

OVERCOMING THE OBSTACLES: LIFE STORIES OF SCIENTISTS WITH
LEARNING DISABILITIES

A Dissertation

by

CRISTA MARIE FORCE

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 2007

Major Subject: Curriculum and Instruction

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ABSTRACT

Overcoming the Obstacles: Life Stories of Scientists

with Learning Disabilities. (August 2007).

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Chair of Advisory Committee: Dr. Carol Stuessy

Scientific discovery is at the heart of solving many of the problems facing contemporary society. Scientists are retiring at rates that exceed the numbers of new scientists. Unfortunately, scientific careers still appear to be outside the reach of most individuals with learning disabilities. The purpose of this research was to better understand the methods by which successful learning disabled scientists have overcome the barriers and challenges associated with their learning disabilities in their preparation and performance as scientists. This narrative inquiry involved the researcher writing the life stories of four scientists.

These life stories were generated from extensive interviews in which each of the scientists recounted their life histories. The researcher used narrative analysis to “make sense” of these learning disabled scientists’ life stories. The narrative analysis required the researcher to identify and describe emergent themes characterizing each scientist’s life. A cross-case analysis was then performed to uncover commonalities and differences in the lives of these four individuals. Results of the cross-case analysis revealed that all four scientists had a passion for science that emerged at an early age, which, with strong

drive and determination, drove these individuals to succeed in spite of the many obstacles arising from their learning disabilities. The analysis also revealed that these scientists chose careers based on their strengths; they actively sought mentors to guide them in their preparation as scientists; and they developed coping techniques to overcome difficulties and succeed. The cross-case analysis also revealed differences in the degree to which each scientist accepted his or her learning disability. While some demonstrated inferior feelings about their successes as scientists, still other individuals revealed feelings of having superior abilities in areas such as visualization and working with people. These individuals revealed beliefs that they developed these special abilities as a result of their learning differences, which made them better than their non-learning disabled peers in certain areas. Finally, the researcher discusses implications of these findings in the light of special accommodations that can be made by teachers, school counselors, and parents to encourage learning disabled children who demonstrate interest in becoming scientists.

DEDICATION

This dissertation is dedicated to my Great Grandmother: Emma Amelia Phillips

You were always there encouraging and loving me. You are my hero and I strive to be a

Godly Woman as you exemplified every day of your life.

ACKNOWLEDGMENTS

As I look on this process it has been a long and winding path. The first acknowledgment I want to make is to My Lord and Personal Savior; Jesus. Without Him I could do nothing. From here the list is long, but I do want to thank those without whom I could have not completed this dissertation. Their support was invaluable.

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TABLE OF CONTENTS

	Page
ABSTRACT	iii
DEDICATION.....	v
ACKNOWLEDGMENTS.....	vi
TABLE OF CONTENTS.....	viii
INTRODUCTION	1
Statement of the Problem	2
Purpose of the Research	2
REVIEW OF THE LITERATURE	4
Definition of Learning Disabilities	4
Predictors of Scientific Ability	5
Disability Legislation.....	5
Learning Experiences in School.....	6
Coping Strategies.....	8
Characteristics of Successful Learning Disabled Persons.....	9
Assistive Technology.....	13
Summary	14
METHODOLOGY	16
Life Story.....	16
Interview Question.....	18
Participants in the Study.....	18
Data Collection	20
Analysis of Data.....	21
Trustworthiness of Data	24
Role as Researcher	25
Summary	27
FINDINGS	28
Tim - “There Is No Right Side Up. There Is No Left and Right.”	28
Summary	39
Sharon – “I Succeeded in Spite of That.”.....	40

	Page
Summary	55
Mont – “The Passion Has to Be There.”	55
Summary	71
Barbara – “No Ahaa Moment.”	72
Summary	82
Cross-Case Analysis	83
Summary	92
CONCLUSION	94
Passion for Science	94
Drive/Determination	94
No Ahaa Moment.....	96
Acceptance of Their Learning Disability	96
Career Goals by Early Teens	97
Careers Based on Strengths	98
Developed Coping Techniques.....	99
Mentors.....	100
Feelings of Stupidity	101
Perceptions of Success	102
Why Might Science Be a Good Field for People with Learning Disabilities?.....	102
Implications for Future Studies	104
EPILOGUE	106
Reflection of My Life Story	106
REFERENCES	143
APPENDIX A	149
VITA	150

INTRODUCTION

Scientific discovery is at the heart of solving many of the problems facing contemporary society. Unfortunately, the United States is in crisis. Scientists are retiring at rates that exceed the numbers of new scientists entering scientific fields of inquiry (Watkins, 2005). Although strategies are being implemented to increase the numbers of qualified individuals who pursue science as a career and enter the workforce as scientists, disabled individuals spanning a wide range of individuals with impaired functioning, but particularly those with learning disabilities, have remained outside the mainstream. Persons with disabilities have been for the most part an “untapped resource” for providing the nation and world with scientists. While federal law protects those who choose to pursue careers by providing many types of disabled individuals with equal access and accommodations, scientific careers still appear to be outside the reach of most individuals with learning disabilities (Alston, Bell & Hampton, 2002; Alston & Hampton, 2000).

For learning-disabled individuals who have succeeded in their pursuits to become scientists, their careers have been personally rewarding and their contributions significant to society (i.e., Albert Einstein, Thomas Alva Edison, Leonardo da Vinci, William Faraday, Henry Ford, and Alexander Graham Bell). Biographies of these scientists are readily available to the public including school children with disabilities who may be interested in scientific careers. These biographies reveal their

This dissertation follows the style of *International Journal of Qualitative Studies in Education*.

accomplishments but tell us little about these scientists' struggles and strategies to succeed as scientists. Therein lies the heart of this study and the stories I seek to tell:

“What are the life stories of scientist with learning disabilities?”

Statement of the Problem

Many students with learning disabilities view scientific careers to be outside their reach for future career goals (Alston *et al.*, 2002; Alston, & Hampton, 2000). Alston and Hampton (2000) state that parents and teachers of students with disabilities agree that “insufficient number of role models exist for persons with disabilities interested in science and engineering” (p. 162). There is a deficit in modern day examples of scientists with learning disabilities. There have been only a few studies of life stories of persons with learning disabilities (AAAS, 2001; Fink, 2002; Gerber & Reiff, 1992; McNulty, 2003; Orenstein, 2000; Rose, 2000). None of these sources focuses specifically on scientists with learning disabilities and their life stories. Therefore, I will seek to tell the stories of some of these scientists using data collected during face-to-face interviews, which will then be used to construct life stories of their struggles and strategies to succeed as scientists.

Purpose of the Research

This research will provide role models and insights for future students with learning disabilities, who face many obstacles in becoming scientists. The goal of this research is to better understand the barriers, understand how they succeed, the challenges, and the decisions learning disabled scientists have encountered while becoming successful scientists. I propose the following questions.

- (1) What are the life stories of scientists with learning disabilities?
- (2) What can we learn from this under-represented group in providing career opportunities in science?
- (3) How do these individuals construct their understanding of themselves and science, and how do they see the connections between the two?

REVIEW OF THE LITERATURE

Definition of Learning Disabilities

Four broad categories define learning disabilities: (1) spoken language, (2) written language, (3) arithmetic, and (4) reasoning. A person may have one or more disabilities falling within these categories. The National Joint Committee on Learning Disabilities (1988) defines learning disabilities as a “group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical abilities...which are intrinsic to the individual and occur across a life span” (p. 1).

One in seven Americans has some type of learning disability (LD Online, n.d.). Persons with learning disabilities have many challenges to succeed in society. These include issues of dependency, underemployment, and unemployment (AAAS, 2001; Fink, 2002; Gerber *et al.*, 1992; Goldberg *et al.*, 2003; McNulty, 2003). Learning disabled scientists are no exception. The group of learning disabled individuals that are the focus of the present study have developed specific strategies for success in their professional lives.

Literature regarding students with disabilities is reviewed below under four broad categories: (1) the use of the advancement of assistive technologies for learning-disabled individuals, (2) information about successful individuals with learning disabilities, (3) disability legislation, and (4) predictors of scientific ability.

Predictors of Scientific Ability

Verbal reasoning ability, mathematical ability (Benbow, 1992; Gustin & Corazza, 1994), and academic achievement (Zeegers, 2004) are important traits for scientists. These skills, identified as important in the development of future scientists, are skills in which students with learning disabilities will have at least one deficit (Zeegers, 2004). Verbal reasoning and mathematical ability are currently tested with the Standard Aptitude Test (SAT) for students entering undergraduate school. Students' academic achievement is often measured by overall school ranking and/or grade point average and SAT scores. Therefore, the standard ways of testing for future scientists will classify students with learning disabilities as under-qualified or unqualified.

Disability Legislation

The first legislative act to address persons with disabilities was Section 504 of the Vocational Rehabilitation Act of 1973. This civil rights act for persons with disabilities states: "No otherwise qualified handicapped individual in the United States...shall, solely by reason of his handicap, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance" (p. 1). This section forbade discrimination from employment, admissions to institutions of higher education, and entitled school-aged children with disabilities to a free, appropriate public education. The first legislation related specifically to education was Public Law (PL) 94-142, the Education for All Handicapped Children Act of 1975. This act guaranteed appropriate educational services to all school-aged students with disabilities and required students with disabilities to be

educated with non-disabled peers to the maximum extent appropriate. PL 101-336, the American with Disabilities Act of 1990 (ADA), was the next civil rights law to “provide clear and comprehensive national mandate for the elimination of discrimination against individuals with disabilities.” This act prohibited discrimination in employment, public accommodations, services provided by state and local governments, public transportation, and telecommunications. The final dramatic law passed to extend the rights guaranteed to persons with disabilities was PL 114-17, the Individuals with Disabilities Education Act Amendments of 1997. This act was an update to PL 94-142.

Learning Experiences in School

Advanced college degrees are prerequisite to becoming a scientist. *Roadmaps & Rampways* (AAAS, 2001) highlights two general characteristics in a study of students with disabilities in higher education. The first is that “the proportion of students who reported learning disabilities decreased from 41 percent for freshmen to 18 percent for graduate and first-professional students” (p. 5). Second, compared to peer graduate students and first-professionals, those with disabilities were less likely to enroll in engineering or scientific fields and more likely to enroll in health fields. Preparation to become a scientist requires that learners complete secondary education, undergraduate schooling, and graduate school.

We can learn something about the challenges confronting prospective scientists with learning disabilities by reviewing research related to the career preparation trajectories of other learning disabled adults (Barga, 1993; Gresh, 1995; Reis *et al.*, 1997; Rose, 2000). First learning experiences remembered by adults were feelings of

being different. In their educational careers, these students remembered exhibiting some of the traits of bright students, but also remembered their struggles in some basic skill areas. Some students experienced this difference at an early stage (McNulty, 2003), while other students experienced this difference later in their educational career. Associated with the stage were memories of failure and struggle. This struggle began with feelings of inadequacy and social isolation (Barga, 1993; Reis *et al.*, 1997; Rose, 2000), including negative encounters with teachers or other persons of authority.

Learning disabled adults also expressed feelings that the educational “system” (mostly K-12) had failed them. Gresh (1995) found that many of the participants in her study associated system failure with mention of poor classroom teachers and a system that made them “feel like they were just a number.” Rose (2000) found that the participants in his study felt victimized by “the system.” He described an incident when a student went to the guidance counselor for help, and the counselor looked in their file and said, “You have above average intelligence,” patted the person on the head, and sent him back to class (p.150). Feelings of hopelessness and anger were expressed as participants described the failure of the educational system (Reis *et al.*, 1997; Rose, 2000).

All memories of learning experiences were not negative, however. Memories of encouragement from an adult were also mentioned, and some participants relied on that encouragement to continue their quest for success in academics. In the midst of describing their negative learning experiences, many learning disabled adults also identified the importance of an encouraging adult, whether it was a parent, teacher,

coach, or professor. A major theme in Gresh's (1995) study was that of the best teacher: the best teacher was the teacher who cared. Best teachers were ones with high expectations, encouragement, and offers of individual help. Rose (2000) found that encouragements from adults, "seemed to have helped in turning the tide of wholesale negativity. These trusted figures...had the effect of bolstering an image of the self that was positive and achievement-capable" (p. 199).

Coping Strategies

Several studies of successful adults with learning disabilities also identified their development of coping strategies as an essential component of becoming successful in school. Barga (1993) placed coping strategies into two categories: positive and negative. Negative coping strategies "carried with them consequences and results that did not benefit or assist the learning disabled student" (p.15). In her research, Barga (1993) also found most of her participants "passing" to avoid disclosure of their disability and "passing" to successfully make it through school. Passing techniques are behaviors that students will engage in to hide (or "pass off") their disability from others. Rose (2000) found that some participants cheated, used crib-notes, copied other students' work, and purposely avoided unwanted classes with fake medical excuses or misappropriated assistance from authority figures. Participants in Rose's study (2000) identified these negative strategies as ways to manage or manipulate "the system," necessary for personal survival, achievement, and progress.

Barga (1993) discussed positive coping strategies as "employed techniques that proved to be of a benefit for the student" (p. 12). Positive coping strategies included the

use of encouraging adults (Barga, 1993; Gresh, 1995; Reis *et al.*, 1997; Rose, 2000), self-improvement techniques (Barga, 1993; Gresh, 1995; Reis *et al.*, 1997; Rose, 2000), and strategies of management of study skills (Barga, 1993; Gresh, 1995; Reis *et al.*, 1997; Rose, 2000).

Another important coping strategy was the development of a self-perception of strength. Many participants took the adversity and believed that “their ability for hard work is their greatest asset...the data indicate that the constructive adaptation or interpretation of their negative school experiences caused this work ethic to emerge” (Reis *et al.*, 1997, p. 15). Rose (2000) found that “rather than allow themselves to quietly disappear or accept their victim status, most co-researchers set about to comprehend and manipulate educational structures which would otherwise destroy them” (p. 208).

Characteristics of Successful Learning Disabled Persons

What makes an individual with learning disabilities successful? There are many reviews of characteristics of successful and unsuccessful individuals with learning disabilities. (Gerber *et al.*, 1992; Goldberg *et al.*, 2003; Higgins *et al.*, 2002; McNulty, 2003). These are persistence, goodness of fit, learned creativity, desire, goal orientation, reframing, and control, which are described in more detail below with examples from research of studies of successful individuals in non-science careers.

The first characteristic that successful individuals exhibit is the need to take control (Gerber *et al.*, 1992). Successful persons make decisions internally by taking a personal stance to take control of their lives. These internal decisions involve desire, goal orientation, and reframing.

Desire is the need to move on in life after diagnosis. The successful person has a high desire to move on from the diagnosis to prove themselves (Gerber *et al.*, 1992). Based on the level of desire in persons with learning disabilities, the individual will have certain characteristics of goal orientation. Successful people set explicit goals which are realistic, flexible, have achievable aspirations, and have a sharp focus (Gerber *et al.*, 1992; Goldberg *et al.*, 2003). Once the goal is set, persons with learning disabilities need to reframe their learning disability experience.

The reframing stage is manifested in the abilities of individuals with learning disabilities to take their experiences and reinterpret them into a more positive or productive experience (Gerber *et al.*, 1992). Reframing is an internal process that individuals with learning disabilities work through in their life spans (Gerber *et al.*, 1992; Goldberg *et al.*, 2003). Successful people have completed all four steps of reframing within their lifetime although the amount of time taken is unknown (Gerber & Reiff, 1991).

The first of four stages in reframing is *recognizing the handicap and labeling it* (Higgins *et al.*, 2002; McNulty, 2003). The event of labeling occurs when the learning disabled person realizes “something” really is wrong with them and it is confirmed by an authority. From the labeling, individuals now have to accept that they have a learning disability. This leads one into the second stage which is *acceptance or negotiating the label*, which will be both positive and negative (Higgins *et al.*, 2002). Successful people with learning disabilities come to accept their learning disability and take their hardship, learn from their failures, and internalize their experiences to persevere (Goldberg *et al.*,

2003). Once the person has accepted their learning disability, they begin the third stage which is “*need to understand*” or “*compartmentalization*” (Gerber *et al.*, 1992; Higgins *et al.*, 2002). This stage is identified as the time when the successful people understand and maximize their strengths and minimize their weaknesses caused by the disability (Gerber *et al.*, 1992). Once successful persons have learned their strengths and weaknesses they continue to the last stage which is *to take action*. The successful person with a learning disability now knowing the label and accepting it, learns its associated strengths and weaknesses, and at this stage takes all this knowledge to make conscious decisions to take specific actions towards his or her goals.

All of the above characteristics are internal to the person with a learning disability. From the internal characteristics come external decisions (Gerber *et al.*, 1992). These external decisions show themselves in goodness of fit, persistence, learned creativity, and social ecologies.

Successful people with learning disabilities exhibit persistence; they realize they have to work harder than “normal” persons and are highly resilient (Gerber *et al.*, 1992; Goldberg *et al.*, 2003). Beardslee (1989) found that individuals with learning disabilities are resilient in their lives, which makes them able to adapt when faced with severe stress. With a strong desire to succeed, these individuals will be persistent and resilient enough to achieve their goals.

Along with persistence, successful people with learning disabilities exhibit goodness of fit to adapt themselves to environments in which they can succeed and their skills and abilities can be optimized. Successful people select careers based on their

strengths, situations in which they can be their own boss, and realize that flexibility is needed to control their future (Gerber *et al.*, 1992; Goldberg *et al.*, 2003).

Another external decision is learned creativity. This is the ability to employ various strategies, techniques, and other mechanisms to enhance abilities (i.e., technology). Successful people with learning disabilities often demonstrate the ability to “think out of the box,” because they have to find new ways to complete tasks that people without learning disabilities take for granted (Gerber *et al.*, 1992; Goldberg *et al.*, 2003). With the ability to “think outside the box”, successful people also exhibit the ability to find a support network (Gerber *et al.*, 1992).

Successful persons with learning disabilities have found a support network (social ecologies) of mentors to guide and assist them in their endeavors. Finding these social ecologies is beneficial to a successful person with a learning disability; research suggests that the support of a parent or other adult makes a difference in the success of a person (AAAS, 2001; Gerber & Reiff, 1991). Once successful people are established in their careers and have a strong support network they will reciprocate the role to become mentors of others (Gerber *et al.*, 1992).

All of the internal and external characteristics are important for successful people with learning disabilities. Along with these characteristics, people with learning disabilities frequently need assistive technology to enable them and to enhance their strengths.

Assistive Technology

The use of assistive technology can enhance achievement in written expression, reading, mathematics, and spelling. An assistive technology device is defined by the Individuals with Disabilities Education Act (IDEA) Amendments (1997) as “any piece of equipment, or product system... that is used to increase, maintain, or improve functional capabilities of individuals with disabilities” (Part A, Sec. 602(1)). Lewis (1998) describes two main purposes for assistive technology: (1) to enhance an individual’s strength, and (2) to compensate for a person’s disability in a way that enables an individual to better complete a task. The first legislation that specifically addressed assisted technology was the Technology Related Assistance for Individuals with Disabilities Act of 1988, which was amended in 1994. IDEA and its 1997 amendments established transition planning and services as a component for a student’s Individualized Education Program (IEP). These amendments mandated that the student’s assistive technology needs be considered in the IEP (Mull & Sitlington, 2003).

With technological developments, persons with learning disabilities have capabilities today that were not available as recent as ten years ago. Assistive technologies are one of the ways to help adults with learning disabilities compensate for their difficulties in a variety of academic areas (Duhaney & Duhaney, 2000; Mull & Sitlington, 2003). Some examples include: books on tape, computers for writing and editing, and voice-recognition programs. With the use of technology, a learning disabled person “can demonstrate his/her intelligence and knowledge” in their written work (Project DO-IT, 2000, p.1).

This brief review of the literature reveals that learning disabled individuals in general become successful adults by integrating their access to external resources and people with their internal attributes of coping, persistence, and control. Not so much is known, however, about learning disabled individuals who become successful scientists. How do these individuals, in particular, address disabilities that are directly related to the qualities that have been recognized as being so important in becoming a scientist? Do successful scientists have other strategies than those exhibited by successful adults in general? How have successful scientists addressed difficulties associated with verbal reasoning, mathematical proficiency, and academic achievement? Stories of successful scientists with learning disabilities have not been told. The goal of this study is to specifically address the ways in which individuals with learning disabilities have succeeded in their pursuits of careers in science.

