2006 AAPP Monograph American Series

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Alexanderia Smith, D. Samuel Deutsch, Larry Edward Jones Jr., and Tracy Harrell Dunn

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Rex Nobles

Dr. Marva J. Larrabee’s untiring commitment and support to AAPP are integral to the publication of this monograph.
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*The Benjamin Elijah Mays Professor*
*Director, African American Professors Program*

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FOREWORD

I am honored to offer a foreword for this year’s collection of admirable essays by participants in the African American Professors Program (AAPP). My perspective is that of mentor for AAPP participant Terry Carter, who is now a tenure-track assistant professor at Southern Polytechnic State University in Atlanta. AAPP’s structured mentoring program is one of its most valuable components. Among other contributions, it provides a support system for cultivating and publishing scholarship like that in this monograph. For some of these writers, these articles will be a welcome first opportunity to get their fresh, often cutting-edge scholarship into academic publication.

For those not familiar with AAPP, let me explain that each participating graduate student has a professor in his or her discipline who serves as an academic mentor to provide guidance throughout the academic experience. With some financial support and much encouragement for personal interaction, the mentoring program comprises a “formal” situation or an expectation for mentors (who may not share the same racial background because the academic landscape lacks diversity) to guide the graduate students into academic culture. At the same time, it creates an opportunity for minority students’ cultures to affect academic values through these mentors.

This two-way cultural education is not just a practical component of AAPP; it also finds theoretical support in Director John McFadden’s scholarship on transcultural counseling (Transcultural Counseling, 1999). I believe that
all educators must be counselors to help guide our graduate students into successful and fulfilling careers. As different cultural backgrounds impact the ways in which our students learn, educators need to understand the effects of cultural background upon learning behavior. Through such understanding, they develop diverse perceptions, so they, like counselors, open themselves up to help their students while also learning about their students’ cultures.

In our intensive mentoring relationship for almost six years, Terry and I enjoyed getting to know one another well enough to travel what we have called a “two-way street” in mentoring one another culturally: I open out what I know about academic culture, while Terry allows me to help him seek ways of integrating African American culture into his academic cultural experience. Mentorship creates a space in which we have friendly expectations of one another; for example, he will take up the challenge of academic writing, and I will be there to help, to explore, to encourage.

When Terry and I undertook an independent study together as preparation for his dissertation, we decided to use our AAPP support to expand our mentorship experience. We traveled to Stanford University to visit Arnetha Ball, a well-known African American scholar in our field. The purpose of our trip was to put a voice and face with a well-known minority name in our field—to see the more personal side of how she incorporates her cultural knowledge into her successful academic career, and thus to provide a model for Terry’s professional development. Terry reflected that the experience of discussing his career thou-
sands of miles away from the University of South Carolina helped him see that he could be a writer and a researcher in a career beyond USC.

All the writers in this volume have had the experience of mentoring in some form, though shaped differently in each case by personalities and disciplinary backgrounds. This mentoring process, like transcultural counseling, leads to "a celebration of cultural diversity" (McFadden, 1999, p. 401). This celebration of cultural diversity is part of the noble aspiration of the African American Professors Program. The present issue of the AAPP Monograph, like the ones before, celebrates the emerging voices of a culturally diverse group of new minority scholars and manifests their contributions to knowledge in their fields.

Nancy Thompson, Ph.D.
English Professor Emerita
Director, Research Communications Studio
Department of Chemical Engineering
University of South Carolina
The African American Professors Program (AAPP) at the University of South Carolina is proud to publish the sixth edition of its annual monograph series. The program recognizes the significance of offering its scholars a venue for engaging actively in research and for publishing papers related thereto. Parallel with the publication of their refereed manuscripts is the opportunity to gain visibility among scholars throughout institutions worldwide.

Scholars who have contributed manuscripts for this monograph are to be commended for adding this additional responsibility to their academic workloads. Writing across disciplines adds to the intellectual diversity of these papers. From neophytes, relatively speaking, to an array of very experienced individuals, the chapters have been researched and comprehensively written.

Founded in 1997 through the Department of Educational Leadership and Policies in the College of Education, AAPP was designed to address the underrepresentation of African American professors on college and university campuses. Its mission is to expand the pool of these professors in critical academic and research areas. Sponsored by the University of South Carolina, the W.K. Kellogg Foundation, and the South Carolina General Assembly, the program recruits doctoral students for disciplines in which African Americans currently are underrepresented among faculty in higher education.

The continuation of this monograph series is seen as responding to a window of opportunity to be sensitive to
an academic expectation of graduates as they pursue career placement and, at the same time, one that allows for the dissemination of AAPP products to a broader community. The importance of this monograph series has been voiced by one of our 2002 AAPP graduates, Dr. Shundele LaTjuan Dogan, a former Program Officer for the Southern Education Foundation, Atlanta, Georgia, a former Administrative Fellow at Harvard University, and currently a Senior Program Officer with the Arthur M. Blank Foundation, focusing on the Pathways to Success Initiative. Dr. Dogan wrote:

“One thing in particular that I want to thank you for is having the African American Professors Program scholars publish articles for the monograph. I have to admit that writing the articles seemed like extra work at the time. However, in my recent interview process, organizations have asked me for samples of my writing. Including an article from a published monograph helped to make my portfolio much more impressive. You were ‘right on target’ in having us do the monograph series.” (AAPP 2003 Monograph, p xi)

The African American Professors Program offers this 2006 publication as a contribution to its readership and hopes that you will be inspired by this select group of manuscripts.

John McFadden, Ph.D.
The Benjamin Elijah Mays Professor
Director, African American Professors Program
University of South Carolina
ROBERT WARE, Ph.D., J.D.
~ Our AAPP Son, Brother, Colleague ~

In Memoriam

It seems like yesterday when this promising scholar entered the door of our African American Professors Program.

The University of South Carolina welcomed him with open arms and a warm heart, for we knew of his golden potential.

Pursuing with excellence the Doctor of Philosophy degree in International Business under the advisement and tutelage of Jeffrey S. Arpan, D.B.A., The James F. Kane Distinguished Professor in the Moore School of Business, this AAPP scholar soared above many in research, scholarship, teaching, collegiality, and service.

As stars shine brightly in the heavens; as stars imprint their names in content; as stars display their oscars in curios; as stars form images in their galaxies; as stars receive their awards in posthumousness...so does this star, as he leaves his work in the academy and his essays in the pages of time.

Robert’s voice echoes in the world.
Robert’s message resounds in our ears for audition.
Robert’s humanity envelopes brotherhood and sisterhood.
Robert’s appetite suggests humane hunger and longing.
Robert’s transculturalism maintains a standard for admiration.
Wherefore you search for genuineness and clarity of expression,
Wherefore you look for focus and task determination,
Wherefore you crave for intelligence and productivity,
Wherefore you quest for hypotheses and significant findings,
Wherefore you behold justice and international equality...

Hence, you will find an original AAPP scholar: our son-brother-colleague in statuesque form, ready to pursue a well orchestrated career for teaching skills germane to success and lifelong happiness...

But when the trumpet sounds and the bugle plays; and the door is knocked and the call comes forth; and the lights are dimmed and darkness appears; and the ticking of a clock and the striking of chimes dictate the next step on a journey toward solitude and compassion embraced by mercy...

Our friend and colleague, Robert, that is, has complied with the bugle and the door, with the chimes and the clock, with the lights and the call toward a home for eternal peace, thus, leaving a legacy of love.

John McFadden, Ph.D.
04/26/06
NARRATIVE STRATEGIES FOR CREATIVE EXPRESSION: SPIRITUAL AND POETIC MEANING

John McFadden, Ph.D.
The Benjamin Elijah Mays Professor
Director, African American Professors Program

Richard G. Deaner, Ph.D.
Columbia, South Carolina
When individuals or families are confronted with loss, the grieving process can be challenging and pervasive. For the purpose of this monograph chapter, loss may occur in a variety of forms, including but not limited to death, divorce, separation, theft, illness, disability, fire, incarceration, or any life transition that involves marked change. For the practitioner in counseling, who is connecting with the individual and/or family in order to attend to the issues of grief and transition, it is crucial to help the client gather validation and hope. Narrative strategies, including the expression of poetry, are avenues in which the linkage of feelings, thoughts, and perceptions related to loss emerges (Neimeyer, 1999).

CREATIVITY AND NARRATIVE STRATEGIES

Narrative strategies can include an emphasis on the phenomenological world of the client facilitated through artistic and creative means. The personal and subjective experience of the individual is accessed and revealed through such activities as narratives, music, art, metaphors, and poetry. In many instances, expressive art techniques provide an opportunity for the client to progress through the grieving process (Glazer & Marcum, 2003). Encouraging freedom of creative expression can allow the client to create a personal analysis regarding perceptions and reactions to events and circumstances that might otherwise be blunted. Furthermore, sharing the personal experience through artistic means, such as poetry, provides a platform on which a therapeutic catharsis is encouraged and normalized. Creating poetry allows the individual to declare his/her story in an unhindered manner. Indeed, Glazer and Marcum (2003) purport “It is therapeutic to tell one’s story; the individual is able to verbalize the events and feelings. At the same time, when a person hears the stories of other people and hears their responses to his or her story, that individual realizes that others have had the same feelings about and experience with grief and mourning” (p. 132). Therefore, the sharing of artistic expression of the grieving process provides a therapeutic opportunity for the narrator and listener alike. According to Neimeyer (1999), the adjustment and reaction to loss is a complex process that is highly subjective and individualized as the person attempts to formulate meaningful reconstruc-
tion. In this manner, “the intimate details of people’s stories of loss suggest a complex process of adaptation to a changed reality, a process that is at the same time immensely personal, intricately relational, and inevitably cultural” (p. 66). Sometimes, elements related to spirituality are included in meaningful construction of the individual. Neimeyer suggests that this occasionally highly personal process can evolve into healthy “life-enhancing spirituality” (p. 67) as the individual adapts to the loss. This heightened sense of spirituality generally provides a source of coping, strength, and meaning for the individual; therefore, the practitioner, utilizing narrative strategies, must be cognizant of this adaptive transformation, regarding the formation of a spiritual foundation. In doing so, the practitioner can respect, acknowledge, and embrace the individual meaning of spirituality as the client moves through the grieving process. In order for this process to occur, one must understand initially the various possibilities from which spirituality is defined in contemporary society.

Given the numerous authors addressing religion and spirituality in counseling (e.g., Ingersoll, 1994; Seybold & Hill, 2001; Wiggins-Frame, 2005), one can imagine the scope in which these constructs are revealed. While religion seems to be easier to define, spirituality is more difficult to distinguish (Cashwell & Young, 2005; Miller, 2003; Wiggins-Frame, 2005). An individual’s conceptualization of religious and spiritual elements may vary. Richards and Bergin (1997) write:

We view religious as a subset of the spiritual. Religious has to do with theistic beliefs, practices, and feelings that are often, but not always, expressed institutionally and denominationally as well as personally.

Thus, the terms religious and spiritual are interrelated, but they can be distinguished from each other along several dimensions. Religious expressions tend to be denominational, external, cognitive, behavioral, ritualistic, and public. Spiritual experiences tend to be universal, ecumenical, internal, affective, spontaneous, and private. It is possible to be religious
without being spiritual and spiritual without being religious. (p. 13)

Wiggins-Frame (2005) agrees that religion "is one form of spirituality" (p. 13) and that spirituality includes one’s beliefs, awareness, values, subjective experience, sense of purpose and mission, and an attempt to reach toward something greater than oneself. It may or may not include a deity" (p. 13). This definition is somewhat similar to the notion that spirituality (like religion) may involve a personal transformation, an encounter with transcendence, or a search for ultimate truth or an ultimate reality that is sacred to the individual. What is religious may also include stipulated behavior patterns and encouragement of adherence to certain religious practices or forms of expression, characteristics that some forms of contemporary spirituality may resist. Still, there is much overlap between these phenomena” (Seybold & Hill, 2001, pp. 21-22). Ingersoll (1994) suggests that the potential for spiritual expression can be understood through the culturally influenced framework of religion. Although spirituality may be viewed universally, the developmental and personal meaning may vary as “each person defines spirituality in her or his personal way, and this changes over time so that each person defines spirituality differently at various periods in her or his life” (Cashwell & Young, 2005, p. 197). Therefore, spiritual and narrative expression, regarding adaptation to loss, is viewed as highly personal, fluid, and organic for each individual. The culture of such expression also can be regarded even as transcultural (McFadden, 1999). The phenomenon of transculturalism in today’s society extends beyond what generally is referred to as cross-cultural or multicultural; transculturalism promotes a comprehensive understanding of others that offers promise for a worldview that complements aspirations for global peace. The dimensions of transculturalism encompass transcendency beyond our differences and even some of our commonalities.

The grief process, then, is an idiosyncratic process, which is worthy of a level of transcultural respect and appreciation that can be found historically in select cultural societies. It is incumbent upon each of us to remain open to and receptive to those who are transitioning through the mourning phase in a search for a renewed level of wellness.
The individual who is adapting to loss may experience various expressions of spirituality. Certainly, the narrative expression during the counseling process will vary depending on the client as an individual. One such expression of spirituality can be accessed through the artistic means of poetic analysis. Honoring the courage of individual expression allows the practitioner and client to explore meaningful adaptation to loss. Investigating narrative expression through an analysis of poetry is a viable means by which clients and practitioners can illuminate, respect, and embrace this personal struggle and adaptation. Furthermore, supporting the creative endeavors of the poet can provide an opportunity for discerning powerful and adaptive sustenance, perception, and movement for practitioners and clients alike.

IMPLICATIONS OF THE FOLLOWING POEMS

Exposing individuals to the following poems offers an avenue by which the thoughts, emotions, beliefs, and perceptions of the poet are revealed. Certainly, reading these poems illuminates the poet’s subjective experience, which includes elements of loss and grief. Indeed, the poems provide a platform by which experiences and interpretations of these experiences contribute to an understanding of an individual’s meaning-making structure discussed by Neimeyer. According to Neimeyer (1999), “Innovating upon culturally available systems of belief, individuals construct permeable, provisional meaning structures that help them interpret experiences, coordinate their relationships with others, and organize their actions toward personally significant goals” (p. 67). It is this experience and process of grief that is so vital for helping professionals to understand, acknowledge, and validate clients. The exposure to this process contributes to increased awareness and attention to the meaning-making experience and guides an “increased appreciation of the possibility of life-enhancing spirituality and ‘posttraumatic growth’ as one integrates the lessons of loss” (p. 67). As such, helping professionals can validate the experience of the individual and can facilitate the grieving process in an appropriately progressive manner. The creative process of poetic expression includes a cathartic release of emotions, beliefs, thoughts, interpretations, and perceptions related to past, current, and future occurrences regarding transition, loss, and grief. In this manner, the creative expression is unique and is expressed according to the phenomenological world of
the poet. Nevertheless, to the reader, the sharing of creative expression may yield surprising stimulation for others who experience loss or transition. The poetic expression may enhance the creative analysis of another individual who is experiencing loss or transition. Thus, reading these selected poems and analyzing their contents, imagery, and themes also may be quite illustrative concerning possibilities for relating to and bonding with others. Although grief may be a private experience, “it is necessarily linked with the responses of others...

Ultimately, reconstructing a world of significance in the wake of bereavement is more than a cognitive or emotional exercise; it also requires survivors to recruit social validation for their changed identities” (Neimeyer, 1999, p. 67). Clearly, the sharing of poetic expression provides accompaniment throughout the struggle, process, and journey of grief and loss.

Included in this chapter is a select group of ten spiritual poems, which evolved from a major loss by way of the unexpected and sudden death of the poet’s beloved wife of 32 years. These ten poetic expressions merely reflect a microcosmic manner by which survivors might confront their own thoughts and accompanying emotions relative to loss in any form. Later in this monograph chapter, a discussion of these poems ensues in order to promote the processing of poetic expressions and to provide possibilities for helping professionals to explore implications for management of and effective adaptation to loss and grief.
You Are My Reason

I live and yearn.
I long and pray.
I kneel and meditate.
I worship and serve.
I walk and wait.
I look and listen.
I learn and teach.
I provide and serve.
I guide and follow.
I love and cry...

...Now, I know why
this humble servant lives and yearns.
this firm believer longs and prays.
this sole son kneels and meditates.
this committed wanderer worships and sows.
this tall physique walks and waits.
this inquisitive soul looks and listens.
this inquiring mind learns and teaches.
this blessed man provides and serves.
this devoted father guides and follows.
this eternal husband loves and cries.

I understand and am moved
because of you,
for you are my reason
for living through a season of trials and triumphs.
When the walls spoke to me
in peace to be still and
to feel your grace and goodness—
...the compassion you always projected.
the understanding from your pure heart.
the righteousness of your service to humanity.
the dignity portrayed through your picturesque stature.
the motherhood mentored by your maternal instincts.

So, you are my reason...
for living and being in the arms of your loving spirit.

You inspire me!
John McFadden, Ph.D.
Let the Chilly Winds Blow

What a sign of the times!
Years are thin while
lives are short
during seasons of dampening.
Chills from an arctic
that land southward
where sunflowers push for blooming
and dogwoods wait their turn.

Sitting on this marble bench,
aside a quiet pool
void of wild geese for this day alone.

Staring at a sky of blue
beyond these barren trees,
standing still like the
residents who lie in repose.

Winds begin to blow
as the temperature dips
in Centigrade from the setting sun;
the winds begin to chill
the breeze across my forehead,
announcing a presence
and to be ignored.

But, there is a message in the air,
one unknowing in the past;
for I traveled this road not
in yesteryear.

Now, I see and attune
my ear to this melodic voice
from an angel I feel amidst this
airy space, and it is a limerick
rhymes in gold, I am told.

If it is to be, taste the breath
of this sweet, cleansing air
and let the chilly winds blow while there is time.

Sustaining the chill from these winds,
John McFadden, Ph.D.
Turning over a New Leaf

There comes a time in each
person’s life
when a change of course
becomes necessary
toward sustaining the remainder
of the blessings of living—
Through sunshine and rain
Through highlight and disdain
Through relief and pain
Through side streets and main
Through gait and cane
Through increase and wane
Through loss and gain
Through field and lane
Through reason and insane
Through modest and vain.

It is called turning over a new leaf—
to maintain sunshine and highlights,
to walk side streets with a gait,
to attain relief alongside increase,
to know gain on the field,
to preserve reason and modesty.

When darkness enters your pathway,
turn to an alternate route.

When the confectioneries begin to embitter,
check ingredients in the oven.

When the diamond seems void of players,
screen the dugout.

When braids decide to unravel,
search for a cosmetologist.

When the trees convert to deciduous,
look for alternative branches,
where joy comes in the morning
upon turning over a new leaf.

*A change will come...*,
*John McFadden, Ph.D.*
Soothing Water

Come to the spring
where the stream rises
and fill, this airy space
beneath a pool
architecturally designed
with angles oblique and
acute, then rounded by curves in marble set by mosaics.

The bubbling water, so clear and pure,
warms the body, releasing
impurities searching for a place
to ground their roots.

What a feeling of relaxation,
of gracefulness attributed
to this water so soothing
that it attracts others
for moods of meditation and prayer,
relinquishing anxieties
of grief and sadness
anger and bitterness
loneliness and strife
conflict and resentment
distress and powerlessness—

Come to this soothing water
and relax with loved ones...
who offer compassion and understanding
who give of themselves freely and openly
who see the longing of your striving
who are colorful in mind and spirit
who connect with angels and the divine.

Look and admire the clean water,
so transparent and appealing
with its natural aroma streaming
from hills, reaching toward the sky.

Soothing water, soothing water—
I feel your caressing and caring—
to thee, I shall be true.

Feeling great and valued with hope,
John McFadden, Ph.D.
The Power of Struggle

Confronting obstacles?
Overcoming hurdles?
Enduring suffering?
Experiencing heartaches?
Climbing mountains?
Wading waters?
Bypassing valleys?
Weathering storms?
Soothing pain?
Understanding grief?
Bearing sorrow?
Accepting loss?
Managing disappointments?
Navigating turbulence?
Smoothing roadways?
Sustaining curves?
Resolving betrayals?
Diluting misunderstandings?
Diverting bitterness?
Facing struggles?

Inherent therein is power from encounters.
   Crisis, these are for mankind,
in times of need and times of excess.
Making the way plain
is an opener to resolve and contemplate,
for that is the substance of a peaceful life,
receptive of sunshine and rain
to feed the forest and console the geese,
wobbling about a quiet pond serene
for the quieted and silent souls
through the passage of decades.

As doves fly overhead to signal peace,
so do the eagles with empowered wings with a span
strong enough to overcome a struggle for survival.

A mechanism for human coping,
John McFadden, Ph.D.
Time to Embrace Grace

Take time for her
as she is worthy
of time and praise.
Remember her
during a time of prayer
and thanksgiving.
Write memories of her
through poetic form
during time of reflection.
Allow her spirit
to surround you
at a time of graceful embracing.
Listen to her sweet voice
echoing around the room
when time opens its face.
Time to embrace her?
Why, it is now—
better today than tomorrow,
an hour not promised
to you or any man.
Grace is so special,
that to embrace her is...
To love her
To remember her
To behold her
To honor her
To personify her—
~during a time of grief and pain
~at an hour of distress and withdrawal
~upon reclaiming after a day’s labor
~in the presence of kings, queens, paupers alike
~on mornings of sunrise and evenings of sunset.
Take time for her, for Grace—
  The scholar in our residence
  The mother in our family
  The wife in our home
  The saint in our midst
  The angel in our lives...
...and sing a tune of celebration
as she lives amongst us and through us.

To embrace her is to love and remember her,
John McFadden, Ph.D.
He Is Strong When I Am Weak

I need thee every hour,
when I am weak and sad
when I am strong and glad.

To know that thou art
my rock and my salvation
as this journey is encountered.

Give me comfort
and peace of mind,
realizing that this son is there.
Within a stormy land and sea,
I am conditioned
to feel secure
because of you, known also as He...
who represents strength enough
for me to travel this journey
even though waves may be rough;
times may be tough.

When the ocean turns to anger
and whales are disturbed,
my equilibrium falters
and I reach for thy hand
of power, strength, and divinity.

Master of my fate,
Captain of my soul,
I turn to thee in earnestness
and humility,
through a prayer of
forgiveness during this
hour of weakening.

I am reminded, thus,
that He is strong
when I am weak;
He sits on the throne
when I am in the creek;
And He has a home,
where I yearn to belong.

In need of strength to carry on,
John McFadden, Ph.D.
Light Is Shining Ahead

Through this dismal tunnel
there appears movement
toward oblivion,
for darkness surrounds
this place—
And, then, comes a reminder
from the pulpit,
"Don’t let ‘nothing’ turn you around."

The key becomes one of perennial
Pushing
Praying
Pressing
Posturing
Portraying...
...that which provided hope
to the weary—
...that which supports
your overall mission—
...that which depicts
obedience to a higher power—
...that which unfolds
through faith and determination—
...that which promises
a tunnel’s eventual end.

Over deliberate time,
the emergence of a candle’s glow
is seen with clarity,
inferring that He is there
with you even though
queries arise and
legitimacy questioned until
light is truly detected as shining ahead.

So, follow the beam,
walking with grace and dignity
throughout this tunnel.
For a bright light is shining ahead
for you and me.

Light as a pathway,
John McFadden, Ph.D.
Fruits of Life

They can be found
in the tropics and
in frigid zones—
in and out of seasons,
Spring/Summer
Fall/Winter, to sweeten
the appetite when
fruits grace the table,
offering a filling
for bakers who choose
to top...

A life well lived,
   A life freely served,
A life abundantly blessed,
   A life spiritually orchestrated,
A life soulfully inspired,
   and preserved through
   a rich legacy for all...
   Generations
   Cultures
   Believers
   Servants
   Saints.

Fruits of life...
   Are citrus and juiced with the spirit
   Are carbohydrate and filled with substance
   Are sweetened and enriched with sucrose
   Are tropical and readied with intake
   Are angelic and offered with grace.

They sustain during good times
   that are known for their rejoice.
They uphold during sad times
   that are tainted for their grief.

Let the fruits of life
   carry you during seasons of drought
   and during seasons of plenty.
For they give wellness to survivors
   and inheritors of the legacy.
Fruits of life, we grace you now
   with humility and a platform of thanksgiving.

In the spirit of Grace,
John McFadden, Ph.D.
Let Me Carry Your Legacy

Golden is it and
worthy of inheritance.
Historical is it and
deserving of preserving.
Cultural is it and
essential for teaching.
Indigenous is it and
charismatic for rooting.
Enriched is it and
valuable for investing.
Prophesizing is it and
seasoned for tasting.
Solid is it and
preparatory for carving.
Sunny is it and
ready for enlightening.
Enlivened is it and
characterized for perpetuating.
Graceful is it and
destined for carrying...
...by one who loves, adores,
and honors you—
...by one who respects, reveres,
and internalizes you—
...by one who believes, listens,
and trusts you—
...by one who befriends, understands,
and consoles you—
...by one who admires, beckons,
and dignifies you.

This is my quest,
A sole desire and craving,
A graceful wish and yearning,
A hope of humility, a longing—
to an angel of Grace:
Let me carry your legacy.

*This, I must and shall do with honor and praise.*
*John McFadden, Ph.D.*
DISCUSSION

In these selected poems, one can comprehend the sadness, anger, loneliness, and despair emoted from the author. Indeed, the painful, unexpected, and sudden loss of a loved one is a deeply arduous circumstance to experience. Upon further examination, one can sense a remarkable amount of freedom displayed through this creative expression. The vivid imagery, symbolism, word usage, and descriptive themes within each poem detail a fluctuating, yet progressive, experience of grief. At times, the perceptions include a deep sense of sorrow, and, at other times, describe hopeful messages to those who may share in similar experiences. It is through this search for sustenance, meaning, and hope that one can appreciate the incredible breadth of emotive expression. The freedom of expression allows a sense of inner turmoil to evolve into peaceful, adaptive forms of personal direction.

These poems provide a comprehensive glimpse into past, present, and future possibilities for understanding strength, meaning, fulfillment, and hope. Within each of these selected poems, spirituality is exposed as words, phrases, symbols, and images develop and culminate, providing a powerful message for the poet and reader. These literary pieces depict a sense of resourceful and spiritual declaration that solidifies as the poems unfold. Understanding, acknowledging, and validating this sense of resourceful and spiritual expression may be integral for the grieving process to continue existentially. In this manner, the poetic illustrations provide a spiritual roadmap of where the individual resides—in the past, present, and future. Grasping the value of such roadmaps promotes sensitive understanding of the individual who experiences loss and reveals the worldview, surroundings, and existence of that individual within his/her spiritual roadmap.

In order to comprehend this roadmap, the helping professional needs to allow a freedom of choice and expression to flourish within the poet; thus, the helping professional could, perhaps, stimulate dialogue surrounding the emergence of and means by which the poetry is revealed. For some poets, reading the compositions may provide a sense of ownership to this creative expression. Others may prefer that their poems be read by another individual. In either case, an open, genuine, and non-judgmental discussion should ensue prior to and after the reading of each poem in order to process any afterthoughts.
After a reading, this discussion can include possible questions related to choice of words, images, phrases, emotions, dimensions, and thoughts; however, these authors believe the inquiries should be related to understanding the meaning, upholding the poetry, and not necessarily to changes or to readjustments. Avoiding unnecessary criticism is essential as practitioners attempt to understand and respect the unique perspective and emotions of the poet. Discussing explicit and implicit meaning within the work can provide a platform on which the poet is able to confirm, clarify, elaborate and illuminate his/her journey. Affirming the creative expression of the poet enhances an opportunity by which the poet’s roadmap is revealed in a cohesive, sensitive, and supportive manner. As the roadmap illustrates the past, present, and future context in which the individual exists, helping objectives can be fulfilled supportively and jointly as sensitive understanding increases. At this stage of the journey, the helping professional and poet can navigate collectively the terrain of the roadmap, and they jointly can determine present and future potential objectives, concerning the poet’s personal, professional, interpersonal, social, familial, and spiritual direction.

EMERGING REFLECTIONS

As you plan, pursue, and navigate your own roadmap, the following questions may provide additional insight and internal consolation for you and others whom you may guide and influence:

**Personal Direction**—To what extent are you able to identify, grasp, and amicably cope with loss and grief encumbered upon you?

**Professional Direction**—How have you maintained the stature to which you have been accustomed in your professional identity, being that you have experienced a state of mourning?

**Interpersonal Direction**—From an interpersonal perspective, at what level have you been able to differentiate between intrapersonal and interpersonal wellness and interconnectedness in your sociological paradigm?
Familial Direction—How has the loss or grief, having entered your journey, served as a reflection of your family constellation and/or early recollections?

Spiritual Direction—For the attainment of spiritual meaning, how has this identified loss or grief contributed toward the manifestation of your lifestyle patterns and ultimate humanitarian and transcultural striving?

CONCLUSION

An individual who experiences loss or transition may encounter challenging issues related to grief. For practitioners in counseling, the narrative strategy of poetic and creative expression can provide a platform on which an individual’s emotions, beliefs, perceptions, thoughts, interpretations, and meaning concerning loss and grief are illuminated freely. Furthermore, the poetic expression and analysis can provide accompaniment, encouragement, validation, and normalization for the individual. Poetic expression and analysis also may offer an avenue by which an individual explores, discovers, and processes past, present, and future directions. In this manner, the sharing of poetic and creative expression enables the counseling practitioner to reflect on emerging possibilities related to personal, professional, interpersonal, social, familial, and spiritual direction with the individual who is experiencing grief and loss. The insight gained through honest, creative, and cathartic expression and discussion may promote understanding and validation as the individual seeks meaning, strength, fulfillment, and hope.
REFERENCES


PART 1:
ARNOLD SCHOOL OF
PUBLIC HEALTH
Complications during pregnancy and childbirth are the leading cause of death and disability for childbearing women in many parts of the world (AbouZahr, 2003; Callister, 2005; Kramer, 2003; Morehouse School of Medicine, 2005). At least 40% of all pregnant women will experience some type of complication during their pregnancies; about 15% of these are potentially life-threatening and require immediate obstetric care (Safe Motherhood, 2005). Most adverse pregnancy outcomes occur in underdeveloped/developing countries; however, there is a growing concern in developed countries, where pregnancies are typically planned, uncomplicated, and where medical technology is available. In fact, the United States (U.S.), which spends more per capita on health care than any other nation, ranks 27th in infant mortality, which is one indicator of its overall health (Martin, Kochanek, Strobino, Guyer, & MacDorman, 2005; Morehouse School of Medicine, 2005). The U.S. is 15th in the world for its maternal mortality rate, which has not improved in 20 years, and has a Cesarean birth rate of 24.4% that is among the world’s highest (Martin, et al., 2005; CDC-National Center for Health Statistics, 2005; Menacker, 2005).

The overwhelming majority of pregnancies result in a “normal birth” (i.e., one free of any complications, injury, infection, or underdevelopment). Nevertheless, pregnancy and childbirth, if not attended to properly, can result in sudden and unpredictable complications that may lead to the death or injury of the mother and infant (Kramer, 2003; Safe Motherhood, 2005). One way to reduce these adverse outcomes is to ensure that a skilled-health professional is present at every birth. Research results support an association between lack of adequate obstetric care with increased infant mortality, low birth weight, and poor maternal- and child-health outcomes (Nesbitt, Larson, Rosenblatt, & Hart, 1997; UNC-Chapel Hill, 2001).
Having a health professional present throughout pregnancy and birth for every woman is not always possible. The American Medical Association acknowledges this problem is a result of a serious shortage of birthing providers and other health professionals in many rural areas of the world and also within the United States (Elliott, 2004; Hartley, 1999). Quality maternal and child-health services pose another issue that has serious implications on the outcomes of a healthy pregnancy. Many women do not have access to good-quality health services during pregnancy and childbirth—especially women who are poor, uneducated, or living in rural areas.

About 20% of the U.S. population resides in Health Profession Shortage Areas (HPSAs), a geographical area that has been designated by the U.S. Department of Health and Human Services as having a shortage in primary-care, dental, and mental-health providers (Office of Primary Care, SCDHEC, 2005). South Carolina, a predominantly rural state, is considered to be one of these HPSAs. In general, its overall pregnancy outcomes and access to maternity care is poor. In 2002, South Carolina had an infant mortality rate of 9.3, which ranked 46th in the country, and was 48th (50 being the worst) in low birth weight outcomes (U.S. Census Bureau, 2002). As in many other rural areas of the country, South Carolina lacks adequate numbers of primary-care physicians, specialty physicians, and birthing providers to address the needs of its pregnant women and infants.

The purpose of this study is to examine the effects of the supply of birthing providers on birthing outcomes at the county level in South Carolina. The study focuses specifically on rural status, its relationship to available birthing providers, and its influence on pregnancy outcomes. As a measure of adverse pregnancy outcomes, low birth weight (LBW) will be used. It serves as a proxy for infant mortality and pre-term birth, which are two major public-health concerns.

LITERATURE REVIEW

Adverse Outcomes

Adverse pregnancy outcomes are a major public-health concern throughout the world. The toll of adverse pregnancy outcomes on the community/nation/world is reflected generally in the social, physical
and mental well being of its people. In most developed countries, pregnancies are planned, complications are few, and outcomes are favorable generally for both mother and infant; however, adverse outcomes are still a fairly common phenomena, the most severe of which is the death of a mother and infant (Kramer, 2003).

The World Health Organization's (WHO, 2005) definition of infant mortality, which is the death of an infant during the first 12 months of life, is often used as an indicator of a nation's overall health. The overall 2002 infant mortality rate in the United States was 7.0 per 1,000, but rates range from 4.4 to 11.3 per 1,000 live births in many states (Kramer, 2003; U.S. Census Bureau, 2002). Preliminary data from U.S. births in 2004 shows an increase in low birth weight and pre-term delivery. In fact, according to a recent publication of the Center for Disease Control and Prevention (CDC, 2003), more than 500,000 infants were reported being born prematurely.

Even when both mother and infant survive, pregnancy complications or problems either at delivery or during the neonatal period do occur that lead to severe maternal or infant morbidity, which are precipitous to death (Kramer, 2003). Kramer notes that the most commonly studied problem is low birth weight (LBW), which is the factor most closely associated with neonatal and infant mortality. LBW is defined by the World Health Organization (WHO, 2005) as a birth weight <2500 grams, and it continues to be reported and studied by epidemiologists and public-health practitioners because it can be measured with excellent validity and precision (Kramer, 2003).

Risk Factors

LBW rate risk factors are associated with a variety of conditions. Hulme and Blegen (1999) identify these risk factors as poor maternal nutrition, teenage pregnancy, premature birth, alcohol use, smoking, the presence of sexually transmitted disease, lack of or inadequate prenatal care, extreme maternal age (i.e., <18 and >40 years), maternal poverty, and single motherhood.

A mother's age is known to be predictive of receipt of inadequate prenatal care, risk of poverty, inadequate weight gain, alcohol or drug use, and a nutritionally inadequate diet, which are all associated with LBW. Maternal poverty and low levels of educational attainment also
are closely related both to women's access to care and to their behaviors during pregnancy (i.e., diet, smoking, etc.) (Child Health USA, 2002). Race of the mother is also a strong predictor, with Black women being more likely to have pre-term births and infants with LBW than all other groups of women (Ananth, Misra, Demissie, & Smulian, 2001; Lieberman, Ryan, Mondon, & Schoenbaum, 1987).

