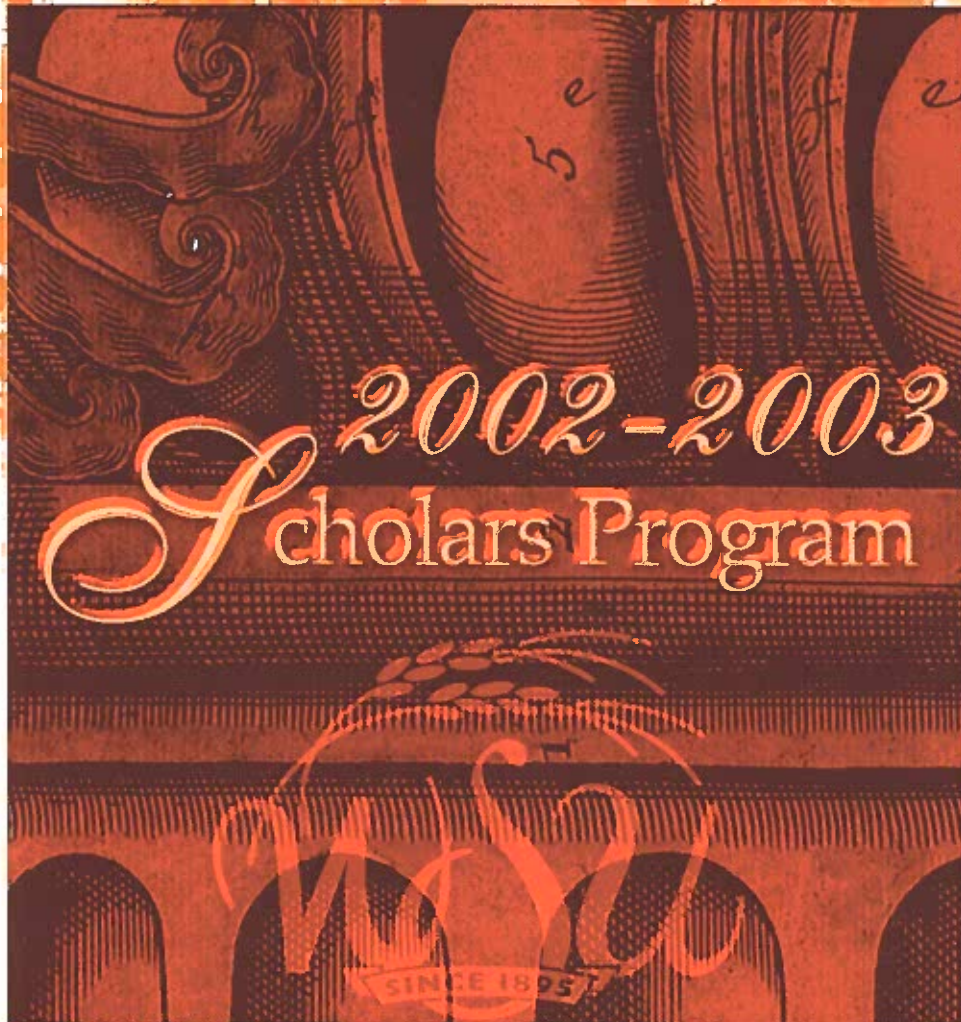


McNair



WICHITA STATE UNIVERSITY





**Journal
of Research
Reports**

Fall 2002-2003, Vol. 8

The *Journal of Research Reports*
is published annually by the
Wichita State University
McNair Scholars Program,
1845 Fairmount,
Wichita, Kansas 67260-0199



Staff Members

LaWanda Holt-Fields, *Director*

Shukura Bakari-Cozart, *Program Counselor*

Sheri Daniel, *Sr. Administrative Assistant*

Emily Guapo, *Writing Tutor*

Peter Phan, *Webpage Manager*

Jan Petersen, *Summer Research Assistant*

The *Journal of Research Reports* is produced and published annually by the Wichita State University McNair Scholars Program to further the objectives of the Program. The goal of the McNair Scholars Program is to provide quality services which encourage students who are underrepresented in higher education to graduate with bachelor's degrees from WSU and to pursue post-baccalaureate degrees.

Research reports are accepted from students participating in the WSU McNair Scholars Program. Reproduction of material in this publication is hereby authorized. No responsibility for the views expressed by the authors in this document is assumed by the editors, professional staff, the McNair Scholars Program, or Wichita State University.

The WSU McNair Scholars Program is 100 percent supported by funds from the United States Department of Education under the Ronald E. McNair Post-baccalaureate Achievement Program.

4-5 W S U A d m i n i s t r a t i o n

Letter from LaWanda Holt Fields, Director
WSU McNair Scholars Program

Letter from Jan Petersen, Research Assistant
WSU McNair Scholars Program

6 - 26 R e s e a r c h P a p e r s

David Diaz II
Characteristics of Students in Fine Arts General Education Courses

Stephanie Kirsh
The Technologies of Proteomics

Ingrid Mendoza
What is Kiva?

Carmen Ubom
Objectivism in The Fountainhead: Ayn Rand's Novel as an Illustrative Test Case for Her Philosophy

Koya Webb
Anaerobic Exercise Capacity in Female College Athletes

27 - 40 R e s e a r c h S u m m a r i e s

Cristal Bolden
The Corporate Scandals of the New Millennium

Catherine O. Browning
The Internet and Infidelity: A Study of Chat Rooms Created for Individuals Who are Married.

Dorine Douglas-Bey
The Role of Substance Abuse in the Lives of Survivors of Sexual Abuse

Kerry Grosch
Effects of Labels in General Education Teachers' Responses to Students with Learning Disabilities

Pamaline King-Burns
The Black Religious Experience

Vanessa Melendez
Optimal Tumor Prevention by Wheat Bran

Michelle Munevar
The Role of Vision and Proprioception in Accuracy of Reaching Movements

Errick Robles
The Conflict in Jerusalem

Salyi Vu
Kansas Advisors' View of Resiliency

W S U A d m i n i s t r a t i o n

President	<i>Donald L. Beggs</i>
Vice President for Student Affairs	<i>Ronald R. Kopita</i>
Assistant Vice President for Student Affairs	<i>Deltha Q. Colvin</i>

F r o m t h e D i r e c t o r

As we bring this four-year grant cycle to a close, I am proud to present Volume 8 of the Journal of Research Reports. The articles featured in this journal represent the work of the Program participants from the 2002-2003-grant year. As one reads through these articles, it is clear that the breadth of research interests is as diverse as the students that we serve, and the quality is outstanding as well. My staff and I could not be more pleased with the efforts that went into producing this meaningful and scholarly body of works.

The Program could not achieve such great accomplishments without the support of the University faculty, staff, and administrators who have mentored students over the past four years. These mentors have not only guided the McNair Scholars in completing their research projects, but they have inspired them to unimaginable heights. All of the research mentors are to be applauded for their efforts in making undergraduate research a reality for the students in this Program.

A special word of thanks is directed to our research assistant, Jan Petersen. Her dedication to the Program and keen ability to motivate the students to produce the best possible document is greatly appreciated. Appreciation is also given to our writing tutor, Emily Guapo, program counselor, Shukura Bakari-Cozart, and the senior administrative assistant, Sheri Daniel, without whose support and persistence in making sure that things got done — and in a timely manner — none of this would have been possible. These individuals are invaluable and irreplaceable. Dedication and commitment are rare qualities and I feel fortunate to have found staff members who hold such qualities.

Finally, I would like to congratulate the students for going beyond the classroom and putting their research interests into practice. Their efforts will not go unnoticed and will prove to be something that they can be proud of. We are most proud of our students and their accomplishments. Their efforts are our efforts, their burdens are our burdens and we share collectively in this well-deserved accomplishment. These students are indeed an example for others to follow in the pursuit of academic attainment. You make what we do a worthwhile cause. Go forth and continue to do good works.



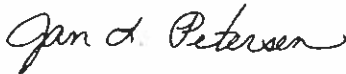
LaWanda Holt-Fields, M.Ed
Director

F r o m t h e R e s e a r c h A s s i s t a n t

It has been my pleasure to serve the Wichita State University McNair Scholars Program for the summer of 2003. I give great thanks to the McNair Staff: LaWanda, Shukura, Sheri, Emily, and Peter—you bring joy, laughter, support and you keep me coming back to McNair year after year. The McNair staff represents leadership and teamwork at its' finest: To the Research Mentors, I also say thank you. Despite incredibly demanding schedules, you have taken time to mentor, teach and to care. Your contributions are invaluable to the McNair program.

Finally, to the McNair Scholars I leave these messages. Within each of you lay wonderful treasures: Treasures of experiences, ideas, interests and concerns critical to society. Each of you has a story to tell and a contribution to make. As you move forward in your journey in higher education and in life, remember to stay focused, to dream dreams, and never forget that your life has great purpose and meaning. Each of your lives has great purpose for this world.

Additionally, Scholars, never forget the power of the written and spoken word to influence, change and inform. As we struggle to cope with a world in crisis, voices of reason and enlightenment are critical. Work to perfect the expression of your ideas. You are the voice of the future. Carry on, Scholars!



Jan Petersen, EdS
Research Assistant

Characteristics of Students in Fine Arts General Education Courses

David Diaz II, *WSU McNair Scholar*

Elaine Bernstorf, Ph.D., *Research Mentor*

Abstract

This research examined some characteristics of students currently enrolled in Fine Arts General Education courses at Wichita State University, Wichita, Kansas. Specifically, we analyzed reasons why students chose fine arts courses and at what point in their college careers they enrolled in these courses. We gathered academic performance information such as GPA and ACT/SAT scores. Data were collected by administering a survey to approximately 75 students enrolled in fine arts classes. The survey asks questions regarding why students selected the courses they are taking, whether they took fine arts courses in high school, whether fine arts was required for them in high school, whether they took their fine arts course in the same area as their high school courses, and at what point (class status) they chose to take their fine arts requirement in college. We compared the answers from those students who had fine arts experience in high school to those students who did not. This research was an initial effort to examine whether fine arts in high school has an influence on students' decisions about the classes in which they enroll and their attitudes regarding fine arts in college.

Characteristics of Students in Fine Arts General Education Courses

The purpose of this study was to describe characteristics of students enrolled in Wichita State University (WSU) Fine Arts General Education courses during the summer semester of 2003. These descriptions will assist the College of Fine Arts in planning for future students. It is possible that enrollment in fine arts general education at WSU could increase due to a new requirement set forth by the Kansas State Department of Education (KSDE) that all high school students must take one credit of fine arts in order to graduate from an accredited Kansas high school. It was our desire to obtain information about current students in order to prepare to meet the changing needs of our prospective students.

Review of the Literature

In the United States there are 25 states that require their students to take a fine arts credit course in order to graduate from an accredited high school. The state of Kansas has become the newest addition to these twenty-five states by adding one credit of fine arts as a requirement for graduation from an accredited Kansas high school. There are an additional thirteen states that require

some form of enrichment such as business or foreign language courses and students have the option of using fine arts to fill this requirement. Students in Indiana are required to take two credits of fine arts if they wish to graduate with an Academic Honors Diploma, and in Tennessee fine arts is a graduation requirement for college-bound students (National Center for Education Statistics, 2001). Local school districts may have their own requirements in addition to the state requirements, which means that there could be individual schools requiring fine arts in states where there are no fine arts requirements. This information suggests that fine arts is a very important part of education.

Not surprisingly, there have been numerous studies on the effects of music on early brain development, which provide solid support for this decision. Psychologist Fran Rauscher and physicist Gordon Shaw conducted a study in 1993 on early brain development at the University of California at Irvine. They found that after six months of playing the piano, five year olds showed dramatic improvement in doing puzzles. Professor Shaw stated, "You can't teach your kid higher math at age two or three but you can teach them music, which is why this music is a window into higher brain function." Rauscher, Shaw, and others believe that studying music stimulates activity in the brain, which causes brain cells to fire in patterns. These patterns form new and lasting connections. These connections are believed to open the doors to higher brain functions such as logic, order, and abstract reasoning. These researchers also found that when students are involved in music programs they are less likely to join gangs, cut classes, and drop out (Music & the Mind, 1999). Music can not only help students have better lives, it also can help them in other classes. The National Council for the Social Studies (NCSS) states the following:

"The framework of the standards consists of ten themes incorporating fields of study that roughly correspond with one or more relevant disciplines. The first theme, 'Culture,' for instance, includes elements of anthropology, geography, history, and sociology... Student performance expectations within that theme are then specified, and examples of classroom activities are provided as illustrations of how to design learning experiences to help students meet the performance expectations" (NCSS, accessed 2003).

Music is a great way to incorporate culture into education. While discussing with fellow educators her plans for a musical world tour, a fourth grade general music teacher ardently stated, "I consider it my responsibility to expose children to the world of musical possibilities. It fits well with their social studies curriculum, too, because music is a way of knowing culture" (Campbell, 2002, pg. 27). This approach to teaching allows the students to make a strong connection to the culture of other countries and their own by giving them the opportunity to see, hear, and do activities from a culture. When the students can see, hear, and do the lesson, the teacher is teaching to three different learning styles. This use of multiple

learning modalities reaches more students. In studying cultures through music, the students also learn basic cultural demographic regions/countries and where they are located. The music experiences help reinforce what students learn in geography. In addition, former Secretary of Education Richard Riley (1992 – 2001) believes that “Through engagement in the arts, young people can better begin lifelong journeys of developing their capabilities and contributing to the world around them” (Fiske, vi).

In recent years, the Arts Education Partnership and the President’s Committee on the Arts and the Humanities formed seven teams of researchers who strongly support this statement. These teams of researchers (The Champions of Change) found that through art education students can attain higher levels of achievement, have an improved personal and social life, and are less likely to drop out of school. One aspect they identified as an area of interest was how arts education affects students from low-income families. They found that the benefits of art education are even greater for students from this demographic group. They also found that arts could help “level the playing field” for disadvantaged students or provide an outlet for a gifted student who was once “acting out” or considered a problem child (Fiske, Pp. viii – xii).

Dr. Larry Blocher from Wichita State University explains another remarkable benefit of Fine Arts programs with the following illustration. First, Dr. Blocher states that in most academic classes if students get a 90 percent they receive a letter grade of A and are considered outstanding. If expectations in music are the same, to get an A in music you can miss one out of every twenty notes. Then he will have an ensemble play a phrase of about twenty notes and he tells each student to miss only one note. The end result is horrifying. Students in performing ensembles perform at very high levels of achievement because that is what is expected, not only by teachers but also from the people who attend the performances. This does not mean that if a student lacks the opportunity to participate in the arts he or she will never succeed at anything. What it shows is that through performance students gain experience in dealing with the high expectations of the professions they will soon pursue. For example, accountants must be highly accurate with their calculations (a B on an individual’s tax return could have serious consequences). If a doctor makes a mistake with a patient it can cost life; if a cashier at the local retail store gives the incorrect amount of change, it is intolerable; and if a mechanic does not fix a car right the first time, it can cost thousands. In almost any field of work, employers have high expectations. If employees cannot “make the grade” they have no chance of advancement and could lose their jobs.

Conclusions may be drawn that the reason arts students can attain higher levels of achievement; are less likely to drop out of school; can have improved personal lives, higher self esteem, and perform better in other classes; and do better in life is because of

the nature of the classes they take. Playing in an ensemble, singing in a choir, or performing in a musical or dance cannot be accomplished without a lot of hard work, discipline, teamwork, sacrifice, and understanding. Fine arts classes create real world situations for students to be involved in, and students in these classes work also on forming good, life-long habits. Students make friends in performing groups. They get to feel special. They have a sense of what it is like to set a goal and be successful in accomplishing it. Success boosts their self-esteem, which helps them perform better in other classes. They have more confidence in their abilities. Fine Arts can improve students’ quality of life.

Methodology

This research project investigated general information about the background that students who come to Wichita State University have in arts education. We wanted to examine the characteristics of students in Fine Arts General Education courses. In addition, we wanted to look for a possible relationship in whether students who were involved in fine arts in high school were more or less likely to take their fine arts requirement at WSU or transfer the credit from a junior college or another university.

Subjects

The information for this study was gathered through a survey (see appendix A). The survey was presented to fine arts general education classes in session during the summer semester of 2003. A total of 53 students completed the survey. The survey was approved by the Wichita State University Institutional Review Board for the protection of human subjects (IRB). Prior to handing out the survey it was explained to the subjects (a script read to all classes, see appendix A) that the survey was optional and anonymous. It took the students about ten minutes to complete.

Procedure

The survey asked about the WSU students’ participation in fine arts during high school. Then the subjects were asked to give reasons why they selected the class in which they were currently enrolled. Information was asked regarding whether students were transferring fine arts credits from other schools or taking them on campus. The survey asked for their major and class status to see if students were taking fine arts general education earlier in their college career or later. In addition, a request was made for students’ Grade Point Averages and ACT/SAT scores for follow-up research at a later date (to look for possible relationships between arts involvement in high school and recorded test scores). At the end of the survey students had the option of giving us some additional personal information and to indicate whether or not they would be interested in participating in a focus group (to be held at a later date).

Analysis

The data from the survey were entered onto a Microsoft Excel spreadsheet (see Appendix B and C). Total counts, percentages, and averages were used to describe the number of students who participated in fine arts in high school, what courses they participated in, how many students were required or believed they were required to take a fine arts credit, and the most influential reason for enrollment in the students' selected college course.