Summary

Learning disabilities is something an adult will not outgrow. In school many adults with learning disabilities remembered good and bad learning experiences. Many individuals with learning disabilities were told they are “stupid” by a teacher resulting in negative feelings for the school system. Also, these same adults had a teacher who encouraged them to succeed in the same school system for which they developed negative feelings. To succeed in school and in life with learning disabilities, individuals must develop negative and positive coping strategies. These include passing as “normal”, development of study skills, and the using of assistive technology.

Successful adults with learning disabilities have exhibited internal and external traits. First, these adults all had a strong need to take control of their lives. Due to their learning disabilities and feeling out of control of their cognitive processes, these adults took control in all other areas of their lives. They also had a strong desire to succeed, set attainable goals to pursue their desires and come to accept their learning disabilities. From their internal choices, successful adults with learning disabilities will achieve despite many obstacles, find new and creative ways of learning, choose careers that will accentuate their strengths, and seek mentors who will guide and direct them.

This research will tell stories of four successful scientists with learning disabilities while answering the following questions.

- 1) What are the life stories of scientists with learning disabilities?
- 2) What can we learn about this under-represented group in providing career opportunities in science?
- 3) How do these individuals construct the understanding of themselves and science, and how do they see the connections between the two?

METHODOLOGY

This study will ask the main question “What are the life stories of scientists with learning disabilities?” There have been a few studies of life stories of persons with learning disabilities (AAAS, 2001; Fink, 2002; Gerber & Reiff, 1992; Gresh, 1995; McNulty, 2003; Orenstein, 2000; Rose, 2000). None of these sources focused specifically on scientists with learning disabilities and their life stories.

The goal of this research is to better understand the barriers, challenges, and decisions learning disabled scientists have made to become successful scientists. I chose an open-ended life story methodology to reveal the life stories of these individuals that have learned to successfully integrate careers in science with their disabilities to reveal strategies, events, and emotions related to scientists’ living, learning, and working in the world of science.

Life Story

A life story refers to the study of a phenomenon experienced by many individuals through comparing and contrasting the accounts of their lives (McNulty, 2003). “Life stories express our sense of self: who we are and how we got that way. They are also one very important means by which we communicate this sense of self and negotiate it with others” (Linde, 1993, p. 3). This method shares experiences of many by describing what is accurate, relevant, and compelling (Atkinson, 1998; Riessman, 1993). Using the analysis of life stories we (the interviewers) “invite others to tell their stories, to encourage them to take responsibility for the meaning of their talk” (Chase, 1995). This

self-narrative is a method of reflecting on the self through lived experiences (Linde, 1993).

With this research the participants were reflecting on their self through their lived experiences of being a scientist with a learning disability. Linde (1993) state that life stories consist of explanations and connections between them told by the individual during their lifetime and consist of two criteria. First is that life stories have a point about the speaker and not a general point about how the world. In this research each participant was sharing experiences of life with their learning disabilities. Within the interview the participants guided their own story based on their experiences. The second criteria for life story research is that the discourse units have, “extended reportability; that is, they are tellable and are told and retold over the course of a long period of time” (Linde, 1993, p.21). Reportability is that a story is not like a common every day occurrence, instead it is different from expectations or the “normal” (Linde, 1993). Within this research each participant has a life story that is notably different from the “normal” every day experience. In this study each participant has had to overcome much in their lives to become scientists.

Life stories method was choose because it allowed each of the scientists in this study to reflect and share their stories and their meanings in their lives today. Each life story is more then an explanation or a collection of events. Life stories is a relation between events which each individual has to relate meaning of new events to the themes of their current story. “Life story is one’s identity, a story created, told, revised, and retold thorough out life. We know or discover ourselves, and reveal to others, by the

stories we tell” (Lieblich *et al.*, 1998). Life stories methodology was chosen because it allows the participant to reveal their life story and how they constructs their understanding of who they are as scientists and an individual with a learning disability.

Interview Question

To obtain free and rich self-narratives of each participants life story a open-ended question was the interview question. Each participant was asked to share their life story as a book, starting from the day they were born to now (Appendix A). They were asked to title each chapter and to identify what made them change from one chapter to another (Lieblich *et al.*, 1998). To help the participants to focus on each chapter four questions were included. This interview question was used to allow for the individual to represent their life story with their own meanings and understandings. A limitation of this interview question is that each participant is asked to represent their lives linearly.

Participants in the Study

Three criteria were used to define a sample of four scientists: (1) each participant was to be a scientist whose learning disability fell within the definition above; (2) each participant scientist was to have a M.S. or Ph.D. degree in engineering or a science-related field; (3) each participant was to be functioning in a scientific career. Scientists were identified by using the snow ball method. This method utilizes participants or other individuals to offer names of individuals who could participate in this study. I contacted Virginia Stern, Director of Disabilities section of AAAS. She identified names of three possible participants. From that conversation, one participant was identified. Two of the four participants were identified by my personal relationship with someone who knew of

them as scientists with a learning disability. In this case, my peer gave me the name and number of the possible participant and I followed up with a phone call. The last participant had openly disclosed his learning disability in a published book. I named the participants Tim, Sharon, Mont, and Barbara.

Tim

Tim has a Ph.D. in genetics and is a professor in biochemistry. He is in his fifties and has been a professor for many years. Tim has dyslexia and was never formally diagnosed. His mother had a master's degree in reading disabilities and used her knowledge to diagnose Tim.

Sharon

Sharon has a Ph.D. in engineering and is an aerospace engineer. She is in her forties and graduated with her Ph.D. when she was thirty-six years old. Sharon was diagnosed in college with a reading disability. She thinks she also has dyslexia.

Mont

Mont has been awarded two honorary doctorates and is a paleontologist. Mont is in his fifties and is a professor in geology and a director of a museum. Mont was informally diagnosed with dyslexia later in his life.

Barbara

Barbara has a master's degree in physiology and biophysics. She later went on to earn her medical degree. Barbara is retired from being a neonatal physician and is in her fifties. Barbara has attention deficit disorder but was never diagnosed. When her son was

formally diagnosed; Barbara realized that she had 10 of 14 the usual traits used to diagnosis attention deficit disorder.

Data Collection

Data collection began in November 2005, and my last interview was completed July 2006. Follow-up communication with the four participants has been ongoing from January 2006 to April 2007.

Preliminary Interview and Consent

I contacted the participants in this study by telephone for a preliminary screening in which I described my research. We discussed their learning disability, and they agreed to participate in the study. I then sent the consent form via mail, which was returned, signed before the first face-to-face interview. I maintained communication with each participant via telephone and/or email about the interview time and place.

Interview

I then interviewed the participants face-to-face for one to two hours at their homes or places of work. The interview question was sent to each participant with the consent form. Most participants did work on their stories as chapters in a book, but seemed overwhelmed by where to start at the time of the interview. I usually began each interview with introductions and impersonal questions about their family and job. I then asked them to describe their learning disability. This allowed each participant to feel comfortable and they would begin to tell their life stories as the question had asked.

The stories were recorded on audiotape and transcribed. Transcription of the data was either completed by my transcriptionist David D. or myself. I then created and analyzed each life story based on the transcription.

Member Check and Follow-up

The use of participants to review their stories and collective data provided the member check of the process (Lincoln & Guba, 1985). The participants were asked to review, edit, and supplement their stories to ensure accuracy in follow-up interviews. These follow-up interviews were conducted by phone or email. A limitation of this study was that three of the participants have a reading disability. While each participant was sent the transcript, no reviews were received. I contacted each participant by telephone for follow up interviews, but Sharon was the only one of the participants who responded. Sharon and I had many phone conversations about her story after the first interview.

Analysis of Data

The interview data were analyzed using narrative analysis. Riessman (1993) states that narrative analysis is a series of interpretive decisions made by the investigator, “Each investigator has to consider how to facilitate narrative telling in interviews, transcribe for the purpose at hand, and approach narratives analytically” (p. 54). The use of participants’ life stories facilitated the narrative interviews in this study.

Chronological Order

I found that each participant had many different facets to their life stories. To assist in my analysis each participant’s story was ordered chronologically. School experiences were broken down by stage. I developed another section describing their

acceptance, limitations, or diagnosis of their learning disability based on when that occurred. I integrated their work lives chronologically with each job. A last section labeled “other” was used for small parts of the narrative that did not fit to the chronological order.

Narrative Inconsistency

For Tim and Mont once their story was in chronological order, inconsistencies emerged in their life stories. Narrative’s of ones life is indirect and multilayered. “Stories are liable to misinterpretations or contradictions on the part of the teller. Because the act is grounded in the human struggle to make sense of an often-confusing world and grows out of personal needs and feelings, it is constantly subject to change, reconsideration, or even whim. Narrative inconsistencies signal points of confusion, uncertainty or conflicting emotions in the narrator” (Poirier & Ayres, 1997). Once each inconsistencies are noted each narrative is read many times for the construct of the inconsistency, or as Poirier and Ayres (1997) describes it as overreading. With the two narratives the inconsistencies were overread and elaborated on in each analysis.

Holistic-Content Perspective

Lieblich’s holistic-content perspective (Lieblich *et al.*, 1998) was used to find the emerging themes in each participant’s life story. The process for this narrative is summarized as follows:

1. I read the narratives many times until a pattern emerged. While reading with an open mind, and allowed the text to “speak to me.”

Making sure to take the whole story and its context into consideration

I found significant aspects.

2. I wrote down initial thoughts and findings. Making note of any exceptions and disharmony in the narrative.
3. Each theme was then found to focus on in the narrative.
4. With different color highlighters, I highlighted the multiple themes in the story while reading separately and repeatedly for each theme.
5. Final note of all themes was elaborated on with consideration of how they appeared in the text, the transition between the themes and their salience in the text.

Descriptor Adjectives

Within this research there are two voices represented. The researchers voice (my voice) and the participants voice. “The researcher’s voice...is everywhere-overarching and undergirding the text, framing the piece, naming the metaphors, and echoing through the central themes...Her voice never overshadows the actors’ voice [the participants voice]. The actors [participants] sing the solo lines, the researcher supporting their efforts at articulation, insight, and expressiveness” (Cole & Knowles, 2001, p. 114). To facilitate myself to keep the participants voice in my analysis and writing I assigned descriptor adjectives to each participant. Each set of adjectives were based on the interaction and life story of each participant.

Cross-Case Analysis

After all four stories were written and analyzed individually for themes, a cross case analysis was performed across all cases in the set of life stories. Typically, cross case analysis is used as a theory-building approach, allowing the analyst to make connections among previously built categories (or themes, in my analysis), as well as to test and to develop the categories further. Themes for each participant were then evaluated for similarities and differences among the 4 participants. In particular, I looked for commonalities that would allow consistent themes to be combined into simpler, yet more abstract, representations. I identified a commonality as a theme existing in at least two participants. Themes belonging to only one participant were identified in the cross case analysis, but no additional elaboration was written. I repeated comparisons across cases until I was satisfied that further reductions were no longer possible. The “final analysis” resulted in a typology for characterizing the life stories of the 4 learned disabled scientists in my research.

Trustworthiness of Data

Lincoln and Guba (1985) pose trustworthiness as a basic question: “How can an inquirer persuade his or her audiences (including self) that the findings of an inquiry are worth paying attention to, worth taking account of? What arguments can be mounted, what criteria invoked, what questions asked, that would be persuasive on the issue?” (p. 290). To determine trustworthiness four ideas can be posed: credibility, transferability, dependability, and conformability. To determine credibility, I used member checking. In the process of member checking, I summed up the life story and the participant was

asked to comment. Later on each participant was sent a copy of the transcription and my analysis of comments and reflections. For transferability, I used thick description of each participants' life story as told to myself for an overall picture of their stories. For dependability and confirmability, I kept a reflexive journal during the analysis and writing stages of my dissertation. A reflexive journal is "a kind of diary in which the investigator on a daily basis, or as needed, records a variety of information about *self* and the *method*" (Lincoln & Guba, 1985, p. 327).

Role as Researcher

"He felt alone with his learning difficulties and labeled himself as 'lazy' or 'stupid'" (McNulty, 2003, p. 369). When reading the literature about learning disabilities, I read this phrase frequently. I remember the day when I realized "I am not stupid!" This day was early in my career as a chemist and late in my educational experience. My learning disability really became apparent when I was in General Biology during my sophomore year. I would study for hours and was still failing in the course. From my frustration I decided to seek out the college's learning center to talk with them about my problems. When I told the director that I could not read a normal clock, nor could I do simple math (except on my fingers), she decided it was time for me to be tested. The day I got my diagnosis was the day my life changed forever. I had always felt "stupid," but on that day I was told that I had a severe learning disability and should have never graduated from high school. At the time, I thought that diagnosis was the end of my extreme difficulties in my studies. Looking back, I see now that diagnosis was the beginning of the biggest fight of my life. I majored in chemistry because it was

and still is the passion of my life. Even my love for chemistry, however, was not enough for my chemistry professors. I was told, “We have never had a learning disabled student in chemistry and it is not possible to be a chemist with a learning disability.” That was the day I was determined to be a chemist no matter what was in store for me. I graduated with a Bachelor of Science degree in chemistry. The professor who did not believe in me initially became one of my biggest proponents. I went to work as a chemist and later got a Master of Science degree in Chemistry at a prestigious research university. Although I overcame many obstacles to get the M.S. degree in chemistry, I still face many obstacles in pursuing my Ph.D. in science education.

Personally, it would have helped me as a science student struggling with learning disabilities to hear stories of others who overcame their struggles to become successful in their careers. I had heard of famous past scientists with learning disabilities, such as Albert Einstein and Thomas Edison, but I knew nothing about contemporary scientists with learning disabilities. I was not aware of others’ successes in overcoming obstacles associated with their career goals in science. While I found my own way to complete a master’s degree in chemistry, I wondered about other learners’ abilities to persevere without role models, mentors, informed teachers, or counselors. I believe that the life stories of scientists with learning disabilities will have significant impact on others who may believe that “science is just not for them,” even though they are passionate about living in a world within a community of scientists that have committed their lives to investigation and discovery.

Summary

There are four questions addressed in this study. (1) What are the life stories of scientists with learning disabilities? (2) What can we learn about this under-represented group in providing career opportunities in science? (3) How do these individuals construct the understanding of themselves and science? (4) How do they see the connections between the two? To answer these questions, I met with each participant to hear his or her life story in a secure place of his or her choosing. I transcribed and analyzed each interview individually for emerging themes. I performed a cross-case analysis once all four scientists' analysis was completed. I used member checking and a reflexive journal to establish trustworthiness of the data and to establish my role as the researcher.

FINDINGS

As I sit here, all of this data seems overwhelming. I have completed all four of my interviews and I am ready to begin the data analysis for each participant. What will I find? Each person is unique and has given me an insider's glance into his or her life because I, too, have a learning disability. I realize the gift they have given me and feel a heavy burden to represent them as who they really are and what they have overcome to be where they are.

This journey began as a personal one. It began when a woman who was told she could not succeed in her life or become a scientist looked back on what she had done. It began with a teacher hearing her learning disabled students telling her that they could not do science because their learning disabilities made them stupid, and with that teacher remembering that she had heard similar voices telling her the same thing. This study began as a journey to stop those voices once and for all.

Now I sit here with four peoples' life stories of how they have overcome their disabilities to succeed in the midst of failures. This has become the story of us all and what we have overcome. It still is to quiet the voices, but now we have a stronger voice. This realization weighs on me as I begin this research. Can I represent each life as it should be? With this begins the analysis of each participant.

Tim - "There Is No Right Side Up. There Is No Left and Right."

Tim was my first participant. He has a Ph.D. in genetics and is a professor in biochemistry. I was excited to meet with him and get his life story. All of the

expectations of my study were beginning to come into reality. When I meet with Tim the first thing he said was, “you are going to be disappointed” while opening his office door. I was interested in why he thought I had an expectation of his life story. After completing the interview it seemed that Tim had expected me to want a story of his extreme hardship and how he had overcome. Instead I got the life story of a man who has worked hard to become a scientist, a man who is happy, conflicted, gifted, empathetic, and resourceful.

After the interview with Tim I had such a happy feeling that I was not alone in the world! I actually found someone who had a different learning style (disability). It was so great to find others out there who have worked hard like me. It made me not feel so alone and isolated; I actually felt some ray of hope. I felt like I have been fighting a one-person battle for a cause, and in reality there are many who are fighting in their own classrooms, one person at a time.

Tim's Story

Both of Tim's parents were teachers. His father was a professor of geology and his mother had her master's degree in education specializing in reading disabilities. Tim was born in a southern state and grew up in a large community. He had some hard times in his early school years. He could not read until third grade. “I wrote my h's backwards, I wrote my e's backwards, I wrote my f's backwards, I did everything you know dyslexic children to do.” His mother decided it was time for him to be able to read by the third grade, and she also taught him to type.

Tim identified himself as a troublemaker for the first couple of years during elementary school. He actually told a story of where “our little group in the first grade drove our first grade teacher to have a nervous breakdown.” Tim seemed to become more interested in school during the fourth and fifth grades. This is also when he had a school teacher who believed in him and worked with him. This specific teacher was a friend of his mother’s and “actually followed him over to high school.”

Certain subjects in school were challenging for Tim while others were not. More specifically, Tim excelled in math and science and “got by” in English and history. To foster his love for science, Tim and his friends formed a rocket club. “When I was in junior high we formed a rocket club, where we shot off rockets and we were good enough that we actually perturbed the people over in the next military town.” After completing high school Tim went on to the university in his home town.

While in university, Tim majored in theology, physics, and then zoology. He changed programs for different reasons. Tim continued on with that university to obtain his masters degree in genetics. While in the genetics lab in undergraduate school, Tim started to run the microscope. His professors noticed that Tim took better pictures than any of the other students. By the time he completed his master’s degree, he was working with the electron microscope and developing all of the pictures. While working with the microscope Tim realized; “I can see more through a microscope than most other people.” Due to Tim’s learning disability, when he views things through the microscope, “it doesn’t have to be right side up for me to recognize it. There is no right side up. There is no left and right.”

Tim was at the same university for his graduate degree in genetics when his advisor passed away, so he earned his master's degree and then attended another college for his Ph.D. While getting his master's, Tim had written papers and won a grant to pay for his graduate career. Today Tim is a professor at a southern research university involved in research and writing a genetics text that will soon be released.

Tim has had to work hard to succeed to become a scientist with a learning disability. In his own life story Tim defined his learning disability and explained how it related to his success. He also has conflicting thoughts about his learning disability.

Conflicted about Learning Disability

Tim had a hard time in his early school years. He could not read and indicated the reason as, "I had a severe dyslexia." Once he got to a certain age his mom realized that she had to take some action and began to teach him typing. With this intervention Tim learned how to read and he was able to work well in elementary school. Tim states that it was his mom's intervention, "basically that solved my problem with reading." This early intervention had completely changed Tim's academic performance and his thoughts about his learning disability. Conflict arose in Tim's story when he began to describe himself as someone who had a learning disability in the past. At other times, he states, "I am still dyslexic."

This internal conflict was displayed many times in his interview. At times, Tim seems to have accepted his learning disability as something that was in the past, and that has not affected him since his mother's intervention. "It was never really diagnosed as a learning disability. I knew I wasn't good in English." Even when he was asked about

how he related to other students with learning disabilities, Tim treated the learning disability as something impersonal to which he did not belong. “Well, I’ve gone through it myself. I’ve watched my mom teach learning impaired people.” This statement clearly removed any of his personal experience with his own learning disability. At other times Tim clearly acknowledged that he still has a learning disability, but sometimes to a lesser degree than when he was younger. When asked how he felt about his learning disability today, Tim stated, “I don’t think, it was, I don’t think it’s been at all a disadvantage....My disability is not a severe one.”

Because of these two main contradictions, some ideas arose as to why Tim is conflicted with his learning disability. First, Tim had an intervention at a young age in which his mother taught him good coping strategies to succeed. During his life he has used these strategies and has not had many obstacles because of his excelling coping skills. Furthermore, Tim had excellent mentors who realized his potential and encouraged him. Later in college his gift with the microscope was noted and he was guided and encouraged to continue in his career as a scientist.