A woman's behavior before and during her pregnancy may impact her outcome. In a study of 78,000 births in Missouri on term-gestation LBW, smoking was found to be highly associated with the increased risk of LBW, especially when combined with alcohol exposure (Okah, Cai, & Hoff, 2005). Okah, et al. identify women who smoke while pregnant as more likely to have LBW babies (i.e., weighing less than 5.5 pounds) and babies whose physical and intellectual growth is below normal. Kleinman and Madans (1985) investigated the effects of maternal smoking and educational attainment on LBW births and found that women with less than 12 years of education were more likely to smoke and have a higher odds ratio of having LBW babies.

Access to care

If all women began prenatal care in the first trimester of pregnancy, the number of LBW babies could be reduced by an estimated 12,600 per year (Nesbitt, Rosenblatt, Connell, & Hart, 1990). Women who start prenatal care in the third trimester and women who receive no prenatal care are both considered at increased risk for poor pregnancy outcomes. One of the fundamentals of the modern practice of obstetrics is the fact that healthy outcomes for both mother and child are dependent upon adequate prenatal care (Nesbitt, et al., 1997). The WHO (2005) reported that the resulting death toll of pregnancy complications could be reduced through the use of key interventions and a "continuum of care" approach for mother and child that begins before pregnancy and extends throughout childbirth and well into the baby's childhood. They estimate that out of a total of 136 million births a year worldwide, less than two thirds of women in less-developed countries and only one third in the least-developed countries have their babies delivered by a skilled attendant.
Although prenatal care reduces the risk for maternal mortality, health-care access and use do not explain fully the disproportionate risk for maternal and infant death for Black women. Other factors, such as quality of prenatal, delivery, and postpartum care, and the interaction between health-seeking behaviors and satisfaction with care may explain part of this difference (Child Health USA, 2002).

Rurality

Within the United States, differences exist along geographical lines. No differences exist between women residing urban and rural areas and their reasons for not seeking prenatal care, but rural women are impacted to a greater extent by not having such care (Peck & Alexander, undated). Peck and Alexander report that infant mortality is higher in rural areas such as in the Southern and Western regions of the U.S. than in the Northeastern and Midwestern regions. They also report that non-metropolitan counties in the South exhibit higher infant mortality rates (i.e., 8.7 per 1,000 live births) than exist in non-metropolitan areas in all other geographical regions the U.S. Whether a pregnant women lives in a rural or urban environment may influence the type and extent of services available and accessible, and ultimately it may affect the outcome of her pregnancy (Alexy, Nichols, Heverly, & Garzon, 1997). In a study by Nesbitt, et al. (1997), researchers explored how the local availability of maternity services in rural areas is associated with neonatal outcomes and the use of health-care resources for both publicly- and privately-insured patients. They argued that to fully appreciate the impact from a health-policy standpoint, resource usage must be evaluated. Their results indicated that women with poor local access to obstetric services are less likely to have a normal baby or a normal child-birthing experience. Controlling for other risk factors such as race, maternal age, parity, marital status, maternal education, and prenatal care, Peck and Alexander (undated) found that rural residence is independently associated with increased rates of post-neonatal mortality but not necessarily with rates of neonatal mortality. Furthermore, they concluded that disparities in infant mortality by area of residence may result from the disproportionate distribution of poverty, race/ethnicity, age, education, as well as availability and access to medical resources.
According to this Peck and Alexander report, many national and state-based studies of prenatal-care utilization contain reports of less-adequate prenatal care among rural women than among urban women. Their analysis of the National Linked Birth Death data set for the 1985-1987 study period revealed that non-metropolitan residents in the U.S. are more likely than their urban counterparts to delay prenatal care until the 3rd trimester. They document that this result persists after controlling for other risk factors such as race, maternal age, parity, marital status, and maternal education. Despite increased technological and medical advances, the status of birthing women and their infants is poor in the United States, a condition that rivals what is found in most developing nations.

Provider availability also may affect the adequacy of some aspects of care in the prenatal period. Rural populations tend to depend mainly on family physicians for obstetrical care (Perloff, 1992). Despite the adequate numbers of obstetricians throughout the country, these professionals are maldistributed significantly relative to the population distribution. In fact, they are overwhelmingly located in metropolitan areas, and a number of non-metropolitan counties have none of these specialists (Perloff, 1992; Rickett, Tropman, Slifkin, & Konrad, 1996). Furthermore, because fewer family physicians currently practice obstetrics, women in rural areas often lack accessible obstetrical services. Rickett et al. identified multiple reasons for this occurrence, including the rise in malpractice costs, lack of shared coverage, the burden of doing deliveries, poor reimbursement for deliveries, and no “demand” for services.

**Birthing Provider Supply**

The supply of physicians, whether practicing primary or specialty care, has a direct impact on the health status of populations. There is a significant association between higher primary-care-physician supply and lower mortality, longer-life expectancy, and better-birth outcomes, even in the presence of high-income inequality and other adverse sociodemographic characteristics (Shi & Starfield, 2001; Hart, Dobie, Baldwin, Pirani, Fordyce, & Rosenblatt, 1996). Although this link is well documented, many communities lack sufficient numbers of primary-care clinicians (Grumbach, Hart, Mertz, Coffman, & Palazzo,
2003). Rural areas tend to have lower supplies of physicians and more difficulty recruiting physicians than do urban areas (Grumbach, et al., 2003; Pathman, Konrad, Dann, & Koch, 2004).

Grumbach, et al. (2003) studied the geographic distribution and patient populations among the variety of primary-care disciplines. In general, the results of their research show that a higher proportion of non-physician primary-care clinicians than physicians practice in underserved areas and care for large numbers of minority patients and patients who are Medicaid beneficiaries or uninsured. They also found that family physicians are much more likely than internists, pediatricians, and obstetrician specialists to practice in rural communities and in HPSAs.

This limitation of physicians is not just confined to primary-care practice, but it includes a shortage of all types of birthing providers in rural areas. Although licensed physicians provide the vast majority of obstetric care in the U.S., the number of other health-care providers doing maternity care generally has increased during the last few decades (UNC-Chapel Hill, 2001). Allen and Kamradt (1991), in their study of access to physicians' services in rural Indiana, found that many of the counties (i.e., designated as predominantly rural) do not have an obstetrician providing obstetrical care, but rather alternative practitioners are typically being used for obstetrical services.

The American Medical Association reports that thousands of rural physicians have stopped offering obstetrical care, leaving hundreds of rural counties without any local source of obstetrical services (Hartley, 1999). Nesbitt, et al. (1997) studied the decline of family practitioners offering maternity care in rural communities and its effects on pregnancy outcomes. One of their major findings was that having fewer physicians per capita in rural areas than in urban areas had a direct affect on the clinical services offered by those physicians. Although they could not conclude that a causal relationship exists between impaired access to rural obstetrical care and adverse perinatal outcome, strong evidence was obtained (Nesbitt, et al., 1997). Hulme and Blegen (1999) found that resources for birthing go well beyond those offered by the birthing provider and are strongly influenced by the practicing location.

The research reported here will add to the existing body of literature because it provides a connection between pregnancy outcomes
and the supply and type of birthing provider that is used. The explora-
tion of this relationship is timely given the decline in physician
birthing providers in the country and the parallel decline in maternal
and child health. This study focuses on the availability of birthing
providers within rural and very rural settings in South Carolina. It is
unique because the data are analyzed at the county level rather than at
the individual level, giving credence to community influence.
The following research questions are addressed:
- Does the availability/supply (in terms of rate per 1,000) of
  birthing providers have an affect on low birth-weight rates?
- Does the availability/supply (in terms of rate per 1,000) of a spe-
cific type of birthing providers have an affect on low birth-weight
  rates?
- Is the supply of birthing providers adequate based on a county’s
  rural status?
- Are any of these factors significantly related to race?

METHODOLOGY

Sample

The population for this study included all of the 46 counties in
South Carolina. This study was ecological, and data were aggregated
at the county-level. Comparisons were made between counties and
not the individuals within each county. Also, each county included in
the sample (N=46) was designated as rural, very rural or urban based
on the South Carolina Office of Research and Statistics (2005), using
as a criterion the size of the largest town in that county. The urban
counties were those with their largest city population greater than
25,000. Rural counties are divided into two groups, rural with the
largest town population greater than 10,000 but less than 25,000, and
very rural counties, largest town with less than 10,000.

Data

The data were compiled from three separate datasets and merged
into one dataset file. Data were collected for a 4-year timeframe (i.e.,
2000 – 2003) and converted to rates per 1,000 for use in this analysis.
The first data set was taken from the South Carolina Community Assessment Network (SCAN), an interactive data retrieval system for community assessment, planning, and health practices, (SCDHEC, undated). Information contained in this data set was divided into several modules. For the purpose of this research, three modules were used. These included the birth module, infant mortality module, and mother’s health and lifestyle module. The following is a description of the data contained in each module.

The Birth module information is generated from birth-certificate data. This module contains maternal race, maternal age, marital status, region, and birth characteristics. The variables taken from this module include: live births, birth weight (i.e., low and very low birth weight), and alcohol use during pregnancy.

The Infant Mortality module is an infant death cohort. Data used are a combination or merge of infant death data taken from death certificates and birth data taken from birth certificates. Once the infant deaths have been matched to their respective birth certificates then a dataset is created based on the year in which the child died. A child can be born in the same year or the preceding year of his/her death. The denominator for any rates calculated is the number of births that occur in the year of the child’s death. Demographic data such as race, ethnicity, county, and zip code are generally based on the death certificate information of the infant. The infant mortality rates for indicators originating from the birth certificate data are calculated by taking the number of deaths with that characteristic over the number of live births with that same characteristic.

Finally, the Mother’s Health and Lifestyle module information is derived from birth certificate information. It contains the control variables for this study. These variables include use of prenatal care, mother’s educational level, and report of mother’s smoking and drinking behavior during pregnancy.

The second dataset used was compiled from the South Carolina data for 2003-2004 obtained from the Office of Women’s Health (OWH, 2005), United States Department of Health and Human Services. These data included the number of pregnancies per county that were reported from women under the age of 18 and those more than 40 years of age.

Information on the detailed demographic data on birthing providers, including certified nurse midwives (CNMs), family
practitioners, and obstetricians/gynecologists was collected from the South Carolina Office of Research and Statistics (SCORS) – Health Professions dataset (SCORS, 2005).

Analysis

The independent variables for this study are the supply and type of birthing providers and the rurality status of each county. Rates per 1,000 were calculated using the frequency of providers divided by the total population of women in the county. The supply of providers was trichotomized into categories of adequacy (i.e., inadequate, adequate, and over-supply). Rates were used to determine groupings and were based on designation criteria set by HRSA for health profession shortage areas. Dummy variables were created for rurality (i.e., presence of rurality = 1; absence = 0).

The dependent variable for this study is low birth weight, which is used as a proxy for adverse pregnancy outcomes (i.e., infant mortality, maternal mortality, LBW/VLBW, and pre-term births). Low birth weight is measured at the time of delivery and is recorded in the medical record and on the birth certificate. It is a good measure because it is concrete.

Three types of analyses were used to investigate the research questions. The first, univariate analysis, was used to provide an ecologic description of each county. Frequencies and rates were generated for birthing data at the county level and are reported in the Results section. Bivariate analyses (Chi-square) were used to determine the relationship between the supply of birthing providers (Family practitioners, Obstetricians and CNMs) and poor pregnancy outcomes (i.e., LBW); and the relationship between type of birthing providers and poor pregnancy outcomes (i.e., LBW). Lastly, multivariate analysis was used to control for behavioral risk factors. A linear model was run to control for underlying indicators associated with adverse pregnancy outcomes, several variables were used in the model (e.g., maternal age, prenatal care utilization, and maternal education).
RESULTS

Descriptive Statistics

The SAS statistics package for Windows version 8.2 (SAS Institute, Cary, NC) was used to generate descriptive analysis on pregnancy and pregnancy-related data by rural status. The data indicated that the majority of births by variables of interest actually occurred in urban areas; however, rural and very rural areas showed a higher number of births to specified higher-risk categories.

Rural status was designated by the South Carolina Office of Research and Statistics (SCORS, 2005), using as a criterion the size of the largest town in that county. The urban counties (n = 15) were those with their largest city population greater than 25,000. Rural counties are divided into two groups, rural with the largest town population greater than 10,000 but less than 25,000, and very rural counties, largest town with less than 10,000. In South Carolina, the majority of the counties (31 of 46) are designated as rural, and 23 of those are very rural. The differences between the two rural designations are important to this analysis because of the maternal and infant risks apparent in these areas.

Of the total Black population, more than 40% (n = 297,790) live in very rural areas. In both rural and very rural counties the Black population differs from the number of whites by less than 3,000. For urban areas the white population (n = 1,091,146) more than doubles that of the Black population (n = 47,057). Other characteristics of very rural counties also may be relevant to understanding these research findings.

Poor pregnancy outcomes and some maternal characteristics differ when very rural and rural designated county data are examined. For example, the poor pregnancy outcomes of infant mortality and low birth weight are higher in very rural areas (21.6% and 19.87%, respectively) than in rural areas (12.7% and 12.0%, respectively). A number of maternal characteristics and behaviors almost doubled in very rural counties in comparison with rural counties. For the very rural counties, births to unmarried women (23.6%), women who drank during pregnancy (12.8%), and those who did not receive prenatal care (18%) seem to be the most clear of these differences.
In this dataset, the total numbers of potential birthing providers are concentrated in urban areas (Obstetricians = 80.3%; Family Practitioners = 70.1%; CNMs = 80.3%); however, those located outside of these areas are found in very rural areas as opposed to rural areas.

Research Question Findings

To investigate the first research question, regarding the effect of the availability/supply of birthing providers on low birth weight rates, multivariate analysis (linear models) was conducted. Controlling for a number factors (e.g., poverty, no prenatal care, births less than 18 year of age and rurality), the supply of all birthing providers in the state was significant for the rate of LBW for white women (p = .033). The analysis yielded an inverse relationship between the two variables, which indicates that as the rate of birthing providers increases the LBW rate among white women decreases. No significant relationship was found for the rate of total birthing providers on total LBW or black LBW.

It was hypothesized that the total number of providers available by rural status would have an effect on pregnancy outcomes. Linear models were used to determine if birthing-provider supply by rurality had an effect on LBW. Again, no significant finding was indicated for birthing provider; however, rurality was significant within that model (P < .01). Based on follow-up comparisons, the combination of birthing provider and rurality was not significant for the LBW rate in either white or black populations.

Analysis of the effect of the type of birthing provider on LBW, the second research question, yielded very different results. It indicated that Certified Nurse Midwives was significant for the total overall LBW rate (p = .02) and white LBW rate (p = .002). Family practitioners also yielded significant results on the white LBW rate. No significant results were found for Obstetricians/Gynecologists, or any birthing provider on the LBW rate for black infants.

To measure the adequacy of the supply of birthing providers by rurality of each county and its relationship on LBW (i.e., examination of question three) chi-square was used. Supply of birthing providers was trichotomized into three adequacy categories (i.e., inadequate
supply, adequate supply, and over-supply) based on the number of childbearing-aged women in the county. The chi-square analysis yielded no relationship between rural status and adequacy of the birthing provider on the overall LBW or for white or black pregnant women.

Living in a rural area was significant to LBW occurrences. This result suggests that women in rural areas of South Carolina are at a greater risk of adverse pregnancy outcomes. Rurality plays an important environmental role on people’s health choices and actual health status (Probst, Moore, Glover & Samuels, 2004). The nature of rural areas may keep providers away (i.e., lack of resources, poor living conditions, lack of competitive salary, etc.) (Colwill & Cultice, 2003). At the same time providers who practice in rural areas may not be accessible to all who live there. Further inquiry into this phenomenon on a national level may support these findings.

DISCUSSION

Surprisingly, no actually meaningful findings were revealed in this study. Although one finding, which was not only statistically significant but may be the impetus for future research in this area, is the supply of birthing providers and LBW among rural white women. It was hypothesized that the supply of birthing providers would be significant for LBW among both black and white women living in rural areas, but this was not the case. It seems that there are several possibilities for why this was true for the white-only category. First, many white women have a family physician whom they trust and respect. Physician-patient relationships have been well documented as having an influence on a patient’s health outcomes (DiBlasi, Harkness, Ernst, Georgiou, & Kleijnen, 2001; Kreuter, Chheda, & Bull, 2000). On the other hand, Black people, in general, have a history of mistrust of the health care system and would be less likely to develop positive relationships with their care providers (LaVeist, Nickerson, & Bowic, 2000; Sheppard, Zambrana, & O’Malley, 2004).

Another consideration is that having available providers (that exist within the county) does not translate apparently into increased access for all pregnant women. For example, providers may be too costly, located too far away in distance, or providers may not be accepting
new patients. Of course, these factors would have an effect on a woman's attitudes and behaviors during her pregnancy and childbirth experience (Kreuter, et al., 2000).

As predicted, Certified Nurse Midwives (CNM) did have an effect on outcomes for the total population and for white women. It seems clear that CNMs have a history of contributing to the reduction of adverse pregnancy outcomes. They spend more time with patients than some other categories of providers, they tend to work in rural areas, and they provide more specialized care than individuals who are untrained (Gabay & Wolfe, 1997; Johnson & Daviss, 2005; Kennedy, 2000).

Based on the analysis of data for the third research question, there is no significant difference in birthing-provider location in terms of rurality within South Carolina. Although South Carolina is designated as a HPSA, this study found no differences in birthing providers in the state by rurality. Two possibilities may explain these findings. First, all counties, regardless of their category of rural status, lack birthing providers; thus, availability of these providers is an issue across the entire state. Secondly, since one of the limitations of the study was distinguishing between providers who actually birth babies or those who have stopped this service, an over representation of providers may be detected. Large numbers of Family practitioners are located in rural areas and may only provide primary-care services (i.e., no practice in obstetrics), and Obstetricians and Gynecologists also may focus their efforts in gynecology rather than in obstetric services; thus, the problem of needed birthing providers may be masked in the results of this study.

Living in a rural area was significantly related to LBW occurrences. This finding seems to suggest that women in rural areas of South Carolina are at a greater risk of adverse pregnancy outcomes than those in urban areas. Rural location plays an important environmental role on people's health choices and actual health status (Probst, Moore, Glover, & Samuels, 2004). The nature of rural areas may keep providers away (i.e., lack of resources, poor living conditions, lack of competitive salary, etc.) (Colwill & Cultice, 2003). At the same time, providers who practice in rural areas may not be accessible to all people who live there. Further inquiry into this phenomenon on a national level also may provide additional support to these findings.
LIMITATIONS

The limitations of this study are focused on its ecological nature. Ecological studies have an important descriptive role in research, but they are less useful in relational and outcome-oriented studies such as this one. Clearly, the availability of data that links birthing providers to specific outcomes in this study may have prevented key questions from being answered. It was not possible to obtain data to establish more accurately the effect of birthing providers on pregnancy outcomes. Another limitation related to these specific data was that they did not provide a description of current birthing practices. Many physicians have dropped obstetric care from their practices; however, these providers also were included in this study simply because they were identified based on their physician specialty, which inherently includes the presumption that such physicians are birthing providers. In addition, other potential birthing providers were not included in the study either because data were not available or because their obstetric services were unknown. These particular limitations may be reduced in future studies by analyzing individual-level data rather than county-level data or by using a larger data set of national counties.

The second major limitation was that these data were in no way generalizable beyond South Carolina. Too few observations \( (n = 46) \) made it difficult to obtain valid and/or statistically significant results.

IMPLICATIONS FOR POLICY

Based on the limited information from this study, combined with data from other studies, a few policy implications can be derived. Grumbach, et al. (2003) suggested that the maldistribution of primary-care clinicians emphasizes the need for the government to continue to provide incentives to training programs for the production of clinicians for underserved communities. Apparently, this is true for birthing providers who are not physicians as well, especially given the impact of poor pregnancy outcomes to the overall health status of the nation. As we continue to see a decline in the number of birthing providers who actually provide these services because of such things as increased liability insurance premiums, new policies are needed that control litigation awards and that will encourage providers to offer these services without penalty.
This author concludes that non-traditional methods of promoting healthy pregnancies must be developed to insure the health of mothers and infants. Considering the national health-care statistics, there is an immediate need for such services. One example of need is that women often lack important information about the relationship between smoking and drinking and LBW and pre-term births. Accessibility and availability of maternity care will continue to have an impact on poor, disenfranchised women and children as long as their needs are not considered or not being met.

CONCLUSIONS

Although this study showed a minimal statistical effect of physician supply on LBW, there are still some important results to be considered. When supply of providers is coupled with rurality, it shows a strong relationship with LBW. One implication of this finding is that these two factors in combination may be worth examining as potential and preventable causes of some adverse pregnancy outcomes. Further study in this area of multiple factors is crucial.

In future studies, it may be important to explore the link between pregnancy outcomes and birthing providers by care philosophy. Physician and non-physician birthing providers may have very different birthing philosophies both between them and amongst themselves. It would be of value to know whether these philosophies have any influence on the health status and outcomes of pregnancy and birthing women.

This study was limited in its scope of adverse outcome, by looking at LBW alone. Although LBW is a good predictor of more serious complications like infant mortality, more preventable indicators (e.g., pre-term birth, infection, etc.) might be more appropriate to use in future research. Clearly, future research potentially can benefit pregnant women and their children.
REFERENCES


THE MEDICAL POTENTIAL OF STEM CELL RESEARCH

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Stem cells are special cells that have the ability to divide for an infinite period of time and can give rise to a wide variety of specialized cells found in the human body (e.g., blood cells, heart cells, brain cells) (Ruse & Pynes, 2003). Scientists primarily work with two kinds of stem cells: Embryonic and adult stem cells. Embryonic stem cells are undifferentiated cells from an embryo that have the potential to become a wide variety of specialized cell types (Panno, 2005). Panno explains that adult stem cells are undifferentiated cells found in a differentiated tissue that can renew itself within certain limitations and differentiate to yield all the specialized cell types of the tissue from which it originated. Some researchers regard these cells as having the greatest potential for the alleviation of medical human suffering since the development of antibiotics (Panno, 2005).

Over 100 million Americans suffer from some type of disease or illness (Tesar, 2003). In general, these diseases include many chronic diseases such as heart disease, diabetes, and certain types of cancer. Many researchers hope that these diseases may be treated or cured more effectively with the help of stem cells. Tesar notes that stem cells can be isolated from embryos, umbilical cords, and adult tissues. Specifically, stem cells can be extracted from adult tissue; however, they are difficult to remove and are severely limited in quantity. Nevertheless, some evidence is emerging that adult cells may be more flexible than has been believed previously (Tesar, 2003).

Stem-cell research has the potential to affect the lives of millions of people in the United States and around the world. This research is currently front-page news because of the controversy surrounding the derivation of stem cells from human embryos. This controversy has stimulated politicians and researchers alike to debate the medical potential of stem cells. Embryonic stem-cell research had been authorized in Britain (Gershon, 2003), but it was halted in the United States by the efforts of President George W. Bush. In August 2001, Bush allowed research to resume in government labs, but restricted
researchers to use only 72 existing lines of stem cells (The White House.gov, 2001). On September 22, 2002, California’s Governor Davis signed Senate Bill (SB) 253 into law. This California legislation is the first law in the country that permits stem-cell research. The bill sets forth the justifications for supporting human stem-cell research: The economic and psychological burden of crippling degenerative diseases; the health care costs of these conditions for both the sufferer and society; and the immense promise of new therapies to treat these debilitating diseases (SB 253, 2002). The bill further notes California’s preeminent position in biomedical research and the anticipated gains to California’s economy of state support for human stem-cell research. Finally, the bill states that open scientific inquiry and publicly-funded research will be essential to realizing the promise of stem-cell research.

The promise of stem cells has three potential outcomes: Their value for basic research, the prospect of using them to treat illness and injury, and the possibility of using them to develop new medicines (Tesar, 2003). According to Tesar, many scientists believe that stem cells hold the answers to important new medicine and treatments. Stem cells have two important characteristics that distinguish them from other types of cells (National Institute of Health [NIH], 2005). First, they are unspecialized cells that renew themselves through cell division. The second characteristic is that under certain physiologic or experimental conditions they can be induced to become cells with special functions such as the beating cells of the heart muscle or the insulin-producing cells of the pancreas.

The hope that many diseases can be treated with stem-cell therapy is inspired by the historical success of bone-marrow transplants for increasing the survival of patients with leukemia and other cancers, inherited blood disorders, and diseases of the immune system (Thomas & Blume, 1999). Research by Till and McCullough (1961) identified the cell type responsible for those successes as hematopoietic stem cells (HSC), one of the few cells to be isolated from an adult stem cell. During the past 5 years, scientific reports of stem cells in the organs of mice, including brain, muscle, skin, and liver tissue have cast a new perspective on the body’s potential capability to replenish its tissues (NIH, 2001). Today, hematopoietic cells are often used to treat people with blood diseases such as leukemia and anemia (Till &
McCullough, 1961). The idea of using adult stem cells in therapeutic applications is attractive for several reasons. The first reason is stem cells are naturally poised to produce a particular tissue, which might consist of several cell types, so they should give rise to all the components of that tissue when transplanted (Maienschein, 2003). Secondly, some stem cells are able to migrate to injured tissue or other discrete sites in the body. Finally, Maienschein indicates that these cells can be engineered to produce a therapeutic drug.

HISTORY OF STEM-CELL RESEARCH

At the same time that some scientist was proving the existence of stem cells in adults, other scientists were trying to find stem cells in young embryos. The first discovery of embryonic stem cells was in 1981 by two groups of researchers, which were led by Gail Martin of the University of California–San Francisco and Martin Evans of the University of Cambridge in England (Tesar, 2003). Tesar describes the discovery of embryonic cells as having a big impact on biological research. It has increased scientists’ abilities to study how embryos develop and also their study of gene expression. Furthermore, the major turning point for the study of embryonic cells occurred in 1996, when researchers at Indiana University implanted chemically-induced embryonic cells into a mouse that subsequently became a functioning heart.

Many diseases discussed in this monograph chapter are currently being treated by gene therapy. With gene therapy, a normal gene is inserted into the genome to replace an abnormal disease-causing gene (Tesar, 2003). In addition, a carrier molecule called a vector must be used to deliver the therapeutic gene to the patient’s target cells. Currently, the most commonly used vector is a virus that has been altered genetically to carry normal human DNA (U.S. Department of Energy, 2002). Furthermore, stem-cell therapy does not depend on viral vectors to treat diseases but introduces human cells into the body in hopes of restoring a person’s health. Throughout the past several years, researchers have been studying how this therapy can assist in attaining valuable medical cures. Clearly, it is hoped that stem-cell research will be permitted so researchers can study organ development, Alzheimer’s and Parkinson’s diseases, Diabetes, and Leukemia.
BIRTH DEFECTS AND ORGAN DEVELOPMENT

A birth defect is an abnormality of structure, function, or body chemistry present at birth that results in physical or mental disability, or potentially fatality (March of Dimes, 2005). The March of Dimes web site indicates that birth defects affect about one in every 33 babies born in the United States each year. They are the leading cause of infant deaths, accounting for more than 20% of all infant deaths. Babies born with birth defects have a greater chance of illness and long-term disability than babies without birth defects (Center for Disease Control [CDC], 2005). In 1998, Congress passed the Birth Defects Prevention Act of 1998. This bill authorized the CDC to collect, analyze, and make available data on birth defects; to inform and educate the public about the prevention of birth defects; and to operate regional centers for applied research on the prevention of birth defects (CDC, 2005).

It is clear that birth defects are caused by both genetic and environmental factors; however, the causes of about 60 to 70 percent of birth defects currently are unknown. Under the Public Health Service Act (2005), support is sought for a National Cord Blood Stem Cell bank to store and distribute stem cells from umbilical-cord blood. Such a bank is noted as allowing all authorized medical personnel and researchers the ability to observe the clinical applications and benefits of using umbilical-cord blood. The preservation of placenta and cord blood also will assist with transplantation in routine or emergency situations (Public Health Service Act, 2005).

Some genetic conditions, such as sickle-cell anemia, are more prevalent in certain ethnic groups. Sickle-cell anemia occurs in one out of 600 African-American newborns (National Heart, Lung, and Blood Institute [NHLBI], 2005). From early infancy, patients with sickle-cell anemia are known to have a high risk of bacterial blood infections. Many patients develop painful crises beginning in infancy and occurring up to 20 times per year. Of course, children with recurrent crises are at great risk of dying before the age of 20 years. The median life-span of a patient with sickle cell disease is 42 years, but patients with severe disease in childhood rarely live beyond 20 years (NHLBI, 2005). According to research by Locatelli, Reed, and Bernauadin (2003), approximately 80 percent of children transplanted...
with cord blood to correct sickle-cell anemia were cured. Cord-blood transplants are especially beneficial for African-American and other ethnic minority patients because cord blood does not have to match as closely as bone marrow in order to be transplanted (Locatelli, et al., 2003). Clearly, an ethnically balanced national cord-blood stem-cell network would allow those in need to find appropriately matched cord-blood stem cells for successful treatment. This type of network also could result in a predetermined percentage of unused cord blood being distributed nationally for use in research.

TREATMENT OF DISEASES

Treatment of diseases using stem cells is the focus of research that potentially could be beneficial to a wide variety of patients. As previously noted, such research includes the study of Alzheimer's and Parkinson's disease as well as Diabetes and Leukemia, among others.

Diabetes

For decades, diabetes researchers have been searching for ways to replace the insulin-producing cells of the pancreas that are destroyed by a patient's own immune system (McKay, Blondel, Laeng, Velasco, & Ravin, 2001). Currently, it appears that this may be possible through the use of cultured embryonic stem cells. Diabetes is the seventh leading cause of death in the United States today, with nearly 200,000 deaths reported each year (American Diabetes Association [ADA], 2005). The ADA estimates that nearly 16 million people, or 5.9 percent of the United States population, currently have diabetes. They also characterize diabetes as a condition of abnormally high levels of sugar glucose in the bloodstream. Furthermore, this excess glucose is responsible for many complications associated with diabetes, which include blindness, kidney failure, heart disease, stroke, and amputations. Additionally, Type I diabetes, known as juvenile-onset diabetes, typically affects children and young adults. According to the ADA, diabetes develops when the body's immune system sees its own cells as foreign, attacking and destroying them. Type II diabetes commonly is known to affect older, sedentary, and overweight individuals with a family history of diabetes (ADA, 2005). Theoretically, embryo-
onic stem cells could be cultivated and developed into the insulin cells
of the pancreas (Assady, Amit, Itskovitz-Eldor, Skorecki, &
Tzukerman, 2001). Assady and associates contend that, with a ready
supply of cultured-stem cells on hand, the embryonic stem cells could
be retained and used for anyone whose health requires a transplant.

Parkinson’s Disease

Parkinson’s disease (PD) is a common neurodegenerative disorder
attributed to the loss of dopamine secretion in the brain (American
Parkinson’s Disease Association [APDA], 2005). The cause of
Parkinson’s disease is unknown, but it appears that it may be caused
by genetics or toxic environmental exposure. According to the APDA,
some researchers believe that the disease might be related to exposure
to environmental “toxins” in pesticides. Parkinson’s symptoms
include tremors, rigidity, and problems with walking or balance
(APDA, 2005). Other symptoms include visual impairment, muscular
stiffness, speech problems, and memory loss. The APDA estimates
that Parkinson’s disease is quite widespread, with about 150-200 cases
per 100,000 population at any given time. In addition, it appears that
about 2% of the population will develop the disease some time during
their lifespan. This association also notes that cases are reported at all
ages, though it is quite rare in people younger than 30, and the average
age at which symptoms begin is 60; the risk of developing Parkinson’s
increases substantially with age. Experiments conducted at the
National Institutes of Health (NIH) demonstrate that embryonic cells
grown in a culture and transplanted into the restricted region of the
brain as well as other post-clinical research show that the cells differ­
etiated into healthy, mature brain cells (National Research Council
[NRC], 2002).

CONCLUSION

Medical and scientific interest in stem cells is based generally on
the desire to find a source of new, healthy tissue to treat mutated or
injured human organs. Thomas and Blume’s (1999) research shows
that there are confirmed sources of stem cells in adult tissues, such as
bone marrow, that maintain the ability to differentiate into the diverse
cell types needed throughout the life of an organism. Research using stem cells will provide the ability to monitor these cells to determine why some cells differentiate and others do not, as well as to study other tissue-replacement therapies that can restore lost function in damaged organs. While the true potential of stem cell research is still in its infancy, research exploring this medical progress should continue. As the National Research Council (2002) concluded, in Stem Cells and the Future of Regenerative Medicine, “keeping as many avenues of research open as possible paves the way for therapeutic advances” (p. 49).

REFERENCES


Hypertension is recognized widely as one of the most complex, modifiable risk factors that can lead to cardiovascular disease. A variety of conditions are known to impact upon the risk of hypertension; among the well researched and commonly known conditions are heredity, dietary patterns, physical activity, and stress [19]. Hypertension is one of the most prevalent risk factors of cardiovascular disease (CVD). Persons with hypertension are known to have three to four times the risk of developing heart disease than those without high blood pressure [19]. Heart disease affects more Americans than any other diseases combined [20]. Cardiovascular disease (CVD), the disease of the heart and blood vessels, is one of the most serious diseases that leads to a greater incidence of morbidity and mortality among adults [18]. Research now indicates that between 70 and 80 percent of all diseases and illnesses are stress related [16], with CVD being no exception. With the eradication of infectious diseases of the past, deaths are now characterized as lifestyle diseases, which are diseases in which pathology develops over a period of several years or decades [18].

More than 61 million Americans have some form of CVD, including high blood pressure, coronary heart disease, stroke, congestive heart failure, and other conditions [5]. In the case of cardiovascular disease, there is no discrimination between women and men; however, women tend to be under diagnosed and treated less aggressively than men [6]. Hypertension killed 42,997 Americans in 1999 and contributed to the deaths of about 227,000 people [2]. According to the American Heart Association (AHA), one in five Americans and one in four adults have high blood pressure [2].

Data used were from the Cooperative Agreement U48/CCU409664 and obtained from the Centers for Disease Control and Prevention to the Prevention Research Center, University of South Carolina, Columbia. The contents of this work are solely the responsibility of the author and do not represent the official views of the Center for Disease Control and Prevention or the University of South Carolina, Columbia.
For the past 40 years, CVD has been mainly researched and documented as a male disease; however, more women (especially women after age 55 or after menopause) are significantly at risk of morbidity and mortality associated with heart disease than are men [5]. In fact, the AHA states that coronary heart disease and stroke remain the leading cause of death among women in America and, in 1994, accounted for 45.2% of all deaths in women [2].

Hypertension is one of the risk factors that can be hereditary but can be controlled by diet, physical activity, as well as reducing and controlling the amount of stress [18]. Hypertension has been termed as the silent killer generally because it often has no symptoms and can cause serious disease if untreated [19]. The prevalence rate for hypertension in Caucasian females is 20.5 percent, and it is 36.6 percent for African American females [2]. In addition, a higher percentage of men than women have hypertension until age 55. From ages 55-74 the percentage of women with the condition is slightly higher; after that a much higher percentage of women have hypertension than men [2]. It is hypothesized that there is an association between social roles, including type and number of roles, and influences on physical activity in African American female adults.

