Through a Window: My Thirty Years with the Chimpanzees of Gombe, Goodall (1990) recognized the value of occupation for captive chimpanzees housed within impoverished environments. Goodall subsequently accepted a position as Distinguished Adjunct Professor in Occupational Therapy at the University of Southern California in 1990 because she believed that the skills of occupational therapists could be applied to help chimpanzees thrive under captive conditions.

Third, the notion that some form of occupational therapy might benefit captive nonhuman primates is now supported by research conducted by Mary Schneider, an occupational therapist. Schneider studied infant rhesus monkeys to investigate specific tenets of sensory integrative theory (Schneider, Kraemer, & Suomi, 1991), as well...
as the differential effects of impoverished versus enriched environments on development of temperamental responses, motor skills, and problem-solving abilities (Schneider, Moore, Suomi, & Champaign, 1991). Schneider's work demonstrates how theoretical tenets developed by occupational therapists to guide practice can be humanely researched with monkeys to the ultimate benefit of both human and nonhuman primates.

Taken in sum, these exchanges suggest that a natural and substantive goodness of fit exists between the disciplines of primatology, occupational science, and occupational therapy. To demonstrate primatology's specific relevance to occupational therapy, this paper examines how primatological research empirically supports two philosophical assumptions about occupation upon which our profession was founded. These are (a) that through the process of evolution, humankind acquired a biological system that required engagement in occupation in order to solve problems of adaptation, and (b) that because of humankind's biological inheritance, engagement in occupation continues to be necessary for developing and maintaining health throughout the life span of the person (Clark et al., 1991; Kielhofner, 1983; Meyer, 1922; Reilly, 1962, 1974; Yerxa et al., 1989). Generally speaking, the first of these assumptions pertains to the adaptive functions of occupation during the phylogenetic, or evolutionary, history of the human species, whereas the second assumption pertains to the adaptive functions of occupation during the ontogenetic, or life span, development of an individual.

It is argued in this paper that because of the close genetic relatedness and, hence, the behavioral similarity evidenced between human and nonhuman primates, there is important evolutionary continuity linking the respective occupational behaviors of all primate species. It is therefore both appropriate and productive for occupational therapists to examine primate models in order to understand the adaptive functions of occupation during the phylogeny and ontogeny of humans.

Phylogenetic History of Humans as Occupational Beings

*Primates and an Evolutionary Continuum of Occupational Behavior*

*Primates* are an order of mammals that possess an evolutionary history of 20 to 40 million years (Zihlman, 1982). Approximately 200 extant species exist within the primate order; these species are divided into four main types of primates. *Prosimians* existed in the animal world before monkeys and apes and presently live in Africa, Asia, and Madagascar. *New World monkeys* live in Central and South America, whereas *Old World monkeys* live in Africa and Asia. *Apes* and *humans* together constitute the fourth type of primate (Smuts, Cheney, Seyfarth, Wrangham, & Struhsaker, 1987). Apes live in Africa and Asia, whereas humans, of course, live throughout the world. In addition to these four main types of primates, many smaller taxonomic divisions are recognized within the primate order. For example, gibbons and siamangs are classified as the *lesser apes*, whereas orangutans, gorillas, chimpanzees, and bonobos (pygmy chimpanzees) are classified as the *great apes*.

Biochemical analysis of the degree of genetic relatedness that exists between various species of primates has verified that humankind is only distantly related to prosimians, yet is very closely related to the great apes, particularly to chimpanzees (Zihlman, 1982). *Genetic relatedness* refers to the percentage of DNA similarity between any two strands of DNA from members of different species. When a strand of DNA from a galago (a prosimian) is compared to a strand of DNA taken from a human, only 58% similarity exists. In contrast, human DNA shares 84.2% similarity with the DNA of capuchin monkeys (New World monkeys), and 91.1% similarity with the DNA of rhesus monkeys (Old World monkeys). Quite significantly, human DNA possesses 98.7% similarity with the DNA of chimpanzees, our closest genetic "cousin" (Zihlman, 1982). Humans are not a direct descendent of chimpanzees, however, nor are chimpanzees on an evolutionary path to becoming human. Rather, the remarkable genetic relatedness between chimpanzees and humans is due to ancestors shared by each species in recent evolutionary history (Fedigan, 1992).