Second, Tim had not fully accepted his learning disability, but had dealt with it on his terms. Within his definition of his learning disability, there were no limitations; it was just a different way of learning. “I don’t, you know, I don’t view them as such. I think it’s just a different way of learning, a different way of looking at things. And it has nothing to do with intelligence. I think using and learning to use your disability, if you want to call it a disability, is the most important thing you can do.” With Tim’s definition of his learning difference, he ran into conflict when he did face some obstacles

caused by his learning disability and his definition failed. When this happened, in his life, he seemed to find other reasons for his failure.

Incompetent Teachers

Within the interview Tim identified three main times in his life when he faced obstacles or failures in his life. The first was that he could not read until he was in third grade. Due to his lack in ability to read he became a “firecracker” in his early school years. When asked if he thought there might have been something wrong with him before the understanding of his learning disability he states, “Oh yes, and I became a trouble maker.” When asked about why he was a trouble maker he stated, “I was intelligent and they were not challenging it. And that’s just plain bad teaching... and they were hiring teachers that simply were not good teachers.”

When discussing his obstacles in English classes in high school Tim offered an explanation. “I had one or two really good English teachers, but quite frankly, yeah, I had mostly rather poor English teachers.” Again this idea of poor teaching came into play when he did poorly in a subject.

The other obstacle Tim faced in his career was when he did not do well in physics in undergraduate school. When asked about why he left physics Tim said, “Because none of my teachers could speak English and I had, I read slowly. So ...the lectures are where I get most of my information. So if they don’t speak English I can’t do it. And they had a rash of having lecturers that did not speak English. If he had spoken in German, I could have handled it, but he stuttered and spoke in broken English. And I just could not follow it.”

When faced with an obstacle in his life, Tim worked hard to overcome it and succeed. His reasoning for the obstacle was based on the incompetencies of others. This idea of others not being competent teachers and his not being able to do well in these courses also correlated to Tim's own definition of his learning disability. These are the times in his life when his definition of a learning disability failed. With this failure came dissonance in his understanding. Tim blamed incompetent teachers for the obstacles in his life.

Mentors

Tim faced few obstacles with his learning disability and had many mentors to encourage and guide him through life to become the person he is today. His most important mentor was his mother. His mother was a specialist who taught children with reading disabilities. She began to work with Tim in third grade. He recognized the difference his mother made, "Other than that I function pretty well even on things I am not that good functioning at, primarily because my mom was just one hell of a mom to have."

During his educational career Tim also had a mentor to believe in him and guide him. In middle and high school he had a teacher who encouraged him, and she followed him when he went into high school. In college, when the professors in the lab where Tim worked realized his ability with pictures and the microscope, they recruited him to do graduate work.

All during Tim's life he had some mentors to work with him and to encourage him to succeed at becoming a scientist despite his learning disability. With the encouragement of his mentors Tim continued with his love for science.

Love for Science

Tim excelled at math and science in his early school years. He states that, "I excelled in mathematics and I was interested in sciences all through junior high school and high school." In junior high and high school Tim knew he could excel in math and science even though he was just getting by in English, French, and history. The ability to excel in math and science while just getting by in other subjects fostered Tim's love for science. Tim also fostered his love for science by forming a rocket club with his friends.

In Tim's interview he never came out to actually state his love for science. Instead, he mentioned mentors and successes in math and science with little mention of other subjects. "But, yeah I was interested in sciences all through junior high school and high school. I had really good science teachers in high school." When discussing English and history, Tim only addressed them twice in his interview. First, he told about his getting by in high school, and then he said that he loved college because he could focus on science courses and only had to take a tiny amount of required English courses. "But it was something that I had to keep in mind when I started to do something. I mean, I assure you I never took an English course as an elective. And all the English courses, all the language courses that I have, are absolutely required for the degrees I've gotten." Tim had a love for science that guided him to major in science in college. Once in college, he also discovered that he had a gift: visual perception.

Learning Disability Is a Gift

With Tim's learning disability came a different way of seeing things. Interestingly, Tim can not tell his left from his right. However, this actually benefited him when he looked at slides under the microscope and at other pictures. He became a cytogeneticist because of his unique visual abilities.

I can see more on a microscope slide than anybody I've ever run into. Just by looking I can usually deconvolute the chromosomes and count them and tell you, ok, this one's translocated. That's what cytogeneticists did in the old times. Now of course they color-code them and any idiot can be a cytogeneticist, but uh, there was a time that that wasn't true and if you wanted to do a, to do any work with chromosome anomalies you had to have a really good cytogeneticist working with you. And not just anybody could fill that...basically I could recognize all 23 pairs of chromosomes. And I could recognize them in any place you put them, in any organization or any order or any orientation.

Tim's visual perception ability has become very important to his life. His unique ability has made him into a successful scientist who has a gift that most of his peers do not have. In that regard, Tim also addressed the idea of comparing his disability to his non-learning disabled peers. In the last quote Tim states that, compared to others in his field, they can not "fill that." Tim shared the idea that by using his gifts and skills, he had learned to succeed with his learning disability; other non-learning disabled peers could not do as well. With Tim's visual perception skills, he has a gift that most people will never have and acknowledged his ability. "I'm a better microscopist than anybody

I've ever met. I can see um, that coupled with the science that goes along with it, uh, that's been my career. So basically I owe my career to being visually different from other people." Due to his success, in spite of his learning disability, Tim also recognizes potential in other students with learning disabilities.

Empathetic Toward Students with Learning Disabilities

Tim is a professor at a large research institution and enjoys teaching genetics to undergraduate students. When discussing what he thinks of his learning disability now he said that, "Student services for disabilities routes their students through genetics, they route them into my course. So I have, well, right now I have eight." When asked why student services routed the students through his course he explains, "Because I make an effort to teach them." Tim then goes on to tell about his eight students and how he accommodates them. When giving his students accommodations he will meet with them individually and assist them in their needs to succeed in his class. For example, one student only has one test question per page. It is obvious to me that Tim goes way beyond what is required by law to help his students be successful in his class.

When asked if students with learning disabilities can succeed in science, Tim had some strong opinions. "I have never been convinced that anyone could not do science. I have had some that have failed miserably, but it's in my opinion it's primarily because of a mindset and they just don't want to do it. I mean, I've had people from floral design, who, by the way, have to take genetics, come over, and I've worked with them and they've made A's in the course. And they've gone out and done some really interesting things with it. Um, and I've had people that majored in genetics flunk. But no, I'm

convinced that, you know, basically if we're talking about normal intelligence, science can be taught to anyone.”

Tim showed empathy for his students with learning disabilities, but he also required them to work hard in his class. Tim had wonderful mentors to help him through his educational career. Now he has become a mentor helping learning disabled students succeed in his courses. Tim used different methods with learning disabled students, just as he had developed different coping techniques to be successful in his career.

Coping Techniques

Typing. Tim has developed specific coping techniques in his life in order to become a scientist. Tim did not learn to read until he was in third grade. He credits his reading to his mother teaching him to type. Since that, Tim does not hand write anything. He uses the computer and typewriter for all of his needs. “And you, if you look around you won't see very many handwritten things. I don't do a whole lot of handwriting....Yeah. I can out-type all my secretaries. Some by a considerable margin. What I have found is, yes, I do have a problem with writing [by hand].” With this realization Tim has learned to cope by typing everything.

Editor. Due to his problems with writing Tim also stated that he had an editor. The editor happens to be his wife. Tim stated, “The problems are not necessarily with the content, it's more with the execution. And having a wife...my wife incidentally is an expert spelling person. She's excellent...she always made A's in English. She has a master's degree in anthropology, and a bachelor's degree in zoology, just incidentally. So she is not unaware of what is going on in biological subjects.” By using an editor,

Tim stated confidence in his work. He has published many papers and is currently writing a genetics text book.

Passing. Tim had many contradictions about his learning disability. When talking about the accommodations he made for his learning disabled students he stated that he understood them because his mother worked with those kinds of students. When discussing his accommodation of students, Tim said that he did not tell his students that he, too, has a learning disability.

Tim used the coping technique of “passing.” Because he had not fully accepted his learning disability he was able to pass off his disability due, in large part, to his own definition of it. He demonstrated times in his life story when he passed. When he was in graduate school Tim did not tell his physics professors or any of his graduate faculty about his disability. He stated that they knew he could not tell his right from left, but otherwise he did not disclose his disability. Tim passed his disability even today when he discussed helping students with learning disabilities in his course. He helps them because he has seen his mom work with learning disabled students.

Summary

Tim’s life was dramatically changed when his mother taught him to read by teaching him to type. With the help of his mother he learned to succeed in school. He had an early intervention for his learning disability. Due to his ability to utilize mentors, coping techniques, and his visual gift, Tim has had minimal obstacles in his life. Because of this he seems conflicted about his learning disability. Because of his confliction at

times he does not seem to think he is learning disabled and at other times states he is. Based on this, Tim does not seem to fully accept his learning disability.

Sharon – “I Succeeded in Spite of That.”

Sharon was my second interview. Sharon has a Ph.D. in engineering and is an aerospace engineer. Sharon was diagnosed in college with a reading disability. She is also a woman in her early forties with three young children. I was a bit nervous about meeting Sharon. I was nervous for a variety of reasons, the biggest being how would she react to me and to my research. I disclosed my own learning disability on the phone and I wondered what her ideas and thoughts were about this. In my pursuit of the doctorate, I had not continued as to a scientist. I wondered if she would hold that decision against me. When I met with Sharon my fears were put aside. She was as friendly in person as she was on the phone. As we began to discuss her life story we realized that we share common experiences.

During the interview Sharon and I shared our common stories. Ellis *et al.* (1997) call this interactive interviewing. They state that “interactive interviewing reflects the way relationships develop in real life: as conversations where one person’s disclosures and self-probing invite another’s disclosures and self-probing; where an increasingly intimate and trusting context makes it possible to reveal more of ourselves and to probe deeper into another’s feelings and thoughts; where listening to and asking questions about another’s plight lead to greater understanding of one’s own; and where the examination and comparison of experiences offer new insight into both lives” (p. 122). While sharing our stories it was like we had known each other all of our lives. Our

shared experiences allowed each of us to open up and share experiences, thoughts, and at times things I even considered shameful secrets. If I had to find five words to describe Sharon I would say she is strong, driven, nurturing, empathetic, and complex. Ironically, I would use almost the same five adjectives to describe myself.

Sharon's Story

Sharon is in her early forties and she is an aerospace engineer. She also has a family with young children while maintaining her career as a scientist. Sharon is the middle child in her family. She discussed her sister the most when talking about her childhood. Sharon's parents worked full time with her dad going back to get his Ph.D. when Sharon was in middle school.

When discussing her life, Sharon described her early years as "happy years." As she goes into her school years, the first thing that Sharon stated was that she "hated reading" and would avoid it at all costs. She was always compared with her sister academically. "Compared to my sister, and there's always the comparison as I grow up...she gets straight A's and Sharon doesn't." Sharon did not get bad grades; she received A's and B's but when her parents compared her to her sister, they considered her grades not as good.

Sharon described her school years as hard times but said that she did "okay." She did not read well in school and credited her passing with being able to understand directions and being good at guessing answers. When taking the SAT and GRE Sharon states, "I do recall whenever I took GREs or high school SATs I used to brag that I

didn't [have to study], I just guessed the answers because I would never read the paragraph."

Sharon started working at thirteen and continued working through high school. "At some point I decided to make Burger King a career because it would pay me money and it wasn't as hard as school. It was a lot easier and I could get recognition. I could get promoted." For a while Sharon thought she would make Burger King Manager her career goal. Where she was in middle school Sharon heard a parent give a talk about her career as an engineer, and she said engineers had to be good in math and science. Sharon said, "I am good in math and science" and decided to become an engineer.

During her undergraduate engineering program, Sharon had to work her way through college. She would sign up for a full time course load and later drop to two courses. It took her five semesters to complete the first year requirements. When she "did the math I had five semesters for one year at college, so I thought four years of college would be too long." So I just quit and started working full time." After working for three years, Sharon got married and moved overseas. While overseas she started taking college courses again, but made sure to take courses that she could complete without reading; some of the texts were on tape so she could listen and then take the tests. Sharon earned her associates degree this way.

Once back in the United States, Sharon went back to college. During this time she was diagnosed with a reading disability. This time she decided not to work and to take only 12 credit hours a semester. After her diagnosis Sharon's husband left her, stating that he did not know about the disability before he married her and he could not

handle it. While she was healing from her divorce Sharon earned her bachelors' degree and decided to go on to earn her Ph.D. at the same college. After graduate school she entered the workforce and was promoted within her first three years of work.

Validation of "Stupid"

Sharon's life story was not much different than mine. We grew up in different homes with different dynamics and had different life experiences. However, we shared many similarities. Sharon grew up in a home where she was always being compared to her sister academically, and I grew up in a family always being compared to my older cousin and her academic progress. Although most people would consider her to have good grades, compared to her sister, Sharon was doing "just okay." However, she felt something was wrong. She realized that she had to work a lot harder to get her grades and she could never complete all of her work. "I wasn't the straight A student and I had to work a lot harder. She would get work done in school. I would bring work home, not that I would do it at home, but I would bring it home. It was a burden to me to just bring it home because I couldn't get it done in that amount of time." In her elementary school experience Sharon had harsh teachers. One teacher called her "stupid" and said she could not learn anything. "I guess, I want to jump back to a fourth grade teacher who actually told me I was stupid, and those are the things that ring in your brain. I mean how many years later I still remember she told me I was stupid, and you can have all the teachers say that you're good and you do well after that, but just to be labeled that way your brain comes back and plays the tape over and over and again. Yes, see I have one person that confirmed the fact that I feel stupid, therefore I am stupid because an adult

told me that.” With the feeling that something was wrong with her and then the negative comment from her teacher; Sharon felt some validation in feeling “stupid.” This was the beginning of self-doubt for Sharon.

Knowing something was wrong with her reading ability, Sharon decided to take a speed reading course in high school. She did not do well in this course. This was one of the times that Sharon really acknowledged something was “wrong” with her in the interview. It is also the acknowledgement of the first step of accepting her learning disability. During high school, Sharon realized that she excelled in science and math, and that she wanted to become an engineer.

This feeling of “stupid” is a feeling that Sharon and I have in common. We both had teachers tell us that we were “stupid.” This negative validation from a teacher is all that I needed to accept that I was not smart. This negative validation began the cycle of keeping a dark secret. Many times teachers told me I was not working up to my potential and deep down I would think, but I am stupid and that is why I cannot do the work. Part of the problem was that I was working harder and longer than my peers and still not getting the work completed or the grades. Sharon had this same issue in her K-12 school years. Even with this negative self-image Sharon held on to the fact that she did well in math and science and persevered to become an engineer.

Fear of Rejection

Both Sharon and I discussed letters we had to give to professors to get our accommodations. In order to get accommodations, a person with learning disabilities has

to present a letter to each professor at the beginning of each semester. This process is very stressful because of the rejection one can get from professors.

I would go to every professor with my letter and say here, I want these accommodations and the first two weeks of every semester were the most stressful of my whole life. I have to find a new teacher, I have to explain myself again, I have to prove myself again, uh, they are not going to believe me, they are going to think I am stupid, they are going to think I am cheating, they are going to think I want something special, they have all of these students why should they spend time with me, so it was very, very stressful each semester.

Within this internal dialog are things Sharon has heard about her disability. Fear of rejection is a large part of her drive in life. Sharon has suffered rejections because of her learning disability, from personal relationships to professors and her major advisor telling her she was not good enough because of her disability. “The professor actually said, ‘who is going to hire you when you get a job anyway?’ I nearly quit school, it was just devastating.” When talking about her advisor Sharon said,

He never really gave me credit and I didn’t know. He told me one of the scholarships, he said the only reason you got it was because I checked the disability box. The only reason you got the job is because you are a woman with a disability. Otherwise you wouldn’t have ranked.

From this rejection in Sharon’s life she developed a fear of rejection. With this fear comes the issue of who to trust with her learning disability.

Hiding/Trust

Rejection causes one to hide his or her disability. Sharon states, “I am not allowed to tell [about her learning disability] because of the negative recognition associated with it, so I feel like I am somebody that has to hide.” Hiding is a key factor to both Sharon and me. We discussed how we hide things about our disability in our lives. On a process level, we hide the fact that we cannot read. Sharon states, “It is this whole hiding thing. I hide the fact that I don’t read. I don’t tell people that I don’t.” Hiding has become a part of our lives. From this hiding comes the idea that disclosing our learning disability is a shameful thing. We have to trust people if we are going to tell them about the learning disability. The quote above is very real to our lives. If we trust only ourselves with this information about our learning disability, it does not leave the door open to be rejected or betrayed. This is a strong theme for Sharon, one that I understand because it is also a strong theme in my life. It is interesting that instead of looking at accommodations as rights, Sharon discussed disclosing her disability to her professors as a trust issue. “Do you trust every professor to tell them, well I want the accommodation, therefore, I will trust you with this information? How do I know you won’t use it against me? I don’t know.” From the issues of rejection, hiding, and trust comes a feeling that the learning disability is shameful.

Shame

Everyone must deal with failure. Many feel success in life means one will have failures. With a learning disability failure will definitely come and it can make one stumble or even quit. Sharon discussed this when the professor told her she could not get

a job because of her disability and having to take extra time for tests. She stated, “I almost quit.” In Sharon’s life failure has had two effects. The first is shame and the second is drive/determination. Drive/determination I will address later.

Sharon worked very hard in school and sometimes failed. The first big failure in Sharon’s life was when an elementary teacher told her she was stupid. This statement verified part of Sharon’s internal discord and brought her shame. She then discussed taking speed reading in high school and “it was just terrible.” The biggest part of Sharon’s shame was the idea that she was making it through school but still could not read. She talked about this when she was in college. “I guess I felt like I was sneaking through. I took a class in college called guilt and shame, and it so much described what I felt going through.” With this idea of shame comes the idea of fooling the education system in Sharon’s life. She felt that she succeeded in her career but felt internally that she is “fooling them all.”

Imposter Syndrome

Clance and Imes (1978) first used *imposter syndrome* to describe highly successful people who have strong feelings of fraudulence and low self-esteem despite their achievements. With this syndrome individuals “believe that they have been fooling everyone (colleges, friends, professors) and have high levels of anxiety caused by intense fears about being found out by those around them” (Turman, 2001, p. 123). Lewis (1988) studied the imposter syndrome in adult women students. Women face many roles in life and are expected to achieve but also by society they are expected to be nurturing and give up their success for appropriate nurturing roles (Studdard, 2002). All

through Sharon's interview, we shared the same feeling of being inadequate and unworthy of our accomplishments and the fear of someone finding out we are "truly not smart." At the same time we shared a strong drive to continue and a sense of accomplishment. At times it is as if we work hard to "hide" who we are so people will not take our accomplishments away. Sharon explains, "I was fooling them all and I guess in some sense I felt that I fooled them all. What if they found out that I really am not smart, and Crista, the honest truth is that sometimes even today I think I am still fooling the whole crowd." Sharon mentioned many times in the interview the idea of fooling people about her abilities and her successes. She even stated that when she graduated from undergraduate school she would not allow the college newspaper to do an article on her about her learning disability because, "if anybody finds out I can't read they are going to take away my degree...you are afraid somebody's going to snatch it away from you."

Throughout the interview Sharon contrasted times of feeling inadequate with the success of her career. She seemed to struggle with her accomplishments and whether she was truly worthy of the success. "...if anybody finds out I can't read, they are going to take away my degree. There's so much of that you strive for success and you're afraid somebody's going to snatch it away from you and say, not valid, she really can't read. (laughing). I think they would be embarrassed to know that I got through without reading." Lewis (1998) and Studdard (2002) suggest that many women in higher careers struggle with their accomplishments and the many roles they have in life. Sharon seems to struggle with the imposter syndrome concerning her learning disability. With the

dichotomy of feeling inadequate or not really being smart and “fooling” the world with this strong determination to continue, Sharon expressed feelings that are common to many adult successful women. One question that does arise is, are Sharon’s feelings intensified due to her disability?

Despite these factors of feelings of being stupid, fear of rejection, hiding her disability, shame, and the imposter syndrome, Sharon has persevered to become a successful scientist. What made her continue?

Sharon exhibited many successful strategies in her life to excel in her field. Throughout her interview six themes stood out when we discussed how she became a successful scientist with a learning disability.