SIGNIFICANCE OF THE SOCIAL ROLE THEORETICAL CONSTRUCT

The construct of social roles is derived from the area of social environmental factors. The social-role construct is a broad term and can be defined as the behavior of people in relationship to positions [12]. Garvin also explains that individuals acquire and maintain various social roles in their homes, occupations, as well as in civic and community organizations [12]. Specifically, women are known to acquire more roles than men inside as well as outside of the home. The resulting role overload and role strain can contribute to increased stress [12]; however, social support also can be a protective factor in the study of role theory.

Stress is defined as any influence, which disturbs the natural equilibrium of the body, and includes within its reference such factors as physical injury, exposure, deprivation, and all kinds of disease and emotional disturbances [14]. Stress is a factor that affects individuals
differently, and long-term stress can have a detrimental impact on the functioning aspect of an individual’s life [15]. In addition, various stressors tend to take their toll on an individual’s capacity to handle various events, which may lead to a weakened immune system and increase one’s susceptibility to illness and disease. Stress is the collective impact that the rigors of life in modern-day America bring to bear on women, such as increased tempo and rapid change, demanding schedules, full work weeks, child care, single parenting, and commuting [15].

According to Seaward, there are three types of stressors that individuals experience: life events, chronic strains, and daily hassles. Life events are discrete one-time occurrences that individuals experience [16] (e.g., death, marriage, births, loss of employment, etc.). Furthermore, chronic strains are ongoing in nature and require long-term responses (e.g., long term-illness, care of a family member, etc.), and daily hassles are the minor difficulties and uplifts (e.g., parenting, work issues, family responsibilities, etc.). The daily hassles and social-role strain exert a cumulative influence on health and well-being and participation or lack of participation in physical activity [16].

The author of this monograph chapter further explains that, for the purposes of this research, role strain consists of the variety of roles that an individual assumes along with the multiple demands of those roles. Role overload was defined as a type of role strain that specifically exists among women. Although being employed outside of the home while serving as the primary caretaker of children as well as holding responsibilities in the church and community all can be pleasurable experiences, without a support system or a periodic break, women are likely to be left feeling overwhelmed in their responsibilities. It is implied in the related literature that all of the stressors combined could create pressures that are likely to induce physical and mental anguish, which could leave little or no leisure time to participate in physical activity.

Stress over time can be a constant wearing force on an individual, and the existing body of research indicates that individuals have varying abilities to withstand stress through the use of coping mechanisms, such as physical activity. When an individual’s coping resources have been depleted, it is not known how to replenish them [14]; therefore, stressors within the individual are events or series of events that
demand immediate attention to control. The pile-up of these stressors without any emotional, social, or physical outlet can cause a person to become ill [12, 14]. Role overload is a stress that results from the expectations for an individual's role performance, which may exceed an individual's available time and resources [12]. According to Ainsworth, et al. [1], two indices representing social factors were related to physical activity: Social issues and social roles. The majority of the measurement articles that were evaluated by this author assessed the construct of social roles and/or social issues simultaneously.

LITERATURE REVIEW

This chapter is focused on social roles, but it also may include a holistic view of assessing physical activity in conjunction with other constructs. The measurement studies that were researched in the preparation of this work utilized cross-sectional research designs. Studies were selected to address the relationship between social roles and/or types of social roles and participation in physical activity among African-American women. The main research question being addressed is: Do the amount and type of social roles influence physical-activity participation by these women?

Social roles exist within an identified social system; individuals are assigned or assume roles based on their position in the system. A given individual performs a specified set of behaviors and occupies a specific position. A total of six measurement research articles on social roles were selected for review. In cross-sectional studies, the entire population is addressed, and a sample is taken of the entire population. These studies provide a good assessment of the general population; however, in order to demonstrate definitive conclusions, especially regarding the temporal sequence of the association, it is desirable to conduct a cohort study. Unfortunately, no cohort studies were available for this review of literature. A detailed description of six articles can be found in Table 1. Four of the six articles used the social-role construct [1, 11, 21, 22]. The social role questions were adapted from the Lengachger and Eyler Women's Role Strain
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<th>Authors/Title</th>
<th>Sample</th>
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<td>Ainsworth et al., (2003) [1] Personal, Social, &amp; Physical Activity in African-American Women in South Carolina</td>
<td>N = 934, Analysis reported on 917 A-A women, ages 20-50 in Sumter &amp; Orangeburg Counties, selected by random-digit dialing sample.</td>
<td>Social Roles: A self-report telephone 9-item questionnaire within a 59 total item survey. A 1-4 Likert Scale (Strongly Agree-Strongly Disagree) was used. The questions consisted of barriers, tasks, responsibilities, and others. Focus groups were conducted prior to survey to assist in selection and development of telephone survey items.</td>
<td>The article did not report reliability (Chronbach's alpha) or validity for social roles. The reliability of each variable was assessed by using the one-way model intraclass correlation coefficient (ICC)</td>
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<td>Cummins (1988) [7] Perceptions of Social Support, Receipt of Supportive Behaviors, &amp; Locus of Control as Moderators of the Effects of Chronic Stress</td>
<td>N = 123, Analysis reported on 112 (62 males &amp; 57 females) sampled from evening classes in business administration at a University in the suburbs of a large metropolitan city in the southwestern U.S.</td>
<td>Social Roles: A self-reported Daily Hassles Scale of 117 events. Items included: concerns about job security, unchallenging work, misplacing or losing things, inconsiderate smokers, &amp; auto maintenance problems. A frequency score was computed.</td>
<td>The authors did not report reliability and or validity for Daily Hassles.</td>
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<td>Evans &amp; Nies, (1997) [10] The Effects of Daily Hassles on Exercise Participation in Perimenopausal Women</td>
<td>N= 35 A convenience sample of women aged 35-55 years from a large southern University enrolled as graduate nursing students.</td>
<td>Social Roles: A self-reported Daily hassles 53-item hassles portion of the Hassles and Uplifts scale. The Hassles scale was used to determine the extent to which certain events were bothersome, annoying, or irritants.</td>
<td>Cronbach's alpha for household-0.89, finances 0.93, work 0.89, environmental &amp; social issues 0.83, home maintenance 0.88, health 0.80, personal life 0.84, family &amp; friends 0.82. The reliability alpha coefficient for the hassles portion was 0.89. Validity was not reported.</td>
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<td>Evenson et al., (2003) [10].</td>
<td>N= 344 A telephone self-report survey with white, Latina, African-American, and Native American women aged 20 to 50 living in rural and urban areas of the United States</td>
<td>A person-to-person and telephone interview. Likert-type (1 strongly agree-4 strongly disagree) survey. The Social Roles scale was adapted from the Women's Role Strain Survey by Lengacher, which was to assess role strain and its relationship to physical activity. Factors included household tasks, childcare, eldercare, work, guilt, husband/partner, and other people's thought about exercise.</td>
<td>The authors used the Intraclass correlation coefficients (ICCs), which represents test-retest reliability based on a one-way ANOVA. The analysis measured subject variability between, rather than, within participants (Interrater reliability). The reliability of the social role scale was 0.64 overall. Validity was not reported.</td>
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<td>Wilbur, et al. (2003) [21].</td>
<td>N = 153 working women who were sedentary at leisure (African-American &amp; Caucasian)</td>
<td>Self-reported scale (0-3 – Not at all to Extremely): Social Roles scale (Baruch &amp; Barnett Role Quality Scales), measures rewards and concerns experience by women as workers, wives/partners, and as parents.</td>
<td>The authors reported internal consistencies for the rewards &amp; concerns of each role from 0.92 to 0.96, no evidence as to use of Cronbach's alpha. Validity was referred to in a previous work.</td>
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<td>Young &amp; Voorhees (2003) [22].</td>
<td>N= 234 African American Women in Baltimore, Maryland. Focus groups were conducted prior to survey to assist in the selection and development of survey items</td>
<td>The Women &amp; Physical Activity Survey - interviewer administered. Social roles included questions about household tasks, responsibilities for childcare, eldercare, work, and community obligations.</td>
<td>The authors did not report reliability or validity in article.</td>
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Inventory & Determinant of Physical Activity in Women Survey [1, 11, 21, 22, respectively, as cited in Ainsworth et al. (1)]. Three of the four articles define social roles in terms of types: Household tasks, Childcare, Eldercare, Work, Guilt, Partner/Husband, Others, Obligations, Organization of Time [1, 11, 22]. One article defined social roles as the experience (i.e., rewards & concerns) as wives/partners, workers, and parents [18]. The two articles that did not explicitly use social roles used the construct of daily hassles, which is related to social roles [7, 10]. As defined in these two articles, various social roles can indeed be daily hassles. Evans and Nies [10] define the daily hassles as household, finances, work, environmental and social, home maintenance, health, personal life, and family and friends. Also, a portion of the Hassles and Uplifts Scale was used [8]. Cummins [7] defines the daily hassles as concerns about job security, unchallenging work, misplacing or losing things, inconsiderate smokers, and auto maintenance problems; the Daily Hassles Scale [13] also was used as a measurement instrument. Two of the articles [1, 19] used focus groups to develop constructs and survey questions. It was hypothesized that as women become involved and overloaded in their prescribed roles that this area of social roles can be a negative influence on participation in physical activity.

Overall, the results of these studies are reported as yielding support for social roles or daily hassles being significant barriers to women’s participation in physical activity. All of the studies used primary self-reported data. One study showed that there was no association between physical-activity level and typical social roles (e.g., work, childcare, household responsibilities, involvement with community groups) [22]. In another study, women who reported lower social-role strain were more likely to meet recommendations for activity than women who reported more social-role strain [1]. Six of the eight U.S. sites in the study by Evenson et al. [11] found that the social roles scale had moderate or substantial reliability (ICC range, 0.23-0.81). One study concluded that the social-support buffer could enhance the daily hassles and lessen the effects of chronic stress (Alpha coefficient .66-.76) [7]. Evans and Neis [10] concluded that there was no statistically significant effect of the total hassles scale score on exercise. Finally, Young and Voorhees [22] report that all the social-role balance scores were positive, suggesting that overall the women perceived greater rewards than concerns from their job, parental, and partner roles.
The six articles that were reviewed demonstrate a focus on assessing social roles and how social roles may or may not effect participation in physical activity. In three articles [1, 7, 22] the reliability or validity of their measurement instruments were not reported. In the Ainsworth et al. [1] article, the reliability of each variable was assessed over a two-week period by using the one-way model Intraclass Correlation Coefficient (ICC), which is another form of reliability (test-retest/temporal stability) that the authors used. The Evenson, et al. [11] study also used the ICC, which represents test-retest reliability based on a one-way analysis of variance (ANOVA). The authors state that in a one-way ANOVA, all sources of variation other than differences among people are considered error. Two articles used ICC [1, 11] as a proportion of total variance in the measure, which addresses subject variability and measurement error. The ICC accounts for variability between, rather than within, participants. Validity (i.e., face, content, construct, or criterion) was not reported in any of the six articles that were reviewed. In the Wilbur et al. [21] article, the authors state that validity was demonstrated in a previous work and that the internal consistencies for rewards and concerns of each role ranged from 0.92 to 0.96. Evans et al. [10] reported Cronbach’s alpha for the eight dimensions of social roles that were considered a self-report of daily hassles, which included: household tasks, 0.89; finances, 0.93; work, 0.89; environmental and social issues, 0.83; home maintenance, 0.88; health, 0.80; personal life, 0.84; family and friends, 0.82. Cronbach’s coefficient alpha for the eight factors demonstrates the internal consistency of the measurements. The reliability alpha coefficient for the Hassles portion of the Hassles and Uplifts Scale [8] was 0.89.

METHODS

Participants

The Women and Physical Activity Survey was used in a telephone interview of 934 African American women living in two counties (i.e., Sumter & Orangeburg) in South Carolina. Participants were fairly equally distributed among three age groups (i.e., 20-29 years, 30-39 years, and 40-50 years); the majority of the participants had a high

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school or general-equivalency diploma (27.8%) or some college education (40.7%). Most had a family household income between $15,000 and $35,000 (52.4%), and most had at least one child living in the home (74%). Of the 917 participants in the study with complete physical activity data, 34.1% (n=313) met current recommendations for moderate or vigorous physical activity, 49.4% (n=453) were insufficiently active, and 16.5% (n=151) were inactive (as defined by Ainsworth, et al. [1]).

Data Collection Procedures

Although data were collected from 934 African American women (20 to 50 years of age) who were interviewed using the Women and Physical Activity Survey [1], all analyses are reported on 917 women with complete physical-activity data (i.e., women with incomplete physical-activity data were dropped from the sample). A sample of women for the study was selected by random-digit dialing. Response rates were 62.3% for Sumter County and 47.4 % for Orangeburg County. African American households are fairly evenly distributed across the two counties; all telephone exchanges in the counties were included in the sampling frame. When two or more household members met the screening requirements (African-American woman aged 20-50 years), the date of the next birthday was used for random selection. Telephone calls were made at various times of the day and days of the week, and each telephone number was called up to 25 times.

Survey Instrument

In the Ainsworth, et al. [1] article, the purpose of the survey was to assess socio-demographic characteristics and personal influences, social environmental influences, and physical environmental influences among ethnic-minority women. As formative work in this research, focus groups were conducted with target populations in order to identify factors that influence physical activity. The focus groups were conducted as part of the Women’s Cardiovascular Health Network Project, which informed the selection and development of survey items.

The social-roles scale was adapted from the Women’s Role Strain Survey by Lengacher and Eyler, as cited in Ainsworth et al. [1], to
assess role strain and its relationship to physical activity. The nine questions began with the phrase, "If you wanted to exercise..." Each question addressed different factors that might "get in the way" of exercising. Factors included household tasks, childcare, eldercare, work, guilt, husband/partner, and other people's thoughts about exercise. Responses were on a 4-point Likert-type scale, including strongly agree (1), agree (2), disagree (3), or strongly disagree (4), and values were averaged to compute a total score. The higher scores indicated lower social-role strain. The reliability that was assessed in this study was assessed over a two-week period by using the one-way model intraclass correlation coefficient (ICC). ICC represents test-retest reliability based on a one-way analysis of variance [1]. The ICC is the proportion of total variance in the measure (i.e., subject variability and measurement error) that was due to the true differences between participants (i.e., subject variability). The ICC is not related to the Chronbach's alpha coefficient; however, this study used the ICC for test-retest (temporal stability) reliability. The study reports the ICC for physical activity was 0.50, indicating moderate agreement. The study provided only an overview of the other variables not specifically social roles. For example, "For most of the variables we studied, the ICC was in the range of moderate to substantial agreement; only three items had fair agreement (ICC=0.23-0.29)" [1]. Validity was not reported. The statistical analysis in the study measured subject variability and measurement error. The ICC accounts for the variability between, rather than within, participants. The ratings on agreement were: 0-0.2 poor, 0.2-0.4 fair, 0.4-0.6 moderate, 0.6-0.8 substantial, and 0.8-1.0 almost perfect [1].

Analyses

The factor structure of the scale was determined by common-factor analysis. A PROMAX (oblique) rotation was planned to determine factor loadings on the second- and third-factor models. Typically, Cronbach’s Alpha is used to assess reliability of a scale; Cronbach’s alpha measures how well a set of items (or variables) measures a single one-dimensional latent construct [9]. DeVellis explains that Cronbach’s alpha is not a statistical test; it is a coefficient of reliability
Cronbach's alpha can be written as a function of the number of test items and the average inter-correlation among the items [9].

The one-factor model revealed that the main underlying construct being measured by the majority of question items could be labeled "Barriers to exercise," and of course there was not a PROMAX (oblique) rotation for the one-factor model. This result indicates that a general construct is being examined and that this construct of social roles can be named "barriers to participating in physical activity." There was one item that had a low-factor loading on this one-factor model as shown in Table 2. Generally a two-factor model successfully expands on the one-factor model by potentially distinguishing two

TABLE 2. Social Role Factor Analysis Results

<table>
<thead>
<tr>
<th>Social Role Items (1 - 9)</th>
<th>Barriers</th>
<th>Factor Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. If you wanted to exercise, household tasks like cooking and cleaning would get in the way.</td>
<td>.55</td>
<td></td>
</tr>
<tr>
<td>2. If you wanted to exercise, childcare responsibilities would get in the way.</td>
<td>.50</td>
<td></td>
</tr>
<tr>
<td>3. If you wanted to exercise, elder care responsibilities would get in the way.</td>
<td>.60</td>
<td></td>
</tr>
<tr>
<td>4. If you wanted to exercise, work would get in the way.</td>
<td>.41</td>
<td></td>
</tr>
<tr>
<td>5. If you wanted to exercise, feeling guilty for taking time for yourself would get in the way.</td>
<td>.53</td>
<td></td>
</tr>
<tr>
<td>6. If you wanted to exercise, what your partner or husband might think about you would get in the way.</td>
<td>.60</td>
<td></td>
</tr>
<tr>
<td>7. If you wanted to exercise, what other people might think about you would get in the way.</td>
<td>.59</td>
<td></td>
</tr>
<tr>
<td>8. If you wanted to exercise, community obligations or activities would get in the way.</td>
<td>.46</td>
<td></td>
</tr>
<tr>
<td>9. If you wanted to exercise, you would need to put more effort into organizing your time.</td>
<td>.26</td>
<td></td>
</tr>
</tbody>
</table>

* Chronbach’s alpha = .74

Question #9 does not load on factor one, which exemplifies that the item should be dropped or worded in a clearer manner for measuring "Barriers," in the one-factor solution.
underlying constructs (e.g., barriers & guilt/others), but a second factor was not extracted. Inter-factor correlations indicate the degree of correlations among the factors [9]; however, after further review, the one-factor model shows the most promise by successfully distinguishing one underlying construct from this questionnaire. When each question is examined by looking at the face validity of each item, the results appear to reflect this one underlying construct adequately. Chonbach's alpha for the one-factor model was .74, which indicates acceptable internal consistency. If the one item (i.e., #9) that did not load was deleted, it would not make a difference in the overall alpha. Table 2 shows the nine items used and the factor loading for the one-factor model.

Of the three separate analyses performed, the one-factor model appears to reflect social roles most accurately. In terms of interpretability, upon examination of the one-factor model, the conclusion is that this one factor is meaningful and parallel to the findings in current literature. The survey questions all contained potential “barriers.” The survey contained only 9 items, which could be an issue in assessing one or more factor models. Generally, more questions would provide a better opportunity to assess models with additional factors. The factor analysis indicates that there is a significant occurrence between the question items and the underlying construct, which is designated as “barriers to exercise”. In terms of simple structure, factor loadings typically are high for the significant factor and low for the other factors. In this case there were no other factors, and the one-factor model was significant.

DISCUSSION

The measurement literature review focused on social roles and was based on the Transactional Model of Stress & Coping by Lazarus and Cohen that was discussed by Garvin [12] and others [e.g., 8]. The articles included social roles as a contributing factor in participating or not participating in physical activity. While most studies have examined the issue of social support, few have addressed the issue of social factors such as social issues and social roles. The social roles score represented a composite of the degree to which social roles such as childcare, household responsibilities, and work interfered with physi-
cal activity. Evans et al. [10] discussed the concepts of an ethic of care and a sense of entitlement as barriers to leisure activity. In qualitative studies, it has been found that women with a high ethic of care placed the needs of others before their own and minimized their own leisure activities [1]. This issue is considered more prevalent in the African American community than among other ethnic groups. African American women often sacrifice their individual well-being for the well-being of their families and community. Often times, women with high sense of entitlement saw themselves as undeserving of leisure unless responsibilities of the family and others were met first [1].

The questionnaire that is recommended would be the questionnaire that Evenson et al. [11] utilized. The article, Test-Retest Reliability of a Questionnaire on Physical Activity and Its Correlates Among Women from Diverse Racial and Ethnic Groups [11], provides psychometric evidence on physical activity and its correlates. The questionnaire they used is reliable among diverse women who are age 20 to 50 years and from various racial and ethnic groups. The test-retest results suggest that test-retest reliability (i.e., temporal stability) is not an obstacle to comparison of associations between physical activity and several hypothesized correlates of activity [11]. The questionnaire was used successfully in assessing a variety of proposed constructs. The instrument also reflected a socio-ecologic perspective and included questions about physical activity, personal correlates, as well as social environmental and physical environmental correlates. The author states that this study is the first to report test-retest reliability estimates for the hypothesized physical activity correlates of sense of community, social issues, and social roles [11]. These construct items were included as a result of the focus groups that Evenson et al. reported. When a sample is tested and then tested again the researcher is provided with additional data that will determine if the initial results were consistent with the retest results.

In the analyses of the participants’ responses for this study, the one factor, overcoming barriers, is the most important factor in increasing physical activity. The research study of Ainsworth et al. [1] had potential limitations related to the use of self-reported survey data to classify physical-activity levels and perceptions of personal, social, and environmental supports. In the current study, the data were
obtained from African American women aged 20-50 who lived in two communities in South Carolina, which may not be representative of other populations. An understanding of social roles for determining health outcomes is beneficial not only to advance physical-activity research but also to demonstrate a better understanding of how social roles can be a benefit or be a barrier to physical activity.

Overall, studies typically vary in their conclusions due to the fact that in each study specific characteristics are defined differently (e.g., social roles, daily hassles, social role influence). The majority of the literature on social roles, social influence, or social issues constitute a relatively new area of research. Wilbur, et al. [21] reflect on the complexity of the physical-activity construct. Stress, predisposing factors, diet, number of children, use of social support as well as other factors may contribute to participation or lack of participation in physical activity. If these other factors are assessed and a holistic (i.e., mind–psychosocial, body–biophysical, and spirit–spiritual) approach is taken in addressing involvement in physical activity, perhaps, the research applications could result eventually in chronic disease being eliminated. A reason for the difference in conclusions could be that the hypotheses for each study were somewhat different. For instance, the majority of the studies reviewed types of social roles as compared to social-role influence or specific-daily hassles. The construct of social roles is complex and does not operate alone. Social roles often are assessed along with social support and stress. There are individual, community, and environmental factors, which also play a part in how individuals handle multiple roles. Additional research on participation in physical exercise is needed to further understand the decisions of African American women and assist them in making decisions that will benefit their health.

REFERENCE NOTES


PART 2:
SCHOOL OF MUSIC
Duke Ellington's musical development and personal style was strongly influenced by Victorian culture, which had been integrated into middle class Black society in Washington, D.C. during the early 1900's. Ragtime music, which during the early 1900's was a form of rebellion against Victorian culture, also strongly influenced Ellington’s musical development. This monograph chapter will discuss how Victorian culture, Washington, D.C. Black society, and ragtime music all contributed to Ellington’s personal style and musical development.

Black Society in Washington, D.C.

When Edward Kennedy Ellington (Duke Ellington) was born on April 29, 1899, Washington, D.C. had the largest black urban community in America. One of the reasons, at the beginning of the 20th Century, Washington, D.C. had one of the largest Black urban communities in America was because of the educational resources that were available for Blacks in that city. In 1864, a law was passed that required the city to provide a Black public-school system. This separate but equal public school system, which was created for Blacks, gave them an opportunity to educate themselves and also to learn politics. In 1867, after the Civil War, Howard University was established and quickly became recognized as Black America’s seat of learning. These educational opportunities for Blacks in Washington, D.C. attracted other Blacks from all over America. By the early 1900's, Washington’s Afro-American society boasted the highest standards of culture enjoyed by Black people anywhere in America. Blacks in Washington, D.C. were benefiting from the educational opportunities that were available for them in the city, but they also created a cultural divide within the Black community. This particular Black community

1 Stuart Nicholson, Reminiscing In Tempo (Boston: Northeastern University Press, 1999), p. 3.
2 Ibid.
3 Ibid.
4 Ibid.
was described as being divided into the upper class, which was educated and cultured, and the lower class that was not educated and worked in blue-collar jobs. The upper class Blacks in Washington took the white middle class as their cultural model.\textsuperscript{5} The white middle class had a culture that was strongly Victorian; therefore, upper-class Blacks who lived in Washington, D.C. during the 1900’s had integrated Victorian culture with their African heritage.

**VICTORIAN IDEALS**

Blacks have been forced to view the mainstream culture with two eye covets: One tries coveting the advantages whites seem to possess, and the other is angrily trying to reject a culture to which they have trouble laying claim.\textsuperscript{6} During the 1900’s, Blacks had to deal with the challenge of trying to be accepted in American society by incorporating some Victorian ideals within Black culture, but at the same time they apparently were denying their own African heritage. W.E.B. DuBois has labeled this double outlook on life as looking through a veil in his book, *The Souls of Black Folks*. Some of the Victorian cultural ideals that were adopted by these Blacks, who lived in Washington, D.C. during the 1900’s, were the formal manner of dress and behavior as well as a genteel interest in the arts. Art, and especially good music, had moral connotations to the Victorians. Music was thought to be uplifting and to turn the mind to higher things and away from depravity and corruption.\textsuperscript{7} According to biographers, Duke Ellington’s family was a member of the Black society that adopted these Victorian ideals, which also contributed to Ellington’s personal style and musical development.

**DUKE ELLINGTON’S FAMILY ENVIRONMENT**

Duke Ellington’s family was a part of a social group whose morals were steadfastly Victorian. This social group shared a genteel interest in the arts and expected their children to aspire to the highest

\textsuperscript{6}Ibid.
\textsuperscript{7}Ibid.
standards of education and deportment. Ellington apparently grew up in an environment in which he was encouraged to take pride in his personal appearance and also in his African-American heritage. Ellington’s father, James Edward Ellington, was a well-dressed man who belonged to a circle of caterers that would cater for the White House and members of the white middle class. According to Ellington’s autobiography, his father provided the best food for his family. Ellington’s personal style also was influenced strongly by his father; clearly, James Ellington influenced the way Duke would dress and talk with women, and he also taught his son to be independent. James Ellington raised his family as though he was a millionaire, even though he literally was not a millionaire. According to Duke Ellington, the values that were taught to him by his family also were being taught to him in the Black public school system in Washington, D.C.

WASHINGTON’S BLACK PUBLIC SCHOOL SYSTEM

Proper speech and good manners were stressed constantly in the Black public schools that Duke Ellington attended in Washington, D.C. Ellington typically was described as being well spoken and having good manners all throughout his life. Ellington’s wonderful speech was a product of the learning environment in the Black public school system in which Ellington grew up. Ellington apparently learned that having proper speech and good manners would help Blacks command respect from the white middle class. The Black public school system in Washington also strongly incorporated Negro history into the curriculum. Thus, Ellington clearly believed that creating an environment that taught Black students about their ancestry helped them to have more pride in their race. Although he had these Victorian ideals incorporated into his family and school environment, it actually was ragtime music that seemed to spark his interest in music.

10 Ibid.
11 Ibid, p. 17.
12 Ibid
ELLINGTON’S MUSICAL DEVELOPMENT

Duke Ellington described his mother and father both as being able to play the piano. Ellington’s mother would play things like *Meditation*, which he described as making him cry. Ellington’s father would play operatic music on the piano by ear. Ellington’s mother tried to give him formal music lessons when he was young, but Ellington indicated that he wanted to go outside and play baseball like all the other eleven-year olds. So at an early age Ellington said he began to reject Victorian classical music. Ellington’s mother would continue to try and give him formal piano lessons, but eventually she allowed the piano to fade into the background because of Ellington’s genuine interest in drawing and painting. Ellington’s interest in the piano was sparked one summer while returning from vacation and passing through Philadelphia. He described hearing a young pianist named Harvey Brooks, who was swinging and had a tremendous left hand. When Ellington got home he had a real yearning to play the piano. Ellington tried to study with some of the local ragtime pianists in Washington, D.C., but he indicates in his autobiography that he could not duplicate anything they were playing.

Later on Ellington clearly tells of being confined to home for a couple of weeks because of a cold. He started to play around on the piano, which led to his first composition called *Soda Fountain Rag*. Ellington kept playing his rag composition repeatedly, and eventually he got better as a pianist; he also would listen to other ragtime pianists around Washington. When Ellington started to play the piano at local parties, he noticed that there was always a pretty girl standing down at the bass clef of the piano. This is how Ellington’s musical career as a pianist and composer began.

VICTORIAN IDEALS AND JAZZ MUSIC

Although at an early age Duke Ellington rejected formal western-classical training on the piano, which is a product of Victorian culture,
Ellington later in his compositional career would combine western-classical and jazz music. One way that Ellington apparently combined Victorian ideals with jazz music was by labeling his jazz band an orchestra. A symphony orchestra, which is a product of Victorian culture, typically consists of string, woodwind, brass, and percussion sections. Traditionally, a jazz band, however, consists of just woodwinds, brass, and percussion sections. Historically, the saxophone is a woodwind instrument that would not be included in a symphony orchestra, but it is an instrument played regularly in a jazz band. Also, the only string instrument that is part of a jazz band is a double bass, which is a string instrument traditionally played in a symphony orchestra, but it is considered a percussion instrument in a jazz band. Ellington's choice of instruments for his jazz orchestra is only one manifestation of his merging of classical and jazz music.

In 1970, which was toward the end of his life, Duke Ellington composed his *Suite from 'The River'*. According to his biographer, Ellington had respect as a composer worldwide by 1970. This composition is clearly a combination of jazz and western-classical music. In the *Suite from 'The River'*, Ellington composed a classical symphony, which consists of strings, woodwinds, brass, and percussion sections. Moreover, he also combined the western classical and jazz genres in another way; specifically, he decided to add another element to this composition by having Alvin Ailey choreograph dance for several movements of this monumental work. This composition is judged to be the accumulation of everything to which Ellington apparently had been exposed in the music world. The fact that Ellington used the instrumentation of a classical symphony and also used movements with titles indicates the influence of Victorian culture and western classical music; however, Ellington also included the swing band sound in this composition. Finally, his inclusion of dance, which was choreographed for seven out of ten movements results in this composition being classified as a ballet, swing and orchestral piece, which is clearly a fusion of western classical and jazz music.
CONCLUSION

Duke Ellington's music and personal style is a product of Victorian culture and jazz music based on this author's knowledge and review of three publications chronicling his life. Ellington's childhood environment taught him the ways of Victorian culture, but it also kept him grounded in his African-American roots. As a result of this duality in his upbringing, Ellington was able to channel both his knowledge of Victorian and African American culture to create great music that would appeal to all races, social classes, and age groups. As a result of Ellington's fusion of Victorian and African American cultures, which can be heard within his music, he is considered to be one of the greatest composers of the twentieth century.

REFERENCES

PART 3:
COLLEGE OF ARTS AND SCIENCES
DETERMINING THE THICKNESS OF AN ALLUVIAL SAND USING GROUND-PENETRATING RADAR

Adrian D. Addison

*Department of Geological Sciences*

Water for the customers served by the Startex Jackson Wellford Duncan (SJWD) Water District comes via the Middle Tyger River at Lyman, SC. Decreasing the cost of operation is always of importance to businesses trying to serve the needs of their customers. One way of accomplishing a cost savings for SJWD would be to find an alternative that would limit the number of chemicals used in the treatment of river water at their facility near Lyman Lake. In conjunction with the United States Geological Survey (USGS) and the University of South Carolina’s Geophysical Exploration Laboratory (GEL), SJWD is undergoing research to potentially use the land around their facility to “pretreat” the water. The USGS and GEL groups are working together to use hydrogeological and geophysical techniques to evaluate the feasibility of such a treatment from a geologic perspective.

Excavations in the vicinity of Lyman Lake have exposed alluvial sands that could be used as a confined aquifer for the bank filtration method of “pretreating” drinking water. The alluvial sands were created through erosion of the hard rock not only by the river but also by other processes. This “pretreatment” by the bank-filtration method would be utilized at SJWD by adding a groundwater-well network, inducing infiltration of surface water from Lyman Lake through the aquifer in the alluvial sands. In this way, the aquifer could provide “pretreatment” for the surface water, which would produce higher-quality source water than currently available. If effective, this “pretreatment” by bank filtration has the potential to lower the SJWD Water District’s water-treatment costs, and it also uses a natural, geologic process rather than a chemical one (Campbell & Journey, 2004).

The placement of groundwater-production wells adjacent to the surface-water bodies is often used to induce infiltration. There is an assumption that the bank-filtration process improves the quality of the water produced from the wells by removing pathogens and other contaminants that may be present in the surface water (Campbell & Journey, 2004).
GPR is a geophysical method, which samples electrical-impedance differences from subsurface features at high-resolution (i.e., centimeter to sub-meter) vertical and horizontal scales, and it has many advantages such as mobility, rapid acquisition, cost effectiveness, almost near real-time interpretation, lack of invasiveness, and/or numerous applied and experimental research applications (Daniels, 2004). The GPR method is described as working by emitting an electromagnetic (EM) pulse into the ground through a transmitting antenna and recording echoes from underground changes in electrical properties by a receiving antenna. Furthermore, these echoes build a radar image that is processed subsequently and interpreted in ways that are similar to seismic methods. Whereas the seismic reflections are produced by changes in elastic velocities and densities, the GPR reflections represent changes in dielectric permittivity, magnetic permeability, and electrical conductivity, often imaging interfaces that cannot be seen on seismic-reflection data (Baker, Steeples, Schmeissner, Pavlovic, & Plumb, 2001).

SCOPE OF WORK

The purpose of this research is to examine the use of the GPR method in conjunction with other techniques in order to determine the hydrogeology and water-transmitting properties of the alluvial sand at the proposed site. In the case of the SJWD site, the most feasible area of study with these techniques may be the coarse-grained sand that lies in the river channel. The GPR was used to determine the extent of the alluvial sand in and on the banks of the river. Data collection, processing, and interpretation are the areas of focus for this monograph chapter.

DATA COLLECTION

GPR data were collected using Ramac and pulseEKKO 100 systems (available from Malå GeoScience [2005] and Sensors & Software [2004], respectively). In addition to the GPR data collection, Global Positioning Systems (GPS) data were collected to determine accurate locations of the GPR lines as well as accurate spatial relationships among the GPR sections. GPS data were collected simultaneously by synchronizing the GPS measurements with those of
the GPR using the Trimble GPS Pathfinder unit (available from Trimble Navigation Limited). Twenty-nine GPR survey lines were collected in three separate trips, using two different systems (i.e., the Ramac and the pulseEKKO 100). The data were collected using three frequency antennas (i.e., 50, 100, and 250 MHz) in two distinctive reflection acquisition modes, which are common-offset and central mid-point (CMP). The common-offset mode was used as single-fold profiling for large spatial coverage, while the CMP mode was used for velocity analysis and further calibration with the common-offset gathers shown in Figure 1.

**Figure 1:** Two types of GPR reflection acquisition, the common-offset (top) and central mid-point (CMP) used in this study (adapted from Neal, 2004).

![Diagram of GPR reflection acquisition](image)

The first dataset consisted of 14 lines that were collected using the Ramac system with 100 and 250 MHz antennas while using 4 stacks per trace for an increased signal-to-noise ratio. These profiles were collected both in the river and on the banks. The second dataset of 10 lines was collected using the Ramac system but was restricted to the river with 64 stacks per trace for an improved signal-to-noise ratio. The third dataset was acquired using the pulseEKKO 100 system and consisted of four common-offset profiles and a central mid-point (CMP) line on the river bank.