Development of increased genetic relatedness to humans is correlated with the advancing development of a number of distinctive evolutionary trends that characterize the order of primates. These trends include progressively freer use of the hands and upper extremities, leading to a variety of precision and power grips; progressive elaboration of the brain and especially the cerebral cortex; progressive development of an upright trunk leading to bipedalism; and progressively longer gestational and postnatal life periods (Jolly, 1985). The development of these trends is manifested by an evolving complexity in occupational behaviors that is apparent across the primate order.

The term *occupational behavior* is borrowed from Reilly (1969) and is used here to refer to the developmental continuum of all occupations and proto-occupations engaged in by human and nonhuman primates. In this paper, the term *occupation* is applied only to people and is defined as "chunks of culturally and personally meaningful activity in which humans engage that can be named in the lexicon of the culture" (Clark et al., 1991, p. 301). For example, building sand castles and doing the laundry are occupations that require "chunks" of time to accomplish and that many people in western culture would classify as examples of play and work. In comparison, the term *proto-occupation* refers to the activities of nonhuman primates that are similar in form to the occupations of humans but that may lack their complexity (Clark et al.,
The relationship between occupations and proto-occupations is consequently not absolute, but one of degree. Thus, the rough-and-tumble play of juvenile rhesus monkeys and chimpanzees looks much like the rough-and-tumble play of juvenile humans (Blurton Jones, 1976). Yet rhesus monkeys do not appear to play symbolically, and although chimpanzees do (Hayes, 1976), their play is not as symbolically embedded and therefore not as imaginative nor as variable as is the play of human children.

When it was discovered that chimpanzees made tools and carried on cross-generational cultural traditions, both formerly believed to be uniquely human qualities, the old idea that an absolute and irrevocable line separated people from animals became outdated (Goodall, 1986). Similarly, the example of play as both occupation and proto-occupation suggests an evolutionary continuum of occupational behavior that correlates roughly with primates’ varying degrees of genetic relatedness to one another. The idea of an evolutionary continuum of occupational behavior is consistent with the contemporary view that primate species most closely related to humans are more likely to possess genetic structures that support flexible behavior, that is, highly plastic behavior, than those only remotely related to humans (Fedigan, 1992). This continuum thus ranges from one extreme of occupational behaviors that are highly stable in spite of changing environmental conditions to the opposite extreme of behaviors that are highly flexible in response to changing conditions. The first extreme is more characteristic of prosimians, whereas the second is more characteristic of the great apes and humans.

**Time Use of Nonhuman Primates**

One way in which the full spectrum of primate occupational behavior may be revealed is through analysis of how nonhuman primates typically spend their time. Such analysis establishes the basic parameters of occupational behavior within the primate order with respect to essential proto-occupations and their usual temporal orchestrations. A basic tool of primatological research is thus the calculation of *time budgets* that classify “the way in which an animal distributes its available time among those categories of activity that are important for its survival and reproduction” (Dunbar, 1988, p. 90). The importance of time budgets for understanding the phylogenetic history of humans as occupational beings is at least twofold.

First, time budgets from studies of wild nonhuman primates suggest that the four temporal rhythms of work, rest, sleep, and play that Meyer (1922) believed demarcated the daily lives of humans possess a long evolutionary history. On average, nonhuman primates spend almost 98% of their available time traveling and foraging in search of food (commonly regarded as work), feeding, engaging in the social activities of play and grooming, and resting or sleeping (Dunbar, 1988). Although the actual proportions of time spent in each of these categories of activity vary from species to species, a somewhat predictable temporal organization consisting of social activity, feeding, work, and play, punctuated by inactive periods consisting of rest and sleep, is apparent in prosimians, monkeys, and apes. According to Jolly (1985):

> A typical primate’s typical day begins with waking, stretching, defecating, little by little it turns to social behavior, grooming and some play among the young. Then off to work, the group moves in a quick, purposeful fashion to the day’s first feeding site and spends the rest of the morning foraging and feeding, perhaps in one place, perhaps in several. Or, spread out amically, foraging as it moves. At last satiated, the primates siesta through the heat of midday. Another bout of feeding in the afternoon precedes the final progression to the sleeping site, more grooming, and sleep (p. 88).