Desire

Early in Sharon’s life she demonstrated a high desire to get an education and later to become an engineer. The first time Sharon heard of an engineer in seventh grade she decided to be one. “The idea of using those kinds of tools to solve problems is what I wanted to do and I guess because I excelled in math and science I figured that is where I would apply myself so that’s why I went into engineering.” Later in Sharon’s life when she left college and then returned, she came back stating, “I wanted an education...I came back knowing I really wanted the education.”

The reason for Sharon’s desire to be an engineer seems to stem from what subjects she was good at in high school. Although this is a bit unclear, what is clear is that her desire to become an engineer was a strong factor in spurring her on amidst many obstacles.

Resilience/Determination

Sharon has succeeded in her career by determination and resilience. She has faced many challenges and obstacles, but she has persevered in her academics and in her career as a scientist.

It's just you feel like you have to work 150 percent to get 100 percent credit, all the time, and that's how it is. At some point you say, well that's an investment I'm going to make because I care that much. I wanted to do well I would put in X amount of time to do well whatever it took and I felt I needed to. Everybody is happy with my work because I work really hard, but I work harder than everybody else to get the same results.

When discussing her advisor in college and his negative attitude toward her Sharon stated, "I got a lot of negatives from him and I didn't succeed because of that. I succeeded in spite of that." This comment accurately describes a strong, resilient woman with the drive to succeed and to work for her goals, no matter what obstacles she faces.

Mentors

Many authors have found that successful adults with learning disabilities have found mentors to encourage them in their careers (Fink, 2002; Gerber *et al.*, 1992; Higgins *et al.*, 2002; Litner *et al.*, 2005). Sharon used mentors throughout her education and career. In school she had a teacher that became a life long mentor, "a fifth grade teacher, um, I ended up getting straight A's in a class and then I actually had him fifth and sixth grade which was a good positive behind that. Uh, he's actually a teacher I still

keep in touch with, uh this many years later, and across, several moves across the country...He did make a good impression so and he still is out there cheering.”

As Sharon talked about her mentors she described how valuable they have been to her. It is interesting to note that she had disclosed her learning disability to some of her mentors but has not disclosed it to others.

Having somebody to cheer, a mentor, is a tremendous value...I have had several. Even at work here there are mentors that have kind of helped me along and I think I have been successful primarily because of that. Not all of them have I disclosed to, but I think there is an invaluable commodity I think you can get from having a mentor and any kind of mentoring that you can offer the kids with disabilities would be tremendous.

Sharon had found an invaluable tool to encourage and validate her in her education and career. She does recognize that mentors are a big part of why she has been successful in her career.

Comparison with Non-Learning Disabled Peers

Within the interview with Sharon a major thought point emerged regarding her learning disability. She compared her skills to the skills of people without learning disabilities. People with learning disabilities develop their own way of learning, and they developed a set of skills to help them succeed in their lives. These skills have been noted as characteristic of successful people with learning disabilities. Sharon recognized this and stated, “somehow I think that if everybody measured according to my strengths, they would all do poorly....If you measured people by my system and if they measured them

by my system they would fail.” This is an interesting comment on comparing herself to others without learning disabilities. Throughout the interview Sharon said she felt inadequate compared to others because of her disability, yet when she stacked up her strengths against others, they could not pass.

Coping Techniques

Sharon had succeeded in spite of the many obstacles in her life. She has had to learn coping techniques to manage her learning disability. Two main types of coping techniques emerged from the data: positive and negative coping techniques. Positive techniques are used to help the person with the disability in their life. Negative coping techniques have consequences and results that do not benefit or assist the person with learning disabilities. Sharon used three positive coping techniques to succeed: listening, writing, and negotiating.

Listening and Writing. Sharon has a disability which makes her ability to read and comprehend material extremely difficult. During her studies and career Sharon said that most of her learning and success happened because of her ability to listen and take excellent notes. “So I use my strengths of listening, I use my strengths of taking notes, I listen to what other people say before I read a lot of stuff.” When in college Sharon realized that if she listened to what people said and then wrote it down, she could remember the information. “And then I have learned I take a lot of notes and I um, I think through college that was my means of survival. I just write everything down. It’s more of a stream of consciousness when I’m in class. I just write everything down. And,

there's something about writing it down that imprints it on my brain that if I wrote it down I don't need to see it again, ever maybe, but by writing it down I learn it.”

Sharon also keeps a private journal with her at all times. When she thinks of something or has new ideas, she enters them into the journal. This idea of writing down her thoughts and ideas as she gets them helps her with her learning and to organize her thoughts.

Negotiating. To receive accommodations in college, students with disabilities have to present a letter to each professor stating they have a learning disability and conveying the accommodations they should receive. The professor is required to make these accommodations by law. In reality many students are denied these accommodations because of professors' incorrect beliefs. Some of these beliefs include that it is unfair that a student with a learning disability gets more time on a test than other students, that this somehow tips the scale to the advantage of the student with the learning disability and is unfair to the other students in the class. Sharon soon realized the reality of getting these accommodations and what more she might need for accommodations to really succeed in her course work.

Within the system of going to the professor with the letter, Sharon soon learned how to negotiate for her accommodations. She was allowed time and a half on her exams but realized this was not enough and negotiated for unlimited time. She soon learned that negotiation was a large key to her success.

I was supposed to be given time and a half to take my tests and I always negotiated for unlimited [time], which was almost unheard of. I want you to trust me to take

as much time as I need to take this test, if you put a time limit on me, and what I ended up negotiating for was on the first test don't put a time limit on me....I bent over backwards to minimize the pain and stress to them, but the time limit I negotiated with. I would say negotiation is some skill that I have really learned that has been helpful to me. That whole negotiation process is a good thing and to say okay, well, lets not get scared about this but to give me unlimited time the first time and negotiate from there and if it is a problem then we will figure it out....But figuring out how to do that (negotiation) made it possible for me to be successful and without that I would never have fooled them all.

The three positive coping techniques that Sharon learned to use were listening, writing, and negotiating. She had learned them well and utilized them in her education and work settings. During her life Sharon also developed a negative coping technique.

Passing. Sharon developed the negative coping technique of passing. For Sharon, passing still occurs in her work life. Sharon passes to avoid disclosure at work out of fear that once she discloses her disability she will be rejected or fired.

I couldn't tell him that. I have only been here in this position, I moved across country a year ago, so I have only been in this position for a short time and I am thinking he is doing my performance review this month. I am not going to tell him I have a disability. I am not going to tell him I am stupid. I mean somehow in my brain disability and stupid is like as in everybody else's brain. Everybody else thinks disability means stupid. I mean what is there that is wrong with you, and I

just can't disclose that. So I hide it. It is this whole hiding thing, I hide the fact that I don't read, I don't tell people that I don't.

From her statements above, it is clear that Sharon's rejection by others has driven her to avoid disclosing that she has a learning disability to her boss.

Summary

Sharon is a strong woman who has overcome much in her life. Her drive to be a scientist has given her the resilience and persistence to continue despite her obstacles. If you met Sharon on the street you would see a strong, intelligent woman who is at the top of her field and a wonderful mother. If you sat down and got to know her, you would realize how much Sharon has overcome and how much she is still challenged by her learning disability. She is a positive role model for many women out there who are struggling to become scientists.

My last question for each interview participant is, "Is there anything you would like to add?" Sharon responded in a great way that sums up the idea of living with a learning disability. "How does a disability affect everything? I mean its not like it is a linear thing. You can't separate it from yourself. You can't say I have a disability I mean things like I am male or female, are black and white kind of the things you have to deal with. A disability is different. I don't know how to explain it or how to really understand it. It affects everything I do and how I think."

Mont – "The Passion Has to Be There."

Mont was my third interview. I was both excited and intimidated to meet him, as I knew part of his life story already from reading about him in another text. This scientist

also overcame much to become who he is, a respected, well-known paleontologist who has made many important discoveries about dinosaurs.

Mont was a very nice man. When I meet with him and talked it was as if we shared a bond. We both realized what each other was talking about when we were discussing issues and problems with learning disabilities. After meeting Mont and reading his life story I would describe him as passionate, driven, an advocate, confident, and challenging. Mont has written his own life story and it is available online. Because of this, I will use his words for his story.

Mont's Story

I² was born just after World War II, and at the time there were precious few places to live in any town. My father and his business partner had started a gravel business. Our first family home for the summer was a canvas tent right on the premises. Father kept a bull snake in the tent to control mice and other critters. Rocks and reptiles were part of my life from the start.

I found my first dinosaur bone at the age of eight during a fossil-hunting trip with my father. Mother supported my interest by driving me to pretty much all of my subsequent fossil-finding destinations. Mother loved to travel and wanted more than anything to see the world.

Kindergarten through eighth grade was extremely difficult for me because my progress in reading, writing, and mathematics was excruciatingly slow. I would never stand to read out loud in class, even if the teachers threatened to

² Mont's story was obtained online by his permission. Due to confidentiality rules from the Institution Review Board the website address can not be disclosed.

give me failing grades. Eventually, I managed to graduate high school, but just barely, having received Ds in all required classes, including English, in which my grade was a D minus, minus, minus. The teacher told me that this was essentially an F, but that he never wanted to see me again. That was indeed the last time I saw him, but I did send him a copy of my first book!

There was, however, one area of school in which I excelled: science projects. After an inauspicious beginning when, while tinkering with a chemistry set as a boy, I generated an explosion which blew out the windows of my parents' basement, I went on to win several regional high school science fairs. For my senior project, I made an exhibit on dinosaur fossils comparing the dinosaurs of Montana with those of Alberta. It was an ambitious project that caught the eye of one of the judges at a state university where the state fair was held. The judge was a geology professor, and he informally invited me to come to the university and major in geology. I couldn't bear to tell him that my grades were so poor that I might not even graduate from high school.

Amazingly, and to the complete surprise of my parents, I did manage to graduate from high school on time, even though I had average grades below D. Fortunately for me, at the time, all that was needed to enter a college or university in our state was a high school diploma. So in the fall, I enrolled at the university, majoring in geology. One year later I would flunk out and get drafted by the United States Marine Corps.

I re-entered the university, and began where I left off, with a GPA of 0.06. Needless to say, I didn't fare well, and began a series of failed quarters where the Dean of Students would send me my "pink slip." Fortunately I had an advisor who believed I wasn't lazy or retarded, and he wrote letters of support for my quarterly returns to school. He had to write five such letters. I didn't finish college, but did take all the geology and zoology courses that I thought would pertain to paleontology. I also took a few courses in archaeology, microbiology, and even attempted English, but failed. When I left the university I believed I was as good a geologist and paleontologist as any other student at the doctoral level.

My goal in life was simple: I wanted to be a dinosaur paleontologist and make some kind of contribution to the field of paleontology that would help our understanding of dinosaurs as living creatures. To accomplish this I knew I needed a job in a museum, but I also realized that with my college grades and no degree, I might not ever get such a job. I made a living driving an 18-wheeler for a while.

For a year and a half I worked with my brother driving concrete trucks and Caterpillar tractors, but all the while, I dreamed of being a paleontologist. On weekends, I drove 70 miles to a little town where my friend taught high school, and he and I would go out dinosaur hunting. It was never quite enough, so I began writing letters to every museum in the English speaking world asking if they had any jobs open for anyone ranging from a technician to a director. A few

months later, I got three responses. One open position was that of a lowly technician at an ivy league university's natural history museum. I applied for three and was offered all three.

Two years after being hired as a technician, my director saw my potential as a research scientist and promoted me to research assistant. Two years later, I was in charge of my own research projects, with funding from the National Science Foundation. Although I had written the successful NSF grants, I had not been allowed to sign the grants on account of my lacking a Ph.D. As far as the geology department was concerned, however, I was a contributing paleontologist with scientific publications and grants, and was a full member of their research faculty.

In a year or so after arriving at the ivy league university, I saw a sign on campus that was clearly aimed at getting the attention of people like myself. In large letters it asked a few pointed questions like, "Is reading difficult?" "Would you rather watch a movie than read a book?" "Would you rather make a phone call than write or read a letter?" and several other questions that I subconsciously answered affirmatively. At the bottom of this sign, it said that if you answered yes to these questions, you should go to such and such office, and someone would evaluate your learning abilities. The offer was made to the university students, and although I wasn't enrolled, I couldn't possibly pass up an opportunity to find out why reading and memorizing was so difficult. I went to the office and argued to have them test me. Lo and behold! I was diagnosed with

some form or another of dyslexia! The diagnosis didn't make reading any easier, but at least it provided an explanation as to why I would probably never be able to pass even a simple college class, at least without having extraordinarily long periods of time to read and comprehend.

When I was back visiting home for summer field work, I was fortunate to meet a woman in a local town. My friend and I had stopped by her rock shop to identify some fossil bones she and her family had collected some time earlier. As we quickly observed, the bones were parts of the skeleton of an adult duck-billed dinosaur. As we were leaving the store, she showed us two small scraps of bone she had over in her house. The bones were parts of a baby duck-billed dinosaur, one of the smallest examples I'd ever laid eyes on. When we examined the other bones in her house we discovered that she had parts of four baby skeletons, and when we arranged to excavate the remaining specimens for the university, we discovered parts of 15 babies, and the first evidence that dinosaurs cared for their young. It was a major discovery--one that would help transform the way in which dinosaurs are envisioned. I published these findings in *Nature*.

My home state university's museum recruited me. I was able to return to my home state and build a world-class dinosaur research program. We've made numerous further discoveries, named new species of dinosaurs, and built one of the best dinosaur collections in the world. Now, my home state university has a brand new Ph.D. program in paleontology through the department of earth

sciences. My great satisfaction these days is the stimulating interaction with and seeing the success of my students.”

Mont has had to overcome much to become the scientist he is today. When discussed his learning disability he had a positive understanding of his learning disability. His ability to see his learning disability as a good thing for him has helped him to succeed however, this was not always the case for Mont.

Feeling Stupid

This word is interesting to me. As a person with a learning disability I understand the connotation “stupid” holds in one’s life. When you are a child and you know your capabilities but are unable to display them on a test or excel in the classroom like your peers, you begin to wonder if something is wrong with you. You call yourself “stupid.” In his life story Mont contradicted himself about being stupid. When Mont talked about his early years he stated, “You know you feel, it certainly makes you feel different, but I don’t think I ever really felt, I never really thought I was stupid.” Later in his interview Mont stated, “Its pretty clear that people didn’t understand things then. I didn’t either, you know as far as I was concerned, I was stupid. I mean, according to, according to non-dyslectics, I was stupid. I mean I really was, and I admit that still.” There are two main points in his contradiction. First, Mont had come to positive terms with his learning disability. So looking back on his life story he realized that he was not stupid. Based on his contradictions in discussing his life however, it seemed that Mont did have some issues with feeling stupid when he was younger. In that way, he appears to at odds with this in his story. Furthermore, he changed the change of wording in his original

statement. He began by stating that he never “felt” he was stupid but he then changed it to “thought” he was stupid. Feeling stupid and thinking you are stupid truly are two different things. This word change to me, represented his acceptance of his learning disability by using his childhood thoughts with his undiagnosed self.

Science was His Refuge

“As a young kid I didn’t cope well. I mean, I guess, I mean, I thought it was doing okay. I mean it didn’t slow me down from being interested in paleontology or geology, or you know rockets you know things that interest me, because I still could learn at my own speed.” When one starts to read Mont’s story one realizes that his younger years in school were very hard for him. I got a continual glimpse of this during his interview. “Well, there were lots of problems. I mean, all of school. There were always obstacles.” This statement seems true of all of the schooling in Mont’s life. In the midst of the hard times at school however, Mont held on to his love for science and began a personal discovery on his own time.

Yeah I loved science. And I did get a little bit, I mean I really worked hard at science because it was...it wasn’t that I wanted to do well because I knew I couldn’t. I mean I couldn’t, I know there was no way that I could do things the way the teachers wanted it done. And so, in my mind I wanted to learn as much as I could. So I mean I, you know, besides going to school and doing poorly I...I’m pretty sure I checked out every science book there was in our library. And I did science projects when I was all through high school. And I won all of them. And I think that you know people have said that that’s probably how I kept my self esteem

higher, high enough. But, you know, I had a whole year to work on them. I could work on them at my own pace; I could look at material and take as long as I wanted. Mont turned his love for science into year-long science projects. There are strong comments in these paragraphs pertaining to his learning disability and how he handled those ideas as a child. “It wasn’t that I wanted to do well because I knew I couldn’t. I mean I couldn’t, I know there was no way that I could do things the way the teachers wanted it done.” This was a powerful realization for a young boy. He realized early on that he could not learn at the pace the school wanted. So he decided to go off and learn at his own pace.

During Mont’s K-12 school experience, science was his refuge. He was not excelling in school, but he had his science projects to immerse himself in during the year. The projects served two purposes in his life. First, he proved to himself that he could do it. Mont won all of the science fairs in high school. This resulted in a good affirmation of his abilities while learning at his own pace. Second, winning all of the science fairs was a turning point for Mont. “That’s probably how I kept my self esteem higher, high enough.” Winning the science fairs was the beginning of Mont’s growth. He was learning to trust his abilities and believe in his capabilities, no matter what others thought.

Desire

With Mont’s love for science came the desire to be a paleontologist. He failed college seven times. Although he states, “...working with the collections, going to the field with the professors and stuff. Again, even though I was getting failing grades, I still

had a heck of a good time and I was learning a lot of stuff.” Even though he was not passing his courses, his love for learning science, in particular paleontology, spurred Mont to continue. When the university would not let Mont continue he stated, “I believed I was as good a geologist and paleontologist as any other student at the doctoral level. My goal in life was simple: I wanted to be a dinosaur paleontologist and make some kind of contribution to the field of paleontology that would help our understanding of dinosaurs as living creatures. I dreamed of being a paleontologist.”

It is evident that science played an important role in Mont’s life in his younger years. Once he went to college and went into the field, the importance of science turned into his passion. When discussing how to go for a goal one wants he said, “The passion has to be there. It’s really hard, in a non-dyslexic world, you know, you could say this person is sick, you could say they’re disabled, you can say all sorts of things, but they still have to live in the non-dyslexic world.” With the passion came the strong desire to be a paleontologist. Throughout Mont’s story he has many failures, but because of his strong desire and persistence, he is one of the most respected paleontologists today.

Failures and Persistence (Resilience)

Mont had many times when he failed in his life. When talking about his school he stated, “Well, there were lots of problems, I mean, all of school. There were always obstacles. But I sort of have an attitude that I do not give a shit. I was going to get what I needed to get done and obstacles, I don’t pay much attention to obstacles. I mean I’ve had them my whole life, so I am not too worried about a few more.”

Mont's persistence was very evident in his career. He did not graduate from college. As a matter of fact he failed college seven times. "So I went, I got back in and a quarter later I flunked out again. I did that seven times." His continuation in college showed his persistence. After these failures, Mont drove an 18-wheeler and stated that "was never quite enough, so I began writing letters to every museum, asking if they had any jobs open from a technician to a director." Mont never doubted his ability to do good work. When he got a low position as a technician he stated, "It was a position that I knew I could work up from. I mean, I think that's sort of the way I do things. I mean I don't mind starting at the bottom because I know I can go up." That is exactly what Mont did. All through his life Mont displayed persistence to accomplish his dream despite what others expected of him.

No Expectations

Mont attributed some of his success to people having no expectation of him. Mont and I agreed on many things, but I would have to say that he presented an idea that challenged many of my thoughts and beliefs. He stated, "the reason we could (succeed) was because no one had any expectations of us. That is a gift. When people do not have expectations of you, you have a great gift, because you can fail, you can start over again, you can take risks that no one else can. So I mean that to me is the answer. There is a heck of a lot more people that do exactly what they want to do because no one has expectations of them." This idea of succeeding because of no expectations was challenging to me. I understood people having no expectations of you, but this is what drove me to persist in my own life. Then I realized this is part of the idea of no

expectations for Mont. His being able to succeed with no expectations has two layers. The first layer was that if he failed no one would think anything of it because there was no pressure for him to succeed. Mont represents this idea in his interview.

If someone thinks I'm going to go pump gas for the rest of my life, you know, and I get out and try college and I fail. No one expected me to pass anyway. It didn't matter. You know, I didn't expect to pass. But you just keep pushing, you just keep trying. And that's my message. Just keep trying, I mean the best thing of all is when people don't have any expectations of you. I mean you can't go wrong.