The Ramac system contains shielded antennas (for optimal data collection in noisy environments), while the pulseEKKO antennas
were unshielded. Shielded antennas are primarily used for mid- to high-resolution radar surveys since they restrict the depth of penetration, whereas the unshielded antennas are commonly of lower frequency and allow deeper penetration in the detriment of noisier data collection (Malå GeoScience, 2005). The added advantage of the pulseEKKO antennas is that they are completely independent from each other, allowing the user to run CMP survey lines with increasing antenna separations. The common-offset surveys with the pulseEKKO 100 system were performed such that the receiver and transmitter antennas maintained a fixed separation distance while being moved in a step mode at a constant rate in the direction of the survey. During the CMP survey, the 50 MHz receiver and transmitter antennas started with a separation distance of 2 m and each were moved 1/2 the step size (i.e., 50 cm) apart away from one another. Common-offset surveys with the Ramac system differ from the pulseEKKO 100 in that all Ramac data were collected at set-time intervals in a continuous-acquisition mode.

DATA PROCESSING

All unprocessed radar traces contain “wow”. “Wow” is due to the saturation of the receiver electronics by a high-amplitude signal (Gerlitz, Knoll, Cross, Luzitano, & Knight, 1993). The “wow” is present along with the signal in the trace, but the “wow” skews the data to more negative than positive (or vice versa) reflection coefficients, which results in each trace having a non-zero mean. Furthermore, this “wowing” makes the data appear to have high-amplitude reflectors near time zero but no reflectors below a minimum recording time. When the “wow” is removed properly, the reflectors can be seen throughout the time section from the minimum to the maximum recording time. The “wow” in the SJWD data-collection effort has been removed by the Ramac Ground Vision and the EKKO View Deluxe GPR processing software by applying a low pass frequency filter that removes the high frequencies.

Automatic Gain Control (AGC) is a time-dependent, exponential-amplitude gain that compensates empirically for amplitude attenuation with depth (Fisher, McMechan, Annan, & Cosway, 1991). An AGC was applied to the data to boost the reflectors at larger depths. In
processing the data, an AGC window length of 200 ns and a scaling factor of 2000 were applied.

Bandpass frequency filtering is used to remove unwanted frequencies that are commonly associated with noise. A bandpass filter is set up to analyze the average-amplitude spectrum of a dataset and noting the range of frequencies that are wanted (Fisher, et al., 1991). For the SJWD dataset, a bandpass filter was used with center frequencies at 50 and 150 MHz; however, a smaller bandwidth was used for the velocity analysis.

In general, velocity analysis is performed in order to obtain accurate electromagnetic velocities for the various geologic layers imaged during data collection with the goal of calculating correct depths of reflectors. Velocities of radar-wave propagation generally decrease with increasing depth (Fisher et al., 1991). The velocity analysis performed in this study yields a range of velocities from 0.13 to 0.29 m/ns. The velocity of 0.15 m/ns (Sensors & Software, 2004) is a reasonable velocity for dry sand or soil, which is feasible based on the location of the CMP line near the treatment facility; however, the surveys collected on the opposite bank and in the channel differ, in that the subsurface is saturated with water. The water table is shallow on the bank that is opposite of the treatment facility; therefore, a velocity of 0.06 m/ns (i.e., average velocity of wet sand) (Sensors & Software, 2004) was used to convert the travel time to depth by using the formula (where, $v$ is the velocity, and $t$ is the time):

$$D = \frac{v \times t}{2}, \quad (1)$$

**BORINGS AND CORINGS**

Ten borings and two cores were collected along the right bank and in the channel in order to help with the stratigraphic delineation and correlation with the GPR data. The borings were performed with a hand auger, and the sediments from each boring were collected and described. The cores contained dense-clay deposits overlain by coarse-grained sands. The combined boring and core data provided the appropriate calibration for the GPR data-geologic interpretation.
RESULTS AND INTERPRETATIONS

There were 29 GPR lines collected for this study; however, only the highest quality lines were used in preparing this report. Lines collected on the left bank of the river near the facility were used for the CMP.

Line 1 was collected in the river and yielded interesting results. The horizontal distance of 125 meters was estimated by using Arc Map 9.0 and the depth was calculated by using the mean velocity of 0.06 m/ns. The reflector at 4 m depth or 150 ns is interpreted to be the contact between the coarse-grained alluvial sand and clay based on correlation with coring and well-placement data. The thickness of the alluvial sands vary along the section from the thickest near the dam, at 3 m, and the thinnest, at 0.5 m, between Lines 114 and 115.

Cross sectional lines 3, 112, 114, and 115 were collected to determine the extent of the alluvial fan from north to south in the river channel. Line 3 is the closest to the dam while Line 115 is at the farthest end of the area of interest. The horizontal distances of the lines were calculated using Arc Map 9.0 and range from roughly 30 (Line 3) to 20 m (Line 114). Line 3 has the best reflection of the bottom of the sand at ~7 m with a thickness of 3 m. Lines 112, 114, and 115 were interpreted by comparing their locations with that of Line 1. On Line 112, the thickness of the sand ranges from 2 to 3 m from South to North. On Line 114, the thickness is 2.5 m, while on Line 115 the thickness is roughly 1 m.

DISCUSSION AND CONCLUSIONS

GPR radar data were collected at the Startex Jackson Wellford Duncan Water District to aid in the evaluation of bank filtration at the site. Interpretation of the GPR data relied on calibration with cores and boring data. The use of the GPR method as part of this study proved to be a valuable tool in the delineation of the alluvial sands in the river channel. The delineation of the sands on the banks proved more difficult to assess because of the higher clay content and noise from cultural objects such as buildings, electrical lines, and pipes. The alluvial sand in the river channel ranged from a thickness of 1 to 3 m. The alluvial sand is thickest near the dam and thins moving upstream.
Although only the clearest of 29 lines were used in the analysis, the cross sectional lines 3, 112, 114, 115 were difficult to interpret; however, they correlate well with Line 1.

In addition to determining the thickness of the alluvial sand at the site, the GPR may be used in making a rough estimate of the hydraulic conductivity of those sands. The GPR measures the changes in dielectric constants between two layers by using an electromagnetic (EM) energy (Daniels, 2004). Daniels also purports that the velocity and changes in impedance of GPR data are dependent on water content. Therefore, a correlation between GPR data and hydro-geological parameters such as conductivity can be made using mathematical techniques, and this will be the focus of further analyses of these data.

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MINNIE WALKER JOHNSON:
ENCOURAGING EXCELLENCE AND ACTIVISM

Nancy Brown

Department of History

“And guidance counselor Minnie Johnson in her regal way, reminded Johnny James of the standard which was excellence”

The State

On the evening of December 17, 1979, Nefertiti, Inc., a Columbia, South Carolina African American social club, honored Minnie Walker Johnson at its annual function. The occasion highlighted the 1979 social season. The evening’s theme “A Tribute to Minnie Walker Johnson Outstanding Educator and Civic Leader” epitomized Nefretiti’s mission of supporting and enhancing educational and cultural opportunities for young African Americans. Members of the organization mentored students, staffed tutorial programs and sponsored cultural events. The attendees gathered to honor their friend, peer and co-worker, Minnie Walker Johnson, as well as to support the club’s endeavors. Present at the event honoring Johnson were Columbia’s education, business, political, affluent and socially active African Americans. She was a prominent member of this group.

A slender brown-skinned woman of medium height and aristocratic bearing, Johnson had been active in Columbia’s educational, business, civic, cultural and social circles for over fifty years. Johnson’s dignified comportment, an outcome of her upbringing, training and philosophy, along with her educational and professional achievements garnered respect and admiration. She

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2 Minnie Walker Johnson Collection, Manuscript Division, South Caroliniana Library, University of South Carolina. The collection consists of four boxes (5 linear feet) of papers and photographs. Hereafter referred to as the Johnson Collection.
3 Nefertiti was a social cultural group whose mission was to enhance the image of and improve the prospects of African Americans in Columbia, South Carolina.
4 Minnie Walker Johnson Collection, Visual Division, South Caroliniana Library, University of South Carolina. The photographic collection (1.4 linear feet) includes photographs of Minnie Johnson, her family and friends. Hereafter the collection will be referred to as the Johnson Visual Collection.
gained entree and acceptance into civic and professional organizations where Blacks were not normally welcomed. Resisting the boundaries imposed on her by a segregated educational, political and social system, Minnie Walker Johnson’s life illuminates the struggles and conditions that African Americans faced in southern communities, irrespective of their achievement and status.

Johnson’s elevated educational, economic and social status did not prevent the vagaries and oppression of Jim Crow from impacting her life and the fulfillment of her ambitions. Johnson could have isolated herself from the problems of her community. She instead involved herself in various civic activities that sought to improve the conditions and prospects for Columbia’s African American community.

Described in an article in the Columbia Record as “promot[ing] a positive image of blacks in the community” Johnson epitomized the concept of the “Politics of Respectability”. African Americans were cognizant of the negative perceptions about them. Some endeavored to counteract such impressions by being circumspect in manner, speech and dress. Such decorum meant more than exercising “civilized” behavior; it was a strategy that endeavored to refute the supposition that African Americans were not ready for full equality in American society.

Johnson grew to adulthood during the nadir of race relations in America. It was during this period that the generation of Black women, which scholar Stephanie Shaw documents in What a Woman Ought to Be and to Do, Black Professional Women Workers During The Jim Crow Era, were raised. Shaw asserts that this generation of Black women was reared strategically. “...[The] strateg[y] reflected concern for the equally important aspects of formal schooling, respectable behavior, self-assurance, self-discipline, and social responsibility.” Johnson internalized the values represented by the strategies she practiced. She represents how the combination of

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5 Columbia, South Carolina, The Columbia Record, August 9, 1979, “Retirement Doesn’t Change A Fighter”, p. 1-C. Hereafter referred to as The Columbia Record. 1896 Supreme Court Decision that legalized the “Separate but Equal” doctrine.


7 Stephanie Shaw, What a Woman Ought to Be and to Do Black Professional Women Workers During The Jim Crow Era (Chicago, University of Chicago Press, 1996) p. 16.
determination, sacrifice, and strategy was integral to the ability to circumvent the psychologically damaging aspects of Jim Crow and to overcome the concomitant sociological challenges. It was this combination of values and an activist strategy that enabled African Americans to overthrow Jim Crow laws and change the prevailing culture.

During the late nineteenth and early twentieth centuries, America was a place of oppression for African Americans, and the period was one of regression of their civil and social rights. Beginning with the *Plessey v. Ferguson decision the Jim Crow culture evolved from de facto to de jure*\(^8\). Black political and social progress achieved during Reconstruction was deliberately and systematically rescinded. Black parents recognized that Black girls (children) were especially vulnerable and that as a result needed special nurturing. "... [W]hile recognizing and maneuvering against the vulnerabilities entailed by being black and female, parents designed child-rearing strategies that would help to ensure the personal, academic, and professional success of their daughters."\(^9\)

Despite Jim Crow and its attendant challenges, Minnie Walker Johnson obtained an education. It enabled her to help others in a myriad of ways. Starting with her education, she achieved success through the combination of parental and spousal support, determination as well as personal sacrifice.

**EARLY EDUCATION**

Johnson's education began at the Loomis Street School in Chester, South Carolina, her birthplace. Her parents John and Lorinda Walker were natives of Chester. In addition to Minnie, there was her sister Lucille who was three years younger.\(^10\)

In the early twentieth century, Chester, South Carolina, the county seat of Chester County, was a small rural town in the Piedmont area of the state. Agriculture drove the economy of the surrounding area. In 1910, John Walker worked at an "eating house" on the town's main

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\(^8\) 1896 Supreme Court Decision that legalized the "Separate but Equal" doctrine.
\(^9\) Shaw, p. 16.
thoroughfare and Lorinda is identified as a cook. The lack of economic opportunity for Blacks in the rural south coupled with the racial climate caused many African Americans to become part of “the great migration” out of the South. The Walkers left Chester and joined the African American migration north. By the early 1920s the family was living in New York City.

In New York City, Minnie attended Wadleigh High School, a prestigious public school for girls. Her experience at Wadleigh showed her that race was not a determinant of ability. As one of a small number of Black girls attending the predominately white school, she excelled academically. Johnson reflected in later years that it was during this period that she began to realize and understand the difference between the education offered to southern Black children and that which was available at a school such as Wadleigh. She further began to understand that a good education was essential for individual and group progress. Scholar James D. Anderson, in The Education of Blacks in the South, 1860-1935, documents the history of the battle waged by African Americans to obtain an education. Black education was inadequately funded, given sub-par facilities, and staffed with poorly-trained teachers.

Minnie Walker’s time at Wadleigh ended in 1924 due to the dissolution of her parents’ marriage.

John and Lorinda Walker separated in 1924. He moved to Washington, D.C., but the Walker women returned to the South. Lorinda and Lucille Walker moved to Columbia, South Carolina where Lorinda opened a dressmaking establishment and Lucille attended school. Minnie transferred to Scotia Seminary in Concord, North Carolina where she completed her secondary education in 1926.

11 Chester City Directory (1910) Chester, South Carolina, Chester Public Library, Local History Room.
13 Johnson Collection, Education Folder.
15 Johnson Collection, Education Folder; Richland School District One, Employment Verification Record.
16 The Columbia Record, August 9, 1979.
18 Columbia City Directory (1925-1926) Columbia, SC, Richland County Public Library, Local History Room.
Scotia Seminary, founded in 1867 and supported by the Presbyterian Church, was an elite Black school for young women. After she graduated from Scotia, Johnson attended Hampton Institute for a year. Hampton Institute’s culture was similar to that of Scotia Seminary.

In 1926, Hampton Institute was known as one of the premier institutions of higher education for African Americans. It was founded in 1868 by Brigadier General Samuel Chapman Armstrong on the banks of the Virginia Peninsular. The guiding principles of “Education for Life” and “learning by doing” were embraced by its students, “promising young African American’ whose mission was ‘to lead and teach their newly freed people.” Hampton is described by author, Cynthia Neverdon-Morton as a place where “The orientation toward community service, evident in Hampton’s academic program, its teacher training,...its extra-curricular activities, had a profound impact on the thinking and future undertakings of its graduates.” The school has adhered to those basic precepts through the years. Johnson entered Hampton Institute in 1926. She left that institution in 1927 to get married.

In September of 1928, Walker married Willis Curtis Johnson, a successful Columbia mortician, businessman, and a member of one of Columbia’s most prominent Black families. He was the son of the Reverend Mack George Johnson, who was the first Black pastor of Ladson Presbyterian Church. Reverend Johnson pastured Ladson for 42 years.

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19 Johnson Collection, Education Folder, Richland School District One, Employment Verification Record.
21 WWW.hamptonu.edu/about/heritage.htm
23 State of South Carolina, County of Richland, Probate Court, Marriage Certificate # 19179; The Columbia Record; Columbia, South Carolina, The Palmetto Leader, “Under The Capitol Dome”, September 28, 1928, Richland County Public Library, Local History Room.
CAREER

In the year after leaving Hampton Institute and before her marriage, Johnson taught at the Booker T. Washington Elementary School. Clearly, it was not unusual for elementary school teachers during this period to teach without an undergraduate degree; "...only about 9 percent of the black elementary school teachers had at least a bachelor's degree."\(^{25}\) After her marriage, she taught at the Waverly School near her home on Hampton Street for several years.\(^{26}\) Johnson also continued to work toward completion of her undergraduate degree.

Between 1930 and 1935 Johnson attended summer sessions at Hampton Institute and took classes at Benedict College, in Columbia, in an attempt to complete her degree requirements.\(^{27}\) During this period Benedict College was not accredited, and this lack of accreditation coupled with the alternative of slowly acquiring credits through summer classes dismayed Johnson.\(^{28}\)

Minnie Johnson's desire for an undergraduate degree could only be fulfilled through personal sacrifice. Johnson, supported by husband Willis, became a full-time boarding student at Johnson C. Smith University in Charlotte, North Carolina. She graduated, *Cum Laude*, from Johnson C. Smith in 1937 with a degree in English and History.\(^{29}\) Johnson then returned to Columbia and resumed teaching for another year.

Despite her demonstrated belief in education, Johnson stopped teaching in 1939 and did not return to the classroom until the 1950s. During the next decade, she worked for both the city and federal government in a series of administrative positions. In the early forties,


\(^{26}\) Johnson Collection; Ethel Johnson Berry, interview by author, written notes, February 8 & 14, 2004, Columbia, South Carolina. Berry is the daughter of C. A. Johnson and Minnie Johnson's niece.

\(^{27}\) Johnson Collection; Richland County School District One Employment Verification Record, Richland County School District One Headquarters, Richland Street, Columbia, South Carolina.

\(^{28}\) *The Columbia Record*, August 9, 1979, p. 2-C.

\(^{29}\) Richland County School District One Employment Verification Record; Johnson C. Smith University Archive, internet access; Ethel Johnson Berry, interviewed by author, written notes, Columbia, South Carolina, February 8 & 15, 2004; Johnson Collection.
Johnson worked for the Columbia Housing Authority. After World War II began, she was the director of the Colored USO in Columbia. In 1942, Johnson accepted a job with the OPA (The Federal Office of Price Administration). By the end of World War II, she was the chief clerk at the OPA office in Columbia. Johnson, in addition to her municipal and federal employment, worked in the family business, the Johnson Funeral Home.

The Johnson Funeral Home was founded by Willis Johnson in 1915. It was the main business of the many enterprises that the Johnsons invested in or owned. Over the years, the Johnsons shared and exchanged managerial responsibility for the funeral home. The couple worked as a team, with Minnie, in later years, as the more public person. Both of the Johnsons worked professionally, publicly and privately, to improve Columbia's African American community. The Johnsons endeavored to increase educational, economic, and political opportunities despite the obstacles of racism and segregation.

Willis Johnson was a founder of the Colored Undertakers Association, secretary-treasurer of the Negro Business League, and both the Johnsons were early and life-long members of the NAACP. The South in the late twenties and up to the fifties was not a hospitable place for the NAACP. African Americans who were known to support the civil rights organization were subject to physical and economic retaliation. The Johnsons were not as vulnerable economically as some others because of owning the Funeral Home. The couple's economic independence allowed them to support diverse civic activities such as sponsoring scholarships and underwriting trips for Black students. The activities that were underwritten by the Johnson Funeral Home demonstrated the business acumen of this couple and their support.

Minnie Johnson returned to the classroom in the 1950s by which time she had earned a Master's Degree in Social Science from New

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30 The Johnson Collection, Career Folder.
31 Williams, Calvernetta Beasley, *The South Carolina Morticians Association, Inc. Formerly Known as The Colored Funeral Directors and Embalmers Association of SC* Columbia: Benedict College Communications Center, 2002.
32 *The Palmetto Leader*, 1926; NAACP Files, Columbia, South Carolina Branch Membership Report, February 2, 1927.
York University. Over time she taught English, Social Studies, Psychology, and Philosophy. As a teacher in Columbia’s segregated education system, she sought to prepare students to compete in a changing world. Remembering those times, she commented that “despite the lack of supplies and with only used books she and other teachers educated their students well”. Many Black educators were known for approaching their work with missionary zeal. Johnson and other Black teachers set high standards for their students because they knew that in the prevailing culture of racism, Blacks had to be twice as good as their white counterparts.

Fifteen years after Minnie Johnson’s death, in an article about C. A. Johnson High School, she was remembered by a former student as always having high expectations for the students. Johnson not only expected excellence, she also helped the students achieve their goals by going the “extra mile” for them.

Along with her professional responsibilities, Johnson was involved in many civic activities. She knew that social change was on the horizon. She believed in, advocated, and demonstrated that proper preparation was necessary for any task or endeavor. Following through on that philosophy, Johnson became a guidance counselor. She was the first Black person, to become a certified guidance counselor in the Richland One School System. Certification requires that a guidance counselor meet criteria of education, testing, and applications that were set by the school system and the professional certification committee.

Johnson encouraged and fostered intellectual development in her students and encouraged the pursuit of excellence, but her interest was not confined to a student’s academic performance. Hers was a holistic approach; Johnson introduced her students to both art and culture.

34 Richland County School District One Employment Verification; Johnson Collection; The Columbia Record.
35 The Columbia Record, April 9, 1979, p. C-1.
37 Richland County School District One Employment Verification; Columbia, South Carolina, The Hornet (C. A. Johnson High School Paper); Johnson Collection, Community Folder; The State, April 8, 1988, “Minnie Walker Johnson, former teacher, civic leader”.
38 Richland County School District One, Employment Verification; Columbia, South Carolina, The Hornet (C. A. Johnson High School Newspaper); Johnson Collection, School Folder.
She took them to ballet performances at the Township, organized United Nations Days, and invited foreign students to meet and talk with the students. Johnson was cognizant of the need to make a good impression physically as well as intellectually. She also was remembered for helping them learn what was correct attire and demeanor for all occasions.

In a recent interview in The State Newspaper, Johnny James, C. A. Johnson senior class president in 1963, remembered how “guidance counselor Minnie Walker Johnson, in her regal way reminded [me] of the standard which was excellence” and how she helped students improve their personal appearance without demeaning them. James described how Johnson took him aside to advise him of the correct way to wear his jeans. He recalled that his jeans were “hiked up” which was unattractive and made him look awkward. Johnson advised him to wear a belt instead of suspenders. Instilling a desire for excellence in her students was important to Johnson, but she also worked to make sure that there were opportunities for them across the board.

In 1969, Johnson retired from the Richland One School System, but she didn’t stop working. Johnson, at the request of Columbia's Mayor Lester Bates, helped to organize and manage the Career Guidance Center, which was established to improve employment opportunities for youths. She and the staff endeavored to see that young people had the skills necessary to enter the job market and then matched them to appropriate jobs.

Johnson credits the Career Guidance Center with helping to keep the peace during a potentially volatile time. The late sixties was a time of urban unrest through the country. Young people were agitating for and against numerous issues such as jobs. The Career Guidance Center provided training for unskilled youths. The counselors helped the participants develop resumes and prepare for interviews with prospective employers. Through the auspices of the Career Guidance Center.

41 Richland County School District One Employment Verification; Columbia, South Carolina; Johnson Collection, Career Folder.
42 The Columbia Record, April 9, 1979; Johnson Collection, Career Guidance Folder.
43 The Columbia Record, April 9, 1979; Johnson Collection.
Center many young people found employment. In Columbia, the reality of and the potential for lucrative employment helped forestall potential unrest.

Minnie Walker Johnson was a consistent and conscientious volunteer and community activist in the Columbia community. Her volunteer activities were many and varied. She was a co-organizer of the citywide student organization that prepared for school desegregation. At the request of then Mayor Lester Bates, Johnson served on the committee that helped ease the desegregation of Columbia’s private and public institutions. The committee evolved into the Community Relations Council, which is still in existence. Its membership of influential Whites and Blacks were invited to participate by Mayor Bates. Mayor Bates’ criteria for membership on the committee were those Whites who were “decision makers’ and African Americans who the Black community listen to and trusted.

Johnson supported Columbia’s local chapters of national civil rights organizations. Johnson was a life member of the NAACP and a recipient in 1980 of its Citizenship Award. She co-founded the Urban League Guild. The Urban League Guild is an auxiliary to the Urban League that raises money to support the League’s programs. Other organizations, in which she was active, included The United Fund, The Alston Wilkes Society, the Statewide Committee for the International Year of the Child, and the South Carolina State Ethics Commission. Johnson was an advocate and activist who used her status to help change the culture in Columbia.

44 Catherine Fleming-Bruce, *Rivers of Deliverance A Visitors path through African American history in Columbia and Richland County*, (Collaborative for Community trust, P. O. Box 50055, Columbia, SC 29250), p. 10.
CONCLUSIONS

Johnson is remembered as a woman of quiet strength and great dignity. She used those attributes along with her acquired educational accomplishments and her economic status to help uplift her community. She never hesitated in confronting the injustices she encountered. Minnie Walker Johnson is remembered as a person who resisted the boundaries and culture of Jim Crow and lived to see its demise.

Johnson's story is important because it is stereotypical of local Blacks whose leadership was instrumental in Black survival on both a micro and macro level. Within local communities such as Columbia there were individual Blacks who initially reached out to encourage and support others privately. This was done through individual acts of monetary support to encourage entrepreneurship and by encouraging and helping promising youngsters to continue their education. Like-minded Blacks organized and developed leadership groups. They used their collective strength to foster change in the local community, which often spread beyond the boundaries of their physical and social areas of concern.

Generations of successful Blacks recall a teacher or authority figure who insisted on excellence in any endeavor and refused to accept excuses of any sort. They were aware of the realities of the obstacles that Blacks faced. Minnie Walker Johnson and others like her deemed it their responsibility to teach and demonstrate strategies to successfully circumvent those obstacles. Minnie Johnson ascended to the privileged class initially through marriage and education. Her sense of responsibility to help others overcome the obstacles of racism and segregation led to civic and social leadership in Columbia, South Carolina and improved the racial and social environment for all the city's citizens.
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Fleming-Bruce, Catherine. (1996). *Rivers of deliverance a visitors path through African American history in Columbia and Richland County*. Available from: Collaborative for Community Trust, P.O. Box 50055, Columbia, SC 29250.


Humankind has been plagued by disease since the dawn of time. It has been the quest of science to understand these diseases and the pathogens (e.g., bacteria, viruses, fungi, plasmodium) that cause them. Viruses are microorganisms that contain a protein coat and either DNA or RNA, the genetic “blueprint” of all living things (Murray, Rosenthal, Kobayashi, & Pfaller, 1998). To a virus, a human host is essential for its survival because viruses would not be able to survive without a host. The ability of a microorganism or a group of microorganisms to cause disease is known as pathogenicity. The mechanisms of how these pathogens cause diseases are known as virulence factors (Takada & Kawaoka, 2001).

Different pathogens have different virulence factors (i.e., invasiveness, adherence, antibiotic resistance, immunosuppression, and toxigenicity), which are responsible for both the production and severity of the disease that occurs in humans. The human body has many mechanisms to protect itself from invading organisms; for example, the immunity system is one these mechanisms. Invasiveness is the ability of a pathogen to enter the host and replicate (Murray, et al., 1998). Once the pathogen has gotten into the body, it must then get into the bloodstream and then into the body’s cells. Viruses are able to get into the bloodstream and into the cells of the body by attaching to specific body cells, and this process is known as adherence. Viruses enter the body’s cells in a number of different ways; however, infection and subsequent disease are only possible when the pathogen can infiltrate as well as evade the body’s defense mechanisms. Clearly, once a pathogen is successful in gaining entry into a body, it must be able to survive the immune response of the body to reproduce and subsequently to produce disease. One mechanism viruses have developed to evade the host’s immune system is production of toxins, also known as toxigenicity, which has serious affects on the host’s immune response and leads to severe infection and even death (Murray, et al., 1998). Two other virulence factors that can result from toxigenicity are immunosuppression, in which the host’s immune
response is suppressed, and antibiotic resistance, in which antibiotics don’t work to eliminate the virus. All of these virulence factors enhance the disease-producing potential of a pathogen by working against the host’s immune system.

**BACKGROUND**

The immune response in humans is divided into two main responses: Humoral and cell-mediated immunity (Murray, et al., 1998). In humoral immunity, the response to infection or pathogens occurs by the use of antibodies. Antibodies help provide immunity against the presence of infectious agents in different ways (e.g., phagocytic killing, blocking the attachment of a pathogen to a host cell, or by neutralization of a toxin or a virus). The cell-mediated immunity response involves the action of different classes of T cells, which are specialized white blood cells that fight infections (Murray, et al., 1998).

Interferons are proteins that are secreted by the human body to initiate a cascade of events. Interferons as a group can be classified by their size, cell origin, and function. Basler, et al. (2000) discuss the three types of interferon (IFN), which are designated as alpha, beta and gamma. Although interferons work primarily against viral infections, they also work against non-viral infections as well. B cells make interferon alpha, fibroblasts make Interferon beta, and natural killer cells make Interferon gamma (Basler, et al., 2000). Murray, et al. (1998) state IFN is first activated by double-stranded viral RNA, which causes it to bind to the IFN receptors on the host cells and stimulates the antiviral state, which is secretion of the anti viral enzymes 2’5’ oligoadenylate synthetase, protein kinase, and ribonuclease L. There are two pathways of the antiviral state of IFN and the mechanism of how IFN inhibits protein synthesis and viral replication of the pathogen. These researchers concluded both the 2’ 5’ pathways and the protein kinase pathways inhibit protein synthesis and are essential defense mechanisms in the human immunity system. Furthermore, when either of these pathways is inhibited or damaged, the antiviral state, which is an essential step in viral immune response, does not occur and allows the pathogen to replicate and produce disease. Ebola is one of those pathogens where this inhibition of the human immune response occurs within infected individuals.
HISTORY OF EBOLA

In 1976, Ebola was first discovered during concurrent outbreaks in the African countries of Zaire and Sudan. At that time, there were over five hundred reported cases with an 88-90% morbidity rate (Klenk & Feldmann, 2001). Even though the origin of the virus is unknown, Cohen (2004) proposes that Ebola was first found in animals and was transmitted to humans from an infected monkey. The virus is currently classified as part of the family of Filoviridae because of its morphology; however, this may soon change because the virus functions more like the family of paramyxoviridae (Klenk & Feldman, 2001).

There are four strains of Ebola designated by where they were found: Zaire, Sudan and Ivory Coast were discovered in Africa while Ebola Reston was discovered in Reston, Virginia, USA, but it was imported from the Philippines (Klenk & Feldman, 2001). These authors indicate the Reston strain consists of three substrains: Philippines, Sienna, Italy. Furthermore, the Reston strain is noted by the authors as pathogenic only to non-human primates while the other strains infect both human and non-human primates. The phylogenetic tree, which shows the relationship of how well two or more organisms are alike based on their genetic code, was constructed using maximum parsimony, showing the relationships of the filoviruses (Bukreyev, Volchkov, Blinov, & Neteso, 1993). Although there are only four strains of Ebola, it has spread to many other countries in Africa such as Kenya, Zimbabwe, Ivory Coast, Cameroon, Gabon, and Central Africa (Weik, Enterlein, Schlenz, & Muhlberger, 2005).

When the Zaire strain was compared to the Reston strain, two notable differences were observed. The first difference was that the Zaire strain contained more glycoprotein than did the Reston; and the second was that the Reston strain did not contain high levels of VP 35 (Takada & Kawaoka, 2001). According to Klenk and Feldman (2001), lower levels of glycoproteins result in lower levels of cleavage, a necessary step for the expression of full virulence in humans. In addition, these researchers identify the second notable strain difference, which is the amount of VP 35 expressed in the Zaire strain is higher than in the Reston strain. The correlation of virulence to expression levels of structural proteins also has been investigated (Klenk & Feldman, 2001).
VIRAL MORPHOLOGY

The Ebola viruses are linear, single stranded, negatively charged RNA viruses that are approximately 19Kb in length and 80nm in diameter (Takada & Kawaoka, 2001). Takada and Kawaoka also indicate that Ebola viruses exhibit a characteristic “U” like shape when observed under a microscope. They describe the Ebola genome as consisting of two layers of protein called the ribonucleoprotein (RNP). The first layer is the lipoprotein that is synthesized from the host as a mechanism to evade the host’s immune system (Takada & Kawaoka, 2001). Further research on the second layer by Hung, Xu, Sun, Nabel, and Klenk (2002) identified this layer as the nucleocapsid that encloses seven open reading frames (ORF) where each gene expresses a different protein. These researchers also discovered that the genome consists of the NP (nuclear protein) for encapsulation of the RNA. The structural protein VP35 works with the NP, VP30, and L proteins to synthesize the glycoprotein and plays a major role in the cytotoxicity of the virus (Takada & Kawaoka, 2001).

According to research by Muhlberger and Klenk (1998), structural VP 40 and VP 24 are membrane-associated proteins whose functions are not completely understood. They concluded that glycoprotein (GP1) and the secretory glycoprotein (GP2) are responsible for binding and fusion of the viral protein to the host cell. Muhlberger and Klenk also report that the structural protein VP30 helps with the encapsulation of the viral genome and that the L protein contains the RNA polymerase activity to help in replication of the virus in the host. In addition, the VP 35, 30 and L proteins were shown to work together to help assemble the nucleocapsid after replication (Bukreyev, Volchkov, Blinov, & Neteso, 1993).

The Ebola virus causes widespread damage to the organs of the host. Cohen (2004) reported the virus was once thought to lead to death in most cases; however, it has since been shown that morbidity depends on which strain infects a person. Takada and Kawaoka (2001) also found that Ebola causes hemorrhagic fever and disseminated coagulation (DIC), which both cause the body to go into shock from the oversecretion of immunological response agents such as peroxidases, cytokines, and chemokines. In addition, they indicate that the liver of Ebola patients becomes extremely damaged by the
hemorrhaging and the lysis of liver cells. The technique developed by Muhlberger and associates (Muhlberger, Weik, Volchkov, Klenk, & Becker, 1999), which is called reverse genetics, provided a research vehicle to experiment with Ebola virions. Reverse genetics, as developed by Muhlberger’s research team, is described as involving the use of the T7 expression system where cRNA, which contains the ORF’s of proteins NP, VP35, VP30 and L, was cloned using RT-PCR; and a second set of T7 plasmids, which contained T7 RNA polymerase, were inserted into HeLa cells to produce viral RNA. From there, they were used to express the proteins (i.e., NP, VP30, 35 and L) (Muhlberger & Klenk, 1998).

HYPOTHESIS DEVELOPMENT

What is the IFN inhibiting potency among Ebola virus strains with different virulence capacities?

This author proposes a study in which the above research question can be investigated using mice and the four strains of the Ebola virus. In organisms like the Ebola virus, virulence factors are the etiological agents responsible for severe onset of disease and, as shown in the majority of cases, death. This study will specifically investigate the Ebola virus virulence factor (VP35), which functions in immunological suppression by the inhibition of Interferon.

EXPERIMENTAL DESIGN

Structural protein VP 35 has been shown to be one of the main components in immunosuppression of the host immune system (Basler, et al., 2003). The usual immune system response to a viral infection would include activation of IFN (Interferon), TNF (tumor Necrosis Factor), and elevated levels of T cells. It is still unclear why immunological response is severely hindered in an Ebola-infected host. Endothelial and macrophage cells are the sites that most commonly are infected by the Ebola virus. As discussed earlier, in epithelial cells the enzyme furin is present and is actually used by the glycoproteins and structural proteins for the survival of the viral genome (Takada & Kawaoka, 2001). In previous experiments, where guinea pigs were injected with the virus, they found a significant decrease in the presence of TNF and T cells in the infected tissues.
VP 35 has been demonstrated to be an IFN antagonist in an assay, which was developed using an Influenza mutant (Bukreyev, et al., 1993). Their assay involved using an influenza virus mutant, delNS1, in which the open reading frame (ORF) has been deleted and is unable to produce the NS1 protein. When canine cells were injected with the mutant delNS1, the IFN levels increased and inhibited the replication of the mutant. When the NS1 proteins from the normal influenza strain or herpes simplex virus protein (ICP34.5) were introduced into the cells, the mutant growth was restored to high levels and IFN was inhibited. It was then understood that IFN attacks the NP ORF and hinders the replication of the virus during the anti-viral state (Bukreyev, et al., 1993).