Results and Discussion

Survey results are described in this section. Appendices B and C contain summary tables. The students were asked where they attended high school and whether or not they thought they were required to take a fine arts course in order to graduate. Of the 53 students 44 (77 percent) went to high school in the state of Kansas. Of the students that went to school in Kansas, only 13 percent reported that they were required to take a fine arts course in order to graduate. When the students were asked to give reasons why they chose the Wichita State University General Education course in which they were enrolled 45 (85 percent) said that they chose the class because it fulfilled a requirement for graduation. Additionally, twenty-three (43 percent) reported that one reason for selection was the fact that it fit their schedule. When asked specifically their main reason for choosing the class, 38 out of the 53 students (71 percent) reported that their main reason for course selection was that it fulfilled a requirement for graduation (see Appendix B). According to the responses (Appendix C) forty-one (77 percent) of the students polled reported taking at least one year of fine arts in high school. The students were asked to report if they transferred any classes from a community college or university and whether or not any of the transferred courses were in fine arts. Sixteen (30 percent) of the students reported transferring courses from a community college and six (11 percent) of the transferred courses were fine arts courses. Of the students who transferred courses from a university, eighteen (34 percent) transferred a course and eleven (20 percent) of the transferred courses were in fine arts. Only five students reported that they were involved in fine arts, outside of the current class, at the university. Nearly half of the students (43 percent) polled were fine arts majors (it should be noted that few student activities in fine arts, other than general education courses, were offered during the summer session 2003 at Wichita State). Of the fine arts majors, three (13 percent) were from music and twenty (87 percent) were from art. There were no theater or dance majors in the group. The students were asked how many hours they had completed up to this point and the average amount of hours completed was 73.

In summary, the two main reasons students gave for enrolling in a specific Fine Arts General Education course were that it fit their schedule and that it fulfilled a requirement for graduation.

Students said they participated in high school music classes such as band, orchestra, and choir for an average of 3.4 years and only 1.6 years for non-music fine arts classes. However, more than twice as many students (58) participated in non-music fine arts classes than in music classes. It is of interest to note that students who reported taking music classes spent an average of over twice as many years (3.4) participating than students who reported taking non-music fine arts classes (1.6). Based on the current data, one may infer that students are not likely to choose a fine arts course in college for any other reason other than to fulfill a graduation requirement and manage their schedule. Plans have been made to repeat the survey during the fall and spring semesters to determine whether students taking courses during the traditional academic year vary from the initial subject group. It also should be noted that the results may have been affected by the fact that nearly half of the students surveyed (43 percent) reported being fine arts majors. In conclusion, we feel that the Kansas State Department of Education and Wichita State University have made good decisions in requiring all students to take a course in an area of fine arts. As former Secretary of Education Richard Riley stated, "Through engagement in the arts, young people can better begin lifelong journeys of developing their capabilities and contributing to the world around them" (Fiske, vi).

References

- Campbell, Patricia S. (2002). "Music Education in a Time of Cultural Transformation," pg. 27 *Music Educators Journal* Vol. 89 / No. 1.
- Fiske, Edward B. (2000). *Champions of Change*. Published by The Arts Education Partnership and The President's Committee on The Arts and The Humanities. Funded by The GE Fund and The John D. and Catherine T. McArthur Foundation. *Music & the Mind Video*, (1999). Carlsbad, California: National Association of Music Merchants (NAMM).
- National Center for Education Statistics. (2001). *State Requirements for High School Graduation, in Carnegie Unite*: Table 153. Online, prepared June 2001. Accessed July 26, 2003.
- National Council for the Social Studies (NCSS) Standards & Position Statement. (2003). *NCSS Standards*. Online. National Center for Education Statistics. Accessed May 28, 2003. Available: http://www.education-world.com/standards/national/soc_sci/index.shtml.

Appendix A
Fine Arts General Education Survey Form

Course Number _____
Day/Time _____

High School Information

What high school(s) did you attend?

Did your high school require you to take a fine arts credit in order to graduate?

Yes
No
Not Sure

If you took a fine arts credit in high school what class did you take? (instrumental music, drama, choir, art, dance, forensics/debate, other)

9th grade
10th grade
11th grade
12th grade

College Information

Why did you choose this Fine Arts General Education class? (check all that apply)

Advisor recommendation
Required for major
Heard it was a good class
I wanted to take a class from this professor
I like this subject/arts area
It fit in my schedule
I heard it was easy
Friends were taking it
Offered in convenient location
Other

Of all these reasons, what was the main reason you chose this class?

Have you transferred any credits from a community college?
Yes
No

If yes, were any of these fine arts credits? (please describe)

Have you transferred any credits from a four-year college/university?
Yes
No

If yes, were any of these fine arts credits? (please describe)

Are you involved in any type of fine arts class/activity at the university in any form other than this class? If so, please explain. (ie. band, orchestra, dance/theater, vocal ensemble, Lessons...etc.)

Other Information
What is your major?

Approximately how many hours you have completed to this date?

Approximate cumulative GPA?

Did you ever take a college course as a high school guest? (If so, what was it?)

(Optional) To further the current research in arts education this additional information would be especially helpful.

Name: _____
WSU Student Number: _____
High School ACT _____ SAT _____
Email address or phone number: _____

Would you be interested in participating in a focus group to help with future planning for the College of Fine Arts? Yes/No

Script

Hi, my name is David Diaz and first I would like to thank you for your time today. I really appreciate it.

I am doing a survey for the College of Fine Arts. The purpose of this survey is to find out some background information on the students taking our general education courses. We are collecting this information so that we can better fit the needs of the students taking these courses. The survey should take approximately ten minutes to complete. If you feel uncomfortable answering any questions you may leave them blank. Please try to be as accurate as possible with your answers. When you are finished please raise your hand and I will collect them. Thank you for doing this and lets begin.

Again, thank you for your help with the survey. (after all surveys are handed in)

Appendix B

Table 1: Summary of Results

	#of students	High School				HS required		
		Wichita	Kansas	USA	Internl.	Yes	No	?
Totals	53	20	21	7	3	16	21	11
Percentage	100.0%	37.7%	39.6%	13.2%	5.7%	30.2%	39.6%	20.8%
Average								
Percentage of students that took any FA in H.S.					77%			
Percentage of students required to take fine arts					30.2%			
Percentage of Kansas students with requirement					13.2%			

	Classes Taken # years taken							
	Music Band	Orch	Jazz	Vocal Choir	Mads	Art General	Studio	other
Totals	13	4	0	7	0	26	2	5
Percentage	24.5%	7.5%	0.0%	13.2%	0.0%	49.1%	3.8%	9.4%
Average # of years in	3.4	3.3	0.0	3.4	0.0	2.2	1.0	1.6

	Dance	Drama	Forensics	Debate	Humanities	Other/not specified
		1	8	6	8	1
Totals	1.9%	15.1%	11.3%	15.1%	1.9%	1.9%
Percentage	2.0	2.6	1.5	1.8	1.0	2.0

	Why this college class?							
	Adv Rec	Required	good class	Liked prof	Like Subject	Fit Schedule	Easy class	Friends
Totals	7	45	7	4	20	23	5	1
Percentage	13.2%	84.9%	13.2%	7.5%	37.7%	43.4%	9.4%	1.9%

	Main Reason	CC transfer credits?			
		Yes	No	FA??	
	Convenient Locale				
Totals	4	Required	16	36	6
Percentage	7.5%	71.7%	30.2%	67.9%	11.3%

	Types of classes taken at CC (# classes taken)					Univ. tranfer credits		
	Art	Music	Dance	Theater	Other	Yes	No	FA?
Totals	4	1	1	0	0	18	34	11
Percentage	7.5%	1.9%	1.9%	0.0%	0.0%	34.0%	64.2%	20.8%

	Types of classes taken at Univ. (#of classes taken)				
	Art	Music	Dance	Theater	Other
Totals	8	0	0	0	0
Percentage	15.1%	0.0%	0.0%	0.0%	0.0%

	Involvement in FA?			Other Information				
	Yes	No	Type	Major				
				Fine Arts Major? Music (inst./vocal)	Theater	Dance	Art (studio/graphic design)	
Totals	5	46	0	3	0	0	20	
Percentage	9.4%	86.8%	0.0%	5.7%	0.0%	0.0%	37.7%	

	Other	Hours completed (average)	GPA (average)	College as high school guest		
				Yes	No	FA Credit?
Totals	28	73	3.2	15	28	1
Percentage	52.8%		6.1%	28.3%	52.8%	1.9%

Appendix C

Table 2: Totals for number of students who participated in FA in high school.

Classes Taken		Totals (#of students whot participated in FA in each area)	Average (# of years taken)
Music	Band	13	3.4
	Orch	4	3.3
	Jazz	0	
Vocal	Choir	7	3.4
	Mads	0	
Art	General	26	2.2
	Studio	2	1
	other	5	1.6
Dance		1	2
Drama		8	2.6
Forensics		6	1.5
Debate		8	1.8
Humanities		1	1
Other/not specified		1	1

Participate in FA (total # of students that participated in FA)	41
Percentage of students that took any FA in H.S.	77%
average participation in MUSIC classes (in years)	3.4
average participation in NON-MUSIC classes (in years)	1.6
Total participation in MUSIC classes	24
Total participation in NON-MUSIC classes	58
Percentage of Fine Arts Majors in MUSIC	13.0%
Percentage of Fine Arts Majors in THEATER	0.0%
Percentage of Fine Arts Majors in DANCE	0.0%
Percentage of Fine Arts Majors in ART	87.0%

The Technologies of Proteomics

Stephanie Kirsch, WSU McNair Scholar

Michael Van Stipdonk, Ph.D., Research Mentor

Abstract

Popular opinion concerning the origins of life and where that first cell came from vary. Some believe that the ribozymes in ribonucleic acid (RNA) progressed enzymatically toward the formation of the first cell. Others believe that amino acids collecting in puddles were heated by the sun causing them to form protenoids. Ultimately it is protein enzymes that are necessary for deoxyribonucleic acid (DNA). The very purpose of a cell is nothing more than a structure designed to synthesize the proteins necessary to produce the enzymes that allow DNA to replicate. Proteomics is the quantitative analysis of proteins present in an organism at a certain time and under certain conditions (Lottspeich, 1999). Each sequence leads to an individual shape, which in turn leads to each individual protein's function. Twenty amino acids form billions of possible protein combinations. Each cell in our bodies contains more than 5,000 different kinds of proteins, each with a specific function to perform. Recognizing and identifying proteins has become a modern day challenge for science. This literature review will examine the most effective methods currently used for protein identification.

The Technologies of Proteomics

The debate over the origins of life is a popular one. If one goes beyond the debate of evolution to how that very first cell evolved, there are two popular schools of thought. Some believe that the ribozymes in ribonucleic acid (RNA) progressed enzymatically toward the formation of the first cell. Others believe that amino acids collected in puddles were heated by the sun, which caused them to form protenoids. However it was formed, today we know that the primary purpose of a cell is to provide a structure for the synthesis of the proteins necessary to produce the enzymes for deoxyribonucleic acid (DNA) to replicate itself.

"Proteomics" and "proteome" are words coined by Marc Wilkins and his colleagues in the early 1990's when it became clear to researchers that DNA and RNA are only one half of life's equation (Liebler, 2002). Proteomics is the quantitative analysis of proteins present in an organism at a certain time and under certain conditions (Lottspeich, 1999). The proteome is the protein complement of the genome (Liebler, 2002). "Proteomics is an interdisciplinary science that includes biology, bioinformatics, and protein chemistry" (Palzkill, 2002). This study is being conducted on a global scale and involves protein expression levels, post-

translational modifications, and interactions with other molecules (Palzkill, 2002). While it is clear that a complete understanding of biochemical processes and their regulation will depend on information at the atomic level, this literature review will investigate the most current technologies used to advance our knowledge in the vast field of proteomics (Howard & Brown, 2002).

A cell is a membrane-bound structure that can carry on the protein synthesis needed to produce the enzymes that allow DNA to replicate itself. DNA and RNA are huge polymers of nucleotides. DNA makes up the genes and stores the information to replicate itself. It also stores the coding for the order in which the amino acids will form each protein. A gene is a segment in DNA that codes for a protein (Mader, 2000). The expression of a gene results in the production of messenger ribonucleic acid (mRNA) that is then translated into a protein. Proteins are then synthesized by the translation of mRNA into polypeptides on ribosomes. Simplified, the expression of a gene results in the production of mRNA, which is then translated into a protein (Yates, 1998). Current evidence suggests some 200 different types of modifications before the protein even becomes a part of a living system (Liebler, 2002).

Proteins become complex compounds of carbon (C), hydrogen (H), oxygen (O), and nitrogen (N) synthesized at the ribosomes in the cytoplasm of the cell-producing proteins. Proteins differ because the number and order of their amino acids vary. The sequence of amino acids leads to its shape, which, in turn, leads to its function. While there are only twenty amino acids, these long chains of amino acids have billions of possible combinations, each with a specific function to perform.

Amino acids are the building blocks of proteins. The way in which a mere 20 amino acids are arranged creates the small differences in body proteins, which results in the uniqueness inherent to each individual. Proteins form as a result of a condensation synthesis reaction between two amino acids, which results in a dipeptide and a molecule of water (H₂O). A peptide is a molecule formed from two or more amino acids. Each amino acid in a peptide is called a residue (R), because H₂O has been lost in the formation of the peptide bond (Jones & Atkins, 2002). The bond that is formed between two amino acids causes it to be polar, which makes hydrogen bonding possible.

The structure of a protein is of utmost importance, because it determines its function. There are four main shapes and millions of post-translational modifications to those shapes. Translation is described as the synthesis of a polypeptide under the direction of a mRNA molecule. During translation, transfer RNA (tRNA) bring amino acids to the ribosomes (Mader, 2000). After reaching their destination—once they have carried out their function—the activities of many proteins are controlled by post-translational modifications (Liebler, 2002). The primary structure of a protein refers to the linear sequence of the amino acids joined by peptide

bonds. Each polypeptide differs by the sequence of its residue (R) groups and the number of amino acids in its sequence. The secondary structure is a polypeptide's orientation in space. The coiling of the chain results in an alpha helix or a right-handed spiral. A folding of the chain results in a beta-pleated sheet. The aforementioned hydrogen bonding between peptide bonds is the force that holds the shape in place. The tertiary structure of a protein is its final three-dimensional shape. This is the shape into which the helix and the pleated sheet are folded. This folding can happen in the blink of an eye. The rate of protein synthesis can be as quick as 20 residues per second. The doubling time of bacterial cells can be as short as every 20 minutes. The quaternary shape, while less predominate, is an important one none the less. It is the shape of the protein that forms hemoglobin. The loss of structure of a protein is called denaturation and may occur to primary, secondary, tertiary or quaternary structures. Denaturation may occur when a protein is exposed to extreme heat or pH. Any modification at all to the primary structure may lead to the malfunction called congenital disease (Jones & Atkins, 2002).

Proteins play an integral part in many complex functions of life and have a myriad of functions. The protein keratin makes up our hair and nails. Collagen, another protein, forms our ligaments, cartilage, bones and tendons. It is the actin and myosin proteins in our muscles which allow them to contract. Proteins transmit chemical and physical signals between molecules in the cell, act as receptors on the cell surface, and control the activity of other proteins, as well as DNA. They transport oxygen, lipids and metals in the blood, act as storage proteins, and control the flow of ions and other molecules across the cell membrane. Proteins also participate in the transfer of electrons in photosynthesis (Fraga, Parker & Pocock, 1995). Proteins form the complement system, which activates when pathogens enter the body. Protein enzymes are necessary for (DNA) replication (Mader, 2000). If not for the protein in our cells, the chemical reactions that happen in a fraction of a second would take hours, if not days.

Proteomics is a "bewilderingly complex" discipline because while every organism has one genome, it has many proteomes (Liebler, 2002). Any protein can exist in multiple forms both within a cell as well as between different cells. Proteomics is a "systems biology," not a "structural biology." It is said to focus on "the behavior of a system" rather than on "the behavior of any one component" (Liebler, 7). Proteins also exist in many modified forms, which in turn affect structure, localization, function, and turnover. In his book *Proteomics*, Daniel Liebler (2002) stresses how important it is to detect and quantify proteins in both their modified and unmodified forms. It is now time to explore just how science accomplishes this huge undertaking.

Up to 1950, it was unclear whether a certain protein possessed a defined covalent structure or consisted of a heterogeneous mixture

of amino acid polymer chains. Research was slow because a protein was almost always isolated and purified on the basis of its biochemical activity before its covalent structure could be grasped in detail. While this strategy was successful, the major disadvantage was its relatively large material consumption and tedious isolation. Additionally, consideration needed to be paid to the retention of biological activity. In 1958, Professor Klaus Biemann analyzed amino acids in a mass spectrometer, somehow stumbling upon how to introduce nonpolar molecules into the mass spectrometer to create ions. The use of mass spectrometry requires creating gas-phase ions from polar or charged molecules (Yates, 1998). Ronald McFarlane was the first to show that underivatized peptides and proteins could be put into a gas phase. In the year 1958, Frederick Sanger received a Nobel Prize for his work in determining sequences in amino acids. Edman Degradation (ED) chemistry was used first to determine these sequences. ED identifies residues by the chromatographic differences of derivatives released at each cycle of degradation. Mass spectrometry was still considered more effective than ED because it was much faster.