The second layer of no expectations was that he was going to succeed in spite of no expectations. This layer was not so obvious with just his words in the interview. This part was obvious to me the first time when he was discussing it by his changes in tone and body language. Mont presented this idea a few times in his interview. The first was in the discussion about the English teacher who gave him a "D minus, minus, minus" and told Mont that he never wanted to see him again. "It means that you have failed English, I don't ever want to see you again. And I didn't want to see him anymore either. And actually, you know, in retrospect, I learned more from him than any other teacher. Um, and I sent him a copy of my first book." The next time you see this in Mont's life was in the receipt of an honorary doctorate from the university in which he failed seven times. Mont in discussing his honorary doctorate and stopped to note, "The person who hooded me, who put my doctoral hood on, was the person who flunked me out seven times." The idea and theme of no expectations has been a freedom for Mont in his life. I

also think it has been a challenge in his life; a challenge to prove to others that he can and would become a paleontologist. Although Mont has had his failures and no expectations to succeed from others, he has persisted in his life and career. An important aspect of his ability to persist was his acceptance of himself and his learning disability.

Acceptance of Learning Disability/Advocate

Getting diagnosed with a learning disability and acceptance of a learning disability are two separate ideas. Many people are diagnosed with a learning disability but have a hard time accepting it. Acceptance of a learning disability is the ability to know one's strengths and limitations and to be proud of who and what you are. Mont has come to a point in his life where he fully accepts his learning disability. When asked how he feels now about his learning disability he responded, "I don't feel bad about it, that's for sure. I think it's a pretty cool thing actually." Mont has fully accepted the good and the limitations of his learning disability. When asked about obstacles, Mont stated, "I mean you know there are some things I can't do. You know if somebody says, when to do these books by (reading) noon on Thursday I'm not going to do it." With his acceptance of his learning disability comes a confidence in himself and the ability to be an advocate for others.

Comparison with Non-Learning Disabled Peers

For most of his school years Mont was compared to the "normal" school system. He did not fare well. He was not able to go through the school system as most of his non-disabled peers. However, he succeeded in spite of the system, a system that was created by people who could master it and who did not have learning disabilities. When

comparing himself to peers who do not have learning disabilities Mont stated, “One of these days, us dyslexics are going to run the world and they (non-learning disabled peers) are going to be just as stupid as we were. You know, I mean if we did give the test and they had to do it our way, they would be just as stupid as we were.”

Mont discussed ways that people with learning disabilities have learned to succeed in the system. Mont clearly worked hard to succeed. He said that people with learning disabilities must develop new ways to successfully complete tasks. Mont then supported his idea by saying that non-learning disabled people could not measure up to learning disabled people. “Because they can’t...because you know, most of these people can’t synthesize. They can’t, you know, they have a really hard time with the big picture. They are so full of memorizations and stuff that they, that it’s just, they just, it’s hard for them to be creative.”

As a person with a learning disability, I might have to agree with Mont. It seems that we all have developed unique ways to “make it” in life. We have had to work harder, and longer. We have also had to find unique ways to successfully complete tasks that are difficult for us. Mont had to be persistent to succeed in his field. Another way for him to succeed was to develop relationships with others to help and encourage him along his path.

Mentors

The first mentors in Mont’s life were his parents. In his autobiography he writes, “Success, I think, must be measured by the standards one meets in achieving it. My father’s high expectations, as severe and unreasonable as they sometimes seemed in the

face of my mysterious disabilities, inspired me. But they might have been merely oppressive, or even destructive, without my mother's understanding and encouragement." This passage reveals that both his mother and father inspired him, yet in very different ways.

All through Mont's life story one can see the role of mentors who helped and encouraged him in his career. During the interview with Mont one thing that touched my heart was that he kept the letter from his advisor at his undergraduate university to help him continue in his studies. He keeps this letter with him. He looked for the letter to show me and stated, "And then he wrote this letter, my advisor, that said that they didn't understand what was wrong with me. He didn't know what was wrong with me but uh, but it was clear that I was very interested in paleontology and knew lots about it but I always failed the tests." This was the first time in Mont's life that he had validation of his academic abilities from someone he respected.

Throughout his life Mont has overcome obstacles through persistence and various strategies. Many of these successful strategies have been internal to Mont to help him find his dream of becoming a paleontologist. He also developed specific coping techniques to help him continue with his work and life while living with a learning disability.

Coping Techniques

Mont has developed certain coping techniques to succeed with his learning disability. Three main techniques emerged during his interview: questioning skills, editors/personal assistant, and books on tape.

Questioning skills. Mont's learning disability "is both visual and auditory. I mean I, I can't assimilate material in my head any better when I'm listening to someone than I can when I'm reading." Because of his problems with listening and reading, Mont has learned to ask many questions. When he was younger his parents thought he was deaf because he asked so many questions. Today he is known in his teaching for his questioning skills. "Students describe me as a Socratic teacher in that I seldom give a direct answer to questions, but rather answer with other questions. Usually the questions that I ask have no particular answer anyway, and the exercise, or ordeal, depending on the student's outlook, is intended to reveal rather than test. I teach the way I learn." His questioning skills have allowed Mont to excel in learning and to excel in teaching.

Co-authors/personal assistant. With his difficulties in writing Mont has coped by utilizing a personal assistant and co-authors. Mont described how his peers and his co-authors help him. "If you'd have been here yesterday you'd have seen a paper finished and submitted. I had a colleague from Berkley, he spent a week here and we wrote the paper. And he sat right there at that computer and typed it in. And the week before I had another colleague from Berkley and we wrote another paper."

When describing one of the best things he has done, Mont talked about his personal assistant. "He has been with me for more than 20 years. And so, and he does, he is very good with paper and administration, and he takes care of all of it for me so he is the administrative director of my program. And I trust him, and he, so we work as a team and he knows, you know, what decisions I need to make and I trust him with the decisions for the department. And so, you know, we now have the largest dinosaur

research program in the United States. But, that's the only way it could be done because the administrations, the administrative staff would have pulled me way down. I mean I just, there's just no way I could do it. So, and that's, you know I really do encourage people like us to get someone they can trust to help." Mont realizes that for him to succeed and to work as a paleontologist he cannot do all of the paperwork. Instead he utilizes a personal assistant to help him and he trusts his assistant. This is an important idea for Mont and other people with learning disabilities. Mont stated it above, but throughout his story you realize that Mont has found people he can trust to help him achieve his goals.

Books on tape. The last coping technique Mont has used is books on tape. Mont likes books and has many books. Many times however, he utilizes books on tape. Furthermore, he encourages his students who have learning disabilities to use books on tape for his class. Books on tape are an excellent resource for reading disabilities. For myself I used them in my classes to keep up with the reading assignments.

Summary

The story of Mont is very inspiring to any individual with a learning disability. His is the story of someone who failed college seven times with no one expecting him to succeed. Instead he had such passion to be a paleontologist that he worked hard to succeed and became a prominent scientist. When discussing failure Mont stated, "It can slow you down. You know when you have failed, and everybody knows it. I mean everyone around, your peers, knows that you have failed." Even though he failed, he overcame the obstacles, accepted his learning disability and developed new viewpoints.

“But I sort of have an attitude that I do not give a shit. I was going to get what I needed to get done and obstacles, I don’t pay much attention to obstacles. I mean I’ve had obstacles my whole life, so, I’m not worried about a few more.”

This statement was the source of my title for Mont’s analysis. After all of the obstacles, he still had the passion and persistence to succeed as a paleontologist. His story is truly inspirational to all, whether one is learning disabled or not.

Barbara – “No Ahaa Moment.”

Barbara was the last participant for this study. Barbara was the only participant in this study with attention deficit disorder (ADD). Barbara has a master’s degree in physiology and biophysics. She later went on to earn her medical degree. Barbara is retired from being a neonatal physician and is in her fifties. When communicating with her by email she was very open and interested in sharing her story. Unlike the other interviews, meeting Barbara did not make me nervous. Instead, I was very excited to sit with her to discuss her life story. By this time I had three different experiences and was looking forward to learning about Barbara and her life with attention deficit disorder (ADD).

The first thing that I noticed about Barbara was her strong character and wonderful laugh. One thing that Barbara and I shared in common was our love for animals. She has quite a menagerie. Her dream is to have a farm with many animals. When meeting with Barbara, I was very welcomed. She also introduced me to her animals.

The analysis of Barbara's life story initially created a hard time for me. She jumped around a lot, which made the analysis difficult. Then, I realized that her speech patterns were similar to the way she takes tests and does things on a daily basis. This was exemplified for me when in the interview. Barbara knitted which allows her to sit for long periods of time, and watched a muted soccer game on television. While we discussed the main interview question Barbara stated that it was hard to think of her life linearly. However, she did have a list of four adjectives to describe herself. Her adjectives and mine are the same. These are: athletic, animal lover, artistic, and intellectual.

Barbara's Story

Barbara is a neonatal physician with a masters' degree in physiology and biophysics. In her early years at school Barbara excelled and was put ahead a year in first grade. She attended private schools and was very active in tennis, swimming, and gymnastics. She also took lessons in music, painting, and skating. When she was not in a lesson or playing sports she enjoyed riding her bike and drawing.

Barbara also loved animals and saving animals that were hurt. When her family suggested that she become a veterinarian when she grew up, she would state say that she wanted to be a doctor. She did well in math and science in high school and enjoyed biology. While in a rigorous prep school Barbara worked very hard for B's. This experience gave her the impression that she was an "okay" student.

Barbara chose to attend a small university so she "would not get lost in the shuffle of people." During this time she excelled in school. She realized she had a good

work ethic from her prep school day and that she could successfully manage the work. Barbara then went on to graduate school. There she had a problem answering multiple choice questions. In undergraduate college most of her test questions were essays, which allowed her to easily demonstrate her knowledge in a subject. In graduate school however, all of her tests were in multiple choice format. Because she had difficulty with the tests Barbara went to a counselor for help. The counselor asked her about her study habits and helped her to change her study skills. With the help from the counselor and hard work, Barbara soon learned how to take these tests, although her way of taking multiple choice questions was more scattered than just sitting down and answering each question in order. However, Barbara was not diagnosed at that time.

After graduate school Barbara went on to medical school. In medical school Barbara found a field of study that fit perfectly with her learning disability. She became a neonatal physician. Within this field she could work with patients while bouncing back and forth from working with patients to working with and the families. She stated that she choose a field of study that was most like being a veterinarian.

Barbara now is retired from medicine and focuses mostly on activities and arts. She is happily married and has three children. Her confirmation of ADD came when her son was getting diagnosed with ADD. When he was going through the official diagnosis she realized that she had ten out of the fourteen characteristics associated with ADD.

Coping Techniques

Barbara uses many different ways to overcome her ADD. The strongest are her coping techniques. With her learning disability Barbara has a hard time spending long

amounts of time on task, and she is easily distracted by other things. When discussing a talk with a study counselor about her methods for studying Barbara stated, “Well what do you do when you sit down to study and started going through the process and some how she brought out that so you sit there for five minutes, ten minutes, and you are reading and then what happens. And I said well the plant needs watering or the dog needs feeding or my pencil broke and I need to find the sharpener, something happens, and the next thing you know I am not studying, and I have kind of puttered my way through three more projects and that would be the first inclination.” With the problem of being easily distracted Barbara has found ways to be able to complete her work and stay on task.

Scheduling/Rewards. Barbara’s first coping technique to succeed with her studies was to schedule short time periods to study and reward herself for studying that length of time. Barbara has a hard time sitting down and working for long periods of time. So she would make a study schedule with fun things to do as a reward for studying the scheduled amount of time. She began slowly, with fifteen minutes of studying then a break. She eventually worked her way up to forty-five minutes of work with breaks. “In high school the academics were extremely challenging and I used to make lists for myself. I will read for fifteen minutes, then I will do my math. That was a reward for me for reading for fifteen minutes then I can draw for a little while.” Later on she stated that working with the breaks really helped her. She still uses this strategy. “I actually still do that, when I was at State we did a lot or reading and a lot of work on research papers and

projects and such. And if I could sit for 45 minutes then I would walk around the building and walk around outside.”

Activities. Another coping technique that worked for Barbara was to be involved in many activities. When she was growing up her mother had her in many different activities. She now thinks she managed her ADD in that way. “I think my mom managed it by keeping me busy in many activities. I had a lot of activities and I played tennis and was on the swim team and on the gymnastics team and did a lot of activities to keep me busy.” With all of the many activities, Barbara was involved in things that kept her interested. Working for rewards enabled her to participate in many sports and interests.

Barbara credits her coping skills as a large part of her success. Her coping skills allowed her to get through undergraduate, graduate, and medical school. Other traits, however, drove her to continue during the hard times.

Desire

Going to college was never a question for Barbara. Her parents had enrolled her in private schools that prepared her for college. When she entered undergraduate college she really did well. When she went to graduate school for her master’s degree and then to medical school, however, she did not do so well. When she discussed medical school Barbara said, “I have always wanted to go to medical school.” Her drive to get her masters and go to medical school was strong. When she started having problems in college she went to a counselor for advice. She did not want to change majors or give up. Her advice to others with ADD is that, “they should do what they are passionate about.”

Barbara worked hard to become a scientist and a doctor because she was passionate about the area and about helping others.

Science Was Innate Characteristic

For Barbara the idea of going into the field of science began “somewhere around eight.” When discussing why she went into the sciences she stated, “But it is something I have always wanted to do and I don’t know why I have always wanted to do it. I just always wanted to do it. I clearly preferred math and science.” For Barbara the desire to have a career in science was her own. Her parents did not have careers in science but she clearly wanted to go into biology and medicine at an early age. She had a strong love for animals and a desire to help others. These innate characteristics to help others and to inquire about things around her drove her to continue on.

Empathetic

Barbara has a strong desire to help others, which is right in line with the medical profession. Her desire to help others was coupled with an empathy for her patients and for others.

I often thought that they should make a position for people who translate what the doctor just breezed in and said. You know they walked in and said something and then walked away and the family is sitting there going yeah, and I would like to be that translator person because I really think that most doctors don’t want to interact with how the family really feels about what they just told them. They want to just drop the information and go away and I don’t mind sitting down and

talking; which is emotionality and personal connection that people get with a close friend.

Barbara has a passion to help people in her field yet ironically she does not think of herself as a good friend. “I would say I am a very good superficial friend. I would think that is not a nice thing to say, but that is kind of how I feel about myself.” Barbara sees herself as empathetic to her patients and others in her career but outside of work she thinks she does not make a good friend she attributes this to her work load and her ADD, which does not allow her to sit and communicate with friends.

Acknowledgement of Learning Disability

Barbara did not get confirmation of her ADD until her son was tested. “When our son was diagnosed, I as a physician looked up the DSM-III ratings and called my husband and said Chance has got 12 out of 14 and I have got 10 so I kind of knew.” When I asked her about her learning disability she said that she recognized that some times she felt that she might have something, but she did not give it much thought. When entering college Barbara had some insight about her limitations, she asked for a college roommate her freshman year who was studious. Barbara felt that if her roommate was staying in her room to study, she would also. “I requested a roommate who was extremely studious, someone who described themselves as studious, and perhaps if somebody else was working really hard then I would work really hard too. So I did have some insight then to it.” She referred to this as an insight about her learning disability. Other times in her undergraduate career she also alluded to some idea of her ADD. To stop amphetamine use, in undergraduate school, the college offered Ritalin free to

students. Barbara took some Ritalin and said, “I did it once and found it really does not help me stay up. It helps me sleep better. And I kind of had a bit of a clue then but never really thought about it.” It is interesting to note that after Barbara talked about finally realizing she had ADD like her son she said, “I don’t know that I ever really had an Ahaa moment with it.” From her previous statements it seems realistic that she would not have an Ahaa moment. Instead, Barbara received confirmation of something that she had suspected about herself for a long time. Barbara went through her educational career and some of her work career without a name for her disability. Instead, she learned how to succeed by developing coping strategies, knowing her limitations, and accepting a nameless learning difference that was different from her peers.

Picking a Career That Fits Her Ability

With an understanding of herself, her study habits, and her short attention span, Barbara she found a career to fit her abilities. When asked about why she became a scientist she stated,

What I choose to do is very well-suited for someone with a very short attention span. In neonatology you very frequently have multiple sick patients simultaneously. So you can pay attention to this one little thing, react to it, bounce over to the next thing and then bounce, oh I forgot to do this, and then bounce back. For the most part it is good to do this, come back and check, come back and check thing. So I think I was well suited for what I was doing.

With this understanding of herself and her need to complete multiple tasks at the same time, Barbara was able to find a position in medicine that worked well for her.

Perception of Success

Barbara had said that she had found a job well suited for her. I was surprised, however, by her answer when I asked her how she perceived her success. She claimed that she was very “mixed” about it.

In terms of being a good doctor, I think I am a good doctor. Taking care of my patients I think I do that well with families. In terms of being a researcher I frequently felt like I couldn't narrow down to the simple question. One of the problems that I get into, and I do this with my art as well, is I start out with something that is simple, oh and this is a great concept idea then as you start to solve for variables or try to control variables you find out there are too many variables to control....So, I don't know. I guess that I am not sure, there were some things that I did that I thought were well done. And then there were other things that involved compromise that I just did not like.

Barbara perceived that she was good at the empathetic part of being a doctor, but not so good at the researcher part. During her career she “worked too many hours” and she “really soured on medicine,” and then she retired. When asked why she retired from medicine, Barbara responded that she started to get dissatisfied with the way things were going. Politics and paperwork, instead of the human side of working with her patients, were more and more prevalent. It is interesting to note that if you were to ask someone in practice about Barbara, they would say that she built one of the best neonatal programs in her state and that she is still recognized for being one of the best in her field in the area. The difference in Barbara's perceptions of those of success and how others

in her field demonstrates how individuals with learning disabilities often do not truly perceive their success.

Squelching Her Love for Art

After retirement, Barbara focused more on her art. She is a very artistic individual. She loves to paint and create.. It is interesting that Barbara said that she could not be artistic and pursue her education at the same time. While practicing medicine, she said that she did not have time to participate in things she enjoyed. When really focusing on her artistic side, Barbara tells an interesting story;

The artist, and I can tell you, the day the artist got knocked out of me, beside the fact that there are little bits and pieces perking through, I was in tenth grade when my English teacher realized I was doodling along the margin of my notebook, and smacked the ruler down on the table and said, ‘Stop drawing. This is English class.’ And she would check my English papers every day. You took the creativity out by doing that; the imaginative aspects are gone. I cannot do that anymore. And I took ceramics class and I took dance classes in college. I did not do art, but I did draw on the side in grad school. I did a little. And after that I did not do anything until I started knitting, and then I started painting and then I started making bracelets and then I said this artist inside of me has been knocked out way too long and it is time to let her out and unfortunately work was overpowering all.

Summary

Barbara worked very hard to succeed in her field as a researcher and a scientist. She earned the respect of many professionals in her field. Yet, she perceives her success as mixed. She became successful in spite of an unnamed issue that made learning more difficult for her. She embraced her artistic and athletic side after her retirement. Currently, Barbara is enjoying her time with zeal. When asked about advice she would give to individuals with ADD who want to become scientists, Barbara said,

So there are all of these little things that set people off (ones with ADD). But you know some of these kids they cannot sleep at night or they are very loud or they are very active or what ever the issue is there is a place for them somewhere in the world. Somebody needs to be up all night long making the big machines work or being the night shift manager or whatever. So all of these things you look at in a person are extremely annoying traits in a ten year old or a twelve year old are not necessarily useless traits. They are valuable traits. And it is a matter of focusing and funneling and getting them where they need to be. It is a question of how bad do you want it and what sacrifices in your normal behavior are you willing to put up with to achieve what you want.

This statement reflects what I know about Barbara and the ways she created to she succeed in a career with ADD.

Cross-Case Analysis

Each participant's thematic analysis demonstrated major themes in each scientist's lives as they learned to adapt and succeed with a learning disability. All four participants had different struggles. Each faced a different obstacle in the path to becoming a scientist. Each participant has a learning disability for which they had to develop skills and strategies to succeed. Each story is personal and unique, yet among all four, I found common themes that helped them to succeed as scientists. These themes are:

- passion for science.
- drive/determination.
- no ahaa moment.
- acceptance of their learning disability.
- career goals by early teens.
- careers chosen based on strengths.
- development of coping techniques.
- better skills than non-learning disabled peers.
- mentors.
- feelings of stupidity.
- women's perceptions of their success.