Thus, consciously or not, nonhuman primates effectively budget their time in proto-occupations necessary for survival and reproduction. Given that chimpanzees appear to be deciding continuously how to invest their time, where, and with whom (Goodall, 1986), it is reasonable to speculate that a conscious component to the temporal orchestration of daily activities may have emerged before the appearance of humans. Meyer indeed hypothesized that it was through “the great process of evolution” (1922, p. 642) that humans acquired the ability to apply an awareness of time with respect to work, rest, play, and sleep in order to solve problems of adaptation. Contemporary research of time use among wild prosimians, monkeys, and apes thus empirically supports an idea of Meyer’s upon which occupational therapy was based and from which occupational therapy’s role in promoting temporal adaptation eventually grew.

Second, primatological time budgets suggest that the work and play of humans are phylogenetically very old occupations and accordingly, as proto-occupations, that work and play promoted adaptation on an evolutionary time scale. *Adaptation* herein refers to the development of behaviors or traits that confer reproductive advantages to individuals. With respect to work, it has been theorized that the progressive development of optimally efficient foraging strategies by spider monkeys and chimpanzees may have been integral to the evolution of advanced mental abilities in primates (Milton, 1981). Because of patchy distributions of food in both time and space, members of these species were challenged to develop sophisticated cognitive maps and considerable memory capacities to exploit their habitats optimally. Their work may therefore have aided development of a human intelligence that was well adapted for finding food and that, given our species’ behavioral plasticity, could be applied to an array of goal-directed occupations.

In like manner, because play’s complexity and frequency were progressively selected for in the primate order, several evolutionarily adaptive functions of play have been proposed. These include physical training and stamina, practice in predatory skills, and practice in light-
Adaptive Functions of Occupation During Ontogenetic Development

Given the genetic and behavioral similarity existing between human and nonhuman primates, it is also appropriate that occupational therapists examine primate models to understand the adaptive functions of occupation during ontogenetic, or life span, development. In this paper, it is proposed that occupation mediates adaptation during ontogeny by maintaining already achieved occupational skills, by facilitating the speed in which occupational skills develop, and by inducing the actual development of occupational skills. The adaptive function of induction is particularly powerful, as it means that dormant potentials simply will not develop if specific experiences are not encountered (Gottlieb, 1983). Occupational skills refer to the ability to perform age-appropriate, socially viable, and species-typical occupations and proto-occupations.

Over the past two decades, primatologists have documented a strong relationship between qualities of the physical and social environments in which captive nonhuman primates live and their resultant behavior, health, and developmental status (Erwin, Maple, & Mitchell, 1979; Segal, 1989). Captive nonhuman primates subjected to sustained, environmentally imposed occupational deprivation spend much, if not most, of their time engaged in maladaptive behaviors. These behaviors include appetitive disorders, such as uncontrollable eating and drinking, hypophagia, coprophagia (eating of feces), urine drinking, and forced regurgitation and ingestion of vomit; motor stereotypies, such as generalized hyperactivity, maintenance of bizarre postures, obsessive "feces art," and repetitious pacing, rocking, circling, bouncing, cage-charging, and head shaking; self-stimulatory behaviors, such as eye-poking, self-mutilation, continuous masturbation, self-hitting, and depilation, sometimes to the point of baldness; and depression or apathy, manifesting in prolonged bouts of inactivity (Erwin & Deni, 1979; Lam, Rupniak, & Iverson, 1991; Maple, 1979; O'Neil, 1989; Walsh, Bramlett, & Afford, 1982). These behaviors are regarded as maladaptive not only because of their inflexibility and adverse influence upon health, but also because they are species-atypical. That is, they are uncommon, if not entirely absent, in wild primates who live within the natural habitats to which their biological systems and behavioral patterns have become phylogenetically co-adapted (Pereira, Macedonia, Haring, & Simons, 1989).