The methods of protein study were under constant development, striving for increased sensitivity. In 1975, the field of proteomics realized an important milestone with the development of two-dimensional (2D) gel electrophoresis. This method enabled scientists to separate a large number of individual proteins from complex mixtures of tissues, cells, and body fluids and begin cataloging them in huge databases. 2D gel electrophoresis was not without its drawbacks. Even for low-abundance proteins it had limited capabilities, particularly for hydrophobic proteins (Howard & Brown, 2002). For the first time, however, protein patterns from normal and pathological states could be compared. Unfortunately, at that time the analytical methods were lacking, so the differences we were finally able to observe merely had diagnostic value, since the proteins identified could not be further characterized.

This shift led to awareness that faster, more automated analysis techniques were necessary. In the meantime, databanks were being developed to accommodate the large amount of data being simulated. These databanks, in turn, developed the associated software tools that led to the birth of bioinformatics, which has become a progressive field today.

The 1990s introduced two new mass spectrometric techniques to be used successfully in protein analysis: electrospray mass spectrometry (ESI-MS), developed by John Fenn, and the matrix-assisted laser desorption/ionization mass spectrometry (MALDI-MS), developed by Koichi Tanaka. Fenn received a Nobel Prize in 2002 for his work related to making gas phase ions from large proteins.

ESI creates ions when a fine mist is generated of charged droplets. The advantage to this method is that the formation of highly charged ions are not fragmented. The downfall of this method is that buffers, salts, and detergents can alter results. Now

techniques used in conjunction with electrophoretically separated protein mixtures present more rapid and efficient determinations. MALDI is a pulsed-ionization technique that uses photons to deposit energy into a matrix and analyte mixture which creates pulsed-ion packets rather than a continuous beam of ions. When organic crystals absorb the wavelength of a nitrogen laser, ionization occurs. Rapid heating causes the crystals to convert to gas phase. MALDI is more tolerant of salts and buffers than ESI. It creates singly precharged ions with a one to one correspondence between ions and peptides or proteins. Current methods use MALDI and ESI for protein identification and sequencing while database searches match sequences (Yates, 1998).

New methods of direct identification using combinations of enzymatic proteolysis, liquid chromatographic separation, tandem mass spectrometry and computer algorithms can match peptide tandem mass spectra to sequences found in databases (Yates, 1). Traditional sequencing was for primary structure analysis and X-ray diffraction and nuclear magnetic resonance (NMR).

Advances in robotics and enhanced methods of crystallography coupled with the availability of higher magnetic fields in NMR have lead to faster, more reliable results.

Today, the four integral tools used in the field of proteomics are an analytic protein-separation technology, a mass spectrometer, special software, and the database. With these methods, even incomplete complex samples can be identified with amino sequence tags as short as two amino acids (Mann & Wilm, 1994). Now a large and rapidly increasing percentage of proteins submitted can be found in sequence databases.

There are many diseases associated with proteins. Parkinson's disease, Huntington's disease and Lou Gehrig's disease are associated with protein inclusions of less well-defined structures (Pain, 2000). Maple syrup urine disease and phenylketonuria are disorders in which the branched-chain amino acids (leucine, isoleucine, and valine) cannot be fully metabolized. A deficiency in the protein collagen is responsible for Ehlers-Danlos syndrome (EDS) as well as a significant fraction of major skeletal birth defects. Cystic fibrosis (CF) is a genetic disorder resulting from improper folding of the first nucleotide-binding domain. Diseases associated with an accumulation of aggregate are Alzheimer's disease and cataracts (Pain, 2000).

Today, mass spectrometers perform a variety of services. Mass spectrometers date prehistoric cave painting in southern France. A mass spectrometer is used at the international space station. Mass spectrometers detect narcotics at airports and test athletes in the Olympics for steroids, and they act as sensitive chemical warfare detectors in the war in Iraq. Mass spectrometers are found anywhere necessary to identify unknown compounds and elucidate the structure and chemical properties of molecules (<http://www.asms.org/whatisms/p1.html> 2003).

The science of proteomics has made numerous advances, many of them recent. However, it is also true that the field is still in its infancy. Even with good separation techniques, many times, several proteins can be located in one position. The supreme challenge is that, unlike the genome, the proteome is a highly dynamic system, which is characteristically altered by changes in "environmental conditions" (Lottspeich, 1999). In addition, no biological state exists in which all possible proteins of an organism are expressed. To date, science must content itself with protein analysis through an investigation of "still snapshots" that when pieced together explain the correlation between the observed differences in protein patterns with biological states (Lottspeich, 1999). Only then will science get a better insight into the complex functional regulation and metabolic networks of nature.

References

- Fraga, S., Parker, J. M. R., Pocock, J. M. (1995). Computer Simulations of Protein Structures and Interactions. Berlin: Springer-Verlag.
- Howard, G. C., Brown, W. E. (2002). Modern Protein Chemistry Practical Aspects, Boca Raton: CRC Press.
[Http://www.asms.org/whatisms/p1.html](http://www.asms.org/whatisms/p1.html). 2003.
- Jones, L., Atkins, P. (2002). Chemistry, Molecules, Matter and Change. (4th Ed.) New York: W. H. Freeman and Company.
- Liebler, D. C. (2002). Introduction to Proteomics. Totowa: Humana Press.
- Lottspeich, F. (1999). "Proteome Analysis: A Pathway to the Functional Analysis of Proteins." Angew. Chemistry International, **38**, 2476-2492.
- Mader, S. (2000). Human Biology. (6 Ed.) New York: McGraw-Hill.
- Mann, M., Wilm, M. (1994). "Error-Tolerant Identification of Peptides in Sequence Databases by Peptide Sequence Tags." Analytical Chemistry New York: McGraw Hill, **66**, 24.
- Pain, R. H. ed. (2000) Frontiers in Molecular Biology Mechanisms of Protein Folding, Oxford: Oxford University Press.
- Palzkill, T. (2002) Proteomics, Boston: Kluwer Academic Publishers.
- Yates, J. R. (1998) Mass Spectrometry and the Age of the Proteome, Journal of Mass Spectrometry **33**, 1-19.

What is a Kiva?

Ingrid Mendoza, *WSU McNair Scholar*

Peer Moore-Jansen, Ph.D., *Research Mentor*

Abstract

Kiva is a ceremonial structure discovered in the Southwest by antiquarians in the 19 century who defined it as a structure that is rectangular or circular in shape, subterranean, distinguished by features such as a bench and fire pit, and used for ceremonial purposes. This definition is still used today and has recently been questioned by archaeologists. What has been proposed is that we look at the different regions of the Southwest and determine if kivas reflect continuity through time with architecture and purpose. This analysis of a kiva may reveal that the definition of kivas needs to be revised.

What is a Kiva?

The subject of this paper is the unique architecture and ceremonial chambers generally referred to as kivas of the ancient Puebloan people of the United States Southwest. The Southwest region of the United States has been of great interest not only to archaeologists, but also many amateurs who find the architecture of the ancient Pueblos fascinating. The Southwest has been described as an area that extends from Durango, Mexico, to Durango, Colorado, and from Las Vegas, New Mexico, to Las Vegas, Nevada (Cordell, 1997:3).

The term kiva has been borrowed from the Hopi language and is used to describe the ceremonial chambers of the Anasazi. The Anasazi, also known as the cliff dwellers, are a people that represent a culture that lasted from 1500 B.C. to around 1300 AD. They lived in Mesa Verde and the San Juan region and are ancestors of the modern occupants in the region, the Hopi and the Zuni (Ferguson, 1996:189). Today, the Hopi use the term "kiva" to describe their ceremonial structures (Smith, 1990:55). Kivas have been studied by archaeologists for at least one hundred years, and yet there does not seem to be any clear-cut definition to describe this structure of the Anasazi. Traditional kiva structures date from approximately A.D. 700 to after A.D. 1300 and are located in the Four Corners Region of the Southwest (Cordell, 1997:190). Throughout the centuries, many have sought out what the exact use and purpose of the kiva in the pueblos was.

The Spaniards were the first to write about the kiva in the 1500s, calling the structure an *estufa* (Nordenskiold, 1973:17). Following the Spaniards, many antiquarians became interested in the Southwest and in the unique structures of the pueblos. The purpose of this research is to understand the definition of a kiva, understand

what features constitute a kiva, and determine if its definition should be questioned. The following are definitions from the past that introduce the reader to the complexity facing archaeologists with regard to identifying kiva structures using past definitions.

Background and Definitions

The definition of a kiva has been used in the past to identify the use of a ceremonial chamber, yet there are no standard features that identify a kiva. It may or may not be consistent in shape, size or its contents, and this varies according to its placement in the Southwest. The Spaniards were the first to explore throughout the Southwest and, while there, they discovered numerous round rooms, which they referred to as *estufas*. In Spanish the word *estufa* literally means stove, but the Spaniards believed that the *estufas* in the Southwest were used like the steam baths they observed in Mexico. (Nordenskiold, 1973:17).

In 1891, a young, 23 year-old aristocrat from Sweden by the name of Gustaf Nordenskiold learned about the ruins in the Southwest and arranged to stay with the Wetherill family in Mancos, Colorado. Even though Nordenskiold did not possess a degree in anthropology or in ethnology, he is well known for his detailed notes and photographs taken of the pueblos during his short visit to the Southwest (Nordenskiold, 1973:XII). During his explorations, he adopted the term "estufa" to identify all the "round rooms" and distinguish them from the square-blocked rooms in the region (Nordenskiold, 1973:17). These *estufas* are what we now call kivas. He believed that the *estufas* that were in current use by the Moki in Oraibe Village, Arizona, could be compared to those at Cliff House in Mesa Verde and that they were used in similar fashion, as a place for religious and political gatherings, and not as a steam bath as the Spaniards believed (Nordenskiold, 1973: 17).

The Moki village of Oraibe that Nordenskiold visited was situated in the northeastern portion of Arizona. In his notes, he describes an *estufa* at Oraibe village as a large rectangular apartment that was two-thirds below the surface; its length was between 7.5-10 meters, width 4.5-7 meters and height 2-3 meters. There was a bench on three sides of the room and a fire pit; the walls were made of stone; the inside plastered and a ladder had to be used to enter through the roof (Nordenskiold, 1973:137). Nordenskiold also stated that the *estufa* was used for special occasions, such as ceremonies for a good harvest and abundant rainfall. Nordenskiold found that it was rare for the women of the village to enter the *estufas*, as their duties were performed outside on the terraces. The men of the village entered the *estufas* during the day and would sit, chat, smoke and weave or do other small duties in the *estufas* (Nordenskiold, 1973:137).

In the early twentieth century, Jesse Walter Fewkes became interested in the Southwest after he began his career as a marine zoologist. In 1895, Fewkes was employed by the Bureau of

American Ethnology and was sent to the Southwest to explore the ancient pueblos (Smithsonian Institution Archives, 1998). Fewkes' definition of a kiva is as follows: "The word kiva is restricted to subterranean chambers, rectangular or circular, in which secret ceremonies are or were held..." (Fewkes, 1999:48). In his reports from 1909 and 1911, he describes two different types of kivas at Cliff Palace. The first type was described as a subterranean room that was circular or cylindrical in form, with pilasters that supported the roof, a fireplace, deflectors, and a ventilator. The second type of kiva identified by Fewkes was circular or rectangular with rounded corners and without pilasters, a fireplace or a deflector (Fewkes 1999:48). According to Fewkes' research in the modern Pueblos, "the kiva represents one of the underworlds or the womb of the earth from which the races of man were born" (Fewkes, 1999:48).

Not until the First Pecos Conference about the Southwest in 1927 did archaeologists agree on a very broad definition of a kiva: "A kiva is a ceremonial chamber specially constructed for ceremonial purposes." (Woodbury, 1993:90). Because this definition of a kiva is vague, archaeologists have for years questioned when a structure should be considered a pit house and not a kiva, and vice versa? "How many features must be present to identify a structure as a kiva?" is a question that many archaeologists ask, as not all structures contain all features ascribed to the kiva complex (Smith, 1990:56).

Watson Smith was a lawyer before he began his archaeological career in the Southwest in the 1930's. He was introduced to archaeology in the summer of 1933 and worked with Paul Martin on the Rainbow Bridge-Monument Valley Expedition (Smith, 1952:vii). Smith's description of a kiva is that it may be circular, rectangular, D-shaped, completely or partially subterranean, or completely aboveground. The entrance may be through a hatchway in the roof or through a door in one of the walls. It may contain columns or pilasters to support the roof, benches around the walls, fireplaces, ventilator shafts, niches in the walls, fixtures for loom supports, and a sipapu which is the symbolic opening in the floor that gives a connection to the underworld (Smith, 1952:5). The sipapu is part of the origin myth as it is believed that the people came up through the sipapu onto the earth (Smith, 1972:120). Smith goes on to state that none of these previously mentioned features are definite; therefore, the definition cannot go beyond that of "a room with a floor, walls, and a roof" (Smith, 1952:5). Smith also believed that the kiva was a specialized ceremonial room that was used for little or no domestic work and was an Anasazi creation (Smith, 1990:59). While working in Big Hawk Valley, Arizona, he discovered that there was a "lack of uniformity in kiva architecture" and discerned that maybe the "specific features" in a room do not determine its function, but its position in the architectural unit and its relation to other rooms determine whether it is a ceremonial room or not (Smith, 1990:70).

By comparing the descriptions of the kivas, we have learned that

they are not steam rooms, but that they are a ceremonial chamber. In his report, Nordenskiöld did not go into great detail about kivas, but he did cover the ruins of Mesa Verde in detail. Jesse Walter Fewkes also reported on the ruins in Mesa Verde; however, in his report on Cliff Palace, he described the size, shape, location, and features of the kivas, as well as any objects discovered within. Watson Smith's main interest lies in what the definition and features of a kiva should be. Watson Smith has investigated many archaeological sites and has done extensive work on kivas, yet he did not come up with a conclusive definition of a kiva.

Features Constituting Kivas

Before the kiva evolved into a specialized ceremonial chamber, it was the domestic dwelling of the Anasazi called a pit house. A pit house is a structure that is built partially underground, has a flat roof, and was either circular or rectangular, and entrance was through the roof (Ferguson, 1996:66,191). It is believed that during the late Basketmaker III period, A.D. 575 to 750, and during Pueblo I period, A.D. 750 to A.D. 900 (Cordell, 1987:193), the architecture of the Anasazi pit houses began to change (Cater & Chenault, 1988:19). As the Anasazi began building aboveground units, the pit houses were being used less for domestic work and were being used more for ceremonial purposes. Archaeologists believe the kiva was not used completely for ceremony until after Pueblo III, A.D. 1100 to 1300, and was used both for protection from the cold in the winter and for domestic purposes, such as grinding corn (Cater & Chenault, 1988:29). Kivas differ in shape and size and this depends on where in the Southwest they are located. Some are circular, square, or D-shaped and range in size from small, 5-8 meters in diameter, (Cater & Chenault, 1988:29) to large, 10-23 meters (Van Dyke, 1999:475).

Small circular kivas are located in the eastern portion of the Four Corners region of the Southwest, in particular Mesa Verde and the San Juan Region (Ferguson, 1996:189). Some of the features include a bench, fire pit and sipapu. This type of kiva has been referred to as a kin kiva, which was used only by an extended family (Ferguson, 1998:11). These kivas are usually built into room blocks or underground, and it is believed that these kivas functioned for both domestic and religious purposes (Ferguson, 1996:13).

How do we know the difference between great kivas and small kivas? Do they have any distinguishing characteristics? As the name states, great kivas are large in size, 10-23 meters, aboveground or subterranean, and its shape may be circular or rectangular depending on its location in the Southwest. Great kivas have been discovered situated away from the habitation units and are believed to be used for communal purposes, such as ceremony and dance, discussion of issues within the pueblo, and market and trade actions (Van Dyke, 1999:475).

In the eastern portion of the Southwest, the great kivas of Chaco Canyon were all circular semi-subterranean, and it is unknown if

they were completely or partially roofed. The building structure was highly formalized with crypts, sub-floor passageways, antechambers, and benches around the structure. Archaeologists believe that, due to the large amount of labor used to construct the great kivas, the structure held a higher value than that of just a community center. Evidence that suggests this is the rich deposits that were discovered in the sealed crypts and niches (Lekson, 1986:52).

Those Great Kivas located in the western portion of the Southwest are rectangular. A good example is the great kiva at Grasshopper Pueblo located in east-central Arizona. This area was occupied between approximately A.D. 1275 to A.D. 1400. The great kiva at Grasshopper Pueblo measures 15 meters by 12 meters and is believed to have first served as a plaza and later transformed into the great kiva that was completely enclosed by the roomblock. The discovery of the postholes in the floor has provided evidence suggesting that the great kiva was completely roofed. Entrance to the great kiva was through a doorway, and it contains few features, such as a hearth, metate, and footdrum (Riggs, 2001:108). The Grasshopper Pueblo was believed to be inhabited by immigrants, and the Great Kiva served as a structure which brought the entire pueblo community together (Riggs, 2001:184).