Passion for Science

Love of science is the first theme common to all four participants. All participants knew that they wanted to be scientists at an early age. The two men

developed their love for science outside of the classroom, both starting with science projects and experimenting on their own time. Mont's love for science, for example drove him to compete with science fair projects and win every year. With a strong passion for science, they each had a strong drive to continue with their education to become a scientist, no matter what obstacles they faced.

Drive/Determination

With their love for science, each participant also had a drive to become successful scientists. With this drive came a determination that each participant clearly demonstrated. Barbara stated that by age eight she knew she was going to work in biology and be a doctor. Tim failed physics in undergraduate school but continued on in genetics. Mont failed undergraduate school seven times and became a prominent paleontologist. Sharon was told by many people in her life that she could not be an engineer, yet today she works in the rigorous field of aerospace engineering. Each demonstrated a strong determination to continue on to become a scientist.

No Ahaa Moment

Barbara used this expression in her interview. She stated that there really was not a light bulb moment, where it all clicked, when she realized she had a learning disability. Instead she thought, "Yeah, what's new." Each participant experiences this in his or her life. None were shocked by the diagnosis of their learning disabilities. All realized there was something different about their learning processes. This seems to have affected the way in which each participant accepted the disability. Three of the four had to learn to accept their disability they developed coping techniques to survive in the educational

system long before they were diagnosed. The exception was Tim, who was diagnosed in fourth grade and learned his coping techniques at an early age from his mother.

Acceptance of Learning Disability

Imagine a sliding scale with “not accepting” on one end and “full acceptance” on the other end. Full acceptance of a learning disability is the time at which one realizes the limitations caused by the disability, with a recognition of while the strengths, and working with this realization to make decisions. The participants in this study ranged from full acceptance to moderate acceptance of their learning disabilities.

Mont and Barbara fully accepted their learning disabilities. Both recognized their limitations and their strengths. Tim and Sharon accepted their learning disability but have not reached full acceptance. Tim accepted his learning disability on terms that at times have led to conflict when things happened that did not fall within his definition. Sharon realized her limitations but seemed to be unable to fully accept her learning disability.

The ability to accept or not accept a learning disability might stem from choosing a science field as a career. Three of the four participants kept their learning disability confidential, in large part, due to the negative connotation in the scientific community. The result has been that these participants have had to work and learn under the guise of being an individual without limitations. This raises questions. Will they really come to full acceptance of their learning disabilities? What does full acceptance look like in the scientific community?

Mont fully accepted his learning disability and has become an advocate for others with learning disabilities. If we look at this example of full acceptance, then we see that those with learning disabilities must realize their limitations, be able to represent their limitations to others, be forthright in explaining why they have limitations, and seek accommodations. Mont is clear about what his limitations are when he writes a book and works with publishers. A publisher sends a contract to Mont with a time frame. Mont responds by saying, by saying if you want the book when I am done, then you can have it, but he will not sign the contract with the time frame.

Career Goals by Early Teens

Participants knew what they wanted to do in their careers by their early teens. They wanted to be a scientist, but they also knew the field in which they wanted to work. Mont wanted to be a paleontologist at an early age. His mother took him and his brother on dinosaur digs when he was young, he decided he wanted it for his career. In eighth grade, Sharon heard an engineer who came to her school and spoke about engineering, saying that one had to be good in math and science. Sharon's belief that she was good in math and science helped her decide that was what she was going to do for the rest of her life. Tim said he knew he wanted to be a scientist when he was young. He credits some of this to his dad being a scientist, and some to a natural curiosity for science and excelling in science in school. Finally, Barbara knew that she wanted to be a biologist and doctor when she was eight. All four participants chose science as a career at a young age. With a passion for science and with determination, each became the scientist they dreamed of at a young age.

Careers Based on Strengths

Participants built careers based on strengths. For each one, science was a passion, although only three participants did well in science in school. Each participant accepted the learning disability to some extent. With this acceptance came the recognition of strengths and limitations. Barbara, who a hard time staying in one place and focusing for long periods of time, chose a career in neonatology. She bounced around between patients and families, where she could communicate well with her patient's family. Tim majored in genetics because of two professors' recognition of his gift as a cytogeneticist. Mont loved dinosaurs and was a good researcher, who started to study on his own while still a child. Sharon chose a field in which she could excel with her analytical thinking and math skills. Participants chose a career based on their strengths, but it is also important to note that they still had to work within their limitations during their careers.

Developed Coping Techniques

Having to succeed in the educational system is very difficult for students with learning disabilities. Once students graduate, they must learn how to become successful in a workforce. There they have to decide to disclose their learning disabilities and receive accommodations. Each, with or without disclosure, has developed coping techniques to help with succeeding in school and in work.

Coping techniques vary. Tim had dyslexia, which meant that he has problems with reading and writing. He did not write, using a computer or a typewriter for almost all of his work. He also had an editor to edit his writing for publications. Sharon had a reading disability and preferred to communicate verbally. For example, when someone

emailed her, she calls them or talks to them before she reads the email. Mont also had dyslexia and had trouble with reading and writing. He used books on tape and used peers to collaborate with him on his writing. Barbara's ADD meant that she had trouble staying focused and keeping on task. So to keep herself going she used schedules and self-administered rewards.

Tim and Sharon developed a negative coping technique called "passing." Each passed off as an individual without a learning disability in order to succeed at work. Sharon felt that she had to "hide" her learning disability to maintain her career. Sharon saw other friends who were penalized for disclosures of their disabilities.. Tim hid his disability. His incomplete definition of a "learning disability" allowed him to pass on the learning difference without accepting or recognizing his limitations. Instead he just stated that he has difficulties with limitations like an individual without a learning disability.

All participants developed coping strategies to succeed in their careers. They thought "outside the box", which helped them advance in their careers.

Better Skills than Non-Learning Disabled Peers

There is one thought that stood out when I considered the coping skills these participants had developed. All had emphasized verbally or within a story that the skills they had developed made them better than their peers: if their non-learning disabled peers had to use the skills they developed, those peers would not succeed. Mont stated this well, "One of these days, us dyslexics are going to run the world and they (non-learning disabled peers) are going to be just as stupid as we were. You know, I mean if

we did give the test and they had to do it our way, they would be just as stupid as we were.” Sharon measured her strengths against her non-learning disabled peers and said, “Somehow I think that if everybody measured according to my strengths, they would all do poorly. If you measured people by my system and if they measured them by my system they would fail.” Tim had similar thoughts when discussing his visual gift. “I’m a better microscopist than anybody I’ve ever met. I can see um, that coupled with the science that goes along with it, uh, that’s been my career. So basically I owe my career to being visually different from other people.” Barbara discussed this idea when she talked about being sick with her third pregnancy. “A very good friend, when I got pregnant with Sara, our youngest, I was very sick and, you know, throwing up every day, all that yucky stuff. And my friend who was a nurse in our unit and she said, you know you finally slowed down to catch up to the rest of us.”

All of the four participants clearly demonstrated that they developed skills and strategies that they thought their non-learning disabled peers could not develop. These statements clearly reflect a reversal of what they had been told the majority of their lives about being learning disabled.

Mentors

Each story includes stories of obstacles, having to get back up, and keeping on going. All participants sought out mentors to encourage and guide them in their careers. In their younger years, mentors were not always their parents. For most of the participants, a positive teacher became a mentor to encourage the student through school. For example, Sharon described a teacher in school, “a fifth grade teacher, um, I

ended up getting straight A's in a class and then I actually had him fifth and sixth grade which was a good positive behind that. Uh, he's actually a teacher I still keep in touch with, uh this many years later, and across, several moves across the country. He did make a good impression so and he still out there cheering."

All participants' lives some mentors did not know about their learning disabilities. For example, Tim stated, "Well, anyone who knew me well knew I did not know my right from my left, but no, I could handle most things." Sharon also discussed mentors with whom she did not disclose her learning disability.

Feelings of Stupid

Mont and Sharon both brought up the issue of feeling stupid. This is a term that I still use as I think of my learning disability. I think that we get this term from many sources, including teachers, peers, and others around us. Sharon recalled a story one of her teachers in elementary school. "I guess, I want to jump back to a fourth grade teacher who actually told me I was stupid, and those are the things that ring in your brain. I mean, how many years later I still remember she told me I was stupid, and you can have all the teachers say that you're good and you do well after that, but just to be labeled that way um, your brain comes back and plays the tape over and over and again. Yes, see I have one person that confirmed the fact that I feel stupid, therefore I am stupid because an adult told me that." Sharon knew that she had a difference in her learning style, her teacher calling her stupid was a validation of her stupidity. Mont never discussed a teacher who told him he was stupid, but brought up the idea in different ways. "It's pretty clear that people didn't understand things then. I didn't either, you know I, as far

as I was concerned I was stupid. I mean, according to, according to non-dyslexics, I was stupid. I mean I really was, and I admit that still.”

Both of these participants brought up the fact that you are stupid if you have a learning disability. This is something that is put into a child’s mind by others. Mont and Sharon brought up this idea when they compared themselves with non-learning disabled peers. They perceived a word based on what they were told by society. They knew there was a difference with their learning style, and outside people validated it by saying or suggesting that were stupid. This also holds true in my own life. I was told I was stupid and that is how the idea began in my head. Over time, Mont learned to accept his learning disability and to not accept others’ definitions. Mont said many times that he has an, “I don’t give a shit” attitude. He learned to ignore these negative thoughts believing them to be invalid. Sharon, on the other hand, still worked with being stupid. Internally she had a dichotomy between feelings of being stupid and feelings of being successful.

Perceptions of Success

The dichotomy between being a fraud (or feeling stupid) and being successful is found in both women’s analysis. Both were successful scientists, but when asked about the perceptions of their own success, both saw it as mixed. Barbara brought this up in her interview. She thought she was a successful doctor but not a good researcher. Barbara stated, “I guess that I am not sure, there were some things that I did that I thought were well done. And then there were other things that involved compromise that I just did not like.” Sharon brought up similar concepts as she discussed her education

and her career. She advanced quickly in her job and received a promotion after three years. Her other colleagues normally are not promoted so quickly. Yet when she discussed her success she said, “What if they really found out that I really am not smart and Crista, the honest truth is that sometimes even today I think I am still fooling the whole crowd.”

Both women exhibited signs of the imposter syndrome, which has been documented to occur in women with advanced careers (Studdard, 2002; Turman, 2001). I wonder as a researcher and as a woman who shares these feelings of inadequacy whether these feelings are shared by all women in advanced careers, or are these feelings exacerbated because of the learning disability?

Summary

The first research question was: What are the life stories of scientists with learning disabilities? This question was answered by the individual analysis of each participant. The second research question was: What can we learn about this underrepresented group in providing career opportunities in science? This question was answered by the cross-case analysis of the four participants. The last question was: How do these individuals construct the understanding of themselves and science, and how do they see the connections between the two? This question can be answered by a German word *gestalt*. *Gestalt* is defined as “a collection of physical, biological, psychological, or symbolic entities that creates a unified concept, configuration or pattern which is greater than the sum of its parts” (Michael, 2006, p. 282). These individuals viewed themselves as individuals, scientists, and learning disabled persons, all in one. With the Americans

with Disabilities Act, the new phrasing encourages us to address people with disabilities as persons who have a disability, rather than to address the person as disabled. In this research and in my own life, this is not true. Disabilities in these scientists' life stories of themselves defined who they were, just as being a scientist defined them. Each part of them combined to make them successful scientists with a learning disability.

CONCLUSION

During the cross-case analysis certain themes emerged in the life stories of these scientists with learning disabilities. In this section each theme will be revisited with current literature, explaining the ways the theme can be used to mentor individuals with learning disabilities who want to pursue degrees in science.

Passion for Science

Fink (2002) found that successful adults with dyslexia pursued interests that they were passionate about. “Their own fascination drove them to read, experiment, and pursue a career that intrigued them” (p. 120). Participants in this study followed their passions. They continued in science despite obstacles. Mont continued in paleontology even though he failed undergraduate school. Sharon continued in her studies despite rejection. To be successful in science, the “passion has to be there” as Mont stated. With this passion comes the drive and determination to succeed. This passion emerged in each participant at an early age.

For students with learning disabilities this passion for science should be fostered. Students demonstrating this passion should be encouraged to pursue their passions with the goal of becoming a successful scientist.

Drive/Determination

Gerber and Reiff (1991) found that successful adults with learning disabilities demonstrated a greater determination to succeed against the odds. Field, Sarver, and Shaw (2003) define self-determination as “a combination of skills, knowledge, and

beliefs that enable a person to engage in goal-directed, self-regulated, autonomous behavior” (p. 339). This study also found that each participant had a strong determination to be successful, no matter what. Tim did not do well in physics and instead of dropping out of school changed his major. Barbara was not doing well on tests in graduate school and had a hard time in school. Both kept on working, learning new ways to succeed and continue in their studies to become successful scientists.

Determination seems to be a quality that some have innately, but some people suggest that students with learning disabilities develop a learned helplessness. A child who demonstrates learned helplessness has been told many times that she cannot succeed and will begin to believe it. The phenomenon therefore squelches any self determination (Field *et al.*, 2003). The present study indicated that each participant had a strong determination to continue.

For students to succeed in science with a learning disability they need to be encouraged to let their determination work for them. Along this line, Mont brought up an interesting point. When he worked with students with learning disabilities in his science classes, Mont said that there was no way to foster this determination. He felt that the student either had it or does not have it. Either way, in this study determination is one of the factors that emerged as important for the participants to succeed in science. I suggest that mentors try to find a method for fostering determination in students with disabilities who do not demonstrate the trait but have a passion for science.

No Ahaa Moment

This is an interesting theme that emerged from this study. Each participant upon diagnosis with their learning disability did not have a “lightbulb” moment. They all realized that they were different early on in life. When diagnosed, they said “Okay, that makes sense.” McNulty (2003) found that people felt they were different before being diagnosed with a learning disability. McNulty’s findings are tied into the findings of this study. There was no “ahaa” moment because all participants had realized previously that there was something different with them. When diagnosed, they now had a name for their learning difficulties.

When assisting individuals with learning disabilities who want to go into science, this idea of no “ahaa” moment might be a way to help them in the process of fully accepting their learning disability. Each participant had a knowledge of their learning disability but no name for their obstacles. As a mentor, discussing with students their learning difficulties can lead to assistance for the student in their learning needs.

Acceptance of Their Learning Disability

Gerber and Reiff (1992) found that successful people had completely accepted their learning disabilities. Higgins *et al.* (2002) completed a similar study on successful, moderately successful, and unsuccessful people with learning disabilities. In their study, they found that most adults with learning disabilities came to some level of acceptance. The unsuccessful and moderately successful adults did not fully accept their learning disability and stopped at the compartmentalization stage, in which they minimized their weakness and maximized their strengths.

In this study, all four participants were successful scientists with learning disabilities. Among the participants two had fully accepted their learning disabilities and two had not. Tim was in the compartmentalization stage and minimized his weakness and maximized his strengths. Sharon was still trying to understand and negotiate her learning disability, as well as come to terms with the meaning of disclosure for her in the work environment. She struggled between the dichotomy of accepting her learning disability, and feared of being rejected or even possibly fired if people found out about her disability. These findings are opposite to both studies mentioned above.

This finding is encouraging to students and adults with learning disabilities. They can still become successful adults while working on accepting their learning disability. As a mentor or a teacher of a student or adult with a learning disability, knowing the different stages of acceptance is important. Encouraging individuals to fully accept the disability will help them bring peace in their lives.

Career Goals by Early Teens

All participants had set their career goals by their early teens. Tim and Mont had their own rocket clubs and knew they wanted to go into science; they began experimenting with science at early ages. Sharon knew she wanted to be an engineer when she was in eighth grade and Barbara knew she wanted to be a doctor and biologist when she was eight. McNulty (2003) also found this in his research on adults with dyslexia: finding a niche in adolescence and young adulthood “could dramatically change a person’s life” (p. 373). He found that “failure to find a niche made for continued struggles” (p.373).

Young adults with learning disabilities should be encouraged to find a niche of their own. My research found that the participants knew what they wanted. This gave them the drive to continue. McNulty (2003) described his participants as having fewer struggles once they found their own niche. In this current study, the participants still struggle, but they have a goal to focus them when they face obstacles.

Careers Based on Strengths

With a passion for science and a niche, all participants in this study found a career based on their strengths. They realized they were good in science and set their goals accordingly. Gerber *et al.*(1992) found that successful adults with learning disabilities “chose work environments that allowed them to maximize their strengths and to compensate for their weaknesses” (p. 15). This is clearly exemplified in each participant. Tim had a visual gift when looking through a microscope. He used this gift for his career. Mont had a passion for paleontology and worked his way to the top. Sharon choose engineering because she was good in math and science. Barbara chose a career in neonatology because she could bounce back and forth between patients and other parts of her job. All four participants maximized their strengths in their careers.

For individuals with learning disabilities, figuring out what they would like to do as careers means that they should look for skills in the things they do well and enjoy. As mentors people should encourage students to go into fields based on these strengths. To find the students strengths career inventories can be used, talking to the student and finding their experiences in different areas, and asking the student what they are passionate about are ways to discover careers for students with learning disabilities.

Developed Coping Techniques

The coping techniques each participant developed to become successful in school and work varied as a result of the learning disability. Many different coping techniques have been documented in literature for successful individuals with learning disabilities (Barga, 1993; Gerber *et al.*, 2001; Gresh, 1995; Reis *et al.*, 1997; Rose, 2000). Barga (1993) extended the definition of coping techniques to include both positive and negative coping techniques. In this study all participants had positive coping techniques that benefited them in becoming successful scientists. Two participants also had the negative coping technique of “passing.” These two felt a need to pass to remain successful in their careers. Notably, the two participants who had not accepted their learning disability are the two participants who used passing as a coping strategy.

To mentor future scientists with learning disabilities one should take care to help them develop positive coping techniques to be successful. Coping techniques range from assistive technology to the use of editors. For people with reading disabilities: books on tape, study groups to discuss the readings, and technology that will scan and read material are all good coping techniques to assist the students. For students with writing problems: editors, software with word processing, and note takers are coping techniques to help them succeed. For all students with learning disabilities: extra time, making a workable schedule with rewards, negotiating accommodations, tape recording classes and quiet time are all coping techniques that can benefit the student. What is important is that each individuals recognize their weakness and find coping techniques to assist them in their endeavors.

Mentors

Numerous research studies have found that successful adults with learning disabilities use encouraging people or mentors as a means of success (Barga, 1993; Fink, 2002; Gerber *et al.*, 1990; Gresh, 1995; Litner *et al.*, 2005; McNulty, 2003; Miller, 1997; Raskind *et al.*, 1999; Reis *et al.*, 1997; Rose, 2000; Spekman *et al.*, 1992). This study had similar findings. Each participant used mentors to guide and encourage them along their paths to become scientists. They continue to do so today in their respective fields. Each participant had at least one mentor in their school years and then as they got into their college years and related field, they identified others to be their mentors.

This finding is an important one for any person who wants to enter any field of study. We all need validation and support as we go along our paths in life. This is also true for all of the scientists in this study. Each had an encouraging teacher and then someone in their college years and now someone in their careers that encouraged them. Most maintained relationships with their early teachers even later on in their lives.

For mentors there are many different skills that can be used. Openly talking with the student about their disability their strengths and weaknesses can assist in the student to accept their disability. The mentor should encourage the student to develop coping techniques and metacognitive skills to assist them when they are faced with challenges in the classroom. Most importantly, a mentor should be there to encourage and actively listen to the student; this will enable the mentor to guide them in their journey.

Feelings of Stupidity

Two participants brought up the idea of feeling stupid in their interviews. Not much research has been done on these feelings. McNulty (2003) described young children who had not been diagnosed with a learning disability as feeling inadequate. Yet these thoughts or feelings are not discussed much in the literature. In my personal story, these feelings were strong. They were verified by two of the participants. This feeling of stupidity is one that each participant has heard early on from teachers, friends, and even family. This negative validation was combined by each individual into their life stories.

This finding is important for any teacher, family member, peer, or mentor. Be careful of what you say! Obviously this negative validation carried on with each participant into their adult years. For future scientists or anyone with a learning disability, a simple comment has a lasting effect. As someone who was diagnosed and thought, “Oh, so, I am not stupid!” this finding is important to remember when mentoring or encouraging an individual with a learning disability to succeed in any career.

Mentors can probe to see whether these findings exist. They can also make notes of students who make derogatory comments about themselves. Cognitively processing these feelings and determining the source may assist students to develop new internal strategies to “correct” the remarks of “stupid” that learning disabled students may be making to themselves.