Thankfully, a substantial body of research demonstrates that nonhuman primates can and do function well in captivity if environmentally imposed occupational deprivation is ameliorated through provision of opportunities for participation in appropriate proto-occupations. A sampling from this research tradition illustrates how occupation influences health through the adaptive functions of maintenance, facilitation, and induction of occupational skills.

Maintaining Skills Through Occupation

For ethical reasons, relatively few studies have been published on what happens to captive nonhuman primates after their removal from occupationally enriched environments that supported their development of a full repertoire of occupational skills and subsequent placement in occupationally impoverished environs that did not. Due to an institutional mandate over which researchers had no control, however, such a move was systematically studied with a family of captive marmosets (New World monkeys). This family was moved from an enriched greenhouse that closely simulated marmosets' natural habitat in the rain forests of South America to a series of three increasingly impoverished environments, the final one being a barren cage with only food and water provided (Schoenfeld, 1989).

Observations before the marmosets' first relocation revealed that they had acquired occupational skills in mating, rearing offspring, playing, grooming, foraging for crickets, and marking territory. With each move into the three progressively impoverished enclosures, the marmosets exhibited proportionately less of these skills. Although their final and most barren environment did not prevent engagement in the social proto-occupations of mating, playing, grooming, or rearing young, it did preclude engagement in proto-occupations that required transactions with the physical environment, such as marking territories and foraging for insects. Nonetheless, the amount of time that the marmosets spent in social proto-occupations markedly declined with the most dramatic decline of all noted in play. Two fetuses were also aborted and two babies were born and then cannibalized within one week. Neither event had ever occurred when the marmosets lived in their naturalistic habitat. In sum, once the fabric of the marmosets' daily activities was shredded, deterioration of health and atrophy of vital occupational skills quickly ensued (Schoenfeld, 1989).

Facilitating Skills Through Occupation

A number of studies exist in which the captive environments of prosimians, monkeys, and apes have been modified to facilitate development of occupational skills. At minimum, it has been found that merely increasing available space is not an effective strategy for ensuring primates' well-being (Fouts, Abshire, Bodamer, & Fouts, 1989; Novak & Drewsen, 1989; Novak & Meyer, 1988).
Rather, nonhuman primates, as do human primates, require more than empty space to rattle about in; they also require interesting things to do that allow them to exert real control over their time.

By occupationally enriching captive environments to allow engagement in interesting proto-occupations, researchers have allowed prosimians, monkeys, and apes to determine themselves whether or not they will continue devoting large amounts of time to maladaptive behaviors. Results have consistently demonstrated that if given the opportunity, these primates generally seem to choose to spend progressively more time in proto-occupations and less time in maladaptive behaviors (Akers & Schildkraut, 1985; Beckley & Novak, 1989; Bloomsmith, Alford, & Maple, 1988; Brent, Lee, & Eichberg, 1989, 1991; Clarke, Juno, & Maple, 1982; Dewey, 1989; Maki, Alford, Bloomsmith, & Franklin, 1989). To cite one example, when opportunities to groom fleece fabrics and to forage for food were given to captive macaques (Old World monkeys), the monkeys became quite involved in these activities and subsequently decreased the amount of time they invested in motor stereotypes by up to 73% (Lam et al., 1991).

Even when nonhuman primates have not developed a preponderance of maladaptive behaviors, their development of occupational skills is progressively facilitated once they are given increased opportunities to engage in proto-occupations (Chamove & Anderson, 1989; Maki & Bloomsmith, 1989; McGrew, Brenman, & Russell, 1986; Nash, 1982; Pereira et al., 1989; Tripp, 1984; Westergaard & Fragaszy, 1985). Captive lion tamarins (extremely endangered New World monkeys) thus acquired better foraging skills, spent less time idle, eating, and drinking, and more time exploring and traveling after introduction of a food foraging puzzle into their enclosure (Molzen & French, 1989). Captive squirrel monkeys, a New World species well adapted for hunting insects, developed greater skills in capturing goldfish from water-filled tubs and in preparing the goldfish for ingestion after being presented with a series of increasingly more difficult fishing problems (Landau, 1987).