Discussion

Many archaeologists do not agree with some of the theoretical interpretations of the kiva. In particular, there remains disagreement regarding the theories that the kiva was used solely for ceremonial purposes (Cater & Chenault, 1988:30), that the large numbers of kivas at a particular site can be interpreted as a ceremonial center (Lange, 1986:16), and that the abandonment of the pit house to live in the aboveground room blocks left the kiva to serve as a special ceremonial chamber (Lekson, 18988:224). The early archaeologists from the nineteenth century did not have a magic crystal ball to see into the past. So how can we be sure that the use of kivas in the modern pueblos was the same as those of the historic period? Cater and Chenault argue that there is evidence that shows that other activities occurred in the kivas, such as the mealing bins for grinding corn and lithic debitage from making stone implements on the floors of the kivas, well into the Pueblo III period. Another problem they raise concerns the influence of the Catholic religion imposed on the Native Americans by the Spaniards. Consequently, the modern use of the kiva may not reflect the attitudes and use of the kivas from the historic period (1988:30).

Stephen Lekson has questioned the interpretation of a kiva by asking why all semi-subterranean, circular structures must be called kivas. He feels that the term kiva is "ill defined ethnographically and archaeologically" (Lekson, 1988:224). What Lekson refers to as a pit structure others call kivas. Some archaeologists believe that a large number of kivas at a site makes it a ceremonial center (Lange,

1986:16). If we look at Lekson's interpretation, he strongly believes that the Anasazi were still using pit houses until the 1300s, and their features were very similar to the kivas, such as the stone/earth walls, a bench, mealing bin, and sipapu (Lekson, 1988:230).

One of the many problems archaeologists face in identifying a kiva is that they cannot communicate with the past to make a definite decision regarding its use as purely ceremonial. We can only go by the modern use of the pueblos today, which may or may not reflect the historic use due to the influence of the Spaniards and Catholicism. We cannot describe a kiva as a kiva, just because the structure is round, semi-subterranean and has few or some of the features which archaeologists from the past have said make up its definition. If we look into our homes, we cook, eat, sleep, and sometimes perform religious ceremonies in them. What would be the interpretations of our homes five hundred years from now if our cities were abandoned? Could it be possible that the interpretation of a kiva has been wrong from the beginning?

The problems faced in trying to correct some of these errors from the past are that there are many archaeologists who find it very difficult to remove themselves from traditional interpretation. Another problem is offending the Native American population in the Southwest. The Native American community now uses the word kiva; if archaeologists are trying to look at the problems with identifying the structures and correcting these problems, they are faced with offending a population that has strong mythic ties to the kiva.

In order for archaeologists to find a more comprehensive definition of a kiva, different methods should be considered. Not just the size, shape, or features can identify a structure. To the student archaeologist the broad term used today is extremely confusing, and it seems to be an anything-goes type of definition. Looking at definitions from the early 20th century, there is not a kiva that includes every feature that has been described. How are students going to be able to identify these structures, if there is not a better definition? We must continue to challenge ourselves with questions, for if we do not question what we have learned, how are we to continue learning?

With the extensive literature research conducted, I cannot offer a solution to identifying a kiva, I can only offer to the reader the broad, confusing definition: "A kiva is a ceremonial chamber specially constructed for ceremonial purposes" (Woodbury, 1993:90).

References

- Cater, John D. and Mark L. Chenault.
1988 Kiva Use Reinterpreted. Southwestern Lore, 54(3):19-31
- Cordell, Linda.
1997 Archaeology of the Southwest. second edition.
San Diego: Academic Press
- Ferguson, William M.
1996 The Anasazi of Mesa Verde and the Four Corners.
Niwot: University Press of Colorado
- Fewkes, Jesse Walter.
1999 Mesa Verde Ancient Architecture: Selections from the Smithsonian Institution, Bureau of American Ethnology, Bulletins 41 and 51 from the Years 1909 and 1911.
Avanyu Publishing, Inc.
- Lange, Frederick and Nancy Mahaney, Joe Ben Wheat,
Mark L. Chenault and John Cater.
1986 Yellow Jacket: A Four Corners Anasazi Ceremonial Center. Boulder: Johnson Books
- Lekson, Stephen H. with contributions by William B. Gillespie and
Thomas C. Windes.
1986 Great Pueblo Architecture of Chaco Canyon, New Mexico
Albuquerque: University of New Mexico Press
- Lekson, Stephen.
1988 The Idea of the Kiva in Anasazi Archaeology.
The Kiva 53(3):213-234.
- Nordenskiold, Gustaf.
1973 The Cliff Dwellers of the Mesa Verde Southwestern Colorado Their Pottery and Implements. Antiquities of the New World, Early Explorations in Archaeology, Vol. 12. New York: AMS Press, Inc.
- Smith, Watson edited by Raymond H. Thompson.
1952 Kiva Mural Decorations at Awatovi and Kawaika-A: With a Survey of Other Wall Paintings in the Pueblo Southwest. Reports of the Awatovi Expedition, Report No. 5. Cambridge: The Wenner-Gren Foundation for Anthropology
- 1990 When is Kiva? And Other Questions About Southwestern Archaeology.
Tucson: University of Arizona Press
- Van Dyke, Ruth M.
1999 The Chaco Connection: Evaluating Bonito-Style Architecture in Outlier Communities. Journal of Anthropological Archaeology 18(4):471-506.
- Woodbury, Richard B.
1993 Sixty Years of Southwestern Archaeology: A History of the Pecos Conference. Albuquerque: University of New Mexico Press

Objectivism in *The Fountainhead*: Ayn Rand's Novel as an Illustrative Test Case For Her Philosophy

Carmen U. Ubom, WSU McNair Scholar

Peter Zoller, Ph.D., Research Mentor

Abstract

In *The Fountainhead*, Ayn Rand uses architecture and the implications architecture has for creating a social vision to explore her philosophy of objectivism. Architecture exists in a public forum and is highly likely to represent a collective social philosophy. Rand presents her concept of the connection between architecture and social philosophy by comparing two areas of thought, collectivism and individualism, while introducing her personal philosophy of objectivism. Throughout the novel, Rand illustrates four major areas of objectivist thought: metaphysics, epistemology, ethics, and politics. These aspects of her philosophy are developed through many literary devices including theme, plot, characters, and dialogue.

The Fountainhead, then, can be an illustrative test case for Ayn Rand's philosophy of objectivism.

Objectivism in *The Fountainhead*: Ayn Rand's Novel as an Illustrative Test Case For Her Philosophy

Architecture can be seen to be socially influenced and to change as a culture changes. Because it is created in such a highly public forum, architecture can be seen to represent what a society stands for. Ayn Rand, author and philosopher, recognized that architecture can represent a social vision; in *The Fountainhead*, the struggle between two architects and a social critic reveals the social struggle between collectivism and individualism. In her novel, Rand uses the world of architecture to explore her philosophy of objectivism. Objectivism is considered through various literary devices including theme, characterization, plot, and dialogue. In fact, *The Fountainhead* can be an illustrative test case for Ayn Rand's philosophy of Objectivism.

Ayn Rand first began to develop her philosophy through her fiction and later published nonfiction works to promote objectivism. Objectivism is based on four essentials: metaphysics, epistemology, ethics, and politics. All four principles are premised on what Rand considers to be logical, rational thought. The metaphysics, or underlying philosophical principle, of objectivism is reality as an objective absolute. In objectivism, this is called the "primacy of existence:" that which exists is independent of consciousness or independent of what one thinks exists. In her own words Rand says, "Reality exists as an objective absolute—facts are facts, independent of man's feelings, wishes, hopes, or fears" (Voice 4).

The opposite of this is the "primacy of consciousness" in which consciousness is not only one's perception of existence but also a means for creating existence. In other words, one attempts to use consciousness to alter or control reality. For Rand, primacy of existence is an aspect of individualism, while primacy of consciousness is inherent in collectivism; both are illustrated throughout *The Fountainhead*.

Like all philosophical theories, objectivism is built on epistemology, the branch of philosophy that studies the nature of knowledge. In objectivism the source of all knowledge is reason and the validity of all knowledge should be evaluated through the use of reason. In Rand, "Objectivism subscribes to the thesis of empiricism: that sense of perception is our basic form of contact with reality, and that all knowledge rests on perceptual data" (Kelley). Rand believes that knowledge based on sense perception, or reason, should be one's only guide to action.

Objectivism's ethical theory has its foundations in virtues, or principled policies of action. An objectivist's ideal virtues would include rationality, productiveness, honesty, independence, integrity, justice, and pride (Hicks). Rand bases the ethics of her philosophy in rational self-interest: "The pursuits of [man's] own rational self-interest and of his own happiness is the highest moral purpose of his life" (Voice 4). Rand has called this idea of rational self-interest "selfish" and even published an ethical guide titled *The Virtue of Selfishness*. It is said, however, that the typical use of the word "selfish" is different from the meaning she ascribes to it, and "for her, the truly selfish person is a self-respecting, self-supporting human being who neither sacrifices others to himself nor sacrifices himself to others" (Raibley).

Because capitalism promotes the pursuit of one's own self-interest to seek maximum gain, objectivism believes it to be the ideal political/economic system. According to The Objectivist Center web site, "The objectivist political theory has three main elements: the foundation of the political system should be the fundamental right to live free from physical force, government has the strictly limited function of protecting rights, and government power should be exercised in accordance with objective laws. Capitalism is the politico-economic system implied by these principles" (FAQ).

In *The Fountainhead*, Ayn Rand presents a society whose philosophy is reflected directly through their architectural choices. The society is one of collectivist thought; the architects oppose originality and rely on ancient "tried and true" architecture to represent a modern society. As one character in the novel said, "The voice of the past is the voice of the people. [...] The proper creative process is a slow, gradual, anonymous, collective one, in which each man collaborates with all the others and subordinates himself to the standards of the majority" (*The Fountainhead* 24). Rand's hero, Howard Roark, breaks through this collectivist thought, even going as far as to criticize the climax of over four centuries of Greek temple

architecture—the Parthenon. Roark's individualism is represented by his daring and innovative architectural style and beliefs: "A building is alive, like a man. Its integrity is to follow its own truth, its one single theme, and to serve its own single purpose. [...] Its maker gives it the soul and every wall, window and stairway to express it" (*Fountainhead* 24). In the novel, emphasis is placed on individualism as the only correct moral choice, a choice which accurately reflects the overall concept of Objectivism.

The theme, or abstract concept, of *The Fountainhead* is personal character. Specifically, it is personal character in relation to individualist and collectivist thought. Rand herself says the theme is "individualism versus collectivism, not in politics, but in man's soul; the psychological motivations and the basic premises that produce the character of an individualist or a collectivist" ("For the New" 66). Rand's characters are used to illustrate the theme of the novel. Although one might say that Rand's characters are symbols, she disagrees and states that they are "personifications of spiritual forces if you wish—four basic types of the human soul" ("Letters" 222). However one chooses to state it, the characters of *The Fountainhead* are intended to represent the concepts of individualism and collectivism. In detail, this is shown through their personality, thoughts, and actions.

Peter Keating is an architect who follows the trends set before him by a collectivist society. He is a pure collectivist and bases his actions on primacy of consciousness. Inherent in Keating's collectivist nature is that he has no original thought process and reproduces the ideas of others to succeed. About Keating, Roark says, "Others were his prime concern. He didn't want to be great, but to be thought great" (605). Because Keating closely adheres to the collectivist guidelines set by society, he is the star architect of his day.

In *The Fountainhead* buildings represent the ideas of society; Ellsworth Toohey, an influential critic, is the man who sways popular opinion on what is considered great architecture, thus manipulating which buildings are constructed. In this way, Toohey controls society and molds it into a unit of collectivist thought. Toohey is considered the great humanitarian of his day; however, he spends his life secretly plotting his rise to power. Toohey accomplishes his goal by brainwashing others with altruist speeches: "This is the time for every man to renounce the thoughts of his petty little problems, of gain, of comfort, of self-gratification. [...] Let us listen to the call. Let us organize, my brothers" (*Fountainhead* 109).

Gail Wynand, a successful businessman, is another character who controls the society of *The Fountainhead*. He has the potential to be an individualist; however, through his newspaper he promotes collectivist thought and in this way contributes to the creation of a collectivist society. He disagrees with altruist ideas but continues to give the public what it wants in order to gain wealth and power. Inherent in Wynand's nature are objectivist values; however, he does not have the integrity to follow through on his ethical beliefs or individualist potential. Because he believes in individualism but seeks greatness through his power

over others, Wynand is a hypocrite; in this way, he rejects objectivism's ethical stance on integrity. In Rand's view, hypocrisy is self-destruction and a form of spiritual collectivism. When speaking with Roark about the building he constructs as a symbol of his life, Wynand says, "Build it as a monument to that spirit which is yours...and could have been mine" (*Fountainhead* 692).

Howard Roark is Rand's hero, or ideal of what man should be. He is the true individualist and follows every guideline Objectivism preaches. He is completely selfish (in Rand's sense of the word) and his only goal in life is his own happiness. Roark firmly believes in the integrity of the human spirit and never flinches in his conviction to live as an independent thinker. This is not something he consciously chooses, but rather it is inherent in his nature to be an individualist. In her early journals Rand describes Roark's character in detail: "He will be himself at any cost—the only thing he really wants of life. [...] He is in conflict with the world in every possible way—and at complete peace with himself." (*Fountainhead* 698).

Rand says her four main characters are "the four basic forms of the relation of the self to others" ("Letters" 223). This means that her characters illustrate four different forms of how an individual might relate to society. In a letter to a fan, Rand describes the four characters:

Roark is [...] the totally self-sufficient man, for whom other people do not exist in any primary, important sense. The man who lives only for himself. [...] Toohey is literally the selfless man [...] the parasite who can exist only through others, through his power over them. [...] Keating is the parasite who tries to fool himself by moral justifications in order to escape the realization of his own mediocrity—the unthinking cannon fodder of collectivism. Wynand is a prime mover who has gone wrong by making one crucial mistake [...] seeking greatness in power over others (which is a form of spiritual collectivism) (223).

In addition, Rand says that her characters relate consistently for or against the principle that "independence is the keystone of human greatness, that the absolute individualist is the moral man, the perfect man, the great man." (224). The influence of Objectivism in *The Fountainhead* is apparent through characterization; Rand believes that only individualists are truly moral, and this same principle is reflected through the characters of the novel.

The plot of the novel closely follows the lives and careers of the four main characters. The plot progression and fate of each character is a direct result of his nature. The most parallel comparison the reader can make is of Roark and Keating, as it is their architectural struggles the novel is based on. This comparison begins in the opening pages of the story. Roark has been expelled from a famous architectural school for not adhering to the rules of collectivist thought; at the same time, Keating graduates with honors and prestigious awards from the same school. Throughout most of the novel, Keating is considered one of the great architects of his time and his career is highly successful. Although his

personal life and the inner workings of his soul slowly fall apart, his career reaches a climax. Consistent with objectivist thought, Keating eventually self-destructs and is ultimately a failure because he is a collectivist. On the other hand, Roark's career seems doomed; throughout *The Fountainhead*, Roark constantly loses opportunities to build because he refuses to sacrifice his individualistic morals. However, Roark is a true success at the end of the novel, triumphing over his adversaries. Objectivism is clearly illustrated by plot because in the novel the collectivist characters ultimately fail and the individualist characters triumph in the end.

Dialogue is a key structural element to how Rand presents objectivism in *The Fountainhead*. The characters' dialogue reveals their own philosophy and, of course, represents either collectivism or individualism. Near the end of the novel, three extensive speeches are used to illustrate objectivism; Rand admits that through these speeches she presents her "whole thesis as clearly, specifically, and completely as one would do in a nonfiction article" (226). One such speech involves the nature of the "second hander"; during a conversation between himself and Gail Wynand, Howard Roark explains that a second-hander is someone who takes credit for the works of others and, although he is dishonest, derives self-respect from others thinking he is honest. Roark says, "[Second-handers] have no concern for facts, ideas, work. They're concerned only with people. They don't ask: 'Is this true?' They ask: 'Is this what others think is true?'" (*Fountainhead* 606). This is an example of how Ayn Rand supports individualism in *The Fountainhead* by building an opposition to collectivism. Rand's philosophy is illustrated because the second-hander (representative of collectivism) is the antithesis of Objectivism.

Ellsworth Toohey reveals the soul of a collectivist in a confession to one of his victims, Peter Keating. Pushed to his frustration point by the "hypocritical sentimentalists" (634) that he controls, Toohey reveals the secrets of how he has worked to create the establishment of a collectivist society. He says that the only way to rule humankind is through the soul: "It must be broken. Drive a wedge in, get your fingers on it—and the man is yours" (*Fountainhead* 635). Both Ayn Rand and objectivism are highly opposed to altruism. In the following passage, Toohey defines this aspect of collectivism: "Preach selflessness. Tell man that he must live for others. Tell men that altruism is the ideal. Not a single one of them has ever achieved it and not a single one ever will. His every living instinct screams against it" (635). Again, Rand presents Objectivism by defining collectivist nature to the reader.

Howard Roark makes the last extensive speech of the novel. This is one of the only speeches that clearly states the philosophy of objectivism, rather than revealing the principles of collectivism, and is key to understanding Rand's philosophy. In fact, Rand says that the key sentence of the entire novel is contained in Roark's speech: "I wished to come here and say that I am a man who does not exist for others. It had to be said. The world is perishing from an orgy of

self-sacrificing" (684). Roark describes the soul of an individualist and explains the difference between creators and second-handers. He stresses that creators essentially continue the cycle of life through productive achievement, which is a key virtue of objectivism's ethical theory. According to Roark (and Rand) creators are inherently individualists: "And only by living for himself was he able to achieve the things which are the glory of mankind. Such is the nature of achievement." (679). Roark explains that man should not exist for the benefit of other men and the choice is to be either dependent or independent. Once again, the reader is introduced to objectivism, as it is a philosophy based on personal independence.