Perceptions of Success

“The imposter phenomena is an intense feeling of intellectual inauthenticity that is frequently experienced by high achieving individuals” (King & Cooley, 1995, p. 304). With the imposter syndrome is a common phrase of “fooling them all.” Individuals who exhibit the imposter syndrome are high achievers but internally feel that it is not earned (Studdard, 2002). This phenomenon was found between the two women in this study. Both Barbara and Sharon were very successful individuals, but their perceptions of success were mixed. Both lived with feelings of being successful and feelings of being inadequate.

This finding is one that can affect any high achieving individual. Studdard (2002) suggests helping individuals form mentor relationships with accomplished individuals. He also suggests educating the individuals about the imposter syndrome. Studdard (2002) found that women thought that imposter feelings were normal. Mentors can educate them about the syndrome to help their students deconstruct these ideas. Women mentors, in particular, may be very helpful if they, too, have experienced the imposter syndrome themselves.

Why Might Science Be a Good Field for People with Learning Disabilities?

What skill do scientists use in their careers? The skills scientists use include problem solving, engage in experimentation, work with ambiguous situations, and are comfortable with saying “I don’t know, but lets find the answer.” In this research each participant demonstrated success in each skill.

Problem Solving

Scientists use problem solving skills on a daily basis. Students with learning disabilities had to learn and succeed within the “real” world. This means each person had to develop their own set of skills to complete normal tasks. Students with learning disabilities have had to utilize problem solving skills throughout their lives. They have had to develop new ways to learn and this makes them excellent at thinking outside the box.

Engage in Experimentation

Scientists had to engage in experimentation to answer questions. They have a problem, and experiment to assist them in finding their answer. Students with learning disabilities engage in experimentation on a daily basis to make meaning to their learning and their lives. Most people with learning disabilities have difficulty deriving meaning from written words. They have had to develop ways to find meaning. They are more active in experimentation to make meaning and are engaged in the real world. Most do not rely on text for meaning. Instead they are out finding the answers for themselves. This could include forming rocket clubs such as Mont and Tim or going on the side of the road, picking up hurt animals and trying to help them like Barbara.

Working with Ambiguous Situations

In the science laboratory all experiments are not neat with simple answers as usually demonstrated in school classrooms. Instead scientists are working with ambiguous questions in which no answers exist. Scientists have learned to work in conditions with ambiguity. Students with learning disabilities are very confident working

in ambiguous situations. They live in a world where they know they understand the material, but are told differently. They succeed in spite of not having a specific name or reason for why they can not learn or understand the same as their peers. They live in a world of ambiguity. This allows them to excel in problem solving and experimentation in ambiguous situations.

Comfortable with Saying “I Don’t Know, but Let’s Find the Answer”

Scientists work in situations where they do not know the answer and have to experiment to find a solution. Students without learning disabilities do not want to admit they do not know something. They are afraid not knowing something will lower the expectations put on them. Students with learning disabilities often say I don’t know the answer. If given the chance they usually will find the answer. They live in a world where there are lower expectations so they can admit they do not know. With this admission comes the ability to problem solve, experiment, and be able to find the answer in many situations.

Implications for Future Studies

During this study, questions arose which could be pursued in future research. The findings of this research also raised more questions.

The first question that arose in the research was the finding that the two women in the study also displayed qualities of the imposter syndrome. The imposter syndrome has been documented to affect educated individuals. In this study, the question arose as to whether the imposter syndrome is exacerbated in women with learning disabilities.

The next research question dealt with information technology and students with learning disabilities. In this study assistive technology was used by some participants as a coping technique to help them be successful in school or at work. There is much research that tells of information technology and its benefits to students in the classroom. The first question that arose was: Is there a difference for students with learning disabilities to use information technology during instruction. The second question that arose was: Is there a difference between the use of assistive technology and information technology during instruction in the classroom.

Finally, this research found that each participant had teachers who were role models and some teachers who had negative impacts on students' lives. Some research exists about teachers who have learning disabilities. An interesting study would be to examine the perceptions, beliefs, and intersection of theory and teacher practices towards non-learning disabled and learning disabled students in their classroom?

EPILOGUE

Reflection of My Life Story

My life story begins at birth. I identify events in my younger years with which school I was attending. By the time of my diagnosis in college, I identify events in my story with major changes/struggles. In this section I will write my story in regular font and in bold font. Bold font will identify that I am commenting on that particular part of my story while comparing it with the research from literature on learning disabilities. I will also reflect on my life story with the findings of this study and will indicate that with italics. All identifying information has been changed to pseudonyms.

Birth and Early Childhood

I would like to say that my birth was normal but life was “anything but normal.” I was born in September, five days after my father’s birthday. My mother was only in her sixth month of pregnancy when she went to the emergency room because she was having labor pains. She was told it was too soon to have a baby and to go home. Later that night her water broke. By this time the doctors believed her and admitted her for a premature birth. At birth I weighed only three pounds and two ounces.

I begin with these facts because no one in my family has been diagnosed with a learning disability, and when studying the development of a fetus the brain and lungs finish developing within the last three months of pregnancy. This may be one explanation for my learning disability.

After spending four weeks in an incubator and gaining weight to about five pounds I was allowed to come home. The next year of my life was touch and go, with many bouts of pneumonia and collapsed lungs, but I hung on.

This is where I think that my perseverance began. I had to hang on for life in the beginning.

I did not learn to sit up until I was one. My parents tell me that they had to use a belt to strap me in a chair so I would not fall out. I also did not learn to walk until I was two, so in remembering stories my parents bring up the fact that they had to carry me all the time. Despite these two delays in my childhood, my speech pattern and learning rate similar to other children my own age.

Travis Christian Academy

My kindergarten year was a hard year for me. I was placed in a private Christian school that had all-day kindergarten. I started at four, as my birthday was in September when I would turn five. I remember having trouble reading and writing. Specifically, I remember that I had to stay in from recess many times, because when I was learning to write, I wrote d and e backwards or I got p, d, or b confused when writing words. What I remember vividly is an experience I had in art class that year. We were learning how to make hearts. Hearts seemed easy enough when the teacher drew them. First, you draw the right side and then you draw the left side. When I tried, I could draw the right side great, but getting the left side to look like the right side was impossible. I remember getting picked on by some classmates because the teacher had to help me and I still could not figure out how to make hearts. I got really upset/angry and cried a lot during

the day. When my dad came to pick me up the art teacher talked to him and showed him my hearts and I sat there crying. I was crying because I was embarrassed and angry that I could not make hearts and felt 'stupid'. This began my frustration with school and learning.

During this year, especially with the heart incident, I think I began to realize that there was something wrong with me. When I compared myself to kids my age, I was different and had problems doing things that came easy to them. This corresponds to McNulty's (2003) research where children as early as the age of two began to think there was something "different" with them. It also corresponds to Higgins *et al.* (2002) when they define the first stage of accepting a disability as "awareness of a difference."

Like Mont and Sharon, I too began to have feelings of being stupid. Like all of the participants, I realized I was different from my peers.

I remember the next couple of grades as very hard emotionally. In first grade I got punished for not being able to memorize words to a song in choir, and was considered the "stupid one" among my peers. Because of this I was constantly being picked on by peers outside of class. My parents moved me to a different, private Baptist school. I started new with the kids in second grade.

Like Sharon and Mont my feelings of being stupid were reinforced by peers and some teachers. Once I realized I was not learning at the same rate as the others and then they started to notice, it was a validation on their part that I was "stupid."

Central Baptist School

Second grade was fun. I became friends with the class clowns and we had fun. My second grade teacher, Ms. Smith, was very nice and worked one on one with me. I remember the whole class helping me to finally learn how to tie my shoes and cheering when I mastered it in December. I also remember starting poorly on speed reading and working hard with my partners to be one of the best speed readers in the class. Although I was a class clown, I was still considered one of the slower kids in class. The other big thing that happened to me in second grade was that my piano teacher told me she would not teach me anymore because I was not learning fast enough. That was a hard day. I remember going back to class and trying not to cry in front of the students.

Third grade was traumatic for me. I think I went to the paddling closet once a week in that class. No matter how hard I tried I could not memorize my multiplication tables, and I got yelled and laughed at frequently because of it. I remember getting a zero on a homework history assignment and getting spanked for it. The teacher told me that no one ever got a zero on a homework assignment and that meant I had not tried to do any work and just wrote down answers even though I had spent a long time trying to figure out that home work. I remember another thing about that year. Because I did not have my multiplication tables memorized, I was constantly being punished by being left behind on class field trips. Instead, I had to stay behind and work on multiplication. I remember one field trip in particular. The whole class was learning to play chess, but I was not allowed to play because I was not keeping up with math. The kids would not teach me chess during breaks, because they said I was too “stupid” to play. On one field

trip day another student who was left behind finally taught me how to play chess. I was very happy that day. To top off the hard year, my teacher wanted to hold me back to repeat third grade. My dad had also failed third grade, and he did not agree with holding children back so after many arguments between my parents and the school, I was allowed to continue to fourth grade with the promise that I would be tutored in the summer to catch up. My parents kept their promise and I caught up with the tutor over the summer.

Henderson Elementary School

My mom and dad did not like the private school. They thought the school was uncaring and not understanding of my situation. Therefore, I changed to the local public elementary school for fourth grade. This was a new school, and it was also my first time in a public school. I remember being very scared and excited on the first day of school. This year was hard for me socially. First of all, I was placed in the “advanced” courses because of my background in private schools. Soon after completing work and my first round of tests, I was placed in the “lower” track. In this school we all were the same class. You had classes at different periods of the day based on your academic standing. I remember being teased for my demotion in status but other than that, the academic year went well. My teachers did not expect much from me and I was barely passing, but I was still progressing enough to make them happy. By this time I hated school. It was something I had to do, but if there was any way I could miss school, I would. Things I enjoyed were to learn how to play the flute and make the band for the next year. This year was extremely hard socially. I was constantly being picked on by the students.

Many days I just wanted to stay home. I remember that I started feeling sick for a certain class every day, and my parents had to pick me up or I had to stay with the nurse until school let out. Academically I was getting by, but emotionally the year was a disaster.

After this hard year, my mom and dad placed me in another private Christian school in the area. This new school was promising to my parents because it had just started up, so all of us were fairly new to the school. Also, the school espoused the same beliefs as my family.

Apple Christian School

The beginning of fifth grade held some promise for me. I still hated school, but my mom and dad promised me that this school was much better than the other ones and I would like it. One thing I learned early on is when you start somewhere new where no one knows you, you can begin anew. No one knew of my academic problems and I was eager to begin, but things changed quickly. Fifth grade was hard and I could not keep up. No matter how hard I studied or worked I failed. My teacher Mrs. Smith was not very nice and got onto me for everything I did wrong. I could not write my numbers or my alphabet to her satisfaction so I had to come to school thirty minutes early every day and work on my penmanship. I literally failed every test that year. My mom thought threats would work. I was told that I would get spanked for every F that I brought home. I faked my mother's signature on a progress report and got into more trouble. Mrs. Smith talked to my mom about changing the spanking rule by pointing out that I was getting better number grades (I was in the 40's and 50's instead of the 30's and 20's). I was getting yelled at for failing all the time. The only exception to this was my speed reading

and comprehension. We had an in-class time where we would read a passage for one minute and then answer questions about the passage. I got up to reading 250 words a minute with 100 percent comprehension. I became an anomaly to my parents and my teacher. My parents fought with the teacher, saying that this was proof that I was smart and that I could handle the work. My teacher fought that, saying she did not know how but somehow I was cheating. (I was cheating, and now my parents will know this because they will read it. The answers to the questions were in the back of the book and I would look at them while we prayed before we began the lesson.) My parents fought hard with the school for me not to fail the grade. I was sent to a psychologist to test me to see if I had a mental problem, which I did not. My parents promised to get a tutor to help me catch up in the summer as they had in third grade, but the school did not agree. I failed fifth grade and had to repeat it again the next year. This was also another hard year socially. This was the year that my asthma became very bad and I had to start taking medications. This was also the year where six boys attacked me and kicked me in the ribs more than 20 times on a school campus while I was waiting for a bus to transfer me to my Christian school. When I went to school and told Mrs. Smith no one would believe me.

I made a resolution during my second year of fifth grade. I was not going to lie about doing work anymore. If I did not have my homework done I would just say “I did not do it” and I would work harder. Up to this time, I really did not like to read. I could read, but it was challenging and I avoided it as much as possible. This year I was angry. Angry and tired of always doing so poorly. I started trying to complete all of my work

and giving up was not an option anymore. I also got very organized with notes and homework assignments. I still could not manage to get them done at night, but I got more work done. This year, I remember an having an epiphany about school and work. Instead of expecting the teacher to help me I would do it myself, and I did. I passed my second year of fifth grade with mostly B's and C's with a few A's. The school itself was not a good experience for me. The teachers were always impatient with me for needing extra help or for asking the same question multiple times until I could figure it out. By the middle of my sixth grade year I decided to leave this school for public school. I was tired of being treated so rotten by the teachers and the students. I was the girl who failed and was constantly reminded of this fact. To this day I still cringe when I think about this school. I know one is supposed to have a forgiving spirit, but when I hear of this school (which is still in operation) I hold much animosity.

This is the time when I began to take control of my school life. Due to failing fifth grade I felt out of control and that made me angry. I took this anger and began to try to take control of my school work by organization and telling the truth. This need for control is one of the characteristics of a person with a disability (Gerber et al., 1992).

As with the participants in this study, I started to develop coping techniques at an early age. I worked hard to organize to try to get myself succeeding with various studying techniques.

Truman Middle School

I started this school in the middle of my sixth grade year, so all of the emotional ups and downs came into play for this year. Emotionally/socially I was having a hard time, but academically it was great! The teachers really cared about their students. They recognized my potential and challenged me. On top of that, for two periods at the end of the week, where we could pick electives like knitting and bowling. I picked both of those classes and I was good in both. I loved knitting and I won an award for being the best bowler in my class. We also had to take shop class, and I also won an award with the mousetrap car that went the fastest and the farthest. For the first time in my life I enjoyed studying. The strangest part is that this coincided with the worst years of my life emotionally. My asthma was getting much worse and my mom and dad were fighting all the time.

I stayed at Truman through seventh grade. My parents got a divorce during this year and I was having a hard time. What I remember most is a history teacher who challenged me academically. He took me aside and told me he was sorry for the divorce, but that I was smarter than what I was giving him and he expected more. WOW! What a wake-up call for me. I felt like I had disappointed my parents somehow and now my teacher was telling me the same thing. That is when my academic life took a turn for the better. I realized that no matter what was going on emotionally, I could always do well in school. This is also the time when I heard about being a veterinarian on career day. I decided that was going to be my career for my life. The veterinarian said that to get into the career you had to do well in school and excel in math and science. I really liked math

and science already, because it was one class where the teacher had to show me only once and I could pick it up on my own. So that was the year I decided I was going to be Dr. Force, DVM.

The choice of being a veterinarian is what drove me during my school career. McNulty (2003) found that successful adults with dyslexia found a niche early in life. Due to being able to find a niche these individuals are better able to compensate for their learning disability as adults.

As with the participants in this study, I also had a love for science at an early age. With this love for science came the career choice to be a veterinarian. This career choice was something that I worked hard for throughout my K-12 education.

Oslo Middle School

My parents divorced. As a result, my mother got a job two hours away from our home town, and so we had to move. She promised that this move would be my last school change. We went to a small town about thirty minutes outside the large city where she worked. This school was really a new beginning for me. I knew no one in the area, I had a new church, and no family lived close by to us. By this time, I was no longer excited about the new schools, but I was determined to become a veterinarian. When I started the school year it turned out to be great! My teachers cared about me, they answered my questions, and for once they treated me as a smart person. I finally fit into a school! There was only one problem. By this time in my life my asthma was very debilitating and I missed many days of school. I had attacks weekly that made me go home early. Then one day, I just turned blue and stopped breathing. After being rushed

to the doctor, a cleaning product the school was using was identified as the source of my asthma. The school was not willing to change the cleaning products, so in the middle of my eighth grade year we moved to the city where my mother worked and I moved to Jacksonville High School.

Jacksonville High School

I was not happy with this move. Actually, not happy is an understatement. I had trusted my mother when she said I would not change schools again. I blamed her for moving me away from a school and friends that I liked. It was hard emotionally for me to move to a new school in the middle of the year, but academically it did not bother me much. I knew what I wanted to do with my life, and I was determined to make good grades so I could be a veterinarian. I began eighth grade in the normal track and finished at the top in most of my classes. I was put in honors math and history for ninth grade and was accepted into the high school choir. I had done so well I was allowed to enroll in Latin for my language track; students who wanted to take Latin had to have a specific GPA and special permission to take the course. During this time, I was excelling in school while being severely depressed.

The beginning of my ninth grade year my great-grandmother died. She had been as closer to my than my mother. With her death, family issues, and health problems, I became suicidal. During this time I made friends with the school nurse, as I had asthma attacks weekly and was also monitored for my depression. Counselors advised my mother to pull me out of school for a month because I was not handling the stress of classes, I was being teased at school, and I was experiencing serious asthma attacks.

During my depression, I had maintained my grades at D's and C's so I did not fail. After counseling and a long break, I was allowed to go back to school. Even though my emotional life was still in turmoil, I was determined to return to school and make up my grades. However, by this time I had failed out of Latin and was not doing well in my other classes either. I was studying very hard and still not getting the grades I wanted. In Latin class I was helping my classmates with answering the questions, but when I would take the tests I would fail. By the end of ninth grade I was allowed to finish in the honor track, but had to continue in regular classes for tenth grade.

By tenth grade, my mom had bought a house to settle us. I was excited to start the next school year. I was put in all of the classes I wanted with the teachers I liked. The year went well. The only problem was my grades. They were good by most students' standards, but they were dissatisfying for me. I had no friends. I went to school and then came home to study all night to make high B's and low A's. I went to my guidance counselor to complain. She told me that I had an advantage over other students because she felt that I would already know how to study when I got to college. I felt "stupid." I did not know why I could not get good grades like everyone else who hardly studied. My mother tried to help me study, but she would end up yelling at me for not concentrating. During the rest of my high school years my teachers would constantly tell me and my mother that I was not working to my potential. My mother interpreted this to mean that I was lazy. To me, it translated that there was something wrong with me. I knew that I stayed after school daily for hours asking teachers for help and then went home and study all night, but I could not get good grades.

One night, as I was watching television with my mother, I identified an explanation for my learning problems. We were watching the Cosby show on television. Theo (the oldest son) was diagnosed as learning disabled when he was in college. I remember telling my mother that I had all of Theo's symptoms. I too read slowly and had difficulties with writing. This was a significant breakthrough for me, but my mother did not take me seriously. She thought it was an excuse for not studying. So I plugged along with high school, excelling in math, science, and computer science, all the while thinking there was something wrong with my brain.

The time of beginning to notice differences from my peers corresponds to Higgins *et al.* (2002) and McNulty's (2003). Gerber *et al.* (1992) and McNulty (2003) even suggest that many children move from realizing they are different to realizing they have a learning disability before the official diagnosis. After watching this show and thinking about my problems, I was pretty sure that I had a learning disability. However, no one would listen to me when I suggested this as a possible solution to my issues. Instead I was told I was lazy, not working hard enough, or not realizing my potential on many occasions.

This is where my story deviates a bit from the participants. First of all most participants stayed relatively in the same school system for most of their K-12 education. Moving around quite a bit had a negative effect on my learning. Also, unlike the participants I did have an ahaa moment. As I watched the Cosby show, I was stricken with the idea that I most likely had a learning disability.

My Diagnosis

I graduated from high school with an A minus grade point average and entered the pre-veterinary program at a prominent college. I had wanted to go to this college since I was seven. It was a dream come true! When I started the pre-vet program, I chose to major in chemistry, because this was my best class in high school. I remember my first day of classes. I had so many dreams riding on college that I ran back to the dorm and threw up after my first class in chemistry. My first year in college was much like my high school years. I would go to class, come back to the dorm, study until bedtime, and receive low grades. Due to my vigilance in studying I had little time to meet friends. I worked hard in chemistry and did well in my homework, but still received C's and D's on my tests. I finally got the courage during the second semester to go and talk to the professor after each test. What was amazing is that he would sit with the test and ask me what I was thinking for my answer to each question. The first time I sat with Dr. Brown and answered his questions he said, "You know the answer to the question, so why did you write this?" By the time I would leave Dr. Brown's office my tests grades were bumped up a grade due to the discrepancy in my verbal answers and my written answers. By the end of this year my dream to become a veterinarian had changed. I loved chemistry so much that I decided to become a chemist. I left my first year with a B minus GPA. It was not the best, but I decided it was okay for my first year in college. Still in the back of my mind I was perplexed. Why did I study so much and still get bad grades? I had decided that I might have a learning disability, but I was too

scared to talk to anyone about getting tested. I was afraid that the response would be I was really “stupid” and that I would have to leave college.