When known IFN inhibitors like the HSV or NS1 protein were added to the delNS1 mutant in later research, the replication of the mutant increased and IFN levels were low, which demonstrates an adverse relationship of amounts of IFN expression and viral replication (Basler, et al., 2000). If one of the Ebola viral proteins also could work in a similar manner like NS1 or HSV, this would indicate an inverse relationship between Ebola proteins and IFN levels. Basler and associates injected canine kidney cells with T7 plasmids, with each expressing a different viral protein from the Zaire strain of Ebola, to see what effect they had on the expression of IFN. Of all the proteins, VP 35 increased replication of the delNS1 mutant significantly. They concluded that VP 35 has some inhibitory effect on IFN, and this inhibitory mechanism is necessary for full virulence (Basler, et al., 2000). Nevertheless, the virulence capacity of VP 35 in various strains of the Ebola virus is still unclear.

METHODOLOGY

In the proposed research, experiments modeled after the Basler et al. (2000) research study will compare the IFN inhibiting potency of VP35 among the various Ebola strains with different virulence capabilities. This research study will be conducted using two hundred fifty mice (i.e., 50 for control and 50 for each remaining strain of Ebola). All the mice will have normal immune systems to see how the virus affects them. The level of IFN will be quantified from tissue culture prior to inoculation of the virus to verify that all the mice have
healthy immune systems. The mice will be separated into five quadrants, representing the five groups (i.e., the four Ebola strains and the control group). The mice will be infected with two small doses of Ebola during the same time period to control for variables in relation to time of infection and exposure to the virus. Daily observations of the mice will be collected to identify physical signs of virulence. Daily examinations of various tissue samples from live mice will be compared to dead mice as an indication of the level of viral expression and the level of virulence, which will be measured by the amount of tissue damage. The mice that die sooner are the ones infected with the more virulent strain and are expected to exhibit lower IFN levels because of higher VP35 expression. The level of viral expression will be used as indicator of IFN inhibition because IFN causes the virus to replicate poorly and, as a result, reduces the level of expression of the virus. A Western blot will be used to separate and identify the VP35 from mouse tissue of the various Ebola strains. Physical and chemical characterizations on the VP35 of each strain will be performed to identify any differences between protein strains such as mass spectroscopy and x-ray crystallography. To quantify IFN production levels, a labeled antibody specific for IFN will be used to tell if IFN is being expressed in the mouse-tissue samples, and a second antibody, which is used to identify/verify that the first antibody is functional, will be examined because the level of VP35 protein expression is correlated to the level of IFN produced (Meisner, et al., 2002).

Based on previous research results, two hypotheses will be investigated. According to the literature, the Zaire strain is expected to have the greatest inhibitory effect on IFN expression levels because it has the strongest virulence and the largest expression of VP35 (Cohen, 2004). High levels of VP35 are expected in the Reston strain because it has not been shown to be infective to humans. Lower levels of glycoproteins (1+2) would indicate lower levels of cleavage of the glycoprotein, which is a necessary step for the expression of full virulence in humans (Wahl-Jensen, et al., 2005). The second expectation would be that the Zaire strain would express the most VP35 because it has the highest virulence capacity of all the strains. This is based on the correlation that the amount of VP35 expression is directly related to the severity of virulence.
Future research is needed to better understand the molecular mechanisms of how Ebola gets into the cell, the sequencing the Ebola genome, and the development of an Ebola vaccine. Since we already know that NP, VP 30, 35 are responsible for virulence, researchers need to find a mechanism to block the synthesis of these proteins and to block the assembly of the RNP, which would render the virus non-disease forming. Ultimately, the goal of future research is focused on the eradication of disease caused by the Ebola virus.

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Interest in the design of prodrugs has skyrocketed since its introduction in the early 1970's (Stella & Himmelstein, 1980). Prodrugs generally are described as agents that must undergo a chemical or enzymatic transformation to the active or parent drug after administration. They are useful when the parent drug cannot be utilized fully due to some problematic physicochemical property, such as poor solubility. Stella & Himmelstein first illustrated how a parent drug has problems penetrating a barrier like a cell wall. A pro-moiety, which is usually a protein that can cross the cell membrane easily, is attached and the cell-wall barrier is crossed. Importantly, the pro-moiety is attached in a way that inhibits the drug activity; thus, it carries the inactive drug across a cell surface. While in the cell, the drug undergoes some transformation either chemically or enzymatically that cleaves the carrier. For example, in cancer treatment, such a drug regains its toxicity and begins to kill the cancer cells (Stella & Himmelstein, 1980). The prodrug approach to treatment has been used for sometime. For example, salicylic acid, an analgesic and antiflammatory agent, was somewhat limited in effect until it was converted to acetylsalicylic acid (aspirin) in the late 19th century (Stella & Higuchi, 1975).

Unfortunately, there are problems with a traditional (bi-component) prodrug model. It consists of the carrier or specifier moiety and drug moiety (Carl, Chakravarty, & Katzeneellenbogen, 1981). The specifier moiety may serve to target the drug to a particular site by making it a specific substrate or enzyme, or it may confer other favorable properties on the prodrug. In the body, the prodrug undergoes enzymatic cleavage to release the active drug, but in most cases the traditional prodrug model fails. The bond linking the two moieties together may be unstable under physiological conditions or the prodrug may be quite stable, but the electronic or steric properties of the drug may hinder cleavage of the prodrug bond by the target enzyme (Carl, et al., 1981).
To overcome these difficulties, Carl et al. (1981) proposed the synthesis of a tri-component prodrug. It consisted of three parts: A specifier, a linker, and an inactive drug. The specifier and drug were described as linked together with a special spacer so that the enzyme will cleave the specifier-linker bond rather than the specifier-drug bond. The linker was designed so that the remaining bond between linker and drug spontaneously cleaves under specific physiological conditions.

Over the last 15 years, scientists have paid attention to all three major parts of the prodrug structure. Their general goal was to develop new prodrugs that incorporate linkers that allow selective release of potent antitumor drugs upon recognition of the target by the specifier (Senter, 1990; Scheeren, de Groot, Damen, Nevalainen, & van den Bergh, 2002). To make this happen, more potent drugs have been designed or isolated (Senter, 2003; e.g., Scheeren, deGroot, Loos, et al., 2001), new vehicles to transport the drug to the cancer cells have been developed (Senter, 2003; e.g., Yang, et al., 2004), and linkers that can selectively release multiple active drugs at the active site have been generated (e.g., Scheeren, et al., 2001). Some of these advancements in cancer prodrug development are presented in the remainder of this chapter.

**DRUG CARRIER OR SPECIFIER RESEARCH**

Recent advancements in site-specific prodrugs have involved antibodies, which are special proteins used to identify and fight foreign objects in the body (Berg, Tymoczko, & Stryer, 2002), to bind to antigens on the cell surface. Boronic acids, which are used as recognition elements to bind specific carbohydrates, also have been used to direct drugs to the cancer-cell surface.

A great deal of effort has been directed towards the use of monoclonal antibodies that bind to the antigens associated on the tumor surface for delivery of drugs to cancer cells. There are several disadvantages with this approach, ranging from low-drug potency to limitations in penetrating the cell barrier. Senter (1990) proposed a new approach to cancer therapy, which is now called antibody-directed enzyme prodrug therapy (ADEPT). In this approach, the antibody is used as a vehicle to drive a covalent-attached enzyme to the solid
tumor-cell surface. The selected enzyme has been designated to convert the desired prodrug into its active state. Once the anti-tumor prodrug is administered, the prodrug is selectively activated by the antibody-enzyme conjugate, populating the cell surface; thus, the active drug penetrates the cell wall and kills the cancer cell.

Florent, Madec-Lougerstay, and Monneret (1999) reported some anti-tumor prodrugs that used antibody-directed enzyme prodrug therapy. In their work, they use a monoclonal antibody (i.e., human β-glucuronidase) to direct the enzyme to the solid tumor cells. Their research demonstrated that high levels of the enzyme were detected in the tumor tissue. This allowed for site-selective activation of the prodrug. In the presence of the activating enzyme, the drug moiety was designed to cleave from its substrate.

Boronic acids have generated much interest in the realm of cell recognition research in recent years (Yan, Fang, & Wang, 2005). Boronic acids have a high affinity for 1,2 and 1,3 diols; thus, they can covalently, yet reversibly, bind to saccharides, forming boronate ester (Wang & Springsteen, 2002). There has been progress made in the construction of novel boronic acid-based sensors for carbohydrates. For example, an anthracene-based fluorescent reporter system developed by Shinkai and co-workers has gained attention due to its large change in fluorescence upon the ester formation (e.g., Shinkai, James, & Sandanayaka, 1994). Wang, Yang, Yan, and Springsteen (2003) applied Shinkai’s system to develop a biomarker for cell-surface carbohydrates. Wang and associate’s fluorescent saccharide sensor, naphthalene boronic acid (i.e., dimethylamino), emits a large fluorescent signal upon binding with sugars under specific physiological conditions (Wang, Gao, & Zhang, 2003). Also, similar diboronic acid compounds have been shown to selectively bind to cancer-cell surface carbohydrates such as sialyl Lewis X (sLeX) (e.g., Yang, et al., 2002).

**LINKER OR SPACER RESEARCH**

Advancements in this section focus on the linkers or spacers that can spontaneously break apart into smaller pieces or be converted into smaller molecules that can be excreted from the human body. As presented above, a linker spaces the drug away from the specifier to
minimize electronic or steric features that may hinder release of the drug (Carl, et al., 1981). A linker also can be used for solublizing the parent drug.

The introduction of polymers like dendrimers in the world of drug delivery have allowed for more drugs to be present at the cancer cell. The use of dendrimers in drug-delivery application has gained much interest in the last decade (Fréchti & Liu, 1999). Dendrimers are structurally well-defined, versatile, synthetic macromolecular polymers with sizes and physicochemical properties that resemble biomolecules like proteins (Boa & Heegaard, 2004). Additionally, the dendrimer can be designed to enhance water solubility, which is of particular importance given the low-water solubility of some drugs. Moreover, multiple copies of the drug can be expressed on the dendrimer, which potentially can increase the potency of the drug.

It is well established that cascade-release dendrimers have been used to design prodrugs (Sharat, Amir, Pessah, & Shamis, 2003). Unlike conventional dendrimers, they contain a linker designed to cascade or to breakdown into smaller parts from a single-cleavage step, releasing the active drug at a specific site (Scheeren, et al., 2001). As a direct result, these prodrugs were documented to possess two advantages over conventional dendrimers. First, multiple covalently-bonded drugs can be released at a specific site by a single-cleaving step. Second, they can be removed easily from the body in contrast to conventional dendrimers.

**Figure 1. Structure of double-release linker and proposed release mechanism of the drug molecules upon activation (de Groot, et al., 2003).**
de Groot, Albrecht, Koekkoek, Beusker, and Scheeren (2003) demonstrated that cascade-release dendrimers made from two or more generations of a branched self-eliminating linker can release multiple leaving groups (i.e., drugs) by a single-activation step depicted in Figure 1. By using the de Groot et al. cascade-release dendrimer, one can take advantage of multiple leaving groups released by a single-cleavage step (Shown above).

As seen in Figure 1, the removal/reduction of the protected amine causes an electronic cascade reaction that includes (a) releasing the first drug molecule and a carbon dioxide molecule (b). With an attack of a water molecule (c), the second cascade reaction occurs, releasing another drug molecule (d) while producing a second molecule of carbon dioxide and the aminodiol (e) that can be readily excreted from the body.

ANTI-CANCER DRUGS

Paclitaxel and Docetaxel are natural drugs with antitumor activity. They commonly are used to treat breast and ovarian cancer and are shown graphically in Figure 2.

Figure 2. Structure of paclitaxel and docetaxel.

These two particular therapeutic agents, however, have a number of disadvantages (DuPre, 2002). Due to their insolubility in water, they must be dissolved in alcohol and administered through the veins. Also, there are side effects associated with their use. For example, paclitaxel (also known as taxol) tends to inhibit cell division of both healthy and cancerous cells; therefore, it temporarily reduces the production of blood cells. This leads to bruising or bleeding and risk of infection. Additionally, docetaxel, a derivative of paclitaxel, has
been shown to be twice as effective as its parent drug yet suffers from many of the same limitations (DuPre, 2002). Both paclitaxel and docetaxel can be inhibited by blocking their C2'-OH group (Kant, Huang, Wong, Fairchild, Vyas, & Farina, 1993). Kant and associates also indicate that several taxol prodrugs are generated by attaching a linker at that C2'-OH position.

Recently, taxol prodrugs have been designed to target hypoxic-tumor tissue. This hypoxic region is known to have a low concentration of oxygen and lower pH than normal tissue; thus, an environment for reductive processes to occur is created (Brown, 1999). For example, there are prodrugs that use the reduction of an aromatic nitro group in this region to selectively release their drug (Shyam, et al., 1999).

**ANALYSIS**

Cytotoxicity and kinetic studies of prodrugs may give some insight into the stability and potency of the proposed prodrug. These studies for anti-cancer prodrugs can investigate a type of human-tumor cells grown in vivo or in vitro (Florent, et al., 1999; e.g., Scheeren, de Groot, Damen, et al., 2002). Patrick (2001) explains that this is a type of cytotoxicity screen that is done to determine how potent the drug is for the target such as cancerous cells. He indicates that experiments can be performed by varying concentrations over time. First, a known amount of cancer cells can be treated with different concentrations of the prodrug to determine potency of the prodrug for cancer cells. By comparing the ratio of treated cells’ and untreated cells’ proliferation during a set time versus prodrug concentration, a graph can be plotted to obtain the EC50 (i.e., drug concentration required to inhibit cell proliferation to 50% versus untreated cells). By comparing the results, some insight about the potency and selectivity of the prodrug for cancer cells can be determined.

Scheeren, de Groot, Damen, et al. (2002) reported some cytotoxicity studies against seven human tumor-cell lines of these animomethylcarbamate linkers, which are used for paclitaxel prodrugs. These prodrugs, differing by the group attached to taxol, are reduced in the hypoxic region of the tumor, causing the electronic cascade-release mechanism reported earlier. In their studies, eight of nine
prodrugs possess only a slight reduction in cytotoxicity. This means that most of the linkers were able to release the active drug with similar chemical or physical properties as the parent drug. The other prodrug showed a greater stability toward hydrolytic enzymes and could be a useful spacer for prodrugs that target other sites beyond hypoxia.

Florent, et al. (1999) reported kinetic studies for drug release for their anti-tumor prodrugs of 5-fluorouracil (5-FU), using high performance liquid chromatography (HPLC).

Their prodrugs showed rapid hydrolysis of the glucuronyl moiety by the enzyme β-glucuronidase, resulting in the release of 5-FU. By monitoring the degradation of the prodrug peak, the HPLC data showed that rapid release of 5-FU from the prodrugs can be observed. From the Florent, et al. results, some insight about the stability of the prodrug linker can be obtained.

CONCLUSIONS

Advancements in prodrug development should pilot breakthroughs in cancer research. Lately, Yang, et al. (2004) developed a diboronic-acid sensor specific for carcinoma cells, expressing sLeX for cancer diagnosis. Scheeren, de Groot, Damen, et al. (2002) have synthesized some novel paclitaxel (taxol) prodrugs that are designed for bioreductive activation in hypoxic tumor tissue. Senter (2003) also reports recent advances in antibody drug conjugates for cancer therapy. Recently, Jeffrey, et al. (2006) combined the ADEPT and a cascade-release approach to develop their monoclonal antibody-cancer drug conjugates for cancer treatment. These scientists are hard at work to generate new improvements in all three major parts of the prodrug structure. Their ultimate goal is to develop new prodrugs that incorporate linkers that will allow selective release of potent antitumor drugs upon recognition of the target by the specifier.
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THE RHETORIC OF EQUALITY AND FIT: ARGUMENT FOR A CULTURALLY RELEVANT ENVIRONMENT

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Education, in general, is considered an essential component in what establishes a culture, community, and ideology; respective to these factors, this author believes that educational competence for all marginalized students greatly needs improvement. In the pursuit of achieving “high standards,” educators often appear to have sacrificed the needs of their culturally-diverse students. Classrooms that are increasingly diverse in identity evidently are expected to appear monolithic in educational achievement. Standardized teaching and assessment practices appear to ignore the histories and abilities of ethnically-diverse students by making their culture irrelevant. That particular approach to education seems to lead to a greater deficit in educational equity and in decreased access to opportunities that are afforded to the majority. Acknowledging this point of view as the basis for this position paper, an essential exercise of changing the status quo would need to evolve out of a thorough understanding of the root causes of what relegates some minority groups to marginal status. African American students have been and remain the largest marginalized group in the area of educational access and equity. This discourse takes a giant leap to make a provocative suggestion that the African American community needs to rally for the creation of an educational “infrastructure” that caters specifically to African American children regardless of socio-economic status.

In this context, an “educational infrastructure” actually refers to the environment in which these students are attempting to be taught and to learn. Such an environment seems particularly important for grades K through 6, when the “zones” of development suggested by Vygotsky (1965) are such that he deems this as the period where the foundation for the construction of knowledge is laid. In his theory, he advances the notion of the learner’s environment as an essential component to what will empower children to shape their life-long pursuit of education. Within this supposition, it is suggested here that
Locating a child’s environment and building a bridge that gradually will deliver the learner to a new social strata provides a viable approach to achieving equal opportunity in the long run. Equal opportunity, as a process to engage the right fit (i.e., the person and the environment would be equal influences), needs to be designed to consider what has historically disengaged children from their opportunities to learn. Since African American students primarily have struggled around an issue of environment and fit, segregated schooling in grades K-6 might not be an unlikely compensatory leap. In fact, among others, W.E.B. Du Bois (1935) advocated segregated schools as an appropriate option decades ago.

**HISTORICAL BACKGROUND**

The foundations of American education provide the necessary link between citizenship and a society based on life in a democracy. Having been denied access to education by law, upon emancipation there was no greater claim for African Americans to stake than education; but, between 1800 and 1835, most southern states enacted legislation making it a crime to teach enslaved children to read or write (Anderson, 1988, p. 2). In *The Education of Blacks in the South, 1860-1935*, James Anderson (1988) explains that there is a correlation between education and the politics of oppression. Anderson says that as early as 1787, Thomas Jefferson “proposed a popular educational system that would offer three years of public schooling to every white child of the commonwealth” (p. 1). Anderson also discloses, “It was believed that Virginia’s peace, prosperity, and ‘civilization’ depended as much, if not more, on the containment and repression of an illiterate culture among its enslaved population as it did on the diffusion of literate culture among its free population” (p. 1). Schooling for those who would be full recipients of the promise of a democracy as well as schooling for second-class citizenship have existed as opposing traditions. In as much as it was imperative to formulate a free and educated class, it was viewed to be just as essential to have an uneducated class. Anderson also posits, “The successful campaign to contain and repress literacy among enslaved Americans triumphed just as the crusade for popular education for free people began to flourish” (p. 2).
One example occurred in 1798; Prince Hall established the first African American school in the also racially segregated North (Hine & Hine, 2003). According to these authors, education began in Massachusetts in 1827; few schools would accept integration, fearing that “black children lack mental capacity and lowered the quality of education” (p. 23). Concomitantly, the authors note that when African American schools were included in Boston’s public school system, the public’s hostile response would be manifested in inadequate funding and a limited curriculum. Clearly, this response would be established before African Americans would be legally awarded citizenship under the Fourteenth Amendment. Considering the Fourteenth Amendment’s insistence that “[n]o State shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any State deprive any person of life, liberty, or property, without due process of law” (p. 23), one might consider education as the pursuit of opportunity that would enhance one’s ability to pursue his/her liberty. Nevertheless, observation over many decades since this declaration results in the conclusion that, for African Americans, entrance into citizenship has done little to counteract a history of subjugation and educational denial.

Even before government intervention, there was an established desire among African Americans for education as well as for Black schools with adequate facilities and Black teachers. The education that former slaves received evidently would insure that they would be in a position to sustain and perpetuate a systematic education for all. Next to the church, Black schools became the most important institution in the community, and Black teachers were held in the highest regard (Anderson, 1988). For example, Anderson notes that as early as 1862, at the height of the Civil War, Charlotte Forten, a Northern Black educator migrated south to the South Carolina Sea Islands to instruct freed people and runaways. The Hines (2003) report that freed slaves were thrilled to learn from any person who was willing to teach, but they preferred Black teachers. African American men and women responded to the need to teach and believed that “[they] must take into [their] own hands the education of [their] race” (p. 267). The rationale for this thinking seems to come from the premise that African Americans had always been in the position of seeing whites in honored positions and in control of their lives. Hine and Hine also
report that "Hezekiah Hunter, a black teacher from Brooklyn, New York commented in 1865 on the need for black teachers: 'I believe we best can instruct our own people, knowing our own peculiarities—needs—necessities. Further—I believe we that are competent owe it to our people to teach them our specialty'" (p. 268).

Certainly, African Americans, at the inception of their citizenship, intended to get educated whether the official law of the land would sanction it or not. Eventually, during Reconstruction, Robert Smalls, a former slave from Beaufort, South Carolina, would gain prominence in the state legislature and establish compulsory education for African American children. Smalls asserted in 1895, "My race needs no special defense, for the past history of them in this country proves them to be the equal of any people anywhere. All they need is an equal chance in the battle of life" (Hine & Hine, 2003, p. 33). African Americans simply wanted to be able to get educated without intervention or obstruction. According to The Meaning of Freedom: The Failure of Reconstruction, Hine and Hine (2003) report, "In 1866, the Freedmen's Bureau set aside one-half million dollars for education" (p. 267). They also report that "Though no laws required segregation, public schools during and after Reconstruction were invariably segregated" (p. 267).

Upon the failure of Reconstruction, white southern resistance began to resent the idea of Blacks becoming educated; the Hines report that "Southerners grudgingly tolerated the desire of black people to acquire an education. One planter bitterly conceded, 'Every little Negro in the county is now going to school and the public pays for it'" (p. 271). Clearly, the strongest opposition to African American education is documented as coming to from the planter (middle) class whites. Anderson (1988) maintains "As a class...the planters reacted decisively to the freedmen's educational movement; they were opposed to black education in particular and showed substantial resistance to the very idea of public schooling for laboring classes" (p. 23).

Securing an education meant truly being able to carry out the tenets of citizenship; this ability was not just to vote but also to secure interest-serving candidates. Anderson also explains that amidst surmounting white resentment and the emergence of Jim Crow segregation, the crusade for fair and accessible education for Blacks began. From the ratification of the Fourteenth Amendment to the election of Rutherford B. Hayes in 1877, there would be a custom of compulsory education,
but "With both state authority and extralegal means of control firmly in their hands, the planters, though unable to eradicate earlier gains, kept universal schooling underdeveloped. They stressed low taxation, opposed compulsory school attendance laws, blocked the passage of new laws that would strengthen the constitutional basis of public education, and generally discouraged the expansion of public school opportunities" (Anderson, 1988, p. 23). Eventually, the existing government would turn its back on racial equality in education.

THE IDEOLOGICAL RACIAL DIVIDE

In 1896, the court's ruling in *Plessy v. Ferguson* established the legality of racial segregation (Martin, 1998, p. 32). Even though, at the time of the ruling, segregation between Blacks and whites already existed in most schools, this decision was described as only holding up a portion of its claim. The *Plessy* decision itself was written to take care in pointing out that race is socially constructed. Actually, out of this construction grew a social ideology that would place African Americans as perpetual second-class citizens.

The idea of simple classification is described as an inherent phenomenon, which means generally that all things are categorized for the purpose of identification. The idea of race, which was originally perceived as a mere biological concept, by way of societies’ aims and goals became a method of giving meaning to social relationships (Martin, 1998). Furthermore, when this classification becomes systemic, Martin indicates that it clearly compels those who have agency in classifying to do so for the intention of assuming power and control. While both thoughts may be perceived as equally wrong, the idea that the state would classify individuals based on immutable characteristics for the sake of limiting an individual’s civil rights is even more seriously injurious. It is particularly damaging because, while everyone learns some degree of rules of classification of their own racial identity without obvious teaching or inculcation, they also are most likely to learn to navigate racial relations based on socially-prescribed stereotypes and misconceptions of who they are. In many cases, this author interprets this to mean that African American children, who are forced into integration or intentionally separated or alienated by the mainstream, might develop severe identity crises that will not be addressed by the system that perpetuates the injury.
COMPENSATORY SEGREGATION

Significant and compelling cases have been made for African American schools to remain separate, but they would stress that such schools be made equal in terms of equitable resources, housing, and protection from antagonistic forces. One important example would be W.E.B Dubois’ article “Does the Negro Need Separate Schools?” that originally was submitted to the Journal of Negro Education in 1935. Writing in response to anti-black discrimination in the North and South and the ongoing contention about how to improve educational opportunities for African Americans, Dubois (1935) argued that African Americans should fight for genuinely equal schools, even if separate. Dubois makes several points that advance the notions of separate schooling:

Race prejudice in the United States today is such that most [African Americans] cannot receive proper education in white institutions...Negroes are admitted and tolerated, but they are not educated; they are crucified. There are certain Northern Universities where [African American] students no matter what their ability, desert, or accomplishment, cannot get fair recognition, either in classroom or on the campus, in dining halls and student activities, or in common human courtesy. (p. 333)

What Dubois (1935) is primarily responding to is the discriminatory backlash that continues to exist even today. He essentially claims that, if left to the dominant group, it would be fruitless to force one group “even by law” to act counter to its basic intent, which is not to allow African Americans the advantage of an education that would place them on equal footing with whites. Dubois does not deny that there are some cases where

There has been no separation in schools and no movement toward it. And yet the treatment of
[African American] children in the schools, the kind of teaching and the kind of advice they get is such that they ought to demand either a thorough-going revolution in the official attitude toward [African American] students, or absolute separation in educational facilities. To endure bad schools and wrong education because the schools are ‘mixed’ is a costly if not fatal mistake. (p. 329)

 Dubois (1935) also claims “separation would be a passing incident and not a permanent evil; but as long as [African Americans] believe that their race is constitutionally and permanently inferior to white people, they necessarily disbelieve in every possible [African American] Institution” (p. 328). By this claim, Dubois alludes to the idea that integrated schools cannot be integrated genuinely because the overreaching majority opinion and sentiments will always prevail. To some degree the same stigma attached to “forced” separation also applies to “forced” integration. Students are marginalized in those settings as well.

The implications for the Brown decision lay in the assumption that African American education (i.e., teaching, learning, instruction, and culture) is inherently inferior. To assume that desegregated schools will advance “equal educational opportunity” is fallacious reasoning primarily because the concepts of “access” and “opportunity” have yet to be realized. There has been no evidence theoretically based or empirically proven to this author that desegregation reverses the basis for that claim. Even African Americans engaged in the process of educating African American students with white (or oppositional) apparatuses seem to have been largely unsuccessful in retroacting the conundrum of access to equal opportunity. With this in mind, consider the way in which Derrick Bell (1976) complicates racial-balance remedies in “Serving Two Masters: Integration Ideals and Client Interests in School Desegregation Litigation.” Bell charges that Blacks must gain access to white schools because “equal educational opportunity” means integrated schools, and because only school integration will make certain that Black children will receive the same education as white
children. This theory of school desegregation, according to Bell, fails to encompass the complexity of achieving equal educational opportunity for children to whom it so long has been denied.

Rather than remain mired in forced integration, what has occurred actually is the state-induced subordination of Blacks in their attempt to gain equal access to educational resources. Bell also asserts that “Providing unequal and inadequate school resources and excluding black parents from meaningful participation in school policymaking are at least as damaging to black children as enforced separation” (Yale Law Journal 85:470). Here Derrick Bell’s (1976) declaration invokes the original appeal for simply Black education.

After 50 years, it is natural to question what the Brown decision actually produced for Black education and what African Americans actually gained with attaining civil rights. Indeed, many African Americans gained access to material rewards and access to at least the rudimentary claims to American citizenship (i.e., desegregated public facilities, housing, and physical access to everything the majority population enjoyed). Nevertheless, the Civil Rights Movement itself stopped short of creating an environment of inclusiveness for all. For subsequent years, African Americans would remain substantially locked in a struggle between assimilation and cultural inclusion. The Movement seemingly stopped short of interrogating the racist ideology of which this country had become imbued. In his article, “Racist Ideology,” Lewis Gordon (1995/2000) posits that “Perhaps the most dominant feature of racist ideology is the extent to which it is premised upon a spirit of evasion” (p. 532). In retrospect, it was and still is rather naïve or presumptuous to assume that a nation that has struggled with race and class issues since its birth would be able to overcome those problems simply because they are forced together to battle or wait it out. Gordon also suggests, “that in the context of the United States, the black/white dichotomy functions in a far more determining way than is acknowledged in the current rhetoric of equal-opportunity discrimination” (p. 533). Meanwhile neither of the ruling branches of the government has made a bona fide attempt to eradicate barriers that continue to subordinate one group to another. In one sense forced integration reifies the same ideological subjection that Plessy fought so hard to maintain. African American students who must leave their community schools, which the state refuses to
bring to minimum standards, view their community as lacking and inferior and automatically the white schools that are well-funded with the same monies are sanctioned as superior.

While it may appear that this liberal act of creating a welfare solution is benevolent, it subversively continues to hold a white measuring rod against African American people. The malicious nature of this act is that it continues to cast aspersions toward the distinct differences of African American culture. Even though African American students might be welcomed through the doors of predominantly white-educational institutions, apparently very little has changed once they obtain entry. They often will learn, in not so inviting ways, that the cost of their success is most likely to be their identity. It is suggested that this struggle has been at the root of a diminished ability for many African American students to compete well and to have formidable self-esteem. Theorist bell hooks (2003) supports this claim as she contends in Rock My Soul: Black People and Self Esteem, “the importance of self-esteem was diminished by the success of the civil rights movement, which led to a new obsession with ‘material security’ and a world in which ‘black people were urged to see consumption as the way to define success and well-being’” (p. 3).

Furthermore, the manner in which education is administered and the way in which it is measured curiously appears to stack the deck against Black children. A Professor of Early Childhood Education at Wayne State University in Detroit, Michigan, Dr. Janice Hale (2001) provides a challenging perspective that addresses the real needs of African American children and youth. Dr. Hale, the founder of Visions for Children, a demonstration school designed to facilitate the intellectual development of African American preschool children, posits that “Achievement data show outstanding performance in school districts that serve children who are white with high average incomes. These data are sometimes used to argue that African American children are genetically inferior or that the quality of education in schools that serve African American children is inherently deficient” (p. 7).

A new phase of racial oppression currently exists that goes beyond mere racial classification; this also is a position implied in Hale’s work. In the post-civil rights era, though some legal means of
securing opportunity was achieved, more implicit forms of institutionalized racism emerged that deal with the “equality of condition.” Dr. Hale (2001) asserts that she does not believe “that young African Americans have the opportunity to obtain anything close to the same education as whites, regardless of their educational setting...because of the economic position of their parents, it is more difficult to purchase quality education or purchase homes that will allow them to attend quality public schools” (p. 35). She cites the work of Jonathan Kozol who has “written extensively about the inferior education African American children receive in de facto segregated schools” and attempts to uncloak the differences in the practice of teaching African American students even though they are educated in the same classrooms (Hale, 2001, p. 35). Hale reproves African American civil rights organizations’ (e.g., NAACP, Southern Christian Leadership Conference, The National Urban League, etc.) attempts post-Brown and post Civil Rights that “pursued court-ordered bussing plans to remedy past discriminatory acts” (p.177). She maintains that for certain people who enjoy a level of economic mobility this has been marginally successful; however, she claims that “the strategies put forward by civil rights organizations have been unsuccessful in bringing about significant education improvements for low-income African American children” (p.177). The unaddressed economic factor becomes an essential component in the process of maintaining a degree of separation and subordination in educational settings. Apparently, the significant difference is that instead of race as the dividing line, it is now economics. Hale (2001) contends that “In the name of ‘quality education,’ whites have been creating smaller and smaller political enclaves so that they can restrict and delineate economically homogeneous school districts. State legislatures have been maneuvering to create subtle structures for maintaining private school excellence within predominantly white suburban public school districts” (p. 176). It is a new method for an old custom. Hale contends further that “Schooling will proceed more smoothly for all children, and specifically for African American children, when the schools improve the ‘goodness of fit’ between their efforts and the role that parents can reasonably be expected to play in their children’s education” (p. 7), reinforcing once again, Derrick Bell’s claim.
Considering the positions of these authors (i.e., Bell, 1976; Hale, 2001), the majority population’s methods to substantiate segregationist aims can be seen in the form of educational-gap testing, tracking, over-remediation, immutable curriculums and inter-district conflicts; and these methods somehow are seen as less than provocative. An extreme example would be Herrnstein and Murray’s *The Bell Curve*, which has provoked debates and attacks since its debut in 1994. In subtle and not so subtle ways, the authors of *The Bell Curve* have used intelligence research to substantiate claims that African-Americans are genetically inferior in intellectual abilities and capabilities. The claims presented are not just that *The Bell Curve* has touched upon issues that are not only sensitive to the majority of persons in this country, but they also are basic to the establishment of governmental public policy. This kind of “so-called legitimate” evidence of African American academic capability substantiates the reasons given for “white flight,” citing that their children’s education would lag because African Americans would need to catch up.

**PEDAGOGY AND ENVIRONMENT**

Having proposed a case for what causes African American educational marginality, the theories of social climate, learning and personality styles, and cultural factors all come into play as I propose an environment that would address these issues as well as the concept of educational fit. Cornell West (1994) posits, “In an environment where the students are exposed to monoculture instead of multiculture, students need to develop a broader sense of sociopolitical consciousness to realize the cultural norms, values, and mores of others. These students need to know that race matters” (p. 160). This environment would not only focus on the particular needs of African American children, it also would enable educators to assemble a curriculum that emphasizes the culture and construct systems of knowledge that prove conducive to individual learning styles because, indeed, African American children are different; they are not inferior. It seems clear that ignoring the uniqueness of racial and ethnic identity hastens to widen gaps in achievement and in access equity for them.

In the age of globalization, the notions of culture and environment are increasingly important. Indeed, the idea of segregation in this age
might appear extreme and maybe even antagonistic to democratic goals. Perhaps, one could achieve equity in education simply by looking more closely at the curriculum and pedagogical practice.

As efforts persist to standardize education, students are more than ever judged by one dimension, their abilities to reach predetermined standards without regard for the experiences of the individual student. Standardization of curricula and pedagogy seems to ignore many years of striving toward multicultural education and pedagogical innovations towards inclusion. P.B. Baker and Lee Digiovanni (2005, July) suggest, in “Narratives on Culturally Relevant Pedagogy: Personal Responses to the Standardized Curriculum,” that “The focus for teachers ought to move away from what curriculum will be tested to how to engage both teachers and students in appropriate pedagogical practices for diverse populations” (p. 3). By relevant and responsive pedagogy, these scholars explain the theory as “using the cultural knowledge, prior experiences, frames of reference, and performance styles of ethnically diverse students to make learning encounters more relevant and effective for them” (p. 3). Such a position is supported by numerous educators (e.g., Gay, 2000; Klug & Whitfield, 2002; Ladson-Billings, 1994; Townsend, 2002). In culturally-relevant pedagogy constructs, an environment is created that attempts to affirm difference and retroact many years of pedagogical practice, in which difference is identified and equated as inferior.