It is important to recognize objectivism within *The Fountainhead*, as it is an integral part of understanding the abstract concept the novel represents—personal character. This holds true for Rand's other works as well; Rand explored objectivism through her fiction, and proceeded to write non-fiction works explaining her philosophy. Many different scholars have discussed the idea that the spirit of society is revealed through the medium of architecture. In this novel, Ayn Rand uses both this concept and the world of architecture as a platform for exploring her philosophy. Rand's exploration of objectivism in *The Fountainhead* is evident through various literary elements. Thus, *The Fountainhead* is an illustrative test case for Ayn Rand's philosophy of objectivism.

Works Cited

- "FAQ: What is the Objectivist View of Law and Government (Politics)?" *The Objectivist Center* 15 March 2002. 7 July 2003 <http://ios.org/articles/wthomas_faq-politics.asp>.
- Hicks, Stephen R.C. "Ayn Rand," *The Encyclopedia of Philosophy*. University of Tennessee at Martin 2002. 7 July 2003. <<http://www.utm.edu/research/iep/r/rand.htm>>.
- Kelley, David. "Foundations Study Guide: Epistemology." *The Objectivist Center* August 1996. 7 July 2003. <http://ios.org/articles/foundations_epistemology.asp>.
- Raibley, J. "FAQ: Virtue of Selfishness." *The Objectivist Center* 30 January 2002. 7 July 2003. <http://ios.org/articles/jraibley_faq-virtue-selfishness.asp>.
- Rand, Ayn. "For the New Intellectual." *The Objectivism Research CD-ROM*. CD-ROM. Indiana: Oliver Computing, 2001.
- . *The Fountainhead*. New York: Signet, 1993.
- . "The Letters of Ayn Rand." *The Objectivism Research CD-ROM*. CD-ROM. Indiana: Oliver Computing, 2001.
- . *The Voice of Reason: Essays in Objectivist Thought*. New York: Meridian Books, 1990.

Anaerobic Exercise Capacity in Female College Track Athletes

Koya Webb, WSU McNair Scholar

Mike Rogers, Ph.D., Research Mentor

Abstract

Various factors determine a person's ability to perform physical work and compete in sports. Success in some sports depends on skill. In others, it depends on muscle strength or speed of movement, and in some, one may be limited by one's stamina. A common denominator of all these activities is that they involve muscle contraction, which can only be performed when biochemical energy is converted to mechanical energy in the form of adenosine triphosphate (ATP). There are three systems that create ATP within the muscle. This study focuses on the anaerobic system. Twelve women track and field athletes participated in the study. Events included jumpers, sprinters, distance runners, and throwers. The Wingate Power test was used to access the peak five-second power, mean 30-second power, and the fatigue index. Absolute and relative scores were used to indicate the relative power of individuals with different body weights. Averages indicated that sprinters have the highest peak output, but also the greatest fatigue index. These and other results help us understand anaerobic capacities (muscle power and fatigue) of women track athletes who perform in different events. This study also serves as the first of a series of studies performed by exercise science students that can help to determine the effects of training on anaerobic power in track athletes.

Anaerobic Performance

Traditionally, research on physical performance has focused almost exclusively on aerobic activities. It is only in recent years that scientists and practitioners have become increasingly interested in high-intensity, anaerobic activities. As a result, there is a paucity of practical information on anaerobic performance and the means by which it can be assessed.

Body movement is created when a muscle contracts. Such contraction requires the conversion of biochemical energy to mechanical energy. To enable contraction, high-energy adenosine triphosphate (ATP) must be available at the contractile elements of the muscle (Bar-Or, 1986). Much knowledge has been generated about the metabolic pathways by which this source of energy is supplied and replenished.

There are three energy sources that provide ATP to the contractile elements. The most immediate source is creatine kinase, which turns adenosine diphosphate into ATP. This source of

energy is available for use at the very beginning of exercise but, in itself, can only sustain muscle contraction for a few seconds.

An intermediate energy source is glycogen, which is stored within the muscle. The initial breakdown of glycogen to glucose-1-phosphate is accomplished through the action of muscle phosphorylase. In the absence of oxygen, a further breakdown to pyruvate and lactate yields three molecules of ATP for each glucose-1-phosphate molecule, through a cascade of reactions. Several enzymes, primarily phosphofructokinase, control the rate of such anaerobic glycolysis. Intense muscle contractions obtained through the use of anaerobic glycolysis can be sustained 20-60 seconds, but with the build-up of acidosis, the muscle fatigues and its mechanical power production declines.

Unlike these immediate and intermediate energy sources that do not require oxygen, the long-term sources of energy are considered "aerobic," because of their dependence on a continuous supply of oxygen. Extra-muscular fats and, to a lesser extent, carbohydrates, provide the pools for their aerobic energy sources. At low-intensity activities, most of the energy is derived from the beta-oxidation of fats, but with an increase in intensity there is a growing contribution of carbohydrate oxidation. The energy pool of fat is markedly greater than that of intra- and extra-muscular carbohydrate. In the presence of oxygen, low- and intermediate-intensity aerobic activities can be sustained for hours. Fatigue eventually occurs when intra-muscular glycogen is depleted (Bar-Or, 1986).

While aerobic fitness depends on the cardiovascular, respiratory, and metabolic systems and represents a person's overall fitness, anaerobic fitness, because of its independence of blood and oxygen supply to the muscle, is a local characteristic of the muscle. A person may have a high anaerobic performance in one muscle group and a lower anaerobic performance in another. A successful 400-meter runner, for example, would need high anaerobic fitness in the legs, but less in the arms. A free-style swimmer, on the other hand, may have higher anaerobic fitness in the arms than in the legs.

Energy Continuum

Anaerobic metabolism does not require oxygen to produce ATP, but aerobic metabolism does. Critical to understanding anaerobic and aerobic exercise metabolism is the fact that these processes are not mutually exclusive. That is, anaerobic metabolism and aerobic metabolism are not either/or situations in terms of how ATP is provided. Both systems can and usually do work concurrently. When describing whether muscular exercise is aerobic or anaerobic, the concern is with which system predominates.

Once ATP has been created; it is stored in the muscle. This amount is relatively small and can provide energy for only 1-2 seconds of maximal effort. However, another high-energy compound, phosphocreatine (PC), also known as creatine phosphate (CP), can be used to resynthesize ATP from ADP

instantaneously. The amount of PC in muscle is about three times that of ATP. Any time the energy demand is increased, at least part of the immediate need for energy is supplied by these stored forms, which must ultimately be replenished. These sources are also used preferentially in high-intensity, very short duration activity. This ATP-PC system neither uses oxygen nor produces lactic acid and is thus said to be alactic anaerobic in nature (Plowman and Smith, 1997).

When the demands for ATP exceed the capacity of the phosphagen system and the aerobic system (either at the initiation of any activity or during high-intensity, short-duration exercise), anaerobic glycolysis is utilized. This is rather like calling in the reserves, because glycolysis can provide the supplemental energy quickly. This system makes activities such as a 1500-m speed skating event possible. That is the benefit. The cost is that the production of lactic acid often exceeds clearance, and lactate accumulates. Since this system does not involve the utilization of oxygen but does result in the production of lactic acid, it is said to be lactic anaerobic (Plowman and Smith, 1997).

The generation of ATP from glycolysis, the Krebs cycle and electron transport-oxidative phosphorylation, is constantly in operation at some level. Under resting conditions, this system provides basically all of the energy needed. When activity begins or occurs at moderate levels of intensity, oxidation increases quickly and proceeds at a rate that supplies the needed ATP. If the workload is continuously increased, aerobic oxidation proceeds at a correspondingly higher rate until its maximal oxygen uptake is reached. The highest amount of oxygen the body can consume during heavy dynamic exercise for the aerobic production of ATP is called maximal oxygen uptake, or $\dot{V}O_{2max}$. Because $\dot{V}O_{2max}$ reflects the amount of oxygen available for the aerobic production of ATP, it is also an important metabolic measure. Both aerobic and anaerobic exercises are often described in terms of a given percentage of $\dot{V}O_{2max}$ (either less than or greater than 100 percent $\dot{V}O_{2max}$). Anaerobic metabolic processes are important at the onset of all aerobic exercise, contribute significantly at sub-maximal levels, and increase their contribution as the exercise intensity gets progressively higher. Depending on an individual's fitness level, lactic anaerobic metabolism begins to make significant contribution to dynamic activity at approximately 40-60 percent $\dot{V}O_{2max}$. However, even then the ability to process oxygen is most important. Since the aerobic system does involve the use of oxygen and proceeds completely to oxidative phosphorylation, it is said to be aerobic or oxidative (O_2) (Howley and Powers, 2001).

These three sources of ATP—the phosphagen system (ATP-PC), the glycolytic system (LA), and the oxidative system (O_2)—are recruited in a specific sequence called the time-energy system continuum. This continuum assumes that the individual is working at the maximal maintainable intensity for a continuous

duration. This means that it is assumed that an individual can go all out for five minutes or less or can work at 100 percent $\dot{V}O_{2max}$ for 10 minutes, at 95 percent $\dot{V}O_{2max}$ for 30 minutes, at 85 percent $\dot{V}O_{2max}$ for 60 minutes, and at 80 percent $\dot{V}O_{2max}$ for 120 minutes. Of course, there are individual differences, but these assumptions are reasonable in general (Howley and Powers, 2001).

Measurement of Anaerobic Metabolism:

There is no generally accepted means by which to directly measure the anaerobic energy contribution of exercise. There are, however, two general approaches to describing the anaerobic exercise response. One approach describes changes in the chemical substances either used in alactic anaerobic metabolism (specifically, ATP, and PC levels) or produced as a result of lactic anaerobic metabolism (lactic acid or lactate). The second approach quantifies the amount of work performed or the power generated during short-duration, high-intensity activity. The assumption is that such activity could not be done without anaerobic energy; therefore, measuring such work or power indirectly measures anaerobic energy utilization.

The first approach uses the measurement of ATP, PC, and lactate, which can be done by chemical analysis of muscle biopsy specimens. Lactate is the most frequently measured variable, in part, because it can also be measured from blood samples. The blood samples may be obtained by either venipuncture or finger pick, both of which are less invasive than a muscle biopsy.

The second approach tests anaerobic power and capacity. The total amount of energy that can be produced by an energy system is the energy system capacity. The energy system power is the maximal amount of energy that can be produced per unit of time. When measuring the anaerobic systems, one would ideally have a test that could distinctly evaluate alactic anaerobic power and capacity, as well as lactic anaerobic power and capacity. Because no such test exists, this information can be measured indirectly by the total mechanical power generated during high-intensity, short-duration work; the amount of mechanical work done in a specific period of time; or the time required to perform a given amount of presumably anaerobic work. One test that provides this information is the Wingate Anaerobic Test (Howley and Powers, 2001).

Research Purpose

The purpose of this research study was to examine anaerobic exercise capacity in female college track athletes. Specifically, this research defined optimal loads for eliciting maximal power-outputs in the muscles during the 30-second Wingate Test. Predictions would suggest that track events that require higher intensity would have a high fatigue index and those events which require less intensity but longer distance would have a lower fatigue index.

Research Methodology

The Wingate Anaerobic Test is the best known of several bicycle ergometer tests used to measure anaerobic power and capacity. The test is an all-out ride for 30 seconds against a resistance based on body weight. The revolutions of the flywheel are counted per second during the test and from the available information. Each of these variables requires the use of different time periods in the calculations. This test defines the optimal loads for eliciting maximal power-outputs in the legs.

Research Procedure

After University Human Subject Review Board approval, 12 female athletes were recruited from Wichita State University to participate in this study. Three of the athletes were distance runners (e.g., events of 1600 meters or longer), three were sprinters (e.g., events of 400 meters or less), three were jumpers (e.g., high jump, long jump, triple jump), and three were throwers (e.g., shot put, javelin, discus, hammer).

Participants read and signed an Informed Consent form approved by the University Human Subject Review Board. Each participant then completed the Wingate Power Test, which consisted of a 30-second sprint performed on a stationary bike. The test was administered in the Human Performance Laboratory at the Heskett Center located on the Wichita State University Campus. The entire procedure took less than 15 minutes for each participant.

Before performing the Wingate Test, participants had their weight measured using a standard scale. The participants then warmed-up for five minutes on a stationary cycle ergometer at a pedaling rate of 60-70 RPM without resistance using a self-selected cadence. Two unloaded five-second sprints were performed at the end of the third and fifth minute of the warm-up period. A three-minute recovery followed the warm-up before beginning the performance test. During the recovery period, each subject was allowed to continue cycling with zero load or to stop and stretch.

The Wingate Test was performed using a cycle ergometer (Monark, model 818E, Varberg, Sweden) equipped with toe clips and straps. The seat height was adjusted so that the participant's knees were nearly fully extended on the down stroke. The resistance to be used during the test was set at 7.5 percent of the body weight.

At the beginning of the test, each participant cycled in the seated position as fast as possible against zero load until, after a five-second countdown, the resistance was suddenly increased to 7.5 percent of body weight using a snap-clip that tightened the resistive belt around the ergometer's fly-wheel. Simultaneously with this increase in resistance, the participants continued pedaling as fast as possible for the next 30 seconds. The participants were verbally encouraged to maintain as high a pedaling rate as possible throughout the 30-second test duration. Participants were required

to remain seated during the entire test. After completion of the test, participants were allowed to continue cycling against a light load for as long as needed for recovery.

A computer, interfaced with the cycle ergometer, was equipped with an OptoSensor 2000 (Sports Medicine Industries, St. Cloud, MN) to measure power output during the test. This system uses an optical sensor to measure rotation of the ergometer flywheel at 22.5° intervals. Power output and pedal cadence were calculated using the OptoSensor 2000 software at one-second intervals throughout the test. Power calculations were based on the inertial properties of the flywheel and crank, flywheel, and crank kinematics, and the load applied to the flywheel. The power output was then normalized by dividing by the participant's body weight to derive relative power output (Watts per kilogram).

Using the data obtained with the computer software, maximal and minimal average power (force times distance divided by time) outputs during consecutive five-second intervals were designated as the peak power (PP) and minimal power (MP), respectively. In addition, the fatigue index (i.e., the percentage of peak power drop-off during the test) was calculated by dividing the difference between the peak power and minimal power by the peak power $((PP-MP)/PP)$.

Means and standard deviations were determined for all variables. An Analysis of Variance (ANOVA) was used to analyze the differences between the four groups of athletes. The statistical software package SPSS v11.0 (Chicago, IL) was used for all analyses.

Assessment of Outcome

The main objective of this study was to assess the anaerobic performance of female college track athletes. During the test a decline in power was observed as the creatine phosphate and ATP were depleted in the first 10 seconds of the test. At this time, the body switches to anaerobic glycolysis and lactic acid builds rapidly in the muscle causing the athlete to fatigue. Although the groups' performance scores were not statistically different, results indicated that the sprinters had the highest 5-second peak output (7.97kg), followed by distance runners (7.23kg), jumpers (7.00kg), and throwers (6.13kg). The distance runners had the lowest fatigue index (31 percent), followed by the sprinters (32 percent), jumpers (34 percent), and throwers (39 percent).

Implications

Usually more aerobically trained individuals have a lower fatigue index. For example distance runners are more aerobically trained; therefore their fatigue index is significantly lower (31 percent) than the throwers (39 percent). Testing can provide information regarding strengths and weaknesses in a certain area or sport. This information can be used as baseline data to plan individual exercise training programs. Athletic success in most sports involves

the interaction of several physiological components. Results from this study provide athletes with information about which components require improvement in order for the athlete to raise his/her level of athletic performance. This information becomes the foundation for an individual exercise prescription that concentrates on the identified areas of weakness.

Conclusion

Differences in anaerobic performance were observed between the different groups of athletes. This study has provided us with a better understanding of the characteristics of anaerobic performance. This is an important step in initiating a series of studies that will examine exercise and performance. Further studies will examine the effects of exercise training protocols on increasing strength/power and the relationships to anaerobic performance. Additional studies will assess the effects of nutritional supplements such as creatine monohydrate on anaerobic performance. These studies will contribute to the development of more effective training programs for athletes.

References

- Bar-Or, O. (1986). "Testing of Anaerobic Performance by the Wingate Anaerobic Test." *Testing of Anaerobic Fitness*. (p. 1-15).
- Howley and Powers (2001). "Theory and Application to Fitness and Performance." *Exercise Physiology*. (p. 386-389).
- Plowman and Smith (1997). "Anaerobic Metabolism During Exercise." *Health, Fitness, and Performance*. (p. 244-250).

The Corporate Scandals of the New Millennium

Cristal Bolden, *WSU McNair Scholar*

Timothy Craft, Ph.D., *Research Mentor*

Summary

This research analyzes contemporary corruption and scandals in corporate America, specifically the companies of WorldCom, Enron, and Tyco. Worldcom, the Clinton, Mississippi, based telephone company, and Enron, an energy trading company, both falsified documents to conceal growing debt problems. Enron is a company marked by illegal off-the-balance-sheet transactions and partnerships. Tyco is a diversified manufacturing and service company in which chief executives have been indicted and are facing criminal charges for allegedly taking \$600 million through fraudulent stock sales and other means. The behavior of the chief officers in these companies is a classic example of greed, dishonesty, arrogance, and ethical blindness, which has characterized much of today's corporate America. The demise of these companies provides witness to some of the most memorable corporate scandals in American history. It is imperative that these corrupt practices no longer continue. Corporate officers must take responsibility for maximizing shareholders' wealth and assuming moral means of serving the public.