In none of these studies did experimenters attempt to shape the behavior of their subjects through schedules of external reinforcement. This suggests that monkeys and apes are intrinsically motivated to engage in interesting and challenging activities. With the lion tamarins and squirrel monkeys, for example, experimental interventions were supplemental to the primates’ daily provisioning. In fact, it is not uncommon for captive nonhuman primates to persist at working hard to obtain food even though they have access to the very foods they are working to get (Beckley & Novak, 1989).

**Inducing Skills Through Occupation**

The adaptive function of induction is extremely difficult to demonstrate given the multitude of experiences that influence development and the subsequent difficulty in isolating one or several of these experiences from all others. Nevertheless, research with monkeys and apes suggests that play, although not crucial to developing technical skills, may indeed be necessary to induce the eventual development of social competence.

Early primatological research found that monkeys who grew up in social isolation often failed to learn how to play, to mate, and to control aggression (Hinde, 1983). Attempting to isolate some of the causes of this dysfunction, Harlow and Harlow (1962) confirmed that infant rhesus monkeys needed peer play even more than maternal contact if they were to develop species-typical social competence as adults. This need existed because it was through peer play that immature monkeys practiced all vital patterns of social interaction, that is, grooming, sex, agonism, and dominance, until these patterns had become adult in form. Moreover, monkeys learned through play to mitigate aggression by channeling it into other forms of social expression (Suomi & Harlow, 1976). Social play was also found to help juvenile monkeys isolated since birth learn how to mate and to control aggression (Novak & Harlow, 1975; Suomi & Harlow, 1972).

Similar findings have been obtained with chimpanzees. Indeed, it is not uncommon for captive chimpanzees who have been reared in physically and socially impoverished conditions to develop, once given the opportunity, mastery over their physical environments while they remain thoroughly incompetent with peer interactions. In exploring a variety of methods to resocialize such deviant chimpanzees, Fritz (1989) found play to be the single most important developmental experience. Fritz therefore teaches deviant adult chimpanzees how to play by introducing them to competent and nonthreatening chimpanzee playmates. Once their ability to play develops, occupational skills in grooming, mating, and rearing offspring often follow.

**Occupation in the Context of Occupational Therapy**

In light of humankind’s close genetic relationship to nonhuman primates, particularly to monkeys and apes, the research reviewed in this paper supports occupational therapy’s founding assumptions that humans inherited a biological need for engagement in occupation through the course of evolution and that such engagement is therefore necessary for adaptation to occur. Accordingly, during ontogenetic development, engagement in occupation most probably serves analogous adaptive functions for people as engagement in proto-occupations serves for prosimians, monkeys, and apes. In addition, the human need for occupation throughout the life span is not superfluous but rather is grounded in a substantive evol-
tionary history of primate adaptation. The primatological record thus prompts occupational therapists to take occupation very seriously.

But do we? There is, after all, evidence that occupational therapy's primary commitment to the therapeutic occupations of self-care, work, play, and leisure is increasingly being subordinated in practice to reliance on non–activity based techniques and technologies. For example, Kleinman (1992) proposed that one reason for the decline of occupational therapy in mental health was because occupational therapy has invested for too long and too exclusively in a medical model that emphasizes treatment applied to passive patients. West and Wiener (1991) similarly argued that the growing use of physical agent modalities that require patient passivity in the context of occupational therapy evidences a departure from the profession's commitment to occupation as its primary treatment modality. In a related fashion, research of occupational therapists' clinical reasoning processes in mental health and physical disabilities has demonstrated that treatment of patients as complex occupational beings is often truncated in lieu of focusing on a component of performance, such as visual perception or upper extremity function (Barris, 1987; Rogers & Masagatani, 1982). In light of these trends, Felder recently made the poignant observation, "It is truly ironic that we continue to devalue the essence of occupational therapy, that we struggle to look more like others than like ourselves when all the while these others are discovering the efficacy of authentic occupational therapy and striving to own it" (1992, p. 567).