CONCLUSION

At the introduction of this discussion, I proposed urgency towards achieving educational equity for African American children. With a 177-year legacy of educational deprivation, it appears only fitting and reparative that educators respond by building cultural competence. While a separate environment might be the cure, ideally all children should be afforded the opportunity to become multi-culturally enriched while acquiring a top-notch education. New pedagogies are needed to focus on transforming the curriculum to fit the experiences of ethnically diverse students. Delpit (2003) sums it up with this assertion:
...we can educate all children if we truly want to. To do so, we must first stop attempting to determine their capacity. We must be convinced of their inherent intellectual capability, humanity, and spiritual character. We must fight the foolishness proliferated by those who believe that one number can measure the worth and drive the education of [a] human being, or that predetermined scripts can make for good teaching. Finally, we must learn who our children are – their lived culture, their interests, and their intellectual, political and historical legacies.

(p. 20)

REFERENCES


PART 4:
COLLEGE OF EDUCATION
The education of students is central to the mission of higher education. Research shows that, traditionally, most classes at colleges and universities have been taught using a lecture-based method (Barr & Tagg, 1995; Bonwell & Eison, 1991; Faust & Paulson, 1998; Smith & Kolosick, 1996). In this traditional method, the focus is on the teacher as the primary information source (Smith & Kolosick, 1996). The teacher lectures to students on a particular topic while students listen and take notes on the lecture material (Faust & Paulson, 1998). Smith and Kolosick (1996) note that students' success or failure is marked by their ability to master a body of information presented in lectures or texts. However, Barr and Tagg (1995) assert that there has been a paradigm shift. Specifically, they note that college has shifted from being an institution that exists to provide instruction to college being an institution that exists to produce learning; this shift is from a traditional paradigm that is referred to as the “instruction” paradigm to that of a “learning” paradigm. Active learning, another pedagogical method that would fall under this “learning” paradigm, has received considerable attention in educational literature. While the traditional method is considered teacher-centered, active learning is considered a student-centered pedagogy (August, Hurtado, Wimsatt, & Dey, 2002). This short monograph chapter will examine some of the information on active learning and its potential uses in higher-education classrooms as presented in some of the literature on teaching and learning.¹

¹ The information provided is based on a limited number of sources. It is not meant to be an exhaustive literature review of active learning. It is intended to give a brief overview of some of the information on active learning that was readily available for discussion by the author.
WHAT IS ACTIVE LEARNING?

Active learning has been considered part of a paradigm or a paradigm in and of itself. August, et al. (2002) note that active learning is one of the non-traditional paradigms that require faculty to become facilitators, coaches, and guides to student learning. With active learning, “faculty make meaning and learn along with students by moving away from memorization of facts to using and applying knowledge” (p. 4). Active learning also refers to a number of teaching techniques used to encourage students to actively participate in their learning experience by doing activities (August, et al., 2002; Faust & Paulson, 1998). “Active learning methods seek to engage students directly and actively with the course content by moving away from memorization of facts delivered unilaterally through a lecture format to a dynamic learning environment that facilitates meaning making resulting in a deeper understanding and the ability to make connections and use knowledge beyond the classroom” (August, et al., 2002, p. 5).

Bonwell and Eison (1991), citing Chickering and Gamson (1987), note that while some may assert that all learning is inherently active and that learning is taking place even when students are listening to a lecture, analysis of the research literature reveals that students must do more than just listen to accomplish active learning. Clearly, active learning goes beyond listening (Bonwell & Eison, 1991; Faust & Paulson, 1998). According to the literature, when participating in active learning, students are using listening practices that help them absorb what they hear as well as reading, writing, discussing, and/or engaging in solving problems (Bonwell & Eison, 1991; Faust & Paulson, 1998; Smith & Kolosick, 1996). Moreover, students are engaged in high-order thinking tasks such as analysis, synthesis, and evaluation (Bonwell & Eison, 1991).

“Active learning activities assist students in making the transition from a dependent relationship with the instructor as sole arbiter of knowledge to one where they recognize multiple sources and authorities of knowledge including themselves” (August, et al., 2002, p. 6). There are a number of active-learning techniques that are cited in the literature such as one-minute papers where students jot down the most valuable thing they just learned and what is still not fully understood,
and they share that information with their team or the whole class (Angelo & Cross, 1993, cited in Yoder & Hochevar, 2005). August, et al. (2002) noted that “one minute papers and similar in-class exercises that require active engagement with the material and provide feedback to the student, journaling and other reflective exercises that require the student to examine her/his experience with the process of learning as well as the product, and by asking students to prepare questions related to the material being covered and engage in class discussion,... involve students more directly in the learning process” (p. 5).

Additional techniques include videos (Angelo & Cross, 1993, cited in Yoder & Hochevar, 2005) or visually-based instruction, writing in class, problem solving, computer-based instruction, cooperative learning, debates, drama, role playing, simulations, games, and peer teaching (Sivan, Leung, Woon & Kember, 2000, cited in Yoder & Hochevar, 2005). Problem-based learning (Ngeow & Kong, 2001) requires students to take on active-learning strategies and adopt a self-directed learning disposition. Ngeow and Kong also found that learning to learn, particularly in the area of problem-based learning, involves: Cooperative learning skills, inquiry skills, reflection skills as well as assessment. Yoder and Hochevar (2005) cited McKeachie (2002), who asserts “designated discussion to be the prototypic method for active learning” (p. 91). Bonwell and Eison (1991) wrote that active learning can be incorporated into the classroom by the modification of the lecture or by having discussion in class. Sokolove (1998) discussed the use of the following techniques: Name badges, cooperative learning groups, large-group discussions, in-class written responses and written take-home assignments that he and his colleagues “anticipated would make the large lecture environment more personal, student-centered and interactive” (p. 3). Others consider cooperative and collaborative learning where students work in groups to be subsets of active-learning techniques (Faust & Paulson, 1998).

**POTENTIAL USES OF ACTIVE LEARNING**

Black and William (1998) note that teaching and learning must be interactive. Bonwell (1997) suggests that the case for the use of active learning in college and university classrooms is research based and persuasive, citing research by Sutherland and Bonwell (1996),
Bonwell and Eison (1991), Johnson, Johnson and Smith (1991), and McKeachie, Pintrich, Lin and Smith (1987). Moreover, Bonwell (1997) notes that students need explicit coaching on developing skills in the classroom before they can be expected to extend such skills outside of the classroom setting; therefore, active learning can aid in this process of skill development and extension. August, et al. (2002) purport that the research cited on the use of non-traditional paradigms like active learning generally has shown positive results with greater gains in critical thinking and problem-solving skills, greater acceptance and tolerance for diversity, and better performance on subsequent examinations. Lesgold (2001) believes “...it is quite clear that there is a role for learning by doing and that it is sometimes much more effective than traditional schooling approaches, especially when the goal is for a person to be able to use the acquired knowledge to attack complex, incompletely structured, and novel problems” (p. 965). Furthermore, it is Lesgold’s belief that “…more learning by doing is needed in most education and training situations” (p. 965).

August, et al. (2002) indicate that cited research has involved numerous calls for a greater focus on improving undergraduate education particularly in the area of quality of teaching and learning. “Interaction, instruction, collaboration, investigation, and learning opportunities can all play a decidedly positive role in learning” (Smith & Kolosick, 1996). The education of students is a major focus of higher education institutions, and, therefore, Stalheim-Smith (1998) indicates that striving to improve the learning environment for students and growing in an understanding of what constitutes good learning is paramount. The August, et al. (2002) research results “…reveal that both groups [faculty and students] agree on the value and desirability of direct involvement in learning, academic collaboration with student peers, and productive, constructive student/faculty relationships” (p. 3).

Providing “good learning” can begin with understanding students and how they learn (Stalheim-Smith, 1998). In their discussion of effective learning and generation Y students, Arhin and Johnson-Mallard (2003) discuss research in which the majority of students at the colleges were born after 1975. Those born between 1975 and 1981 are categorized as generation “Xers,” and those born after 1981 are categorized as generation “Yers.” The authors cite Whitehead
(1997) who considers both of these generations to be more independent, resourceful, and peer dependent due to the proliferation of modern technology available to them. Moreover, they also refer to the Brown (1997) paper on generation Xers, in which he considers this group to be inventive, self-sufficient problem solvers who often desire feedback and detest authoritative control. While these general student characteristics potentially can have an impact on the way students of today are able to learn, Cross (1999) finds it important to note that the “most serious barrier to taking learning seriously lies in our failure to take individual differences seriously” (p. 267).

**ACTIVE LEARNING AND ITS POTENTIAL IMPACT ON LEARNING**

Learning has been classified and defined in a number of ways throughout the research literature. Driscoll (2002) makes the following assertions about learning: Learning occurs in context; learning is active; learning is social; and learning is reflective. The author further states, “Without an appropriate context, comprehension and learning are difficult and unlikely to succeed very well” (p. 3). The inquiry-based, hands-on nature of active-learning techniques also encourage authentic student learning through the development of high-order thinking skills, which can promote a deeper understanding of the material. In discussing the active nature of learning, Driscoll cites Scardamalia (2002) who found that “[w]hen students become active participants in the knowledge construction process, the focus of learning shifts from covering the curriculum to working with ideas” (p. 4). These authors note that technology can facilitate learning by providing a medium for “transformative” learning; however, it is not the technology that guarantees learning. Rather, it is how the technology is used that will determine whether transformative learning happens (Driscoll, 2002).

In addition to varying definitions of what constitutes learning, some researchers have found that students do have different ways of learning (Cross, 1999; Sokolove, 1998). Cross (1999) states, “if you want to know how students learn, find out what makes them tick. Looking carefully at how even one student learns is often quite revealing...” (p. 267). Arhin and Johnson-Mallard (2003) note that the
learning styles of today’s students are more active and visual rather than verbal. The active-learning methodology may be able to address the learning needs of the majority of students effectively because its student-centered approach involves “...anything that students do in a classroom...from listening practices...to short writing exercises...to complex group exercises” (Faust & Paulson, 1998, http://www.cal­statela.edu/dept/chem./chem2/Active/main.htm, paragraph 1). In active learning, the students (i.e., learners) are responsible for their own learning, and the teacher is a facilitator who guides the students through their learning process (August, et al., 2002; Stalheim-Smith, 1998). In some of the literature, active-learning techniques have been shown to positively influence students’ attitudes and achievement. In fact, some studies have shown that students prefer active-learning strategies to traditional lectures (Bonwell & Eison, 1991). Stalheim-Smith (1998) writes about “a 2000 year old proverb” that has potential to summarize the overall philosophy of active learning and speak to its role in developing critical thinking skills: “I hear and I forget. I see and I remember. I do and I understand” (p.3).

Apparently, learning by doing is the central tenet of active learning. Bonwell and Eison (1991) state that while some may assert that all learning inherently is active, other researchers suggest that students must do more than just listen. Moreover, Bonwell and Eison also refer to Chickering and Gamson (1987) who state that not only do students need to read, write, discuss, or be engaged in solving problems for learning to take place, they also must engage in high-order thinking tasks such as analysis, synthesis, and evaluation. As Stalheim-Smith (1998) suggests, “Critical thinking stresses the individual’s ability to evaluate and interpret information, make predictions, identify assumptions, and draw conclusions from data” (p. 4).

In some research studies that evaluate student achievement, active learning strategies were found to be superior to lectures in promoting the development of students’ skills in thinking and writing (Bonwell & Eison, 1991). Sokolove (1998) discussed the difference between knowing and understanding, and he reported that students in the active-learning section of the experiment performed as well or better than the students in the traditional-lecture section. Belcheir (2003) noted that what students do as they attend class and complete assignments is the first indicator of active learning. “Learning is more likely
to deepen when students are discussing ideas with others and applying that learning to projects inside and outside the classroom” (p. 6).

Cross (1998) states, “What we know about student learning is that students who are actively engaged in learning for understanding are likely to learn more than students not so engaged” (p. 263). Active-learning techniques like discussion (where students ask and answer questions about the material), the case-study method and guided design (where students focus on problem solving), and concept mapping (where students draw connections between course material) can help all students to think critically (Faust & Paulson, 1998). Bonwell and Eison (1991) found that other active-learning strategies like debates, drama, role-playing, and simulation are “worthy of instructors’ use” (p. 3). These authors also assert that the critical-thinking skills students develop while engaging in active learning can have a practical application across disciplines and contexts. Brown (1997) sees “true” learning as when achievements have relevance beyond the classroom. Active learning provides the atmosphere for acquisition of critical-thinking skills that will help students succeed both inside and outside of the classroom (Stalheim-Smith, 1998).

ACTIVE LEARNING AND FORMATIVE ASSESSMENT

As evidenced by a few of the active-learning techniques discussed in this paper, active-learning is an interactive-educational pursuit. Active-learning strategies employ a combination of interactions: They are between teacher-student, student-student, and teacher-teacher (Sokolove, 1998) in order to bring about authentic learning. Brown (1997) suggests that authentic learning is a result of the learner’s ability to communicate a detailed understanding of a problem or issue rather than just regurgitation of memorized sets of isolated facts. While lectured-based instruction often times involves summative assessment where students are evaluated via a test or another medium for their final grade, active-learning strategies can provide an opportunity for instructors to conduct formative assessments (Bonwell, 1997).

Ngeow and Kong (2002) note that even while students are encouraged to be engaged in the learning process, assessment still focuses on the end product (i.e., not formative assessment). In formative assessment, the class can be evaluated as a whole to determine what infor-
formation needs to be provided, which is information to benefit the students but is not used in determining the final grade (Faust & Paulson, 1998). Clearly, the interactive component of active learning also is important because it provides the context for assessment. Active-learning methods like finger signals (where students are asked questions and instructed to signal their answers) or flash cards (where students respond to flash cards held up by the instructor) both allow the instructor to assess student understanding of the material presented (Faust & Paulson, 1998). Other techniques like team-based games and panel discussions allow students to work together to present their understanding of the material (Driscoll, 2002). As Driscoll states, “Learning is facilitated when students get feedback about their thinking, whether that feedback comes from within, a teacher, or a peer” (p. 5).

POTENTIAL BARRIERS TO ACTIVE LEARNING

Bonwell and Eison (1991) found that there are a number of barriers to active learning. The most common barriers noted were: The powerful influence of tradition; faculty self-perception and self-definition of roles; the discomfort and anxiety that change creates; and the limited incentives for faculty to change. With regard to their research on active learning, Smith and Kolosick (1996) found that “this ready access to information and learning independence can easily overwhelm teachers and students as they struggle to organize and filter the flood of possibilities” (p. 2). Additionally, Ngeow and Kong (2001) state that “Some students find it difficult to cope when asked to transform into active critical thinkers” (p. 2). Concomitantly, Hansen and Stephens (2000) found that there are certain dynamics that impede collaborative learning in four areas: Student expectations (learned helplessness and self-appraisal), group dynamics (low tolerance for challenges and self-loafing), environmental conditions (political correctness and consumer attitudes), and evaluation demand (peer-evaluation anxiety and product fixation). Mattson (2005) considers active learning “an empty buzzword used by educational administrators. It is a philosophy and movement that portends trouble for the future of higher education and the American professoriate” (p. 1). The author notes that while “there are some good ideas among the reams of arti-
icles and books about active learning...these examples do not counteract the recent misuse of active learning principles, or how these ideas help cover up deeper problems in academe” (p. 4).

Yoder and Hochevar (2005) indicate that instructors often hesitate to move toward expanded inclusion of active-learning approaches in their classes because classroom coverage of some course content is lost in the process. Nevertheless, these authors’ findings suggest “that lost classroom coverage because of greater time devoted to active learning techniques need not negatively affect student’s performance” (p. 94). Their data “…although limited to their specific context are consistent with the argument that materials covered in class but rather left to independent coverage outside class through assigned readings, need not to be sacrificed and indeed may be compensated for by prior metacognition” (p. 94). Actually, the introduction of discussion into a lecture-based course is one of the most common strategies for promoting active learning.

Discussion has been found to be preferable to just lecture because it promotes long-term retention of information, motivates students to learn further, and it allows students to apply information in new settings and to develop their thinking skills (Bonwell & Eison, 1991, citing McKeachie, Pintrich, Lin & Smith, 1986). In addition, it is important to note that faculty members need to be knowledgeable of how to ask questions and to engage students in meaningful discussion (Bonwell & Eison, 1991, citing Hyman, 1980). Bonwell and Eison also assert that feedback lectures, which consist of two mini lectures separated by small-group discussion that is built around a study guide, and guided lectures are ways to incorporate active learning into existing lecture courses. In such an approach, students listen to a 20-30 minute presentation without taking notes, and after the presentation they spend five minutes writing what they remembered, with the remainder of the class period spent in small groups clarifying and elaborating on that information as another of the ways that active-learning techniques can be incorporated into lectures.

CONCLUSION

also indicate that while lecture is a more efficient way to present information, the use of lecture as the only mode of instruction can present problems for both the instructor and the students. Sokolove (1998) found that while active-learning approaches take more time and consequently reduce the time available in class for coverage of material, it also was recognized at the outset that even in a traditional lecture course, it is impossible to cover all the material contained in even the least challenging introductory textbook. According to some of the literature discussed, active learning can improve upon the traditional method of instruction by placing students at the center of the educational experience and by focusing on “learning.” In addition, active-learning strategies foster classroom environments where students are engaged and can learn valuable critical-thinking skills. Furthermore, active-learning strategies also have been found to afford teachers the opportunity to actually teach and assess whether “true” student learning is taking place.

Bonwell and Eison (1991) note that active learning is not an all or nothing venture; incorporating active learning into the college classroom does not have to be a daunting task. These authors also conclude that active learning can take place by simply infusing brief demonstrations or short ungraded-writing exercises followed by class discussion into a predominantly lecture class. Yoder and Hochevar (2005) found that deciding when to use any learning technique requires that instructors continually ask themselves what is most important in the materials they are covering and seek out information from students about which points remain muddled for them. Ngeow and Kong (2001) purport that to facilitate the goals of learning new ways to learn, “teachers and students need to be provided with appropriate and accessible pedagogical tools and support” (p. 5). The exploration of the potential value in the use of active learning seems to be a worthy pursuit, particularly, if it can enhance student learning.

REFERENCES


AN INTEGRATED APPROACH TO COUNSELOR SUPERVISION: THE DISCRIMINATION MODEL FROM THE FEMINIST PERSPECTIVE

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According to Bernard and Goodyear (2004), supervision is an evaluative intervention provided by a more experienced member of a profession to a beginner within that same profession, over an extended period of time. The authors go on to point out that the purpose of this intervention is to monitor and enhance the professional skills of the beginner. The process of supervision is used in a variety of professions such as clinical psychology (Gabbay, Kiemle, & Maguire, 1999), nursing (Hancox, Lynch, Happell, & Biondo, 2004), school psychology (Fischetti & Crespi, 1999), and teaching (Pajak, 2002; Zepeda, 2002). Supervision, in these professions as well as in the counselor education profession, serves as a gatekeeper as described by Bernard and Goodyear (2004).

It is this author’s opinion that supervision for any beginning professional, metaphorically, is similar to sitting down for a meal. The trainee is usually hungry and eager to be fed from the wealth of knowledge that awaits her or him on the supervision table. This monograph chapter is an attempt to explore the main course of this supervision menu, which is the supervision model. The Discrimination Model can be described as the meat on the table. The feminist perspective of supervision can be described as the seasoning for the meat. Certainly, the meat is edible without the seasoning, but since throughout the supervision process one strives to produce seasoned professionals, it seems only reasonable to add a bit of seasoning (i.e., the feminist perspective) to the supervision model. The feminist perspective is viewed by this writer as adding just the perfect seasoning, which enriches the relational aspects of supervision. The Discrimination Model of counseling supervision provides roles and foci, in order to capture the supervisee’s developmental needs, while the feminist approach enhances this experience by attending to the
supervisee's relational needs. Moreover, feminist supervision places a strong emphasis on building collaborative, egalitarian, and supportive relationships (Szymanski, 2003).

**TWO APPROACHES TO SUPERVISION**

According to Bernard and Goodyear (2004), Bernard developed the Discrimination Model of Supervision in the mid-1970s for use as a teaching tool. The Discrimination Model has three separate foci for supervision and three supervisor roles. The three foci are labeled *intervention skills, conceptualization skills,* and *personalization skills.* The three supervisor roles are *teacher, counselor,* and *consultant.* In terms of the foci, the *intervention skills* focus relates to what the trainee is doing in a counseling session. The *conceptualization skills* focus relates to how the trainee understands what is occurring in the session. The *personalization skills* focus relates to the trainee's personal style of therapy, as well as the trainee's ability to handle personal issues that may arise in counseling sessions. Conceptually, there are nine combinations of the three roles and three foci that could be used to integrate the Discrimination Model with another model or perspective of supervision such as the feminist perspective. Bernard and Goodyear (2004) point out that the Discrimination Model is situation specific so that supervisors may tailor their responses to their supervisee's individual needs. Similarly, the feminist perspective also focuses on the individual needs of the supervisee, by encouraging the supervisee's involvement in the development and maintenance of the supervision relationship (Bernard & Goodyear, 2004). For instance, the supervisee would have an active voice in the development of the supervision contract, which also ties into the supervisor using the *consultant role* from the Discrimination Model. More examples of the marriage between the feminist perspective of supervision and the Discrimination Model will be addressed later in this monograph chapter.

In terms of the roles described by Bernard and Goodyear (2004), each role is important to the supervisory process. One example is that the *teacher role* in the Discrimination Model would be used to teach trainees techniques with which they may not be familiar, by recommending reading materials or by actually facilitating a role play with
the trainee in order to demonstrate the skill. Generally, the counselor role in this model would be used to help the trainee examine the way in which a client’s issues could be affecting her or him. The counselor role also might be used to help the trainee recognize certain issues that may be blocking her or his ability to work with a particular population of clients. Finally, a supervisor in the consultant role would work with the trainee to explore the possibility of using certain counseling models or interventions that she or he believes would be effective with a particular client.

The Discrimination Model of supervision affords the supervisor a tremendous opportunity to examine which roles and focus areas would be most helpful for the supervisee. The idea of freedom and flexibility rings true equally from the feminist perspective of supervision, which is why this author determined that it adds such a desirable flavor to aspects of the Discrimination Model. Nonetheless, the feminist model of supervision can enhance the already existing goals of the Discrimination Model of supervision. Supervision is a relationship and, as indicated by Sharf (2000), difficulties in developing relationships and being aware of one’s own feelings are issues that lend themselves to the application of feminist therapy.

The Discrimination Model and feminist model of supervision are compatible approaches to supervision. According to Szymanski (2003), feminist supervision grew out of the literature and practice of feminist therapy. Similarly, Sharf (2000) points out that feminist approaches may be combined with other theories. This blend of the feminist perspective with the Discrimination Model (Bernard & Goodyear, 2004) offers insight for creating a collaborative supervision relationship, without sacrificing any of the Discrimination Model’s concepts. Hipp and Munson (1995) point out that “the practitioner faces many issues in the client relationship that can be better understood, and are more likely to be brought to supervisory discussion, if a feminist perspective is openly shared” (p. 36). Specifically, Porter and Vasquez (1997) state that “feminist supervision encompasses a collaborative relationship that is mutual and reflexive in nature. It is not egalitarian; rather, it is predicated on the principle of mutual respect characterized by clear, direct, and honest dialogic communication and responsible action” (p. 161).
In conducting counseling supervision, feminist supervisors also have access to three roles, which are to teach, to empower, and to engage in ongoing self-examination in their relationships with trainees. According to Porter and Vasquez (1997), the teaching role consists of not only teaching feminist therapy content but also of modeling the process of counseling as well. The second role of empowerment requires that the supervisor empower the trainee to address issues related to “the intimate nature of the therapeutic relationship and to the maintenance of good boundaries, in ways that make it safe for the client [or in this case the trainee] to address them” (p. 161). Finally, the authors point out that feminist supervisors must recognize that open communication within the supervision process requires continuous self-examination, self-care, and lifelong learning. These characteristics of feminist supervision blend with the already existing Discrimination Model of supervision in a way that a supervisor using both models does not have to sacrifice the tenets of either. Instead, the models apparently can exist together, whereby the best possible outcomes for the supervision process are promoted by incorporating the feminist-relational tools for success with the Discrimination Model’s tools for success.

Upon first glance, it may appear as though the Discrimination Model (Bernard & Goodyear, 2004) of counselor supervision would have little in common with feminist supervision; however, this perspective is an erroneous conclusion. Porter and Vasquez (1997) declared that supervision from a feminist perspective is best coined “covision.” The authors point out that covision includes “collaboration, mutuality, disagreement without disapproval, safety, regard for each person and her or his ideas, the ability to integrate many different perspectives, as well as the ability to encompass both relationship and challenge” (p. 158). This definition of covision complements the goals of the supervision roles that are described by Bernard and Goodyear (2004); therefore, the basic principles of the Discrimination Model and the feminist perspective share many of the same goals. Interestingly enough, the individual means by which each of these models attempts to reach their mutual goals also can be explored for similarities that serve to maximize the supervision experience.
INTEGRATING THE DISCRIMINATION MODEL AND
A FEMINIST PERSPECTIVE

Bernard and Goodyear (2004) list three roles of the Discrimination Model, namely the teacher role, the counselor role, and the consultant role. The teacher role in the Discrimination Model would be used to enlighten trainees on concepts that may not be clear or familiar to them. The counselor role would be used primarily to help a trainee to examine the effect that a client could have on her or him. Finally, the consultant role of the Discrimination Model could assist trainees with exploring the techniques and implementation of particular interventions. The feminist perspective of supervision is built upon a foundation of supervisor characteristics that seem to mirror the roles of the Discrimination Model described above.

Porter and Vasquez (1997) highlight the three characteristics of a feminist supervisor, as previously described, which are parallel to the three roles described in the Discrimination Model. The teacher role of feminist supervisors and that also is presented in Bernard’s Discrimination Model are similar. Advocates of both models refer to this teaching role as a way to enhance the trainee’s development by modeling techniques and teaching concepts. Feminist supervisors also foster the discussion of issues central to the therapeutic relationship, which is consistent with the idea of the consultant role in the Discrimination Model. The feminist supervisor empowers the trainee to address clinical issues, which also parallels descriptions of the consultant role in Bernard’s model. These roles of empowerment and consultation blend together well, addressing issues that some supervisors pretend do not exist, because empowerment from the supervisor sends a message that the trainee is prepared to begin developing her or his own conceptualization of what is occurring with a particular client. Clearly, receiving minimum direction from the supervisor, in the form of consultation, has an empowerment impact on the trainee. Finally, feminist supervisors “discourage rigid, dogmatic, dualistic, or dichotomized thinking, which inhibits dialogue” (Porter & Vasquez, 1997, p. 162). This process of implementing a self-examination role is similar to the counselor role in the Discrimination Model, as the supervisor encourages the trainee to maintain an open mind when working with clients, and also encourages openness and self-examina-
tion within the supervision relationship by embracing the trainee’s thoughts about therapeutic possibilities.

Bernard and Goodyear (2004) outline three foci of supervision, which are intervention skills, conceptualization skills, and personalization skills. The authors indicate intervention skills are focused on what the trainee is doing in the counseling sessions; the conceptualization skills focus is used to address how the trainee understands what is taking place in a counseling session; and the personalization skills focus is used to examine the way in which the trainee’s personal issues and personal style of therapy could be affecting the counseling process. Each of these foci clearly can be merged with the concepts of the feminist approach to supervision.

The intervention skills focus of Bernard’s Discrimination Model typically is visible with the teacher role of the feminist supervisor because, if a trainee is not familiar with gender stereotypes, for instance, it will be important for the supervisor to teach the trainee about the way in which these stereotypes could affect the counseling and supervisory relationships. The conceptualization skills focus of the Discrimination Model also is connected to the conceptualization component of the feminist supervision model, in that the trainee is encouraged to exercise her or his ability to conceptualize a case with the support of the supervisor. Similarly, this relates to the personalization skills focus of the Discrimination Model because, as indicated above, feminist supervisors do not inhibit dialogue; therefore, trainees will be encouraged to openly discuss personal issues they may be facing that are related to working with a particular client. That supervisory openness assures trainees that they will not feel as though they will be judged or be evaluated negatively by the supervisor for doing this kind of self disclosure.

The meat of the Discrimination Model, blended and seasoned with the feminist perspective, produces a unique element of the supervision process, whereby supervisees experience the freedom to polish their intervention skills with a non-threatening teacher perspective. The supervisee is also free to begin conceptualizing her or his client cases with the help of a non-judgmental consultant. Finally, the supervisee experiences the ability to address her or his personal issues as they relate to a particular case, while experiencing validation from her or his supervisor, who takes on the role of a counselor. It is clear that
aspects of the feminist perspective of supervision can be merged easily into each role and focus of the Discrimination Model. Lastly, the Discrimination Model provides much insight toward the positive development of the trainee, while the feminist model adds openness, empowerment, and connectedness between the trainee and the supervisor. Integrating the feminist perspective of supervision with the Discrimination Model is a reciprocal process, one in which feminist concepts can become an integral component of the Discrimination Model.

INTEGRATING FEMINIST SUPERVISION INTO THE DISCRIMINATION MODEL

This section of this monograph chapter will explore five feminist-supervision concepts, which are socialization, gender, power, diversity, and emotion. Furthermore, specific feminist supervision methods will be examined. These methods consist of contracting and collaborative methods that include fostering competence, applying multiple perspectives, providing options to the trainee, making suggestions during call-ins, and encouraging mutual feedback between supervisor and trainee.

While Porter and Vasquez (1997) outlined the characteristics of a feminist supervisor, Prouty (2001) developed the five concepts of socialization, gender, power, diversity, and emotion as they relate to feminist supervision. According to Prouty, the socialization concept deals with the way in which supervisors help trainees to identify socializing forces that influence them. The concept of gender is described as including ideas related to roles, relationships, and interpersonal styles that are experienced or constructed according to a person’s gender. Power, from this feminist perspective, is examining who has the power and how it is being used, as well as whether it is overt, covert, known, or unknown. The feminist concept of diversity deals with flexibility, acceptance, and tolerance of differences. Finally, the concept of emotion focuses on the trainee’s comfort level for working with emotions in the therapy room (Prouty, 2001). All these concepts appear to relate well to the goals of the Discrimination Model.

As a part of the supervision process, supervisors working from the Discrimination Model with a feminist perspective may need to
help trainees identify socializing forces that influence their clients. Generally, this activity would incorporate the feminist perspective with the personalization skills focus and the counselor role of the Discrimination Model.

The second feminist concept, gender, typically involves the teacher role of supervision from the Discrimination Model along with the teaching characteristic of supervision from the feminist perspective. As one example, Prouty (2001) notes that supervisors must teach trainees to recognize certain words, such as “chairman” instead of “chairperson,” that reinforce traditional gender positions in order to gain more insight into the way in which gender impacts their clients’ lives.

Supervision from a feminist perspective also focuses on diversity, not only by teaching trainees to become more knowledgeable about people who are different from themselves, but also to help therapists become more flexible around these differences (Prouty, 2001). The process easily could incorporate the roles of counselor and consultant as well as the foci of conceptualization skills and personalization skills of the Discrimination Model.

Prouty also says that feminist supervisors emphasize the importance of helping the trainee to elicit, validate, and effectively deal with emotion as a part of being a competent therapist. He indicates that feminist supervisors help trainees to learn to value their own emotional reactions and to be emotionally and verbally congruent in therapy. Depending on the supervisor’s personal preferences, implementation of the emotion concept could be approached from any of the Discrimination Model roles, and, in order to develop trainee insight, it might involve a focus on conceptualization skills or personalization skills. However, this concept more often may be related to the intervention skills focus and the teacher role of the Discrimination Model, as it addresses what the trainee is doing in the session and understanding the way in which the client is receiving it.

While the teacher role of the Discrimination Model may be used to determine what will be addressed during the session, the consultant role may be used to determine how these supervision issues will be approached. An example of this implementation is visible with the feminist concept related to power analysis. Power, as a feminist concept, represents the importance of helping trainees to identify the affects of power in their clients’ lives (Prouty, 2001). This concept
relates quite well to the conceptualization skills focus and the consultant role of the Discrimination Model. Feminist supervisors in a consultant role might assist the trainee with exploring the ways in which power, or the lack thereof, is related to the client’s issues.

The personalization skills focus also is vivid within the feminist perspective of supervision. The feminist perspective encourages an open communication within the supervision process and encourages the trainee to examine her or his emotional reactions related to the work. This approach also is congruent with the counselor role of the Discrimination Model, as supervisors work with supervisees to gain insight into their emotions. Therefore, the concepts of feminist supervision can be coupled with components of Bernard’s model as a means of adding depth to the supervision process. Incorporating feminist methods into the supervision process seems to be synonymous with providing quality assurance for the experience, by accenting the core and essential components of a healthy relationship.

Prouty, Thomas, Johnson, and Long (2001) conducted a qualitative study of the experiences of feminist family-therapy supervisors and the therapists they supervised. The researchers conducted interviews at eight counseling sites as a means of collecting data related to the supervisors’ and supervisees’ feminist-supervision experiences. Additionally, four sites provided a videotape of a supervision session, and participants from those sites were asked to identify any similarities or differences between the videotaped session and a typical supervision session that they experienced. This method of collecting data, while fostering self-examination of the supervision relationship, is consistent with the consultant and counselor roles of the Discrimination Model (Bernard & Goodyear, 2004). Based on the Prouty, et al. (2001) findings, contracting and collaborative methods for supervision emerged from their study. Specifically, the authors indicate that the supervision relationship should begin with a contract that outlines the trainee’s goals, mutual evaluation, and clarification of the trainee’s responsibilities. This approach is consistent with the consultant role of the Discrimination Model, primarily because of the mutual involvement in the process of both the supervisor and the trainee. Prouty, et al. also state that the goals should be identified by the trainee, which also is indicative of a consultative relationship between the supervisor and the trainee. Furthermore, the authors point out that the supervisor can assist the trainee with developing these
goals by asking questions like, “So when supervision is over, how would you like to look? What would you like to work on? How can I be helpful as your supervisor?” (p. 95) Questions such as these also will serve as a way to assess the trainee’s needs by using open communication, which is consistent with the personalization skills focus and both the counselor role and consultant role from the Discrimination Model, as the supervisor attempts to help trainees identify how they personally view their professional needs. Prouty, et al. (2001) indicate that the trainee’s goals often are used as criteria for evaluation. Through using this approach, the trainees evaluate their own progress, since they initially set their own goals in a supervisory contract as noted previously. This self-evaluation process is consistent with the consultant role of the Discrimination Model because mutual evaluation tends to foster a collaborative working relationship between the supervisor and the trainee.