WorldCom began in 1983 as a small company named Long Distance Discount Services, Inc. in Jackson, Mississippi (Kirkpatrick & Lockhart LLP, 2002). Within 15 years, WorldCom became a global telecommunications giant and one of the largest companies in the world. WorldCom attained its growth through rapid acquisitions of other companies. The company's continuous growth and transformation into new companies made it difficult to organize and merge the newly acquired operations and personnel.

To protect the integrity of WorldCom, corporate officers, i.e. CFO and other accounting executives, created a multi-layered accounting scam to hide its accounting irregularities. The June 25, 2002, disclosure of a \$3.8 billion restatement regarding the line cost of capitalization may be the largest issue in terms of dollars (Kirkpatrick & Lockhart LLP 2002). The Security Exchange Commission (SEC) has charged WorldCom with fraud for misleading investors by misstating and hiding expenses for more than two years. WorldCom executives have admitted to at least \$9 billion in erroneous accounting. Executives delayed reporting some expenses and misrepresented others to give investors the appearance of growth during secretly hard times.

A second example of one of the largest corporate scandals in recent times is that of Enron. Enron was born from the merger of

Houston Natural Gas and InterNorth, a Nebraska pipeline company. In 1985, Enron began its business as a company that shipped natural gas through pipelines (Thomas 2002). Its role changed rapidly over the next 16 years, making it one of the nation's most dominant energy traders. In order to maintain its growth, Enron engaged itself in intricate contracts and undertakings. According to Thomas (2002), Enron, once the seventh largest company in the U.S., was warned in August of 2001 by former VP for Corporate Development, Sherron Watkins, of impending financial problems based on "a wave of accounting scandals." Two months later, in October 2001, Enron officials announced that the company was actually worth \$1.2 billion less than had previously been reported. The difference was due to both inflated estimates of income and the failure to include all the company's debts in reports to investors. A number of top Enron executives have been charged with fraud, including securities, wire, and mail fraud. When a corporate executive like Enron's CEO Ken Lay portrays himself as an innovator and deceives his shareholders and employees, the distinction between earning money and pretending to earn it becomes perceptible. Moreover, Enron's accounting firm, Arthur Anderson, LLP, has been convicted of obstruction of justice, was fined \$500,000 and was placed on probation for five years.

In addition to the corruption and scandals of WorldCom and Enron, a conglomerate company, Tyco, is no stranger to treachery and deceit. Tyco is a diverse manufacturing and service company, having operations in areas of Plastics & Adhesives, Engineered Products & Services, Healthcare, Electronics, and Fire and Security Services. The conglomerate company abandoned plans to split into four parts when concerns arose over its accounting practices in the wake of the Enron fiasco (Byrnes, Symonds 2002). Under accusations of mismanagement, CEO Dennis Kozlowski resigned. Kozlowski was later charged for allegedly avoiding payment of over \$1 million in sales taxes on \$13.2 million in artwork. Many accounting irregularities at Tyco were discovered, particularly acquisition accounting techniques that boosted financials, creating losses exceeding \$7 billion.

These accounting scandals gained a lot of public aversion and created disbelief toward the accounting disclosures. In order to ensure that more Enrons, Worldcoms, or Tycos do not happen in the future, accounting disclosures need to be more authentic. "The current system rests on accounting framework that is becoming increasingly insufficient to meet investor's demand for relevant information, especially information related to the intangible sources of value that are critical for so many firms" (Benson, 2003, p. 93). The financial statements released by such accounting firms can be of great importance to the investors and shareholders, if it is truly reflective of the companies' health. Balance sheets and income statements should present the financial conditions

according to a pre-defined and scheduled timeframe and comply with rules that have not been manipulated by managers to camouflage their inabilities and mislead investors and shareholders.

Today's corporate scandals, whether insider trading or auditing irregularities, are not caused by a lack of regulatory laws or by the capitalist features of the economic system. They are caused by irresponsible individuals who should be tried under criminal laws that already exist (Kocchar, 2002). No matter how many regulations the government imposes there are always ways for dishonest individuals to find loopholes in the laws.

Sadly, many business executives rarely view these issues as immoral, but rather as accepted practices of business. These business executives fail to realize that money gained dishonestly is morally worthless. "Merely having or getting money is not noble; making money is" (Thomas, 2002).

References

- Benston G. Bromwich M., Litan R.E., Wagenhofer A., "Following the money". AEI Brookings joint center Washington D.C.
- Byrnes N., Symonds W. C. I, the Avalanche Headed for Pricewaterhouse? Investigators are digging into the firm's Tyco dealings. Retrieved June 29, 2003, http://www.businessweek.com/magazine/content/02_41/b3803057.htm.
- Kochhar M. (July 2002) "Capitalism and Financial Scandal" Retrieved June 29, 2003, <http://objectivistcenter.org>.
- Thomas W. (July 2002) "The Morality of Money." Retrieved June 29, 2003, <http://objectivistcenter.org>.
- Thomas W. C. (March/April 2002) "Rise and Fall of Enron," Today's CA, the Texas Society of CPAs
- (2003, May 19) Tyco tack on \$1b more in charges. (Tyco International will take \$1+ billion in after-tax charges in its second quarter) Accounting Today, v17 i9 p41(1).
- United states bankruptcy court Southern district of New York. (November 4, 2002). "First iterim report of Dick Thornburgh, Bankruptcy court examiner." Washington, D.C. Kirkpatrick & Lockhart LLP.

The Internet and Infidelity: A Study of Chat Rooms Created for Individuals Who Are Married

Catherine O. Browning, *WSU McNair Scholar*

Rhonda K. Lewis, Ph.D., *Research Mentor*

Summary

Muscleman: Do you come here often?

Bunnybabe: No, this is my first time here. You?

Muscleman: I usually hang out here a few nights a week, enough to have gotten to know some of the regulars. I didn't think I had seen you here before.

The first impression one may have when reading the previous exchange is that the setting may be in some dimly lit, smoky bar. Today's reality is that it could be taking place at the office on the work computer or on the family computer, possibly while the spouse and children are sleeping elsewhere in the house. The Internet has opened the world to many new sites, sounds, and people. The Internet has also brought pain and distrust, even divorce.

"Infidelity is defined as taking sexual energy—of any variety that will compromise integrity—outside of a committed relationship, and pretending it will not affect the person, their partner, or their relationship, as long as it remains hidden in both partners" (Shaw, 1997, p. 29). In our world today, committed relationships take on many different situations. No longer is a committed relationship just between a husband and a wife. There are gay couples, lesbian couples and men and women who live together in a committed relationship but choose not to make their commitment legal through marriage. No matter what the arrangement is, infidelity—breaking the trust—is painful and changes lives.

Emily Brown (2001) writes in her book *Patterns of Infidelity and Their Treatment*, "Affairs have always been with us and always will be. Only the details change. Technology is one of those details" (p. 18). Before the Internet, it was tougher to find someone with which to have an affair. Now one only has to go as far as linking up to the Internet to find ready made Chat Rooms with titles such as, "Married and Flirting," "Married Cheatin or Chattin" or "Married But Tempted."

It's no secret that the word "sex" is the number one searched topic online. Many websites even hide the word sex into their Hyper Text Markup Language (HTML) so that their web page will be included, even if nothing about their site has to do with the topic of sex!

During the two-week period starting June 16, 2003, and ending June 29, 2003, I used one of the more popular search engines, Google.com (<http://www.google.com>) to monitor the number of

web pages using the following words listed either in their title, description or HTML:

1. "Free Married Personals"
2. "Free Adult Chat Rooms"

My reasoning for choosing the words "free married personals" is to demonstrate the ease and availability in which anyone married can find a web-page that allows one to post a personal ad in order to find someone else with whom to make contact. The results of the search for the number of web pages with the words "free married personals" grew from 516 web pages on the first day to the expansive number of 687 web pages found on the last day of the two-week study. This is a growth of 171 web pages. If this number of 171 is averaged over the fourteen days, it reflects an average of twelve new pages added to the World Wide Web each day.

Using the same reasoning for choosing the words "free adult chat rooms," I was able to observe the ease and availability with which anyone married can find a web page that allows one to find a chat room in order to connect with someone else instantly. The results of the search for the number of web pages with the words "free adult chat rooms" grew from 16,200 web pages on the first day to the 22,600 web-pages found on the last day of the two-week study. This is an increase of 6,400 web pages. If this number of 6,400 is averaged over the fourteen days, it reflects an average of 457 new pages added to the World Wide Web each day.

When online, one can be whomever they want to be. Sometimes the only hint of information is through the nickname, and even that is not always as it seems. The other person may be presenting themselves as a female, but in reality be a male and vice versa. This is called genderbending. Genderbenders are "individuals who switch gender while engaged in online pursuits" (Cooper, et al, 2000, p. 16). In cyberspace, there is a greater occasion to be anonymous, allowing one the freedom from prejudice. There is no such thing as a bad hair day, love handles or crooked teeth when surfing in cyberland.

There are those that would argue that as long as there is no physical contact it is not cheating. "Internet sex has the potential to change the parameters of infidelity. Husbands, wives, and partners may view the discovery of a nonphysical online sexual liaison as a bona fide form of infidelity, and it may be just as damaging for the long-term future of the relationship as physical sexual infidelity" (Griffiths, 2001, p. 340).

What about those who do take their online relationships to the next level and meet face to face? According to Dr. David Greenfield (1999) in his book *Virtual Addiction*, "Research figures show that a large percentage of Net users pursue their online contacts in the real world" (p. 104). This may seem innocent to the two people that are involved, but to the rest of the people in their lives, the automatic thoughts are that it will lead to a physical relationship, especially if the meeting has been kept secret from the spouse and family.

As a growing method of communication, the Internet creates a new territory for our society to explore. Much of our society is struggling to understand all the very intricate details of rules, responsibilities, and realities this new medium brings to our lives. Internet infidelity, or cybersex, is an emotional adultery. "Infidelity online is no less harmful than offline, and in some cases it can be worse" (Maheu & Subotnik, 2001, p. xiv). These are emotional affairs that can hurt people. The secrecy is the destroyer of the partnership.

Couples need to establish what the ground rules are when going online and then respect their partner and respect what the rules are. If you are caught having cybersex online or having met your online lover in real life, there is no delete or escape key to push to take it all back. Once the line has been crossed, trust will never be the same.

References

- Brown, E.M. (2001). Patterns of Infidelity and Their Treatment (2nd ed). Philadelphia, Pennsylvania: Brunner-Routledge.
- Cooper, A., Delmonico, D.L., & Burg, R. (2002). Cybersex Users, Abusers and Compulsives: New Findings and Implications, In A. Cooper (Ed.), Cybersex: The Dark Side of the Force (5-29). Philadelphia, Pennsylvania: Brunner-Routledge.
- Greenfield, D.N. (1999). Virtual Addiction. Oakland, California: Harbinger Publications, Inc.
- Griffiths, M. (2001). Sex on the Internet: Observations and Implications for Internet. Sex Addiction. The Journal of Sex Research, 38(4), 333-342.
- Maheu, M.M. & Subotnik, R.B. (2001). Infidelity on the Internet: Virtual Relationships and Real Betrayal. Naperville, Illinois: Sourcebooks, Inc.
- Shaw, J. (1997). "Treatment Rationale for Internet Infidelity," Journal of Sex Education and Therapy, 22(1), 29-34.

The Role of Substance Abuse in the Lives of Survivors of Sexual Abuse

Dorine Douglas-Bey, WSU McNair Scholar

Ruth Hitchcock, Ph.D., Research Mentor

Summary

This research focuses on the harmful effects of sexual abuse and the tendency of survivors to use drugs. Sexual abuse may range from violence such as rape to more hidden abuse such as inappropriate touching by a trusted adult. The effects of sexual abuse may vary depending on the following factors: type and severity, the child's age, the child's personality and temperament, and the child's family and community support (Swan, 1998). In many cases, the abuse may have life-long, devastating effects such as later substance abuse. This project addresses the following issues: (a) the tendency of survivors to later abuse drugs and (b) the need for substance abuse treatment centers to not just treat the addiction but to also treat underlying problems such as sexual abuse. When treating substance abuse, issues such as sexual abuse must be considered since such painful circumstances in an individual's life may be driving the need to abuse drugs. This information is critical to the process of treating survivors of sexual abuse and those individuals who have turned to drugs to alleviate their pain.

According to researchers there are approximately 60 million survivors of childhood sexual abuse in America today (Swan, 1998). Although the impact of the sexual abuse varies depending on many factors, the impact on the emotional well being of survivors cannot be minimized. Early identification and emotional support for sufferers are critical. Researchers have found that those victims who suffer in silence suffer greater psychiatric distress than victims who disclose and receive support and help (Finkelhor & Brown, 1986). All too many victims are suffering in silence.

Victims of sexual abuse may suffer severe psychological trauma such as fear, paranoia, anxiety, depression, sexual guilt, hostility, lack of trust of others, poor self-esteem, flashbacks, post traumatic stress disorder (PTSD), attention and concentration problems, and a tendency towards substance abuse (Matsakis, 1997). In addition to the psychological and emotional abuse, there may be physical abuse involved as well (Farrell, 1998). Perpetrators may kick, stab, pinch, and or beat their victims. Physical abuse may include skull fractures, broken bones, bruises, abrasions, welts, and burns. The atrocity of sexual abuse, regardless of the severity or type, may cause significant harm to the lives of survivors (Matsakis, 1997).

The underlying issues and pain of sexual abuse may create greater vulnerability to abuse drugs (Rohsenow, Coribett, & Devine, 1988). Suffering sexual abuse as a child creates a risk factor for later developing problems with drugs and alcohol. Victims may

use drugs to medicate their emotional pain, escape reality, gain an increased sense of power and control, reduce anxiety, and achieve a false and temporary sense of security (Matsakis, 1997). This initial substance abuse may lead to later addiction.

Failure to address child abuse during substance abuse treatment may increase a greater risk for relapse (Rohsenow, Corbett, & Devine, 1988). If underlying problems driving the drug or alcohol addiction are not treated, the rate of treatment success is extremely poor. When the treatment does not work, victims may feel hopeless and believe that the system has failed them. They may become even further troubled and depressed and may repeat the cycle of substance abuse at a greater rate than they did before treatment.

In conclusion, the impact and harmful effects of sexual abuse on the lives of survivors can cause devastating consequences. Many survivors tend to abuse drugs or alcohol to medicate or alleviate the pain. There is dire need for substance abuse treatment centers to address the underlying problems, not just the addiction. Many times when there is one abuse, the presence of other forms of abuse is evident as well. Sexual abuse can have severe and overwhelming influences on the sexual, emotional, physical, and psychological development of the victims. Failure to address child abuse during substance-abuse treatment may result in relapse, repeated cycles, and extremely poor treatment results.

The pain that may be driving the drug or alcohol addiction must be addressed. If the sexual abuse is acknowledged and adequately treated in addition to the substance abuse, the success rate may be much greater.

There is great hope for survivors of sexual abuse who have later developed an addiction to drugs or alcohol to cope with the pain. There are other ways to deal with emotional pain rather than turning to drugs and alcohol. It is critical that they find the help and support they need to cope with the realities of life.

References

- Fareil, L.R. (1988). Factors that affect a victim's self-disclosure in father-daughter incest; student manuscript winner. *Child Welfare*, 67, 462-8.
- Finkelhor, D. & Browne, A. (1986). Impact of child sexual abuse: A review of research. *Psychological Bulletin*, 99, 66-77.
- Matsakis, A. (1998). *Trust after trauma*. Oakland, CA: New Harbinger Publications, Inc.
- Rohsenow, D. J., Corbett, R., & Devine, D. (1988). Molested as children: A hidden contribution to substance abuse? *Journal of Substance Abuse Treatment*, 5, 13-18.
- Swan, N. (1998). Some child abuse victims are more vulnerable than others to drug abuse. *Child Abuse and Drug Abuse*, 13.

Effects of Labels on General Education Teachers' Responses to Students with Learning Disabilities

Kerry Grosch, *WSU McNair Scholar*

Nancy McKellar, *Ph.D., Research Mentor*

Summary

More than 6.5 million students with disabilities received special education services nationwide during the 1999-2000 school year. According to the National Center for Education Statistics (2002), this is nearly double the number of students served during the 1978-1977 school year and about 11 percent of the total public school population. This sector of the student population continues to rise. Eligibility for special education requires that a student have a disability that meets the criteria for one of 13 categories recognized for federally funded services, and that the student demonstrates need (Knoblauch & Sorenson, 1998). The disability label follows a student from one grade to the next, and from one school to another, entitling the student to services, and helping others who work with the student to better understand his or her learning difficulties (Hallahan & Kauffman, 2000).