The research reviewed in this paper suggests that diminution of the use of occupation as occupational therapy's primary treatment modality, if it is occurring, is therapeutically unjustifiable. Primatological research substantiates the view that the efficacy of occupation as a particularly powerful treatment modality is tied to the phylogenetic history of humans as occupational beings. Moreover, this research tradition offers guidance on promoting the therapeutic use of occupation in practice and validating it through empirical research with humans. Three core concepts emanating from the literature herein reviewed on nonhuman primates are next applied to practice and research with people in the interest of informing and thus fortifying occupational therapy's primary commitment to therapeutic occupation.

Environmental Press

Primate studies demonstrate that environmental press, or qualities of the environment that prompt certain kinds of behavior (Barris, Kiellhoffer, Levine, & Neville, 1985), must support engagement in occupation if adaptation is to occur. Concerns posed by this concept are whether or not patients suffer from environmentally imposed occupational deprivation in the context of occupational therapy and, if so, how this can be remedied. Related questions to guide practice and research include (a) In what ways do or do not occupational therapy clinics press for patients' engagement in occupation? (b) In what ways do or do not different systems of health care provision press for occupational therapists' use of occupation? and (c) What are optimal health care environments for provision of occupational therapy services if we are to maintain a primary therapeutic commitment to occupation?

Exerting Control Over Time Use

When captive nonhuman primates are provided with the choice to participate in proto-occupations, they gain control over the use of their time and subsequently influence their health favorably. A central concern posed by the concept of time use has to do with the relationship between patients' environments, both treatment and living, and resultant opportunities for controlling use of time through chosen occupations. Related questions to guide practice and research with people are (a) What is the relationship between environmentally imposed occupational deprivation, real and perceived loss of control over time use, and the eventual development of disabilities or of syndromes of learned helplessness (Seligman, 1975)? and (b) How can occupational therapists best help patients adaptively and meaningfully control the use of their time when living in institutional settings that demand high levels of behavioral compliance to daily routines and to expectations of caregivers?

Therapeutic Efficacy of Occupation

Engagement in proto-occupations is a highly economical means by which nonhuman primates are able to decrease involvement in behaviors deleterious to health and to develop functional competence in daily life. A central concern posed by the concept of therapeutic efficacy thus has to do with the relative effectiveness by which occupations that inherently and simultaneously engage the musculoskeletal, information processing, symbolizing, sociocultural, and ethical dimensions of a person produce desired functional outcomes in comparison to interventions that are not comparably holistic. Primate studies therefore urge a strong commitment to the developing research tradition within occupational therapy that has begun to evaluate the relative therapeutic efficacy of: (a) occupations with embedded exercise versus those withrote exercise (Yoder, Nelson, & Smith, 1989); (b) exercise enriched by occupational imagery versus exercise lacking such imagery (Riccio, Nelson, & Bush, 1990); (c) purposeful versus nonpurposeful activity (Kirchner, 1984; Steinbeck, 1986); and (d) activity versus verbal therapy (DeCarlo & Mann, 1985; Klyczek & Mann, 1986). Moreover, a strong commitment is also urged to qualitative research that examines the complex relationship of occu-

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Conclusion

In his book *Peacemaking Among Primates*, Frans de Waal (1989) commented that if four different species routinely engaged in a particular behavior, similar behavior in a closely related species would be understood as having the same origin. De Waal speculated that no one would object to this extrapolation unless, of course, the fifth species happened to be humankind, the presumed “Crown of Creation” (1989, p. 229). In the spirit of both de Waal and Goodall, this paper has emphasized the evolutionary origins of humans as occupational beings and the continuities in occupational behavior thereby evidenced between people, apes, monkeys, and primates. By focusing on occupation’s pivotal role in adaptation, it has attempted to underscore the necessity of enriching both the science and practice of therapeutic occupation for the benefit of all primates, human and otherwise.

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References


West, W., & Wiemer, R. (1992). Should the representative assembly have voted as it did, when it did, on occupational therapists' use of physical agent modalities? American Journal of Occupational Therapy, 45, 1143-1147.