The feminist techniques of collaborative methods include fostering competence, applying multiple perspectives, providing options to the trainee, making suggestions during call-ins, and encouraging mutual feedback between supervisor and trainee (Prouty, et al., 2001). Prouty and associates describe fostering competence as a process of eliciting clinical knowledge from therapists/trainees, thereby, assuming existing competence and the ability to integrate new clinical ideas with existing ones. This process also is consistent with the consultant role and the intervention skills focus of the Discrimination Model, as the supervisor in this role also assumes that the trainee has reached a level of competence whereby she or he can successfully implement appropriate interventions. Applying multiple perspectives also is important in the feminist supervisory relationship, as it encompasses the ideas that there are many ways to look at a situation, and there are many ways to facilitate the therapy process (Prouty, et al. 2001). This procedure is similar to the teacher role and the conceptualization skills focus of the Discrimination Model when trainees are taught how to examine and conceptualize cases from different perspectives. This teacher role then evolves into more of a consultant role as the supervisee gains a better understanding of case conceptualization; therefore, the supervisee may rely less on the supervisor and more on her or his creative center as a means of understanding a client’s presenting issues. Providing options to the trainee is also an integral component.
of the feminist supervision process. Prouty, et al. state that the supervisor generally starts off with a compliment, followed by a statement that would be similar to these: “you might think about this...”, “what I’m hearing is...,” or “think about these questions.” This approach too is related to the teacher role and the intervention skills focus of the Discrimination Model when trainees are taught to examine more effective approaches for working with their clients. Additionally, collaborative call-ins involve providing choices or multiple perspectives to a trainee who is in session when she or he is given multiple options from which to choose. Prouty, et al. (2001) point out that collaborative call-ins create a vehicle for providing alternatives. This process also could be similar to the teacher role and the intervention skills focus of the Discrimination Model, as the supervisor provides the trainee with suggestions for improving her or his intervention skills and may specify the most desirable choice for the trainee. Mutual feedback is described by Prouty, et al. as an informal way of providing compliments, requests, and constructive criticisms between the supervisor and the trainee. The authors go on to say that this is a mutual process and often takes the form of a check-in during supervision. For instance, the supervisor may ask questions like, “Does this make sense?” “How does this fit for you?” This type of inquiry taps into the counselor role and the personalization skills focus of the Discrimination Model, as it gives trainees an opportunity to consider their personal feelings regarding the feedback.

One final technique worth mentioning is the use of role plays for the beginning therapist who may not yet feel comfortable in her or his ability to exhibit a certain skill. As Prouty et al. (2001) indicate, this technique provides the beginning therapist with a safe place to practice the skill, which enhances her or his level of confidence in using the skill in a counseling session. This process is related to the teacher role of the Discrimination Model and the intervention skills focus, as the role play may consist of the supervisor modeling the use of a particular intervention skill. Similarly, it may be equally important for the supervisee to role play the counselor’s position, which would enable the supervisor to present different issues from a client’s perspective. Role playing further enhances the supervisee’s experience with implementing appropriate interventions, which again, is consistent with the intervention skills focus of the Discrimination Model.
CONCLUSION

Feminism is a way of thinking and being that is constantly emerging and changing (Hipp & Munson, 1995). The Discrimination Model, according to Bernard and Goodyear (2004), implies that supervisors will tailor their responses to the particular trainee’s needs; therefore, the integration of these two models seems to form an exceptional union, as they accent and enhance supervision goals. More importantly, trainees appear to benefit from an integrated approach to supervision that promotes freedom to grow as professionals, freedom to be and to feel, and freedom to learn beyond the traditional limits. Most importantly, the clients served by these trainees will be exposed to a relationship that generates this freedom throughout the counseling process, thereby offering these clients the same freedom to grow, the freedom to be and to feel, and the freedom to realize their strength to overcome.

This monograph chapter has outlined the way in which each of the two supervision models that were presented exist separately, as well as the ways in which they can be integrated. Upon introducing this topic, supervision was described as metaphorically being synonymous to eating a meal, with the Discrimination Model as the meat and the feminist perspective as the seasoning. Many people do not view seasoning as a necessity for a meal; some even feel as though it can overshadow the hard work that the chef has already put into preparing the meal. Poetically or metaphorically speaking, this is the essence of the feminist approach. From a supervisory perspective, feminism does not involve pushing the way into any relationship, nor does it involve a demand for any process to be used. The feminist supervisory perspective is simply made available, should you have the desire or taste to indulge.
REFERENCES


PART 5: COLLEGE OF ENGINEERING AND INFORMATION TECHNOLOGY
Carbon, in its various forms, has played a major role in providing suitable purification materials and catalyst supports, as well as reactive and non-reactive sorbents, throughout the history of heterogeneous catalysis. Previous research shows that there are many attributes of carbon that account for its desirability, such as its ability to withstand extreme reaction conditions, controllability of surface area and porosity, and its relative ease of disposal upon deactivation (i.e., simply burn the carbonaceous material to recover precious metals while emitting mostly carbon dioxide and water).

In 1991, Iijima [1] discovered what are known today as multi-wall carbon nanotubes (MWNTs), which are carbonaceous materials with an atomic structure similar to that of graphite (sp2 hybridization) but in a cylindrical shape, with each cylinder surrounded by another of larger diameter. Two years later, Iijima and Ichihashi reported the isolation of single-wall carbon nanotubes (SWNTs) [2]. Scientists in many technical fields have sought to make use of these unique materials; the unusual properties of carbon nanotubes (CNTs) may lead to possible breakthroughs in the electronic, computer, chemical, polymer, medical, and textile industries, to name a few.

The focus of this monograph chapter is the use of carbon nanotubes for the renewable energy and catalysis industries. Specifically, reactive metal nanoparticles deposited on CNTs can be used as fuel-cell electrodes, one of the fundamental components of fuel cells. The use of fuel cells may lower the dependence on fossil fuels, provided that the fuel for the fuel-cell itself comes from renewable energy (see Science You Can Understand: The Chemical Reaction, Fuel Cells, and the Fuel Cell-Powered Automobile, in the 2002 edition of the African American Professors Program Monograph Series). Although fuel-cell electrocatalysts prepared with carbon nanotubes currently may not allow enough production of energy for everyday applications, future advances in CNT technology may make these materials competitive with current electrocatalysts.
Although there is a substantial interest in these nanostructured catalytic materials, many previous studies have investigated CNTs from a purely theoretical standpoint; therefore, there is limited information regarding catalysts prepared from these materials. There are many details that must be addressed in order to design and manufacture useable CNT-based, fuel-cell technology. These include the large-scale production of CNTs, desirable support properties of CNTs, and techniques employed for metal deposition and nanoparticle formation (i.e., formation of the active phase). This monograph chapter will review these three aspects of the development of carbon nanotube-supported catalysts and conclude with a brief review of current efforts to employ such materials in experimental systems.

LARGE-SCALE PRODUCTION OF CARBON NANOTUBES

In order to compete with others in the catalyst-support industry, manufacturers of carbon nanotubes need to develop methods to synthesize their product in greater quantities and with higher efficiency than is possible with existing techniques. Currently, chemical-vapor deposition (CVD) and arc-discharge methods apparently are best suited for large scale production, but these methods typically are known as too slow and expensive to produce carbon nanotubes in quantities suitable for industrial application. Thus, nanotube manufacturing capabilities need to be scaled up at minimal additional cost in order to fully realize a prosperous market for CNTs in the catalyst industry.

It has been shown by Bronikowski and co-workers that that chemical vapor-deposition techniques can make 10 g/day of high-quality single-wall carbon nanotubes [3]. These materials were shown to grow at high-pressure (i.e., 30–50 atm) and at high-temperature (i.e., 900–1100°C) conditions in flowing carbon monoxide over iron catalysts. Specifically, SWNTs of up to 97 mol% purity were produced at rates of up to 450 mg/h [3]. This process has been studied and optimized with respect to a number of process parameters, which include temperature, pressure, and catalyst concentration. The synthesis of SWNTs occurs at a significant rate only at temperatures above 500°C; and the rate of temperature increase from 300 to 500°C is important in determining the quality of the overall product [3]. For example, if the
heating rate is too slow, the iron clusters may undergo sintering and create particles that are too large to create nanotubes. On the other hand, the per-atom binding energy for small iron clusters (i.e., 2-10 atoms) is 1.5 – 2.5eV, which is less than the bulk value of 4.28eV; thus, at temperatures where SWNTs form, such small clusters may dissociate, which results in the formation of iron oxides and amorphous carbon. While CVD yields large quantities of high-purity CNTs, the number of defects (such as gaps and dangling bonds) is known to be higher than for other processes. As will be seen later, defects create sites for nanoparticle deposition, while, at the same time, they can hamper the structural integrity and thermal stability of the catalyst as a whole.

Currently, the plasma-arc discharge method has been shown to produce high-purity SWNTs at rates of approximately 1 g/min [4]; however, a substantial amount of waste was generated in this investigation, and the relative quantity of CNTs compared to the amount of other carbonaceous material was quite low, suggesting that this method is more expensive than CVD. Still, the raw materials and the equipment used in this process were relatively inexpensive, as well as easy to use; thus, with some refinement, this technique may show promise for large-scale CNT production.

An organization called Nanotechnology Now compiled the answers to questions most frequently asked of companies that produce carbon nanotubes [5]. The questions focused mainly on the quantity, cost, and types of carbon nanotubes that they produce and the methods used to manufacture them. All of the companies surveyed, which were reported in this publication, use either the arc discharge or CVD methods for CNT production, and their prices range from tens to hundreds of dollars per kg of single-wall, double-wall, and multi-wall nanotubes. These CNT manufacturers are listed in Table 1.

Table 1. Carbon Nanotube Manufacturers (Adapted from “Nanotechnology Now” [5])

<table>
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<tr>
<th>Carbolax</th>
<th>CNR</th>
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<th>CatalytiMaterials</th>
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<td>BC Systems</td>
<td>Hyperion</td>
<td>ILJIN</td>
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<td>Nanocarlab</td>
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<td>Nanamor</td>
<td>Rossmet</td>
<td>Shenzhen Nanotech</td>
<td>SWeNT</td>
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As of April 2003, the greatest rate of CNTs production is 10 kg/day via chemical vapor deposition. Although this rate of production seems extremely slow when compared to that of traditional catalysts (e.g., the rate of catalyst manufacture for petroleum refining catalysts can exceed hundreds of tons per day), efforts are being made to increase production capacity as the demand for carbon nanotubes continues to rise.

SUITABILITY OF CARBON NANOTUBES AS CATALYST SUPPORTS

The most important characteristics of any catalyst support are its adsorptive properties, electronic properties, and stability under reaction conditions [6]. Unfortunately, to possess the desirable qualities of only two of these three parameters will result in a less than suitable support material. Research results indicate that each of these attributes plays an important role in the overall goal of the development of a suitable CNT-based catalyst.

Supported catalysts consist of two phases, which are the supporting or distributing phase and the active phase [6]. Typically, the support is inactive for reaction, and its primary goal is to promote the active phase (i.e., where the reaction generally occurs). Carbon nanotubes are used for the support phase in fuel-cell electrocatalysts, while for the active phase a metal such as platinum usually is used. The capability to distribute the active phase is known to be one of the most important characteristics of a catalyst support. One of the keys to achieving this is to have a support material with a large surface area. Carbon nanotubes are composed of cylindrical graphene sheets with semi-fullerenes at the ends as “caps.” Single-wall nanotubes have more carbon atoms exposed to the accessible surface than do multi-wall nanotubes; thus, SWNTs have a higher specific surface area (i.e., area per mass) than MWNTs. Although theoretical studies have shown that SWNTs can achieve a specific surface area of greater than 3000 m$^2$/g [7], the largest value that has been obtained experimentally for these materials was 1587 m$^2$/g by Cinke and co-workers [8]. Still, most researchers have reported more modest SWNT surface areas ranging from 400-900 m$^2$/g [9], while, in the case of MWNTs, the specific surface area has been lower (i.e., in the range of 200-400 m$^2$/g) [10].
In addition to providing a large surface area, the support material must allow for adequate transport of reactants and products to and away from the active phase, respectively. Multi-wall nanotubes are mesoporous materials; in other words, the interstitial spaces between adjacent MWNTs are on the order of 2 to 50 nanometers [11]. Based on the work of Yang and associates, single-wall nanotubes consist mostly of micropores, or pores with interstitial spaces of 2 nanometers or less. This is to be expected because as SWNTs are more closely packed than the thicker-walled MWNTs, which tend to have more narrow channels between nanotubes and potentially result in reactant/product transport limitations.

Instead of molecular adhesion occurring on single nanotubes, species usually adsorb on bundles of nanotubes [12]. It has been shown by Serp and co-workers that, in a single-wall nanotube bundle, adsorbates can adhere to an individual nanotube on a bundle’s surface, in a groove on the bundle’s surface, inside an individual tube, or in-between multiple tubes.

A schematic representation of these adsorption configurations are shown in Figure 1. As for MWNTs, it has been shown that smaller outer diameters favor adsorption due to the fact that most of the adsorption occurs on the surfaces of the MWNTs and not as frequently in its pores [13].

If carbon nanotubes are to be used as supports for electrocatalysts, it is important that these materials are able to facilitate the transport of electrons (i.e., to allow electrical current to flow through the fuel cell). The electronic properties of carbon nanotubes are defined by the diameter of the tube as well as by the type of nanotube (i.e., armchair, zigzag, or chiral) [14]. Bethune et al. demonstrated that the curvature of the nanotube induces strong modifications of the electronic properties of graphite. Specifically, the p bonding orbital is different when one compares graphite with carbon nanotubes, which are two materials that are both sp2 hybridized. For example, Ouyang, et al. showed that armchair
SWNTs conduct electrons like metals, while those in the zigzag configuration act like semi-conductors [15]. On the other hand, MWNTs behave similarly to graphite in terms of their electrical conductivity at high temperatures, while at low temperature they have two-dimensional electron-transport features [16]. Although defects in carbon nanotubes will alter their electronic properties, these rules generally are applicable.

The electronic properties of carbon nanotubes primarily will influence the chemical characteristics of the deposited metal. For example, Menon and colleagues have shown that CNT curvature significantly affects the magnetic moments of nickel when adhered to SWNTs [17]. Such a modification can make for interesting kinetics at the reactive interface, especially when one considers the already-altered electronic properties of the metal that arise due to nanoparticle size effects.

Experienced researchers in catalysis know that the durability of fuel-cell electrocatalysts is a serious issue. Carbonaceous catalytic materials often are subject to extreme conditions such as high temperatures, high pressures, and various mechanical stresses. Due to the extensive network of carbon to carbon covalent bonding, carbon nanotubes are known to be well-suited for these extremes. The simplest and most practical method for determining hydrothermal stability is by thermogravimetric analysis. As evidenced by Moon and colleagues, single-wall nanotubes gasify (or combust) at higher temperatures than do multi-wall nanotubes (i.e., 800 vs. 650°C, respectively) [18]. This phenomenon can be attributed to the extensive presence of defects and metal impurities in MWNTs compared to SWNTs.

Mechanically, carbon nanotubes have proven to be extremely strong and remarkably flexible. Lourie and Wagner reported Young’s modululi for SWNTs and MWNTs of 2.8–3.6 and 1.7–2.4 TPa, respectively [19]. Additionally, theoretical studies have shown that carbon nanotubes can withstand bending at moderate angles (<100°) with only the development of kinks and a few highly-strained regions [20]. These defects are deemed reversible except in the case of extreme bending angles.
METAL DEPOSITION TECHNIQUES AND NANOPARTICLE SYNTHESIS

There are various methods for the deposition of metals onto carbon nanotubes. While techniques such as electron beam deposition, incipient wetness impregnation, organometallic cluster derivation, and others have their merits, the simplest and most predominant method of metal deposition is known to be wet impregnation. In using this technique, one brings an excess of solution containing the metal salt to be deposited in contact with the carbon-nanotube support. The solvent distributes the metal precursor throughout the pores of the material, and then is evaporated, which leaves the metal salt dispersed on the surface. Subsequently, thermal or chemical-reduction steps will render zero-valent metal nanoparticles dispersed on all of the surfaces that were in contact with the solution. This technique is one of the most widespread methods for metal deposition primarily due to its simplicity; related research is discussed below.

Planeix et al. synthesized a solution of ruthenium 2,5-pentanedionate in toluene to be deposited via wet impregnation onto multi-wall nanotubes [21]. After deposition and reduction treatments, transmission electron microscopy revealed ruthenium nanoparticles varying in diameter from 2-7 nm, resting on a well-defined multi-walled nanotube. Another group of researchers has experimented with wet impregnation of SWNTs, MWNTs, graphite, and activated carbon supports by an aqueous copper solution [22]. Results showed that the SWNTs and graphite supports were not coated by any copper nanoparticles. On the other hand, the MWNTs and activated carbon supports were found to have copper particles on their surfaces with diameters in the range of 5 to 15 nm. These researchers conclude that the presence of defects in the MWNTs and the functional sites in the activated carbon are an aid in metal deposition. Fan and co-workers also have observed this phenomenon [23]. Hydrogen selenide (H₂Se) was adsorbed on single-wall nanotubes in order to identify any chemical-defect sites. By treating the sample in flowing oxygen, the H₂Se was oxidized to form zero-valent selenium nanoparticles that were situated in the defect sites due to the presence of favorable bonding conditions. Upon imaging with an electron microscope, these researchers were able to locate and better characterize these defects in single-wall nanotubes.
Since MWNTs have more defect sites and, thus, more sites for metal incorporation, many researchers have focused on investigating the deposition of precious metals on MWNTs instead of on SWNTs. For example, Xue et al. conducted deposition experiments with palladium, gold, platinum, and silver on a MWNT support [24]. In their research, the CNTs were immersed in a solution containing the corresponding salt of one of the metals mentioned above, followed by evaporation of the solvent. The resulting material was reduced at elevated temperatures to yield nanotubes covered in platinum nanoparticles. Just as it may desirable to activate coal char or graphite to form a more active surface for adsorption, researchers have developed methods for the activation of carbon nanotubes in order to better facilitate metal deposition and adhesion. Acid washing or other oxidative treatments commonly are used in order to create oxygenated functional groups, such as carboxylic acids, on carbon nanotube surfaces [25]. Kusnetzova et al. showed that this process creates abnormalities in the structure of both single-wall and multi-wall nanotubes and increases the possibility of metal adhesion. Nonetheless, the downside of this procedure and similar techniques is that such an oxidative workup may affect some of the underlying physical properties of carbon nanotubes such as surface area and porosity, as well as their hydrothermal and mechanical stability.

Lordi, et al. used nitric acid to oxidize SWNTs, resulting in the formation of carboxylic acids on the surface [26]. Upon subsequent wet impregnation of a platinum salt, they observed highly dispersed platinum nanoparticles ranging in diameter from 1-2 nm. Lordi and associates used a catalyst that was 10% (by weight) platinum, and the data implies that a vast majority of the metal atoms were at the surfaces of the nanoparticles and available for reaction—something very difficult to achieve for a material with such a high metal loading. A more destructive oxidation treatment can be performed on MWNTs simply because there are more layers through which the acid can penetrate. In particular, one type of attack is the formation of steps or edges in the carbon nanotube, or even openings of the graphene sheets at the fullerene caps [27]. Reactions of MWNTs and a mixture of sulfuric and nitric acids yields a sufficient quantity of surface defects to accommodate enough metal to synthesize a 10% platinum catalyst [28]. In this research by Li and associates, the particle sizes ranged from 2-4 nm, which indicates a loss in dispersion when employing MWNTs as a support rather than SWNTs.
CONCLUSIONS

Carbon nanotubes exhibit catalyst-support characteristics that rival those of traditional carbonaceous materials. They show a high capacity for adsorption due, in part, to their surface area characteristics, porosity, and tendency to form bundles. Furthermore, the inherent curvature of carbon nanotubes results in electronic modification of what would ordinarily be graphite. Such electronic changes affect the conductivity of the material as well as the nature of the electronic interaction between the nanotube and metallic nanoparticles, which potentially leads to synergistic behavior. Single-wall and multi-wall nanotubes both exhibit remarkable mechanical strength and flexibility. These materials also may withstand reaction temperatures greater than 500°C. Nevertheless, one of the greatest challenges for the implementation of carbon-nanotube supports appears to be finding the optimum quantity of defects in the tube structure. These imperfections, such as incomplete or dangling bonds, metal impurities, or amorphous carbon species that did not form nanotubes, provide adhesion sites for reactive metal nanoparticles, while they also decrease the structural integrity of the nanotubes. Deposition of metals onto carbon nanotubes can be performed through oxidative treatment as pretreatment followed by wet impregnation of a metal precursor. The active phase of the catalyst is comprised of metal nanoparticles, which are formed by exposure of CNT-supported metal precursors to reducing conditions at elevated temperatures. These characteristics of catalysts prepared by carbon nanotubes appear to be quite promising for fuel-cell applications; thus, with refinement, it may be possible to develop catalysts that are superior to those based on graphite and polymer supports through the use of CNTs.
REFERENCE NOTES


PART 6: COLLEGE OF PHARMACY
NITRIC OXIDE ALTERS THE ENZYMATIC ACTIVITY OF HUMAN N-METHYLPURINE DNA GLYCOSYLASE BY POST-TRANSLATIONAL MODIFICATION

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Colorectal cancer is the second leading cause of cancer deaths and one of the most common types of cancer affecting men in the United States [1]. Each year 130,000 Americans are diagnosed with colorectal cancer, and over 50,000 cases result in death [1]. There is a strong association between ulcerative colitis (UC) and an increased risk of developing colorectal cancer [2]. Initiation of the inflammatory response leads to the activation of macrophages, which invade tissues and elicit various physiological mechanisms [3]. Prolonged activity of inflammatory mechanisms may lead to chronic inflammation as the levels of harmful reactive species increases and becomes damaging to tissues [3]. Nitric oxide (NO) is the reactive species thought to be the source for the increased DNA and protein damage in ulcerative colitis [3, 4].

Inducible nitric oxide synthase (iNOS) is one of four NO producing synthases that have been shown to be overexpressed during ulcerative colitis [3]. As presented by Huassin and associates, iNOS differs from other types of NO synthases in that large amounts of NO are produced in short bursts, whereas, low levels of NO are continuously produced in other types of NO synthases. Furthermore, NO is a reactive free radical that has been implicated in many physiological processes such as the regulation of apoptosis and protein function [3, 5]. However, the overproduction of NO is thought to be involved in NO related disease pathology due to the damage of DNA and various proteins [3, 5].

NO damages DNA by the deamination of adenine, guanine and cytosine to produce hypoxanthine (Hx), xanthine (X), oxanine (O), and uracil, respectively [6]. Furthermore, NO significantly alters fatty acid metabolism to produce lipid peroxidation byproducts that react with DNA to produce 1,N⁶-ethenoadenine (eA), 3,N⁴-ethenocysteine (eC) and N²,3-ethenoguanine (eG) [7]. These researchers report that many of the single nucleotide, base lesions formed by NO are recognized and excised by specific DNA glycosylases within the base-exci-
sion-repair pathway (BER). Human N-methylpurine DNA glycosylase (MPG, AAG, ANPG) is particularly interesting, in this regard, because MPG is able to recognize Hx, X, O, εA, εG and other substrates [8, 9, 10]. MPG functions in the first step of BER, which involves the removal of damaged purines by a nucleotide flipping mechanism, which results in an apurinic (AP) site [11]. NO may induce the formation of secondary DNA adducts such as 3-methyladenine (3-meA) and 7-methylguanine (7-meG), which are efficiently repaired by MPG [11, 12]. In addition, MPG has recently been shown to bind to, but not to excise 3,N4-ethenocysteine (εC), which is another type of DNA adduct produced during ulcerative colitis [13]. The significance in the strong binding affinity of MPG to εC was demonstrated by Gros et al., whose research showed that εC is able to titrate the binding of MPG away from Hx and εA and reduce excision [13].

In addition to damaging DNA, NO may post-translationally modify proteins, resulting in altered activity or in ubiquitin degradation [14]. NO modifies specific amino acids of proteins through nitration and nitros(yl)ation reactions by the addition of -NO₂ and -NO groups, respectively [15, 16]. Although the post-translational modification of MPG has not been observed, the post-translational modification of other glycosylases such as human 8-oxoguanine DNA glycosylase and thymine DNA glycosylase have been reported [17]. Therefore, it is reported that high levels of NO during ulcerative colitis may lead to various types of DNA damage; many of which are repaired by MPG. Furthermore, NO may post-translationally modify MPG, resulting in altered activity and an imbalance in BER. Apparently, it is the imbalance in BER and decreased repair of mutagenic DNA adducts that may contribute to increased genomic instability and risk for colorectal cancer in patients diagnosed with ulcerative colitis.

RESEARCH GOALS

The specific aim of this proposed research is to determine if NO post-translationally modifies MPG in vivo and in vitro. In addition, it also is designed to determine if the NO-induced modification of MPG affects its enzymatic activity and interactions with APE. Furthermore, the amino acids of MPG that are subject to NO modification will be identified. Once the amino acids involved in NO modification are identified, the roles these amino acids play in the enzymatic activity of MPG also will be determined.
BACKGROUND AND RATIONALE

MPG removes damaged purines by a nucleotide flipping mechanism that involves the intercalation of a tyrosine residue into the DNA helix, resulting in the promotion of glycosidic bond cleavage [18]. The importance of the tyrosine residue (Tyr 162), in the removal of DNA adducts and the protection of resulting AP sites, has been demonstrated through site-specific mutagenesis by Wyatt and Bloom [18, 19]. In addition, several other tyrosines in the active site of MPG are located in close proximity to the flipped substrate and may play important roles in substrate recognition. The detection of 3-nitrotyrosine is a common biomarker in the diagnosis of inflammation, and it is a major product in the nitration of proteins; thus, 3-nitrotyrosine formation during post-translational modification of MPG may alter the ability of MPG to recognize and remove DNA adducts. MPG is the only known glycosylase to remove the potentially mutagenic adducts Hx and eA that are formed during ulcerative colitis [21]. Hofseth et al. showed that higher levels of the inflammatory cell marker, CD 68, are related to the increased expression and enzymatic activity of MPG and APE compared to baseline levels in colon tissue [22]. Furthermore, Hofseth et al. observed a correlation between the altered expression and activity of MPG and apyrimidinic/apurinic endonuclease-1 (APE) and enhanced microsatellite instability (MSI) [22]. The increased MSI may be due to the altered MPG activity or MPG/APE interactions as the result of NO post-translational modification of MPG. This author and associates observed by western blot analysis that NO is able to modify MPG in vitro during incubation with NO donor diethylamine NONOate (DEA/NO). The ability of MPG to excise Hx and eA, in second-order rate reactions, was altered when treated with DEA/NO and spermine NONOate (SPER/NO). Further analysis is underway to characterize the activity of nitrated and nitros(yl)ated MPG for the removal of Hx and eA in the presence of APE. APE functions in the second step of BER involving the displacement of MPG from the AP site generated by adduct removal in the initial step [23]. Our initial findings suggest that NO can not only produce DNA damage, but it also can alter the activity of MPG by post-translational modification; thus, these findings raise the possibility that altered activity of MPG by NO induced post-translational modification contributes to mutagenesis.
The ability of NO to post-translationally modify MPG was tested using purified n-terminally truncated wild-type MPG (Δ54) and a NO donor or source of peroxynitrite (ONOO⁻). Prior to the addition of MPG, the pH of the basic solutions of NO donors (i.e., DEA/NO and SPER/NO) were lowered by the addition of hydrochloric acid to produce 2 molecules of NO and one molecule of the corresponding amine. DEA/NO has a half-life of approximately 2 minutes when dissolved in phosphate buffer pH 7.0 at 37°C; thus, a saturated solution of NO (Invitrogen) is formed. In contrast, SPER/NO has a half-life of 39 minutes in phosphate buffer pH 7.0 at 37°C, which results in a slow continuous release of NO (Invitrogen). Prior to enzymatic analysis, MPG was incubated with DEA/NO, SPER/NO, or peroxynitrite (ONOO⁻) at room temperature. After NO-induced modification, the ability of MPG to remove εA and Hx paired opposite thymine (T) was analyzed.

The concentration of MPG was 200-fold higher than the concentration of the substrate in order to ensure second-order rate kinetics. Reactions were carried out in sodium phosphate buffer pH 7.0 at 37°C, and at specific time points the reaction was stopped by the addition of 0.1M sodium hydroxide and placed at 85°C for 15 minutes. The ability of NO-treated MPG to excise εA and Hx opposite T was altered and compared to the untreated control. Analysis showed inconsistency in how the activity of MPG was altered; specifically, experiments revealed the activity of MPG was either decreased or increased as compared to the untreated control. Furthermore, there was a difference in the degree to which the activity of MPG had increased or decreased. Likewise, western-blot analysis of MPG treated with DEA/NO and ONOO⁻ revealed that the degree of 3-nitrotyrosine formation of MPG varied between experiments. In contrast, the nitration of MPG was not detected by western-blot analysis when treated with SPER/NO. Although 3-nitrotyrosine formation of MPG was not detected when treated with SPER/NO, the activity of MPG was altered.

In addition, the excision of εA and Hx by MPG in human-colon carcinoma (HCT 116) whole-cell protein extracts was tested by second-order rate kinetics. Prior to enzymatic analysis, HCT 116 cells
were treated with SPER/NO and whole-cell protein extracts were taken by centrifugation. Similar to that of purified MPG, the excision of eA was altered when HCT 116 cells were treated with SPER/NO and compared to the untreated control. However, unlike the erratic activity of purified MPG, the excision of eA was decreased 90-95% of the time when HCT 116 cells were treated with SPER/NO. Surprisingly, nitrated MPG was not detected by western-blot analysis using a 3-nitrotyrosine antibody, which implies that other forms of NO modification may have occurred.

RESEARCH DESIGN AND METHODS

Aim 1:

As previously stated in the preliminary study, the enzymatic activity of nitratred MPG was inconsistent in whether the activity either decreased or increased as compared to the untreated control. The reason for the inconsistency appears to be due to the use of NO donors, which leads to the nitrosylation of thiol-containing amino acids. During treatment of MPG with SPER/NO, the slow release of NO by SPER/NO favors direct reactions of NO with thiols and amines. Nitrosylation of MPG by SPER/NO may explain the altered activity of MPG in the excision of Hx and eA and the absence in the detection of MPG nitration by western-blot analysis. In contrast, the treatment of MPG with DEA/NO leads to nitration due to the high rate of release of NO, which favors reactions with O2. In the presence of O2, the reactive nitrogen species (RNS) involved in MPG modification is not only NO but also nitrogen dioxide (NO2•), which is the species commonly involved in tyrosine nitration [24]. Tyrosine nitration occurs in a two-step process in which a free radical (i.e., •OH, NO2• or NO) first reacts with tyrosine to produce a tyrosyl radical, which is followed by the reaction of NO2• with the tyrosyl radical to result in tyrosine with a nitrogen dioxide molecule at the C-3 position as shown:

\[
\begin{align*}
\text{NO} + \text{O}_2 & \rightarrow \text{ONOO•} \\
\text{ONOO•} + \text{NO} & \rightarrow 2\text{NO}_2• \\
\text{NO}_2• + \text{Tyr} & \rightarrow \text{Tyr•} + \text{NO}_2^- \\
\text{Tyr•} + \text{NO}_2• & \rightarrow \text{Tyr-NO}_2
\end{align*}
\]
To ensure that greater than 90% of MPG modification occurs by nitration in the proposed study, MPG will be treated with sodium nitrite (NaNO₂), peroxide (H₂O₂), and iron (III) chloride (FeCl₃). FeCl₃ dissociates to Fe³⁺, which oxidizes H₂O₂ to H₂O to form the ferryl radical (Fe⁴⁺=O). The ferryl radical oxidizes the NO₂⁻ produced from NaNO₂ to NO₂⁺, which can nitate MPG as described below:

\[ \text{Fe}^{3+} + \text{H}_2\text{O}_2 \rightarrow \text{Fe}^{4+} + \text{H}_2\text{O} + \frac{1}{2}\text{O}_2 \]
\[ \text{Fe}^{4+} + \text{NO}_2^- \rightarrow \text{NO}_2^+ + \text{Fe}^{3+} \]

In addition to nitration of MPG by the NO₂⁻/Fe⁴⁺/H₂O₂ redox system, the nitration of MPG may be accomplished by the use of an enzyme catalyst such as hemin, horseradish peroxidase, or myeloperoxidase.

\[ \text{Hemin-Fe}^{3+} + \text{H}_2\text{O}_2 \rightarrow \text{Hemin-Fe}^{4+}=\text{O} + \text{H}_2\text{O} \]
\[ \text{Hemin-Fe}^{4+}=\text{O} + \text{NO}_2^- \rightarrow \text{NO}_2^+ + \text{Hemin-Fe}^{3+} \]

Nitros(yl)ation of MPG will be accomplished by using SPER/NO as the NO donor. O₂ will be excluded from the reaction in order to ensure that the modification of MPG occurs only by nitros(yl)ation and not by nitration.

The post-translational modification of MPG will be tested \textit{in vivo} by treatment of HCT 116 cells with various NO donors such as SPER/NO, DEA/NO, S-nitroso-N-acetylpenicillamine (SNAP), and 3-morpholinosydnonimine (SIN-1). For comparison, other human cell-lines will be tested to determine how NO modification affects the activity of MPG.

The ability of nitrated or nitros(yl)ated MPG to excise Hx and εA as well as other substrates of MPG also will be tested by first-order rate kinetics, in order to determine if NO modification of MPG affects the catalytic rate (k_{cat}). During first-order rate kinetics, all MPG molecules are complexed with substrate (ES) and the rate of the reaction is dependent only on the conversion of substrate to product (P) that is described as: \[ ES \rightarrow E + P \]

In addition, the enzymatic analysis of modified MPG will be tested by second-order rate kinetics where the concentration of MPG is in high excess to the concentration of the substrate. In
second-order rate kinetics, the conversion of substrate to product is not only dependent upon the catalytic rate but also upon the association and dissociation of the MPG/substrate complex (ES) shown as: $E + S \leftrightarrow ES \rightarrow E + P$

Second-order rate kinetics allows us to determine the $k_{cat}/K_m$, second-order rate constant of substrate with MPG that has been modified by NO. In addition, we will determine if NO modification of MPG affects the $K_m$ (strength of the MPG/substrate complex).

Similar enzymatic assays of MPG involving the coincubation of APE will be analyzed to determine if NO modification of MPG affects interactions with APE. O'Connor et al. showed that APE interacts with MPG and increases the rate of excision of Hx [24]. Thus, NO modification may alter MPG/APE interactions and the rate of MPG excision.

**Aim 2:**

Tyrosine nitration is a common biomarker indicative of nitric oxide stress. Interestingly, MPG contains six tyrosines, which either make contact with the damaged base or the DNA backbone [25, 26]. Nitration of one these tyrosines, especially Tyr 162, may have a significant impact on MPG activity [26]. Secondly, NO has been shown to regulate protein function by a direct reaction with thiol containing amino acids such as cysteines [27]. There are four cysteines present in MPG, which makes it a likely candidate for protein nitros(yl)ation; therefore, it is likely that NO can modify MPG, and the amino acids subject to NO modification must be identified in order to understand how the activity of MPG will be affected. To determine which amino acids are modified by NO, mass spectroscopy and amino acid site-specific mutagenesis will be performed.