However, that label, in a sense, also opens a Pandora's box, potentially aligning the student with an assortment of negative connotations that frequently are attached to the very label designed to prevent school failure (Hallahan & Kauffman, 2000). Even prior to meeting a student with an exceptionality, teachers may form attitudes based on preconceived notions of the label. A student may be viewed on the basis of his or her disability, rather than as a person who also happens to have a disability (Hallahan & Kauffman, 2000; Weinstein, Madison, & Kuklinski, 1995). General education teachers report lower expectations of students labeled as disabled, describing them as less motivated to learn, less likely to graduate from high school, and less successful in future interpersonal relations and work as adults (Carroll & Rappucci, 1978; Fox & Stinnett, 1999). In some studies, general education teachers also have demonstrated less willingness to work with these students (Carroll & Rappucci, 1978; Gillung & Rucker, 1977; Taylor, Smiley, & Ziegler, 1983), and this attitude may worsen with teaching experience, depending on the nature of the disability (Soodak, Podell, & Lehman, 1998). Soodak and colleagues found this to be particularly true with students identified as learning disabled, the most commonly identified disability.

About half of all students with disabilities receive the bulk of their services within the general education classroom, where they remain with non-disabled peers for 80 percent or more of their school day, under the instruction of a general education teacher (National Center for Education Statistics, 2002). Inclusion is increasingly common in special education practice, in part because it allows students with exceptional needs to feel a sense of belonging and to participate more

fully in classroom activities (Halvorsen & Sailor, 1990). Inclusion also helps create a classroom environment that is more reflective of a diverse society, and students may be more likely to accept, respect, and support each other, regardless of diversity, with more sustained interaction (Bradley, King-Sears, & Tessier-Switlick, 1997). Federal law requires that students be in the least restrictive environment, which means an inclusive setting, unless their individual needs require otherwise (Knoblauch & Sorenson, 1998; Lipsky, 2003). A final report to the President's Commission on Excellence in Special Education phrased it this way: "Children placed in special education are general education children first" (2002, Finding 3 section, ¶1).

Historically, the notion of placing a student with a disability in a least restrictive environment has been received with mixed sentiments by general education teachers, particularly when it involves full-time inclusion (Hallahan & Kauffman, 2000; Mastropieri & Scruggs, 1997). Realistically, inclusion means that general education teachers make accommodations and adapt their instructional practices, and special education teachers serve as consultants (Bradley, King-Sears, & Tessler-Switlick, 1997). However, only about one in four regular education teachers note they have adequate time, training, and resources to meet these students' academic needs, and many are highly reluctant to make "substantial changes in their classroom routines to accommodate students with disabilities" (Mastropieri & Scruggs, 1997, Teacher Attitudes toward Inclusion section, ¶1). Teachers express sentiments of being frustrated and overwhelmed by demands on them to be a "Jack of all trades" to every student, exceptional or otherwise, in today's increasingly diverse classroom. This particularly may be the case in a high stakes era of results-based accountability, with public reporting of assessment scores and potential loss of federal funding for schools in which students do not appear to academically measure up.

Using a descriptive scenario and modified Bender Classroom Structure Questionnaire (Bender, 1992; Bender, Vail, & Scott, 1995; deBettencourt, 1999), this study measured general education (K-9) teachers' confidence in their teaching skills and willingness to make accommodations and to expend extra time in instruction of a student described as experiencing academic-related difficulties indicative of a learning disability (LD). Sixty-four teachers from graduate courses and professional development workshops in Kansas were randomly assigned to one of two conditions, distinguished by the presence or absence of a statement that the student had been identified as learning disabled. The hypothesis was that general education teachers would report less confidence in their teaching skills and less willingness to make changes or to expend extra time in instruction of the student identified as learning disabled, versus the same student without the LD label.

After reading a one-page description of "Kelly," teachers rated their agreement on a five-point Likert-scale to five questions related to personal confidence and willingness to teach Kelly. The higher the rating, the more in agreement the participant was to the statements, such as "I have sufficient training to teach Kelly." The

participants in this study were willing and confident about teaching Kelly. The overall mean rating for all participants was 19.22 (SD = 2.98) out of a possible 25. The mean for the No-Label group was 19.06 (SD = 2.85). Comparatively, the mean for the Label group was 19.38 (SD = 3.15). There was not a significant difference in ratings between the two groups, $F(1,62) = .17, p = .68$.

Thirteen statements on the questionnaire addressed individualizing instructions, such as "I would try to determine how Kelly learns best." The mean rating for these questionnaire items was 51.64 (SD = 5.34) out of a possible 65. For the No-Label group, the mean for this section was 52.41 (SD = 5.61), while the mean for the Label group was 50.88 (SD = 5.03). There was not a significant difference between the two groups in their endorsement of individualized instruction statements, $F(1,62) = 1.32, p = .26$.

The questionnaire included 11 statements related to metacognition, such as: "I would encourage other students to share various techniques that may help Kelly memorize facts in class." Out of a possible rating score of 55, the overall mean for these items was 42.61 (SD = 4.91). Although the No-Label participants ($M = 43.50, SD = 4.63$) endorsed the metacognition strategies more strongly than did the Label participants ($M = 41.72, SD = 5.09$), the difference between the two groups was not significant, $F(1,62) = 2.14, p = .15$.

Four additional statements were added to the questionnaire based on findings in other research, such as "I would try to have Kelly placed in a pull-out program as soon as possible." A higher rating score in this section would indicate problems with having the fictitious student in the respondent's classroom. The overall mean for this category was 10.39 (SD = 2.61) out of a possible rating of 20. The mean for the No-Label group was 10.69 (SD = 2.57), and the mean for the Label group was 10.09 (SD = 2.66). As with the other comparisons, there was no significant difference in ratings between the two groups, $F(1,62) = .83, p = .37$.

Participants in this study were asked to report endorsement of an assortment of instructional and metacognitive training strategies to teach a student who clearly demonstrated having exceptional needs, but who may or may not have been officially recognized as learning disabled. The label was not a significant factor in determining their responses to the student's needs. The teachers' perceptions of the student's needs appeared to matter more than the label.

References

- Bradley, D.F., King-Sears, M.E., & Tessier-Switlick, D.M. (1997). *Teaching students in inclusive settings: From theory to practice*. Boston: Allyn and Bacon.
- Carroll, C.F., & Reppucci, N.D. (1978). Meanings that professionals attach to labels for children. *Journal of Consulting and Clinical Psychology, 46*, 372-374.
- deBettencourt, L.U. (1999). General educators' attitudes toward students with mild disabilities and their use of instructional strategies: Implications for training. *Remedial and Special Education, 20*, 27-35.
- Fox, J.D., & Stinnett, T.A. (1996). The effects of labeling bias on prognostic outlook for children as a function of diagnostic label and profession. *Psychology in the Schools, 33*, 143-152.
- Gillung, T.B., & Rucker, C.N. (1977). Labels and teacher expectations. *Exceptional Children, 43*, 464-465.
- Halvorsen, A.T., & Sailor, W. (1990). Integration of students with severe and profound disabilities: A review of research. In R. Gaylord-Ross (Ed.), *Issues and research in special education* (pp. 110-172) New York: Teachers College Press.
- Hallahan, D.P., & Kauffman, J.M. (2000). *Exceptional learners: Introduction to special education* (8th ed.). Needham Heights, MA: Pearson Education Company.
- Knoblauch, B., & Sorenson, B. (1998). *IDEA's definition of disabilities*. Arlington, VA: ERIC Clearinghouse on Disabilities and Gifted Education (Eric Document Reproduction Service No. EC E560). Retrieved July 13, 2003, from <http://ericed.org/digests/e560.html>
- Lipsky, D.K. (2003). The co-existence of high standards and inclusion. *School Administrator, 60*, 32-35.
- Mastropieri, M.A., & Scruggs, T.E. (1997). What's special about special education? A cautious view toward full inclusion [Electronic version]. *The Educational Forum, 61*, 206-211.
- National Center for Education Statistics. *Contexts of elementary and secondary education*. Retrieved June 21, 2003, from http://nces.ed.gov/programs/coe/2002/section4/tables/t28_1.asp (2002).
- National Research Council. (1999). *High stakes testing for tracking, promotion, and graduation*. Washington, D.C.: National Academy Press.
- President's Commission on Excellence in Special Education. (2002). *Executive summary*. Retrieved July 12, 2003 from <http://www.ed.gov/inits/commissionsboards/whspecialeducation/reports/summ.html>
- Soodak, L.C., Podell, D.M., & Lehman, L.R. (1998). Teacher, student, and school attributes as predictors of teachers' responses to inclusion. *The Journal of Special Education, 31*, 480-497.
- Taylor, R.L., Smiley, L.R., & Ziegler, E.W. (1983). The effects of labels and assigned attributes on teacher perceptions of academic and social behavior. *Education and Training for the Mentally Retarded, 18*, 45-51.
- Weinstein, R.S., Madison, S.M., & Kuklinski, M.R. (1995). Raising expectations in schooling: Obstacles and opportunities for change. *American Educational Research Journal, 32*, 121-152.

The Black Religious Experience

Pamaline King-Burns, *WSU McNair Scholar*

Anna Chandler, Ed.D., *Research Mentor*

Summary

Religion addresses the very foundation of a people's sacred set of values. In order to address concerns of African Americans, one should study religion from the black person's experiences and perspectives. Black religion is a significant aspect of American spirituality, and to exclude it arbitrarily from the normative study of religion in America runs the risk of seriously distorting the picture of what American religion is like (Lincoln & Mamiya, 1990). American sentiment traditionally has promoted the idea that the only relevant spiritual institutions were the mainstream white churches. Anything outside of this domain seemed to be of little or no significance. Even in today's society, the misconception that the African American's (black's) religious experience was nothing more than a replication of the European American's (white's) religious experience is widespread.

According to Lincoln & Mamiya, there are seven major historic black denominations in America: the African Methodist Episcopal (A.M.E.) Church; the African Methodist Episcopal Zion (A.M.E.Z.) Church; the Christian Methodist Episcopal (C.M.E.); the National Baptist Convention, USA, Incorporated (NBC); the National Baptist Convention of America, Unincorporated (NBCA); the Progressive National Baptist Convention (PNBC); and the Church of God in Christ (COGIC). These seven major black denominations account for more than 80 percent of black religious affiliation in the United States. The other remaining 15-20 percent is scattered among various small black sects, the Roman Catholic Church, and the mainline white Protestant denominations.

This review of literature has shown that these independent, historic and black-controlled denominations have made significant contributions, not only to this country, but also to the state of Kansas. Because of the contradictory nature of the existence of black people in this nation, steps towards self-actualization and self-reliance were necessary for the survival of the African American. Black clergy heard the cries of an oppressed people and responded with such things as the benevolent aid societies like the Free African Society and the Black Masons and churches such as the African Methodist Episcopal Church. In these churches and benevolent aid societies, blacks were taught to read and write and to become independent and self-reliant. By continuing to support Black Institutions of Higher Learning, nursing homes, apartment complexes, and black businesses, a strong tradition exists today within and between these institutions and the original purpose of

the African Methodist Episcopal Church (A.M.E.). Not only is the A.M.E. church alive and well in Kansas, but also in many cities in these United States and throughout Africa, South America, and around the world. The impact of the A.M.E. churches cannot be denied, as W.E.B. DuBois, Methodist member, so eloquently stated in *The Gift of Black Folk* (1924):

"...above and beyond all that we have mentioned, perhaps least tangible, but just as true, is the peculiar spiritual quality which the Negro has injected into American life and civilization. It is hard to define and characterize it – a certain spiritual joyousness, a sensuous, tropical love of life in vivid contrast to the cool and cautious New England reason; a slow and dreamful conception of the universe, a drawing and slurring of speech, an intense sensitiveness to spiritual values – all of these things and other like to them, tell of the imprint of Africa on Europe in America. There is no gainsaying or explaining away this tremendous influence of the contact of the north and south, of black and white, of Anglo-Saxon and Negro."

References

- Du Bois, W.E.B. (1903). *The Souls of Black Folk*. Phoenix Publishing Corp.
- Lincoln, C. Eric and Lawrence H. Mamiya. (1990) *The Black Church in the African American Experience*. Duke University Press.

Optimal Tumor Prevention by Wheat Bran

Vanessa A. Melendez, WSU McNair Scholar

John Carter, Ph.D., Research Mentor

Summary

The human body contains an organ called the colon. It is part of the large intestine, which is part of the digestive system. It is responsible for, in essence, turning what would be diarrhea into solid feces. It absorbs water as the stool passes through it (Ross, 1982).

Unfortunately, the colon is not immune to diseases, like cancer. While hereditary factors play a big role in one's risk of developing colon cancer, so do lifestyle factors. Diet and exercise are major components that can determine with a great deal of accuracy one's likelihood of developing this silent killer. If diet plays such a big role, can it prevent colon cancer? Absolutely.

Cancer researchers estimate that 70 percent of colon cancer cases can be prevented by diet alone (Willett, 2002). What foods can prevent colon cancer? Our research focused on wheat because it is a food that is high in antioxidants. Since foods that are high in antioxidants have been shown to reduce the risk of colon cancer (Takemoto & Klopfenstein, 2001), we hypothesized that wheat would also reduce the risk of colon cancer.

The purpose of this study was to aid in the prevention of colon cancer.

Previous studies have found that wheat reduced the number and size of tumors in mice (Earnest, Einspahr, & Albert, 1999). Another study looked at wheat versus oat bran and found wheat to have a greater effect on the reduction in size and the number of tumors in mice (Reddy, 1989). These studies confirm that diet is directly related to colon cancer risk.

How exactly is wheat able to do that? Think of wheat as a warrior. The body is under constant attack by damaging, toxic molecules called free radicals. Once free radicals get to the cells, DNA is damaged. Cancer is nothing but a mutation of genes. Wheat is capable of stopping free radicals in their tracks by neutralizing them. Thus, the chances of getting colon cancer greatly decrease (Antioxidants, 2002).

Our previous study looked at five different wheat varieties to determine their effect on the number and size of tumors in the colon. Mice were fed their diets for 10 weeks, and then data were collected. Our analysis showed that the more antioxidants the wheat had, the fewer tumors the mice had and the smaller they were. In this study, we chose one of the wheat varieties from our previous study called Ike wheat. It is among the highest-antioxidant wheat grown in Kansas.

The purpose of this study was to determine the minimum amount of wheat needed in the diet to significantly reduce the number and size of tumors. The strain of mice we used was called MIN mice, chosen because they are born with the gene that leads to colon cancer. The mice were divided into groups and fed five different concentrations of Ike Wheat, ranging from 5-45 percent of their diet for 10 weeks. The remaining portion of their diets consisted of a rodent diet. Upon completion of their diet period, data were collected and analyzed. From that, we determined that only a minimum of 5 percent wheat in their diet produced significant results.

This study supported our hypothesis. Future studies will look at the effect of wheat on breast cancer, and then we will do a clinical study using human subjects. The ultimate goal is to get wheat into more food products, thus increasing the intake of wheat in the diet. In this way, chances of getting colon cancer can be decreased.

References

- Antioxidants (2002). NutritionalSupplements.net. [Online available] <http://www.nutritionalsupplements.net/antioxidants.htm>
- Earnest, D.L., Einspahr, J.G., & Albert, D.S. (1999). Proactive role of wheat bran fiber: Data from marker trials. *The American Journal of Medicine*, *106*, 32s-36s.
- Reddy, B.S. (1989). The effects of dietary fiber on colonic bacterial enzymes and bile acid in relation to colon cancer. *Gastroenterology*, *102*, 1475-1482.
- Ross, Gordon. (1982). *Essentials of Human Physiology*. 2nd ed. Chicago: Yearbook Medical Publishers, Inc.
- Takemoto, Dolores & Klopfenstein, Carol. (2001). Cancer protective effects of wheat with different antioxidant potentials. *Kansas Wheat Commission*. [Online available] <http://www.kswheat.com/research/2001KSURsearch/Proposals/cancer.htm>
- Willett, Walter C. (2002). Balancing life-style and genomics research for disease prevention. *Science*, *296*, 695-698.

The Roles of Vision and Proprioception in Accuracy of Reaching Movements

Michelle Munevar, *WSU McNair Scholar*

Daniel S. McConnell, Ph.D., *Research Mentor*

Summary

Past research indicates the importance of visual and proprioceptive information for the accuracy of reaching movements. Optimal integration of both the visual and proprioceptive information about hand position leads to accurate hand localization (Van Beers, Wolpert, & Haggard, 2002), which is necessary for accurate reaching movements (Bingham, Zaal, Robin & Shull). According to the Optimal Integration hypothesis, visual and proprioceptive information are variably weighed in relation to their relative precision. This varies across the workspace. One example is that there can exist a location where visual information is accurate, yet proprioceptive information is distorted. Overall, this hypothesis predicts that both the visual and proprioceptive weights are dynamically changing as the hand moves through the workspace, resulting in a continually accurate perception of hand localization.

In the current study, we tested the validity of this prediction that the hand is always localized accurately across the workspace. To give the participant the opportunity to use both visual and proprioceptive information, we used a virtual reality setting. The participant wears a head-mounted display, where they see a virtual cube that is representative of their fingertip. On their fingertip, they wear a sensor that gives signal to a motion tracker that measures where the finger is in the workspace. The workspace in this experiment consisted of a tabletop with nine locations on a 3 X 3 grid configuration. Participants were presented a virtual fingertip in a different location than the actual fingertip. We used offsets in the experiment that were 0 (no offset), 2, 3, 4 and 5 cm, either to the left, right, near or far.

We found that the detectability of the offset was not as high as expected, which means that distortions on visual and proprioceptive information were too large for both to be optimally integrated. Interestingly, results showed that visual information was used more in some specific areas of the workspace where proprioceptive information was used less, and vice versa. Errors varied across the workspace, which does not necessarily indicate a lack of optimal integration of visual and proprioceptive information. It means that the information might have been weighed incorrectly. We found that the participants were able to detect left/right offsets easier than near/far offsets. More specifically, near was more detectable at the closest row of locations, while far was more detectable at the farthest two rows of

locations. An interpretation for these findings is that an over-estimation occurred for the felt hand position up close. However, underestimation occurred for the felt hand position at far distances. For left/right offsets, the left offsets were more detectable at the left-most column of locations. Conversely, the right offsets were more detectable at the right-most column of locations. Both left and right offsets were equally detectable at the middle column. An interpretation for these findings is that there was an inward left/right compression of the haptic perceptual space. In other words, the responses of the felt hand position seemed to shift toward the middle.

In conclusion, our findings were not consistent with the idea of optimal integration (Van Beers, Wolpert, & Happart, 2002). Basically, our participants clearly did not have a good idea of where their hand location was; therefore, we can conclude that the combined visual-proprioceptive hand information is still distorted. Also, the size of these distortions varies depending where your hand is in the workplace. Therefore, visual and proprioceptive information must be combined in a way that will cancel out these distortions to allow accurate reaching movements.

References

- Bingham, G.P., Zaal, F.T.J.M., Robin, D. & Shull, J.A. (2000). Distortions in definite distance and shape perception as measured by reaching without and with haptic feedback. *Journal of Experimental Psychology: Human Perception and Performance*, *26*(4), 1436-1460.
- Van Bees, R. J., Wolpert, D. M. & Haggard, P. (2002). When feeling is more important than seeing in a sensorimotor adaptation. *Current Biology*, *12*, 834-837.

Conflict in Jerusalem

Errick Robles, WSU McNair Scholar

Robert D. Lindsted, Ph.D., Research Mentor

Summary

This research discusses the controversy between the Israelis and the Arabs over the sacred city of Jerusalem. This city is the most holy site for Judaism and the second and third most holy site for Islam, because revered places of worship—the Al-Aqsa mosque and the Dome of the Rock—are there. Israelis and Arabs see Jerusalem as their capital city, the area that was promised to the descendants of the patriarch Abraham. The Bible and the Koran provide views on why each group has rights to the sacred site of Jerusalem. The ongoing issues regarding the occupation of this section of land are key to the lack of peace in the Middle East. Recently, the jihad-wars, beginning around the seventh century and lasting approximately one thousand years, have again erupted in the Middle East and will pose many problems for the future of the world unless a peace agreement is reached. This research is critical for better understanding of the cultural background of both groups of people and each point of view. In order to gain greater understanding, we must grow in our knowledge of the conflict.

The following are some of the reasons that make this site holy to each group of people. First, Jerusalem is holy to the Jews because the temple was built at the site where Abraham was to sacrifice his son Isaac. Later, this temple was destroyed and rebuilt. The Western Wall, otherwise known as the Wailing Wall, is a surviving remnant of the outer enclosure of the Second Temple. The Jews also believe that Jerusalem is the site of the events that will take place on the Day of Judgment. Second, the Muslims believe it is holy because, in the early years of Islam, Muslims prayed toward Jerusalem just as they now pray toward Mecca. Muslims also believe that Muhammad ascended to heaven from the stone now enclosed by the Dome of the Rock. The Al-Aqsa Mosque is the second holiest mosque in the Muslim world. Additionally, both groups of people see Jerusalem as the area promised to the descendants of the patriarch Abraham. God promised Abraham that he would bless his descendants, and they would be as the sands of the sea. Both the Jews and the Muslims trace their roots back to Abraham, for Abraham was father to Isaac and Ishmael. The Jews claim Isaac as the chosen descendent, while the Muslims claim Ishmael.

The question arises, who inherits the promise of the occupation of this land? It is still debated to whom the land was originally promised. The Muslims believe that Jerusalem was given to them. The passage they refer to when making this claim is, 'What about

my offspring?' asked Abraham. 'My pledge,' said Allah, 'will not apply to the evil doers.' (Koran, Al-Baqarah, Section 15). The Jews believe it was promised to them by the passage in the Old Testament book of Genesis 17:20-21, where it states, "And as for Ishmael, I have heard thee: [. . .] and I will make him a great nation. But my covenant will I establish with Isaac [. . .]."

According to some the followers of the prophet Muhammad, Ishmael was the chosen son for whom this controversial territory was offered (Ghounem & Rahman, 2003). Kedar is a descendant of Ishmael, according to Genesis 25:13, and Ishmael is the base for the family tree of the prophet Muhammad. Some Muslims believe that the scribes deliberately swapped names to make Ishmael an illegitimate son. Furthermore, some believe that it was Ishmael who was to be sacrificed, and the covenant was first offered to Ishmael. Using various biblical verses relating to Abraham's age, these individuals deduce that the passage, "By faith Abraham, when he was tried, offered up Isaac: and he that received the promises offered up his only begotten son," found in Hebrews 11:17, refers to Ishmael and not Isaac. One Muslim states, "Isaac was not the only son, as a matter of fact, Issac was not even born yet and Abraham's only begotten son was Ishmael" (Ghounem).

On the other hand, many of the Jewish faith propose that Ishmael is not a legitimate son of Abraham and, therefore, his other son Isaac must be the one to whom the covenant was issued. As support, they cite the biblical covenant God made with Abraham nearly 4,000 years ago known as the Abrahamic Covenant, which is contained in Genesis 12:1-3: "Now the Lord said to Abram, 'Go forth from your country, and from your relatives and from your father's house to the land which I will show you; and I will make you a great nation, and I will bless you, and make your name great; and so you shall be a blessing; and I will bless those who bless you, and the one who curses you I will curse. And in you all the families of the earth shall be blessed.'" These individuals believe that this covenant was confirmed to all the descendants of Abraham beginning with his son Isaac and his son Jacob. These people also refute the Muslims' claim to Jerusalem by asserting that the Qur'an never mentions Jerusalem as a holy city, while it appears in the Hebrew Scriptures more than 660 times.

There have been many significant victories and struggles for the land of Israel. On May 14, 1948, Israel declared its independence and since then there have been many uprisings by their neighbors who thought the land was theirs. The day following the declaration of Israel's independence, five Arab neighbors invaded them. By the end of this war, Israel had increased its territory by 50 percent over the 1947 United Nations partition plan. Israel's military has prevailed and occupied territory previously controlled by its attackers. There have been three wars since Israel established independence. The first was the Sinai Campaign on October 29 to November 5, 1956. The next was the Six-Day War in

June of 1967. The last one was the Yom Kippur War that occurred October 6 through October 24, 1973. Since the 1967 Six-Day War, the number of settlers has increased from less than 500 to over 203,000 by the year 2000. This is a direct fulfillment of what the Bible said would occur (Soutar).

The crisis involving this land has frequently been dealt with from a political standpoint, but the reasons for battle also stem from religious differences. As the descendants of Isaac received a covenant and promises that were to be fulfilled, so did the descendants of Ishmael. In Genesis 16:10 and 17:20 it states that the descendants of Ishmael will be multiplied exceedingly. They will also become a great nation, according to Genesis 17:20. They will even be given all of the land east of Canaan, Genesis 16:12. All of these promises, though given thousands of years ago, have since come to pass with amazing accuracy. Right now there are more than 200 million Arabs on the earth. They occupy a great nation, which is made up of 21 states. Their territory covers a large area of 5.3 million square miles of oil rich land. There is only one Jewish State that has a population of more than 6 million people and they are confined to an 8,000 square mile area.

There will always be fighting over this land unless Israel decides to vacate the West Bank, Gaza and East Jerusalem, which is technically in violation of the promise made under the Oslo agreement to cease from inhabiting these territories. Unless Israel permits the Palestinians to have a small state of their own, no reconciliation can be made between the two groups (Christison). From "Religion and World Peace: A Muslim's View," the wife of previous Egyptian President Anwar Sadat states, "Islam is a religion based upon peace, love, and compassion. It abhors violence and killing; upholding the sanctity of life is an obligation of all Muslims." Many Americans and Europeans wince when they hear the word "Islam" as they imagine terrorists waging jihad throughout the world, and she states, "I can excuse the feeling because, unfortunately, some of the fundamentalists and some others give such a bad image of Islam" (Tanenbaum).

The main purpose of exploring Muslim and Jewish beliefs within the context of the holy land is to eventually obtain peace in the Middle East. If people are more informed about what kinds of issues those in the Middle East deal with on a daily basis and the history behind these issues, the reason there is constant fighting will be better understood, and consequently, the means for peace may be discovered.

References

- Christison, Kathleen. "Can Coexistence Exist in the Promised Land?," The Washington Spectator 1, Vol. 28, No. 3. (February 2002).
- Holy Bible (King James Version).
- Holy Qur'an.
- Ghounem, M., and Rahman, A. "Isaac or Ishmael to be Sacrificed?," (4 January 2003).
<http://www.geocities.com/Athens/4229/isaac.html>.
- Reagan, Dr. David R. "The Middle East Crisis in Biblical Perspective." pg.(3-10) The Lamplighter (July-August 2002).
- Soutar, Paul. "Israel and Palestine," The Wichita Eagle (16 April 2002).
- Tanenbaum Memorial Lecture. "Religion and World Peace: A Muslim's View," Print Summer 1997 v34 n3 p456 (5). Journal of Ecumenical Studies. Info Trac Web: Expanded Academic ASAP. 18 April, 1996 Lecture.

Kansas Advisors' View of Resiliency

Salyi Vu, WSU McNair Scholar

Marlene Schommer-Aikins, Ph.D., Research Mentor

Summary

Almost forty years of research has been done in an attempt to decrease drop out rates and improve student retention across the nation (Astin, 1975; Hansmeier, 1965). The national drop out rate in 2001 for Ph.D.-granting universities is approximately 30 percent (Brann, 2002). Tuition revenue lost per student who drops out of college in Kansas is at least \$14,400 (Robbins, 2000). Additionally, institutional financial aid and other campus-related businesses are negatively affected by loss of student body. Drop outs who still carry the frustrations and negative self-perceptions of themselves for several semesters after their return to college may also continue to struggle as returning adults.

Why are some students able to persist and overcome obstacles to graduate while others are not? Their ability to overcome these obstacles and graduate is called resiliency. According to Webster's II Riverside Dictionary (1984), resiliency is the "ability to recover rapidly, as from misfortune" as well as to "regain [one's] original shape after being bent, stretched, or compressed" (p. 595). Past research has often focused on the negative reasons for students' inability to be resilient. On the other hand, Gitterman argues that "by emphasizing the deficits and negative aspects of [an] individual, ... we have given insufficient attention to other dimensions of the human experience such as resourcefulness, courage, coping, and recovery" (2001, p. 22). Hence, this study is the third of its kind in attempting to develop a better understanding of the resiliency of Kansas college students.

This is the second study involving the proposed group broadly known as Kansas advisors. The sample surveyed in Fall 2002 were attendees of the Kansas Academic Advising Network's 2002 Conference held at Hutchinson Community College in Kansas. Responses from the Spring 2002 study—which consisted primarily of Wichita State University (WSU) advisors—was combined with those most recently surveyed for this study. The total number of participants in this study were 51 employed members (18 men and 33 women) whose responsibilities at some time included academic advising—or activities relating to enhancing or encouraging student retention—in college in the state of Kansas. Surveyed participants' perspectives on the resiliency of college students at their respective institutions were measured using both the Advisors' Perspective on Resiliency of WSU Students Questionnaire and Advisors' Perspectives on Resiliency of Students Questionnaire (Vu, 2002).

Both questionnaires were identical in nature. The only items changed included a section for participants to include the names of their institutions. The questionnaires comprised four sections. The first section assessed participants' professional background at their institutions, including their advising responsibilities, any other institutionally professional responsibilities, their total number of years in the academic field, and the total number of years of advising at their institution. The second section assessed participants' epistemological beliefs or beliefs about the nature of knowledge and learning using a 32-item questionnaire developed from a longer questionnaire used for the last 13 years (Schommer, 1990). Participants' beliefs in the certainty and structure of knowledge as well as their beliefs in the speed and ability of learning were assessed with this questionnaire using the Likert Scale from 1 to 5 (1=strongly disagree; 5=strongly agree). The third section assessed participants' degree of agreement to perceived factors affecting resiliency. This section initially began with the statement: "Students are more likely to be resilient if...". The remainder of the section consisted of 27 sentence fragments—derived from responses to Spring 2001's pilot study—that could complete the statement. Participants were asked to respond on a Likert Scale from 1 to 5 as to how much they agreed that each sentence fragment would complete the initial statement. The last section asked participants to name the top three reasons, from the 27 resiliency items listed, why they believe students at their institutions are resilient.

Data derived from this study were analyzed using the SPSS program to generate frequencies and means. The initial focus was on the top five reasons all participants believe students are resilient. The top five perceived reasons for resiliency are as follows: (a) students "have positive perceptions of themselves—believe that they can do it" (45 percent); (b) students "have a good social support system" (31 percent); (c) students "believe that they can overcome any barriers they encounter" (30 percent); (d) "college is a priority for them" (30 percent), and (e) students "understand the connection between their education and future employment" (28 percent). The secondary focus compared responses between WSU advisors and other Kansas advisors. WSU's top five contained four of the top five for the total group studied. WSU's resiliency items ranked one and two were identical to the ranking of the total group. Other Kansas advisors' top five reasons perceived for resiliency consisted of all five top reasons for the total group but in differing order. In comparison, other Kansas advisors believe that having a strong social support system is more important than students' positive self-perceptions.

In the past, researchers have often looked at retention from a negative point of view. Tinto (1975) used entrance exam scores to predict student failure/drop out. Hansmeier (1965) and Wishart (1990) noted that there was a negative relationship between

students' past grade point averages and their success after readmission. In contrast, this three-year study attempted to find resilient characteristics in Kansas college students to further encourage and increase student resiliency. This study takes a positive approach toward the study of retention. As written by Martin Krovetz (1999), "[the] problem focus model offers little help to educational and community leaders who would prefer a more proactive position...based on building capacities, skills, and assets—building resiliency" (p. 6). According to the 51 Kansas advisors surveyed, an important characteristic of resilient students is their personal view that they can be successful in college. Additionally, Kansas advisors support Shield's finding that having a good social support system seems to also be a dominant characteristic of resiliency (1994). Although it has been noted that all 13 respondents whose job titles were identified as academic advisors, secretarial/clerical staff, or coordinators/counselors at WSU had strongly agreed with the resiliency item regarding students' positive self-perceptions, only 82 percent strongly agreed in the overall group in this study. It has also been noted that Kansas advisors do not strongly believe that the speed of learning is quick, nor is knowledge fixed. Thus, it is believed that students who have similar beliefs may be more likely to persist in learning difficult tasks (Dweck & Leggett, 1988).

These findings should be considered cautiously because they were based solely on responses received from volunteers who at some time have been employed in an advising or retention capacity. It must not be forgotten that these perceived resiliency factors are based on opinions. Therefore, causal claims cannot be made on the findings of this research.

Future analyses will look at the relationship between epistemological beliefs and perceived reasons for resiliency between WSU and other advisors in Kansas. It is hoped that future research will be conducted in which returning adults are surveyed so that their opinions on resiliency can also be compared with views of advisors.

References

- Astin, A. W. (1975). *Preventing Students from Dropping Out*. San Francisco: Jossey-Bass.
- Brann, C. (2002). Overview of ACT. Presentation at the Wichita State University. ACT Presentation/Training, Wichita.
- Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological review*, 95, 256-273.
- Gitterman, A. Vulnerability, resiliency, and social work with groups. In T. B. Kelly, (2001). In T. Berman-Rossi, & S. Palombo (Eds.), *Group Work: Strategies for Strengthening Resiliency*, 19-33. New York: Haworth Press.
- Hansmeier, T. W. (1965). Factors related to success of college students academically dismissed. *College and Univeristy*, 40 (1), 194-202.
- Krovetz, M. L. (1999). Fostering Resiliency: Expecting All Students to Use Their Minds and Hearts Well. Thousand Oaks: Corwin Press.
- Robbins, R., PhD. (Washburn University). PowerPoint presentation at the 2000 KAAAN Meeting at Fort Hayes State University, Manhattan.
- Schommer, M. (1990). Effects of beliefs about the nature of knowledge on comprehension. *Journal of Educational Psychology*, 82 (3), 498-504.
- Shields, N. (1994). Retention, academic success, progress among adult, returning students: a comparison of the effects of institutional and external factors. *NACADA Journal*, 14 (1), 13-24.
- Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. *Review of Educational Research*, 45, 89-125.
- Vu, S., & Schommer-Aikins, M. (2002, July). A Closer Look at Advisors' Perspectives on Resiliency. Paper presented at Wichita State University's 8th Annual Closing Symposium, Wichita.
- Webster's II New Riverside Dictionary. (1984). New York: Houghton Mifflin Company, 595.
- Wishart, M. E. (1990). Making rational reinstatement decisions. *NACADA Journal*, 10 (1), 18-21.

The McNair Scholars Program is 100% federally funded.

1999-2000	\$207,599	2001-2002	\$222,482
2000-2001	\$221,827	2002-2003	\$245,336



Notice of Nondiscrimination: Wichita State University does not discriminate on the basis of race, religion, color, national origin, gender, age, marital status, sexual orientation, status as a Vietnam-era veteran, or disability. Any person having inquiries concerning this may contact the Office of Equal Employment Opportunity, Wichita State University, 1845 Fairmount, Wichita, Kansas 67260-0145, (316) 978-3001.