Mass spectroscopy is an analytic method that is known to separate compounds based on mass-to-charge ratio, thereby providing a means of detecting tyrosine or cysteine modification. Site-specific mutagenesis is known as a procedure used specifically to switch one amino acid for another. Previously, a mutant form of MPG (Y162A) was constructed in which tyrosine at position 162 was substituted for an alanine. In our research, nitration and nitros(yl)ation reactions will be carried out using Y162A and wild-type form of MPG. The change in
the degree of nitrination will be compared between Y162A and wild-type MPG by western-blot analysis using a nitro-tyrosine antibody; thus, a way is provided to indirectly determine tyrosine modification. Furthermore, site-specific mutagenesis of MPG will give insight into how the amino acids that are subject to NO modification are involved in the activity of MPG.

DISCUSSION

Chronic inflammation contributes to 25% of human cancers worldwide [3]. Although the processes are not understood, the link between chronic inflammation and cancer predisposition is thought to be due to increased formation of free radicals by inflammatory cells [3]. Free radicals, such as NO, can damage DNA and modify proteins involved in a variety of cellular processes, which lead to protein loss, or gain-of-function, or degradation [3]. MPG is a type of glycosylase in BER, which repairs many mutagenic purine adducts formed by NO [8, 9, 10]. In contrast to other glycosylases, MPG is the only known human multi-substrate glycosylase, thus, it is important in genome maintenance [8]. Furthermore, Hofseth et al. have shown that an imbalance in MPG and APE activity leads to increased microsatellite instability [22]. Studies have shown that human 8-oxoguanine DNA glycosylase and thymine DNA glycosylase can be post-translationally modified by NO, which causes loss of enzymatic activity [17]; therefore, the decrease in MPG activity by NO-induced post-translational modification may lead to a significant increase in DNA mutations.

Previous in vitro experiments have shown that DEA/NO can alter the activity of MPG by post-translational modification. Nevertheless, the in vitro experimental conditions of this proposed study will be optimized to ensure only one form of modification, such as nitration or nitros(y)lation, through the use of specific NO or NO₂⁻ donating chemicals. Secondly, the amino acids that are susceptible to NO-induced modification and the role of those amino acids in the enzymatic activity of MPG will be determined. Finally, in vivo experiments using mouse models will be conducted to determine whether NO modifies MPG and alters its enzymatic activity.
REFERENCE NOTES


ALUMNA CONTRIBUTION: AN EXPLORATION OF HOW CONSUMERS USE DIRECT-TO-CONSUMER ADVERTISING

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Some consumers today are more proactive about their health than ever before (Wilkes, Bell, & Kravitz, 2000). These consumers, also dubbed “empowered consumers,” want complete information prior to decision-making regarding purchases and services (Blankenhorn, Duckwitz, & Sherr, 2001). Because this information expectation extends to healthcare products and services, these consumers are demanding more information about medical treatments (Kopp & Bang, 2000). They believe that more medical information will give them more control over their health (Rosenthal, Berndt, Donohue, Frank & Epstein, 2002).

Coinciding with this consumer movement, pharmaceutical companies are feeling pressure to create demand for their products. There are several reasons for this pressure on pharmaceutical firms. One such reason is related to the difficulty that many pharmaceutical companies have creating new drugs (Harris, 2000). Harris asserts that fewer new drugs mean fewer new sources of revenue for these companies. Furthermore, Harris indicates that other market forces over the last forty years have affected the ability of pharmaceutical companies to create profits. Cearnal (1992) pointed out four sources of pressure on pharmaceutical companies at the time. They are: (a) There is more competition; (b) managed care has become a dominant force; (c) patent protection is not as long; (d) and the use of generic drugs has grown. This pressure apparently leads to the increased use of direct-to-consumer prescription drug advertising (i.e., DTC advertising).

DTC advertising is defined as “any promotional effort by a pharmaceutical company to present prescription drug information to the general public through consumer-oriented media” (Davis, 1999, p. 133).

Similar to advertising for other consumer products, DTC advertisements pitch potent prescription drugs to consumers in a fanciful way. Generally, the commercials depict healthy-looking, happy people in appealing environments. The risks usually are disclosed in a fine-printesque voiceover near the end of the commercial. Because using a prescription drug is not as non-consequential as using a heavily advertised shampoo, policy makers are divided on the value of this marketplace phenomenon (Anonymous, 2003). Even though these DTC ads meet the FDA’s requirement for balance between risks and benefits, industry experts indicate that these ads downplay the risk disclosures (Anonymous, 2003). Furthermore, many argue that the ads are an
oversimplification because 30 seconds is hardly enough time to share all of the risks and controversies surrounding a drug (Tanouye, 1998); therefore, some fear that consumers are getting an incomplete picture about the advertised drugs.

Opponents also believe that these ads promote reckless behavior, presenting a pill as the health solution instead of less invasive, more natural measures (e.g., sensible eating and exercise) (e.g., Chandra & Miller, 2005; Wilkes, Bell, & Kravitz, 2000). Critics raise concerns regarding the impact of DTC advertising on the traditional doctor-patient relationship (e.g., Hollon, 1999). Clearly, some researchers (e.g., Alperstein & Peyrot, 1993; Chandra & Miller, 2005) are concerned about the results of DTC-prompted requests for prescriptions and the physicians’ response to these requests.

Despite aforementioned criticisms, there are those who support DTC advertising. They argue that the ads educate consumers about ailments and possible treatments (Anonymous, 2003). Proponents also believe that these ads have raised consumers’ health consciousness (e.g., Calfee, 2002; Perri & Dickson, 1987).

**APPROACHES OF PRIOR RESEARCH**

In previous DTC research, attempts were made to answer the question: What does DTC advertising do to consumers? These studies utilized either experiments in which ad elements were manipulated or surveys in which consumer characteristics were measured. The intent of these efforts was to examine the impact of ad format or consumer characteristics on various outcomes, which are reflected in the following dependent measures: Awareness (e.g., Alperstein & Peyrot, 1993; Morris, Mazis, & Brinberg, 1989), attitude (e.g., Morris, Brinberg, Klimberg, Millstein, & Rivera, 1986; Morris, Brinberg, Klimberg, Rivera, & Millstein, 1986; Morris, Ruffner, & Klimberg, 1985), behavioral intentions (e.g., Perri & Nelson, Jr., 1987) and behavior (e.g., Perri & Dickson, 1987; Peyrot, Alperstein, Van Doren, & Poli, 1998). Other studies considered outcomes such as comprehension (e.g., Morris, Brinberg, Klimberg, Rivera, et al., 1986; Morris, Brinberg & Plimpton, 1984; Morris & Millstein, 1984; Morris, et al., 1989) and risk perception (e.g., Everett, 1989; Morris, et al., 1984). This prior DTC research reflects the dominant logical-empiricist para-
digim typically used in social-science research. Generally, the goals of research under this tradition are to examine the frequency and/or intensity of specific occurrences as well as the relationships between variables. Generalizability to a larger population is desirable, and the use of quantitative measures is acceptable to achieve these objectives. Historically, this approach has provided policymakers with valuable information regarding the relationships between important variables (e.g., consumer characteristics and attitudes toward DTC ads) and an estimation of the prevalence of certain outcomes (e.g., awareness) in the general population. Nevertheless, a different approach may provide policymakers with consumers’ thoughts and opinions about DTC advertising that would arise during the course of normal conversation.

This study differs from prior work in that a different research paradigm—phenomenology—is used, which is best suited for providing a “first-person description of experience” (Thompson, Locander, & Pollio, 1989, p. 136). Clearly, this perspective allows for the existence of multiple realities (Glesne & Peshkin, 1992). To capture these realities, the researcher follows the methoda of Mick and Buhl (1992) and uses semi-structured, in-depth interviews. One benefit of this type of arrangement is that the “instrument” is dynamic and customized (Glesne & Peshkin, 1992). The “researcher-instrument” (i.e., interviewer) is able to adapt and change the questions in response to the informants’ comments (Lincoln & Guba, 1985). By doing so, the interview questions are described as remaining relevant and effective in capturing a complete description of the experience (Glesne & Peshkin, 1992).

Another benefit of this approach is the emphasis placed on the context of the research (Thompson, Locander, & Pollio, 1990). Specifically, informants are interviewed in a familiar setting, a place where they are comfortable and likely to have these types of conversations. Also, in drug research, these interviews occur in the context of viewing DTC ads; therefore, the results of this research effort are “thick” descriptions of how consumers utilize DTC advertising in their everyday lives. Certainly, these first-person accounts grant policymakers exposure to conversations that are normally confined to the privacy of an individual’s home. These accounts also inform future researchers, particularly regarding variables and possible relationships that may have been overlooked in the DTC research literature.
METHODOLOGY

Sample

The informants were recruited from churches and senior-citizen centers in three towns in South Carolina. The researcher relied on flyers, word of mouth and personal contact to recruit participants. Also, the informants made referrals to the researcher for additional potential participants. The sample consists of individuals who are not typically included in DTC research. Informants were 17 African American females, ranging in age from 65 to 79. The informants were paid $30 for their participation.

Data Collection Procedures

Since the purpose of this research was to gain a richer, fuller understanding of the phenomenon of DTC advertising from the perspective of individuals who have experienced it, phenomenological interviews seemed most appropriate. By using phenomenological interviewing in this context, the researcher obtained first-person accounts of the informants’ experience with this unique type of advertising, as they experienced it. Similar to previous research of this type (e.g., Mick & Buhl, 1992), semi-structured interviews were conducted using prepared questions. Having the prepared questions for the interviews ensured some level of consistency in the data collected during the interviews. These interviews, lasting 45 minutes to 3.5 hours, occurred during the period from July through November of 2001.

In keeping with recommendations of Thompson et al. (1989), the researcher sought to create a comfortable atmosphere for the informants to discuss their experiences. Consequently, the researcher allowed the informants to choose the location of the interviews. All of the informants chose their homes as the site with the exception of one, who chose her office.

The objective of the interviews was to invite conversations about the DTC ads that the informants had seen. To achieve this objective, the researcher brought a 9-inch TV/VCR unit to show selected DTC commercials to the informants. The selected commercials represented the following brands: Prevacid (acid reflux), Vioxx (arthritis), Zocor (cholesterol), and Detrol (overactive bladder). All these ads were 60
seconds in length except Prevacid (i.e., 45 seconds). They all utilized mature characters interacting with children except Prevacid, which featured a stomach behaving as a human. A fifth ad for Allegra (allergies), a 30-second commercial featuring females varying in age, was shown to each informant first. This placement gave each informant the opportunity to practice being interviewed with the same commercial. Nevertheless, to eliminate the potential for order bias, the remaining commercials appeared in a different sequence to create four versions of these stimulus tapes. A local media company copied the commercials onto videocassettes to assure the quality of the videotapes.

After viewing two iterations of each commercial, informants were provided the following preplanned prompts. These questions were obtained from the research of Mick and Politi (1989) and Parker (1998). They are:

1. Describe for me what is going on in the ad.
2. Tell me your opinions and feelings about what’s going on in the ad.
3. What do you think the advertiser was trying to communicate in this particular ad?
4. Who do you think the advertiser was trying to reach in this particular ad?

Despite these prepared questions, the researcher was careful to allow informants to discuss other topics not included on the list of questions and also to probe when necessary. After the discussion of each commercial was exhausted, the informant was shown another commercial. This process continued until all of the commercials were discussed. At the end of the interview process, the researcher asked five summary questions. They are:

1. Tell me about any similarities that you may have noticed across the commercials
2. Tell me about any differences that you noticed.
3. Was there anything in the commercials that bothered you?
4. Is there anything that would motivate you to go to your physician?
5. Would you like to add anything?

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ANALYSIS

The overall objective of the analysis process was to describe and understand the informants’ advertising experiences, using theoretical explanations to enlighten the interpretation of their experiences. Once the first interviews were transcribed, analysis of the data became an ongoing process. The process was similar to the hermeneutical circle, in which the analysis follows a back and forth movement between part to whole (Thompson, et al. 1989). As Thompson, et al. describe, in some instances “the part” represented a portion of one transcript being compared to the whole transcript. In other instances, “the part” was the one transcript being compared to all of the transcripts.

In addition to the examination of the direct discussion about the commercials, the data were reviewed for discussion about DTC advertising in general. The researcher also wanted to understand how these women think DTC ads can be used and what their feelings were toward this type of advertising. Examples are: Did they find it useful or useless? How did they use it in their daily lives?

FINDINGS

Uses of DTC Advertisements

While the debate among public policymakers regarding the worth of DTC advertising continues, it seems clear that consumers develop their own opinions about its worth. Without prompting from the interviewer, many informants shared their views about this controversial type of advertising. They pointed to the numerous ways that DTC advertising impacts consumers (Table 1).

1 Note the order of the commercials was rotated across the informants.
TABLE 1. Summary of Identified Uses of DTC Advertisements

- Encourages doctor-patient dialogue
- Improves self-diagnosis and treatment identification
- Influences prescription drug usage
- Mitigates embarrassment regarding certain ailments
- Provides source of inspiration
- Provides entertainment value
- Educates consumers about ailments and available treatments

**Encourages Doctor-Patient Dialogue.** Two informants believe that one of the purposes of DTC advertising is to encourage conversations with their doctors regarding the depicted ailments and the advertised drugs.

Edith: ... I say, "Doctor, you think we ought to try so and so and so?" And sometimes he tease me. He say, "You trying to be the doctor?" [Laughter] But you know, I see it on television. And I said, "Well, Doctor, uh it was so impressive on television."...

Roberta: ... if you if you’ve got [high cholesterol] and you can ask your doctor for Zocor as opposed to some other product or or sometimes you know you see these things on television and if you’re really into communicating with your doctor, you’ll go back and say to him, "What about this? What about this?" ...

After viewing one of the commercials, a couple of the informants indicated an interest in asking their doctor for the advertised drug.

Juanita: Yes but I had not paid that much attention to it. Not for the name that I had noticed that but now it is very real to me. I am going to ask the doctor for [Zocor].

Charlotte: They were saying that that medications will correct it. Maybe I’ll ask my doctor about [Prevacid].
Experts estimate that in 1997, DTC advertising prompted 10 million people to visit their physicians and request an advertised drug (Handlin, Mosca, Forgione, & Pitta, 2003). Clearly, these DTC-prompted doctor visits are desirable outcomes if they result in the discovery of previously undetected ailments. There is some evidence that this may be happening. In a 1999 survey, the FDA discovered that 27% of the respondents discussed a previously undetected ailment with their doctors as a result of DTC advertising (Handlin, et al., 2003); however, public policymakers want more information regarding the quality and quantity of these DTC-prompted doctor-patient interactions (Lexchin & Mintzes, 2002).

Despite the potential positive outcomes of DTC-initiated doctor visits, there are several potential negative outcomes. One is related to the doctors' responses to these visits and requests. Research indicates that doctors are prescribing 75% of the DTC-initiated requests (Lexchin & Mintzes, 2002). This is not a disturbing outcome if fulfillment of 75% of the requests helped patients who were suffering from the ailment. Unfortunately, the quality of these fulfilled requests is noted as dubious by Lexchin and Mintzes. According to these authors, part of the problem may be doctors complying with the patients' requests without exploring other alternative treatments or convincing them that they do not need the drug when the patient does not qualify for the drug. If doctors are relying on patients to diagnose themselves and simply are fulfilling their requests, there is yet another issue: DTC advertising often promotes drugs for ailments that are difficult for a consumer to self-diagnose (Lexchin & Mintzes, 2002), which means that consumers are likely to be receiving prescriptions that they do not need.

Another criticism is that DTC advertising may be driving healthy individuals to request unnecessary prescription drugs (Mintzes, 2002). According to Mintzes, this possibility concerns policymakers because it may lead to increased use of prescription drugs among healthy individuals. In addition to the concern regarding the implicit message of DTC advertising of a pill for every ill, the emergence of an ill-for-every-pill mentality also concerns policymakers (Mintzes, 2002).
Improves Self-Diagnosis and Treatment Identification. Two informants in this study indicated that DTC advertising improves self-diagnosis and treatment.

Jackie: But as you watch television and everything and you ask and you, you ask yourself questions or you figure out. You can figure, if you think about what you’re looking at or think about your system, and what there’re saying about the medication, you can kind of figure out what you need and what you don’t need before you even go to the doctor. ...

Gail: … I said to my doctor, “Tylenol doesn’t seem to be working [for my arthritic pain].” You know. I said, “When I first started taking it, it was working well. It doesn’t seem to be working that well anymore. And so now I’m asking if is something else I can switch to ok.” Well you see if I looked at the commercial and I fell for what I call the hype, I wouldn’t have needed to ask [my doctor]. I could have made that decision myself [claps hands once], Vioxx, Vioxx.

Even though these women indicated that they typically research possible treatments, their comments reflect that perhaps they would diagnose themselves based on DTC advertising. Even though these women viewed doctors as mortals, their comments indicate that they also view doctors as unnecessary in the diagnosis process. This orientation towards doctors may be related to their distrust of doctors. Both women quoted above believe that doctors engage in guesswork in their diagnosis and experimentation in their prescribed treatments. So, perhaps, in a DTC-prompted interaction with their doctors, they may be less likely to utilize the doctor’s advice and more insistent on having their request for the prescription fulfilled.

Another factor that may influence these consumers’ tenacity for fulfillment of their requests is their orientation towards medication. Both women indicated that they were reluctant to use prescription drugs. If they are convinced they need an advertised drug, despite this orientation towards medication, they may be more resolute in obtain-
ing a prescription from the doctor. As mentioned earlier, using DTC advertising for self-diagnosis is problematic because of the risk of misdiagnosis and the physician simply granting fulfillment of the prescription request.

**Influences Prescription Drug Usage.** At the center of this debate regarding the impact of DTC advertising on self-diagnosis and prescription requests is DTC advertising’s potential influence on the consumer’s approach towards treatments. Does the advertising encourage or discourage prescription drug use? Some informants expressed one of those likelihoods.

**Encourages Prescription Drug Usage.** Opponents of DTC advertising are concerned that these ads drive growing numbers of consumers to choose prescription drugs over lifestyle changes to improve their health. Three informants (i.e., Christina, Marci, & Stephanie) indicated that they understood healthier habits as an alternative to prescription drug use. Two of these women indicated a personal reluctance to use prescription drugs as well as a preference for natural treatments. Perhaps this orientation influenced the meaning they assigned to the ads and their potential concerns regarding connections between DTC advertising and consumer demand for prescription drugs.

One informant elaborated on this trend towards an increased reliance on prescription drugs or the perpetuation of a “pain-pill-pleasure” mentality discussed by Shimp and Dyer (1979).

Christina: ... Like for instance, people with diabetes I’ll take that for example. If you eat properly, if you come up with diabetes, if you eat properly, you can get yourself to the point where you don’t need a needle or take medication. So what you think these people with diabetes do? They eat whatever they want to do. Eat anything and then just take a pill to take care of it. ...You can reduce your blood pressure by losing 10 pounds. So don’t lose it. Take the pill and keep it down and now we have a pill for everything. So what do [pharmaceutical companies] do? Advertise it. Put it on TV. Do what you want to do and take a pill. ...
Discourages Prescription Drug Usage. Another concern for some informants was the severity of side effects. DTC ads are required to disclose the most important side effects for the advertised drug. Some of the women indicated that these disclosures scared them, dissuading them from considering the advertised drug as a treatment option.

Juanita: That's the frightening part of taking medicines now. I mean it's very good to know about the side effects but it's also very frightening to see all the things that could happen when you take something to relieve one thing that you may get a thousand other things from it. ...

Roberta: ... these things that they say at the end [chuckles] about what the product causes [Laughs]. Sometimes it's worse than the ailment itself and I'd be. Good gracious [Laughs]. I'd rather have the overactive bladder than to have all that other stuff, the things [Laughs]. I don't know what the thinking is behind that but it's it's interesting that they go on with this litany of things you know at the end and I thought, "Well, that would keep me from [using it]" [Laughter]

Theresa: ... Most things have side affects. And I know I had a doctor once tell me when you take something for one thing, it will upset another thing, and then you have to have something to counteract that. So you know. So I guess nothing is truly without side affects. Because most you know, most commercials I notice when they're giving the side effects, they will scare you to death. ...

Such a reaction to DTC advertising may lead many consumers to use natural remedies and lifestyle changes to treat their ailments, thus, mitigating the perpetuation of a pain-pill-pleasure mentality. Nevertheless, this fear response also may dissuade consumers from considering drug therapy, which, under certain circumstances, may yield greater benefit from a prescription drug than a lifestyle change.
Mitigates Embarrassment Regarding Certain Ailments. One of the objectives of healthcare professionals is to reduce the number of people suffering from undiagnosed ailments. Unfortunately, many ailments may be undiagnosed because embarrassed patients do not initiate conversations with their doctors. One informant believes that DTC advertising creates a public forum and makes embarrassing ailments like incontinence seem less shameful.

Juanita: ... One thing I am pleased that they have finally come around to talking publicly about things like bladder control because I remember a time when we would never even confess that we had a problem with our bladder. Now we women, we talk about it ...

This is a positive potential outcome because research indicates that 25 million men and women suffer from this ailment (Bren, 2005), and 11 out of 12 individuals suffering from this ailment do not discuss it with their doctors (Cotton, 1990). Research also indicates that 80% of these cases can be successfully treated (Bren, 2005). Embarrassment is listed as one of the primary reasons for this silence (Cotton, 1990). If DTC advertising can remove the stigma and embarrassment surrounding certain ailments similar to what Pfizer's advertising of Viagra did for the treatment of impotence, fewer of these ailments might go undiagnosed and untreated.

Provides Source of Inspiration. Research has found that mature individuals are portrayed most commonly as the “perfect grandparent, the adventurous golden ager, and the productive golden ager” (Miller, Leyell & Mazachek, 2002, p. 316). These idealized images reflect mature persons who appear to enjoy their roles either as the happy, family-oriented grandparent, the active, fun-loving golden ager, or the capable, independent golden ager. For three informants, DTC commercials reaffirmed what it means to be an older person in today's society.
Michelle: ...[the Vioxx commercial] showed people I think as they really are. Mature people who are grandparents and those are the kinds of interactions that they they would normally have.

Juanita: It teaches that these are the things that we should be doing. We should be helping out with the grandchildren. A lot of people don't realize that. We should be kinder to pets or it realizing that that could release some of the loneliness. We should be cultivating. We should be concerned with the environment. These are things that you really don't have a chance to do when you were working and now that you're older, you can go out in the yard, you can have a dog, you can be with the grandchildren and I think a lot of older people miss out on some of the plus sides of being older by not doing things like this. So I think it could be a, I think [DTC ads] could be a teaching thing also. You see people doing this and maybe I should be doing this. Oh maybe it's a good thing for me to do. It's all right to do that.

Lori: [The advertiser] was trying to communicate the idea that you can keep up your active schedule, see. Just by doing a few preventative things. Just like taking that. See you don't have to. Even though we are a certain age, we don't sit down and hold our hands. You see you can be out there. You can be you can you can stay active. You know you find a lot of people who say, "I have gotten old and it's not the much that I can do." [The DTC ads] say, "Get up and move around. You can be as active as you want to be." See that's the idea that I think they are trying to put forth to people in our age group. Just because you say you are 65 and older doesn't mean that you have to close the book. You see and so we can get out there and walk. You know we can get out there and drive if you want to but I mean you don't have sit back and just say, "I've gotten old." So you can still lead an active, productive life if you want to. Even if you have some slight ailments, you know. You have something to help you keep that under control.
Also, the informants revealed connotative meanings from DTC ads that suggest idealized depictions of mature individuals like being active, feeling attractive, or feeling sexy and youthful.

In addition to using idealized images, DTC advertising also uses idealized lifestyles. For example, in the Vioxx commercial, one character who is a mature woman bathes a young child. In the opening scene, she is seen chasing the child upstairs. The next scene shows her at the tub drying the child. The inference is that Vioxx enabled the woman to chase the child up the stairs and to kneel down at the side of tub for the bathing and subsequent drying; however, the viewer does not see the woman breathing heavily from exhaustion because she chased the child for several minutes. Also, the viewer does not see the mature woman lose her balance or lean against the wall to steady herself. Instead, what the viewer sees is an idealized and, perhaps, unrealistic slice of life. One informant described the Vioxx commercial as such.

Juanita: [The Vioxx commercial communicates] that there is help. You don’t have to have pain. That you can function with arthritis. You don’t have to be all crippled up and all broke down. You can do the same thing that you were doing when you were younger. Bathing a baby that’s a lot. You know stooping over, getting down to the tub and chasing that child upstairs. That’s nothing that you would see yourself doing. We know and I want to say this on the microphone we know it’s not true. We know they don’t work that well but it makes you feel better. We know it doesn’t work like that.

Interviewer: You don’t think the medicine works?
Juanita: I know it doesn’t. ...

Even though Juanita recognized these images as unrealistic, other informants revealed meanings that reflect their different perceptions. They associated the drugs with the following characteristics: Better life, new lease on life, enjoying life, feeling good, having a ball, feeling great, no worry, freedom, happy ending, and miraculous cure.
Researchers have found that consumers tend to compare themselves to persons depicted in ads (e.g., Richins, 1991); therefore, communication of idealized people and lifestyles can be helpful and harmful to viewers. If the consumer perceives the depiction to be inferior to herself and/or her situation, the comparison elevates the consumer's self-concept (Gulas & McKeage, 2000). Unfortunately, if the consumer perceives the depiction to be superior to herself and/or situation, the comparison may damage her self-concept and create discontent, anxiety, and neuroticism (e.g., Richins, 1991, 1995).

Richins (1995) identifies three techniques that an individual uses to repair this damage to self-concept. First, he indicates one may attempt to decrease the perceived disparity between herself and the idealized depiction. Two informants describe this response.

Edith: ... naturally people are going to try anything if they are sick, you know. I didn't mean to say anything, but to see that on TV and here I am sick with arthritis, you know, I am willing to try anything, as long as it is not affecting my body in any other way.

... 

Gail: Well, they show you pictures of people who've obviously made such good recovery and are so busy enjoying life. That the main thing you want to do is you want to feel better so that you can enjoy life, so that you can go out. ...

This inspirational-type response can be positive for consumers who are currently using medication to treat the depicted ailment because it may lead to greater compliance with their current drug therapy. This response also may be positive if a consumer suffering from the depicted ailment seeks treatment and the treatment improves her health and/or her quality of life.

Although some inspiration-type responses are positive, this effort to decrease the discrepancy between the self and the depiction can have negative outcomes. If the consumer uses the drug and it does not improve her health (e.g., inefficacy, side effects) and/or her quality of life or the consumer does not qualify for the drug because of an existing condition, this may lead to more negative self-feelings.
Another response to the discrepancy is to reduce the importance of the idealized situation (Richins, 1995). In fact, this response may yield a positive outcome if the consumer adjusts her health goals, making them more realistic and attainable. For example, instead of seeking a cure for arthritis, Roberta settles for pain management.

Roberta: That the, that the product will allow you to do those things that you want to do as you know because it doesn’t cure anything. I mean I can still feel, even with the Celebrex, I can feel some of the pain. But, as my doctor says, “Well, don’t take it, you know and let it go because you know, Tylenol is safer than that anyhow.” But the point is you got to take twenty Tylenol to do the same thing, you know and this you take one-a-day and and it helps some. It doesn’t, I guess maybe for some people it might take away all the pain. But for me it just doesn’t take away all the pain. But it’s it’s makes the pain bearable, and that’s what they’re saying. They don’t want to be able to climb mountains; but to do the simple things and so that allows me to be able to get up and down off the curb without falling down in pain. But it doesn’t it doesn’t cure it.

Conversely, a different outcome from an adjustment in importance may lead to negative health behaviors. For example, if Roberta decided that mobility is unimportant and stopped taking her medication and/or exercising, her health would probably suffer. Also, if Roberta were not using a medication to treat her arthritis, an adjustment in the importance of mobility may have led her to decide against seeking treatment.

A third response to mitigate negative self-feelings includes a refusal to make a comparison with the idealized depictions. Researchers indicate that this is implausible because these comparisons are made unconsciously as well as consciously (Richins, 1995).

*Provides Entertainment Value.* Although advertisements with idealized images are criticized for contributing to consumer discon-
tent, advertisements that allow consumers to escape their reality are
effective selling tools (Richins, 1995). Several informants described
DTC advertising as entertaining, mentioning either the background
music or the vivid images.

Christina: Well, it’s certainly not reaching children.
Even though the children would love it. It’s almost
like a cartoon. ...

Edwinna: [My great-granddaughter] dance.
[Laughter] Whenever she sees [the Prevacid com-
mercial] and the other [great grand] too. They be in
there. Got their hands up. You know how kids do,
the dancing and things. ...

Juanita: I look at [DTC ads] for entertainment first
of all. It appeals to me and I like it. I love the col-
ors in it and I love the jingles. Now I love the jin-
gles and the music. I like that. ...

Roberta: Some of [the DTC ads are] just entertaining. ...

Marci: … And I used to be sitting in there by
myself and I just laugh when he has those frowns on.
… [Informant refers to scene in Vioxx commercial]

Theresa: … And I like [the DTC ads]. They were uh
well written and they were beautiful. I like the you
know the color.

These comments indicate that the women were attending to the
peripheral cues in DTC ads. Peripheral cues are defined as “factors or
motives inherent in the persuasion setting that are sufficient to pro-
duce an initial attitude change without any active thinking about the
attributes of the issue or the object under consideration” (Petty &
Cacioppo, 1981, p. 256). One reason for the women engaging in this
“peripheral-route” processing is lack of motivation to process the
information. Perhaps, these women did not view the products as per-
sonally relevant.
Another reason that an individual may engage in peripheral-route processing concerns the ability to process. One factor affecting processing ability is distraction, which researchers purport leads to reliance on peripheral cues and other heuristics (Petty, Unnava, & Strathman, 1991). One informant mentioned the consumer's health as a potential distraction. For consumers who have poor health, physical suffering may serve as motivation to process the message; however, it also may serve as an impediment, affecting the consumer's ability to process the information. Gail describes a situation in which pain facilitates the consumer's processing of peripheral cues and impedes attention to message arguments.

Gail: ... the person who's in pain is not necessarily listening to what comes after the relief. You know as soon as you get to the [benefits], you just cut the rest of it out [i.e., side effects]. You just don't hear it, you know. Um sometimes it's because you're in so much pain; you don't want to hear it, you know. Um or for whatever reason, you just don't hear that, you know. ...

Because DTC advertising promotes products that can result in serious negative (as well as positive) outcomes when used, peripheral-route processing of DTC ads present concerns for public policymakers. Even though researchers have found that attention to peripheral cues sometimes lead to message processing (Miniard, Bhatia, Lord, Dickson, & Unnava, 1991), there also is evidence that it distracts from message processing in cases of high involvement (e.g., MacInnis & Park, 1991). This concern is probably what led the New Zealand Medical Association to make the following statement regarding DTC advertising (DTCA): "We are strongly of the view that DTCA, particularly on television, must avoid excessively dramatic or emotional presentations. Drama and emotion make good television, and even good advertising, but they are not appropriate ingredients of DTCA of prescription drugs" (Hoek & Gendall, 2002, p. 206).

In addition to enhancing and distracting message processing, peripheral cues stimulate inferences (e.g., MacInnis & Park, 1991). Informants frequently mentioned specific peripheral cues—the race
and gender of the actors—that they used to make inferences about both the ailment and product. For example, Lynn and Juanita wondered if these cues were indicating the group who suffers from the depicted ailment.

Lynn: Well, in this particular commercial [for Detrol] it depict a White male. That tells me knowing that I have had that same problem that it’s not just an African American woman’s problem. It’s everybody’s problem uh.

Juanita: ... I wonder if he is trying to say that more men have problems with that? ...

For other informants, the race and gender of the actors indicated who was meant to use the product.

Michelle: ... The [ads for Allegra, Detrol, and Zocor] all targeted White Americans. It would appear to me, European Americans [are the target audience for the ads].

Roberta: [Laughs] I guess [the Detrol advertisers were trying to reach] their old White men, I don’t know. I don’t mean to be funny but maybe they did.

Juanita: ... [the Detrol commercial] is a man’s commercial.

Margaret: Well, [the Detrol commercial] is geared for a man.

Healthcare researchers believe that there are numerous cases of under-diagnosed and under-treated individuals who could benefit from prescription drugs (Calfee, 2002); however, if consumers make erroneous inferences based on peripheral cues used in DTC advertising, they could intentionally exclude themselves as potential sufferers of the depicted ailment as well as benefactors of the advertised drug. For
older consumers this is an important concern because some gerontology researchers indicate that cognitive processing changes as individuals age. Older consumers apparently rely more on heuristics, attending to peripheral cues (e.g., Lord, Lee, & Sauer, 1995).

**Educates Consumers about Ailments and Available Treatments.**

“A preponderance of research shows that advertising improves markets by providing consumers with essential information that they would otherwise ignore, fail to receive, or receive too late” (Calfee, 2002, p. 177). This statement reflects the major claim of DTC advertising supporters, who emphasize the educational value of the ads. They purport that DTC ads provide consumers with information about ailments (e.g., symptoms) as well as about the benefits of advertised treatments. Several informants view DTC advertising in this manner.

Charlotte: I think [DTC ads are] wonderful. I do. It makes people alert. It makes them know what they should do if they have certain problems. They should discuss it with their doctors and get on it so that they can be helped.

Lynn: Well, the commercials gave information. Needed information that we as seniors should have should know about and you’d be surprised many of these commercials come on and we have a tendency to change channels or turn the commercial down because usually the commercial musics are loud and you may be having dinner or whatever and you’ll turn that down because that’s too loud and you just turn that down and you don’t listen to. But looking at, listening to that and watching specifically that you know, it gives me needed information that I should have if I hadn’t noticed that before...

Marci: ... I just, I just sit here and watch them and see what’s good for what you know. And I know she said she had um cholesterol problems and it lowered her cholesterol and that’s why she could get out in the garden and work in the flowers and do what she had to do.

Theresa: ...But I think the [DTC] commercials are very informative. ...
These comments indicate that the informants attend to the message, which is important if the advertised drugs are personally relevant. Theresa discussed the medication trade-off that she associates with prescription drugs.

Theresa: ...you can listen and weigh the good things and the advantages and disadvantages. ...

Perhaps the others also consider the information regarding the "disadvantages" of the advertised drugs but failed to mention it during the interview.

Nonetheless, many public policymakers are concerned about using the ads for information because research indicates that DTC advertising provides asymmetrical information, with the inclusion of benefits dominating the disclosure of risks (e.g., Lexchin & Mintzes, 2002). Other criticisms include omission of evidence to substantiate the claims and the use of ambiguous language (Lexchin & Mintzes, 2002). DTC advertising also is denounced for the exclusion of information about other treatment options (Coney, 2002), the drug's success rate (Mintzes, 2002), and how the drug works (Lexchin & Mintzes, 2002).

LIMITATIONS

This research suffers from at least three important limitations. The first is an issue of generalizability. The purpose of this research was to describe the advertising experiences of 17 participants. These findings reflect the experiences of these women and do not generalize to the larger population that they may represent. Another limitation is common to interpretive research. These 17 informants may have provided socially desirable responses during the interviews. Perhaps, they monitored their responses to improve their appearance or to attempt to help the researcher. The researcher used two recommended techniques to safeguard the integrity of the data (Wallendorf & Belk, 1989): employing “good” interviewing techniques and promising informants anonymity. The third limitation of this research is the researcher herself. For this study, the researcher collected, analyzed, and interpreted the data. Despite the preparation prior to each interview, variability in interviewing techniques from interview to interview may have created