My sophomore year came around with the high hopes for this school year. I would get A's and things would be easier. Instead they got a lot worse. This year I was taking organic chemistry and introduction to biology as my science courses. Organic chemistry was hard, but biology was awful. I would study for hours with my friends and by myself and was failing the course. Finally, I got the courage to make an appointment at the learning center. I remember that day well. I was very scared. I met with Dr. Smith and told her my problems. The one thing that surprised her (which she still remembers to this day) is that I could not read a clock. A digital clock was okay, but the regular rotary clocks were my downfall. When someone would direct me by using the words of clockwise and counterclockwise, I got lost. This is what made her decide I might have a learning disability and that I should get tested. Then she said what I was dreading to hear, “But first you have to get an IQ test to make sure you just do not have a low IQ.” Inside I was screaming. This was my nightmare come true. I expected that they would tell me I really was stupid and that I would have to live with it the rest of my life.

The IQ test came and went. I was told that my score indicated that I had a learning disability. WHEW! I was happy, sort of. Next came the learning disability testing. The test itself took many hours and days to finish. The tester came out for two to three days for nine hours each time. She was so fascinated with my story that she took me out to dinner the last night to discuss the challenges I was having. For once I felt validated in my difficulties. The testing was over and waiting for the results was hard. So

much was riding on this. Finally the results came in. I did have a learning disability. I was happy to hear this, but not so happy to hear how bad my disability was. I was told that I should not have been able to graduate from high school, let alone get a B minus average in a prominent private college while majoring in science. Let us review what I found out was wrong with me. I had an aural, oral, written, reading, math, and visual spatial disability. I remember my mother coming up to hear the results and her starting to cry. She was sad because she had yelled at me all those years and told me I was lazy and would amount to nothing if I did not work harder. But I was thinking, wow. That is a lot wrong with me, but it is a good thing we can fix everything.

I was excited. I was no longer “stupid!” I had a learning disability. So the next day after the diagnosis I sat with Dr. Smith and said, “Okay, so what do we do to fix it?” I truly thought that there were techniques to fix the disability. Shockingly I found out that although there were techniques to help me, I was too old for them now. I should have gotten the help when I was younger and now I had to re-learn how to study and use accommodations for helping me. There was no magic fix. I remember leaving that appointment disappointed. I had walked in excited that I really had a disorder and left feeling dejected. I was asking God “Why me? Haven’t I been through enough in my life? When will I ever get a break?” I was angry at God for a long time. Between my asthma and my learning disability, I truly thought I was a joke in heaven for enjoyment. I truly felt that God would say, “We need some laughter for the day. Let’s see how Crista is doing.”

My diagnosis is a component of the reframing process from Gerber *et al.* (1992). This process is called the labeling process. In this process I officially get labeled as a person with a learning disability. The anger I felt is also the beginning of my acceptance of my learning disability.

The few friends I had seemed to split like the Red Sea. One side was supportive and said that they would help me get through the disability, while the other side said I must have done something bad in my life for God to curse me like this. Needless to say, I had fewer friends, very quickly.

Although I was disappointed that I could not be “fixed” I was excited that I could get help with my learning by using some accommodations for my classes. My accommodations that I received included unlimited test taking time, a calculator for simple math, and a tape recorder for lectures. If we had a writing assignment in class, it was extended to the next day so I could use a computer. When called upon in class I was given an allowance for some time to assimilate my thoughts. These accommodations seemed fair in allowing me to be successful in school.

Assistive technology is important in the role of empowering people with learning disabilities (Forgrave, 2002). Getting accommodations, including tape recording and word processing skills, could enhance achievement in my studies (Quenneville, 2001). This is the only place I discuss assistive technology, but it played a crucial role in my achievement as a teacher and a graduate student.

In this section assistive technology is one of my main coping techniques. Similar to all of the participants, I have developed coping techniques that benefit me and my learning disability.

The Letter/Challenges

Anyone who has a learning disability and gets accommodations realizes the dread of “the letter.” To be able to get full accommodations each student has to get a letter stating that he or she has a disability (by the way it is against the law to state what the disability is) and a list of the accommodations the student needs for each class. The student has to make an appointment to meet with the professor to give him or her the letter in case they have any questions or objections to one of the accommodations. The director of the learning center for learning disabilities, had warned me about professors who were not willing to accept accommodations. So with a bit of dread, but mostly excitement to be getting help, I headed off to give the letters to each of my professors. I was in college during the late 90’s, but most of the professors had not dealt with these letters. The campus was just trying to catch up with the disability legislation.

Section 504 of the Rehabilitation Act of 1973 marked the beginning of legislation to protect anyone with a disability from discrimination in the workplace or schooling. From this act PL 94-142 (Education for all Handicapped Children Act) is what guaranteed my accommodations in the undergraduate classroom. This act guarantees appropriate educational services to all school-aged (Ages 2 – 21) children with disabilities.

I handed out my letters with little incident and was pleased to begin a new journey with classes. The next day Dr. Smith called my room and said she needed to talk with me, and we made an appointment. When I saw her she told me she had some bad news. She then proceeded to tell me that the head of the chemistry department had said, “We have never had a learning disabled student in chemistry and it is not possible to be a chemist with a learning disability.” He then suggested to her that I find a new major such as elementary education. His comment changed everything. No more feeling sorry for myself. There is one thing I have always prided myself on and that is being stubborn, especially when someone tells me I cannot do something, especially something I loved such as chemistry. That day I determined I would get my B.S. in chemistry and I would show Dr. Phillips that I was as good as anyone else.

This part of my life I truly was establishing my desire for what I wanted for my life. Gerber *et al.* (1992) stated that desire is the need to move on after diagnosis of the learning disability. Higgins *et al.* (2002) stated, that after the person has negotiated what they label means to them, she wants to prove herself. Rose (2000) stated that students with learning disabilities showed a high level of perseverance in their educational careers. I have truly prided myself on being stubborn, which is another word for perseverance or determination.

This drive and determination can be found in the stories of all of the people in this study. We all had a point in our lives to choose to continue on or to stop. This was the time in my life where I decided to go on, no matter at what cost.

Graduation and First Round of Graduate School

By the time graduation came around Dr. Phillips had changed his mind about someone with a learning disability becoming a chemist. Actually, he had become a mentor to me, and at times I regarded him as a loving father. The chemistry department having had three faculty members, so I had multiple classes with Dr. Phillips. I had to work to earn his respect, but in the end I earned his and my own respect. I worked hard in my courses and was proud of who I had become. I became interested in Dr. Phillips's research and completed an independent study with him. When it came time to graduate I remember talking with him about how our class had discussed who out of the eight chemistry majors would "make it" in chemistry. We all decided one of our colleagues who made straight A's by hardly studying would go far in the chemistry world and I remember him shaking his head. He looked at me and said, "If any of you are going to make it, Crista, it will be you." WOW! This was quite an honor, coming from a man whom I had grown to love and respect.

With graduation looming, all of us were contemplating future careers as we applied to graduate schools in chemistry. Having fully accepted my learning disability as a part of my life, I decided to disclose my disability while applying to schools.

Based on the Americans with Disabilities legislation people with disabilities do not have to disclose their disability on applications. It is a "right to know" issue that the person with the disability has the right to determine if and when he or she wants to divulge his or her disability. At this point in my life I had also accepted my

learning disability with all the negatives and positives, which is the second step in the reframing process (Gerber *et al.*, 1992).

I had a B minus GPA, which was a bit low. However, I had great recommendations, many extracurricular activities, and excellent leadership experience. I applied to quite a few graduate programs in chemistry. Most were in my GPA range and a few were Ivy League schools. As my friends were getting interviews and acceptance letters, I was getting nothing. So I called the schools to see what was happening with my applications. Off the record I heard, "We have never had someone with a learning disability in our chemistry program before." On the record, they said they never received my application, or that they never received my references. I remember one college had called and talked with me about my disability, but always seemed to be missing one reference. Ironically, it was Dr. Phillips's reference. So one day, Dr. Phillips and I faxed the reference letter six times to the graduate advisor for chemistry. When Dr. Phillips had finally communicated with the graduate advisor, he stated that he had received the reference. Two weeks later when I had heard nothing from the program I called to inquire about the status of my application and was told it was still incomplete. They stated that they had never received Dr. Phillips's reference letter. By this time graduation was a couple weeks away. I gave up on going to graduate school and decided to get a job as a chemist.

Working

Getting a job as a chemist took time. In the meantime I worked data entry until I could find a position as a chemist. I finally got a job working for Dow Pharmaceuticals

through a temp agency. This was a good time for me. I had decided not to disclose my learning disability because of my struggles with graduate school applications. While working at Dow, I was praised for my dedication and chemical knowledge. The position I had was a quality assurance chemical technician, and at the beginning I enjoyed the job. As I worked, over the months it became mundane and I realized that I needed to go to graduate school to get the kind of job that would stimulate me during the coming years. During the application process there was one school that had given me a hard time but had finally received everything to complete my application. So during this year I followed up with Tarrow University. At work I was encouraged to go back to school. My colleagues thought I was smart and should pursue the Ph.D. They always joked that I would get my degree in three years instead of five because I was so determined and smart. Eventually I was accepted into the chemistry department at Tarrow University as a Ph.D. student. Encouragement of my colleagues, my own confidence of being good in chemistry, and the accolades at work, enforced my decision to begin at Tarrow the next year.

Tarrow University

As with every new beginning of a school year I began with high hopes and dreams. Tarrow was known for its disability program and helping students with accommodations. The chemistry department seemed very willing to work with my learning disability at the onset of the program. They had a requirement that once accepted into the program you had to take the ACS chemistry exam and pass to continue. You had three times to pass, once in the fall, once in the spring, and once in

the summer. If you did not pass after the third time, you were dropped from the program. Having to take a standardized test made me go to the learning disabilities office right away. There I found out that there was no legislation to protect graduate students and their accommodations. In fact, I could only get the accommodations with a professors' agreeing to them. I would be given double time, a separate testing area, a calculator for simple math and a tape recorder if, and only if, the professor agreed to these terms. The department of chemistry allowed me a separate testing area and double time for the ACS exam. I was told a calculator was not necessary because the exam only required only simple math.

So began of a long and frustrating year. I tried to explain that part of my disability was that I could not do simple math in my head. The department did not change rule about the calculators, so I took the ACS exam in the fall semester and failed. (I later was told that I failed by one question and they decided to fail me because they were sure I would pass the next time.) As the first semester of courses began, my professors allowed all of the accommodations. I soon realized accommodations helped with the testing, but they did not change people's minds. As I went to professors for help they seemed frustrated with me. Some expressed feelings of animosity in that I got extra time when their other graduate students did not. One professor said that he would not help me unless I would show him the work I had done. He was insistent that I was not doing any work and coming in for help instead of working. What I really needed was to sit and talk with him about what I was thinking for each problem. If my thinking were correct, then I could have direction to start the problems. On the surface, the department

was meeting all of my accommodations and willing to work with me, but under the surface I felt the direct opposite. By the end of the first semester I had made it through, but I was exhausted.

After Christmas vacation I came back tired but ready to begin my second semester. This is when I hit a brick wall. In my analytical chemistry course I had a professor that would not let me use a tape recorder in his classes. He would not let anyone record his classes. When asked why, he stated that he did not want a record of what he was saying. That made sense because his mouth was foul and many off-colored jokes were included in his lectures. Furthermore, he seemed uncaring of my situation and would not give me extra time for assignments. By this time I was very ill and exhausted. It seemed that I was pushing myself just to get up, attend classes, and perform my teaching assistant duties. My asthma flared up, but as usual I pushed myself to go on because I was determined. I would not let them beat me into giving up my dream of becoming a chemistry professor.

By the end of January my body had enough. I went to the hospital emergency room one Saturday night with an asthma attack and was admitted to the hospital. This was my second admittance for asthma that year. On the next Monday, I was told they were going to release me if I could walk down the hall. This walk was a requirement of all asthma patients to make sure they could take care of themselves when they returned home. Well, I went for a walk and came back to my room. All I can remember from that point on is that I could not breathe. Later that night I was admitted to ICU. The next day my oxygen went down to 72 percent and I was ventilated. By the time my parents

arrived from New York, they were told that I was going to die. I was on 95 percent assist with the ventilator, and I had severe pneumonia. It was touch and go for a while, but I made it. I was ventilated for two weeks. When I woke up from my semi-comatose state I was unable to walk or hold my head up. I stayed in the hospital for two more weeks before being allowed to go home.

The chemistry department was good to me and kept me on assistantship during my stay in the hospital. When I got home it was an upward battle. I had to learn to walk again and also return to graduate school. When I got back to school I was given an option to quit my courses (I had missed 4 weeks of school), which meant I would lose my assistantship for the rest of the semester. The other option was to continue with my courses and complete them. There really was no choice: I needed an income. I continued with my courses and was assigned a tutor for the analytical course. At the end of the semester I did not pass with the required B in each course. I just made a C in the analytical course. I stayed on for the summer and realized that this program was not for me. I just could not get the professors to work with my learning disability, and my health was paying for the undue time and stress. So I quit the chemistry program. Actually, I quit chemistry for good. I felt defeated and I said that I would never do chemistry again. When I moved back to New York with my mother, I threw out all of the undergraduate and graduate notes I had taken in chemistry. The only thing I kept were the books, because they were expensive and I wanted to sell them.

Healing Wounds

Ironically, a good paying job for me was found in chemistry. Once I had rested and physically recovered to semi-normal, I called my old boss at Dow. He was surprised to hear that I had quit the program but was more than happy to tell me they had a job opening. He told me to schedule a day to interview. At Dow, you have a day of interviews with many different departments. You also have to complete a test to get hired. I was worried about the test, but my old boss said not to worry and that it was easy. For some reason I thought the test was a chemistry test because I was interviewing for a chemist position. Because of that I did not divulge that I had a learning disability and needed accommodations. Instead I filled out the application and checked no disability on that section of the application. By the time I got to the test the day of the interviews I was feeling confident. I was given the test and one hour to complete it. Instead of it being a chemistry test it was a business test with questions that I had never seen before. They were answerable but they all required simple math. This was the one test for which I would need a calculator and time to complete it. I knew I did not pass, even more so when the boss I would be working for canceled our interview and I was sent home early. Angry at myself for not divulging my learning disability, I called my old boss and told him I had a learning disability and if I could retake the test with my accommodations I would pass. I never heard from Dow again.

I was angry. Not so much angry at Dow, but angry at myself and the learning disability. Why couldn't I just check that box on the application? But I knew why. I had experienced it from so many people. Each application stated that they are equal

opportunity employers, but they really are not. On the record they do not care if you have a learning disability. They encourage you to apply. Off the record you are taken off the list even before you have a chance to interview.

So I went home and applied through a temp agency and got a job at Kraft as a chemical technician. Again, no one knew I had a learning disability; I kept it to myself like a dirty little secret. I began work at Kraft and was happy with the job. I got to work for many chemists who kept on asking me why I was not going for the Ph.D. The wounds were still too fresh from Tarrow so I just said that school was not for me. After a couple of months, the job soon became routine. I wished for something where I could think and do research. Soon I was recruited by one chemist to do some research for him. One day when we were talking about his results he asked me why I was not in graduate school, so I told him about my learning disability. He then looked at me and said I have dyslexia also, but you just have to keep on going. I then told him about Tarrow and the hard time I had. He then told me that I just did not find a good place that fit with me. He encouraged me to go to graduate school. He kept on insisting that I was too intelligent to do routine daily work, and that the research world was missing out if I did not try again. Again as in my first position as a chemist, I was repeatedly told that I was very good and intelligent at my job and I needed to get an advanced degree. So with encouragement from work and home, I applied to graduate schools again. But this time I had learned my lesson; I did not divulge my learning disability during the application process. I also did not divulge about Tarrow University. Now I had two nasty little secrets.

This part of my life story is interesting. It documents successful people's persistence in life (Gerber *et al.*, 1992; Goldberg *et al.*, 2003). Choosing colleges and programs that fit me is another trait of successful people with learning disabilities. Successful people fit themselves to environments in which they can succeed and their skills can be optimized (Gerber *et al.*, 1992). However, I would add that at this point I was in the beginning of this process and truly had not found the graduate program that had the best fit for me.

Finding mentors during this time to guide my choices in life is an example of social ecologies (Gerber & Reiff, 1991). I began having mentors in undergraduate school with my professors, and now I had them in my work environment and academic choices.

This part of my life also is documented in research on women with learning disabilities. Ferri (1999) states, "The impact of learning disabilities then, is not only about mistakes, but also the anxiety, fear, and shame that individuals can come to attach to those mistakes." This also corresponds to the feelings of successful women who experience feelings of inadequacy, often called the imposter syndrome (Clance & Imes, 1978; King & Cooley, 1995; Lewis, 1988; Studdard, 2002; Turman, 2001).

Like the two women in this study I too struggle with feelings of inadequacy, even though I have succeeded in life. Like Sharon I fear at times if people truly knew, how little I knew they would take away my degrees. At other times I struggle with feelings of accomplishment and feelings of inadequacy.

Also this was a time for me when I started to seek mentors. Like all of the participants in this study I had mentors in school. However, this was a time in my life that I started to seek out people who could and would encourage me through my life choices. The mentors I sought out are ones with whom I also still keep in touch. Some relationships have changed to friendships.

Texas University

This time I did not walk in with rosy colored glasses. I knew it was going to be hard and I was willing to fight to become Dr. Force. Even before I moved down to Texas I sent my documentation of a learning disability to the disabilities office. From what I had learned at Tarrow, I was going to have to fight with this office to get what I needed. I was right. When I called about my documentation they stated it was too old, and that I needed to be retested or they would not help me. I was originally tested at the age of twenty, and now I was twenty-seven. I argued that the literature states that adults do not change much so there really was no need for new documentation, but I lost my battle. One week before I moved to Texas, I had to squeeze in three days of 6-10 hours of very costly testing. With my results in tow, I moved to Texas University to begin a Ph.D. in Chemistry.

Before I decided where to go I made sure that the program would “fit” with me. It seemed to be a rigorous program, but I liked the campus and the way they treated their graduate students. I came early in July to start working for Dr. Boyd before classes started. He had impressed me at my interview, and his research was interesting. I really liked his post-doc and I was excited to start working with that team. I began in the

summer and decided to stay with the team for my doctoral research. Dr. Boyd seemed very pleased to have me on his team. There was only one small problem, I still had told no one in the chemistry department about my learning disability. Classes began and I made an appointment with the learning disabilities office. My counselor was very nice but stated that there had never been anyone with a learning disability in their office from chemistry before. My counselor stated he could write a letter requesting time and a half on a test, a simple calculator, and a tape recorder to record my classes, but I had to be aware that my professor might say no. In that case I would not get the accommodations. So I received my letters to give to the professors. (Again as noted above, the letters state what accommodations are needed, but do not tell about the disability.)

Because of the previous reactions of the letters had caused in other programs I waited to give them out. I needed to muster the courage to explain the issues of my disabilities. Most of the professors were too busy and just took the letter. I asked them if they had any questions to let me know and I would answer them. I was excited that there were no major reactions from any of the professors. Later on in my first semester I went to a professor to ask for a bit more time for a homework assignment. It was a heavy reading load and I needed some extra time to read it and answer the questions. I was sure the professor would give me an extra two days and was not scared to ask because the professor was a woman. When I went into her office to talk to her, she became agitated with me and began to yell, "Well, if you can't read then you should not be in chemistry. You obviously are a smart girl, but you should join a different department. Chemistry is a program for intelligent people who can read and learn on their own. Obviously, you

cannot do that so go to a department that does not require such rigor.” She did not give me the extension I needed. I was crushed. I managed to get the homework assignment done and turned it in on time. After my first semester, I had gotten all C’s. My advisor told me I had to get all A’s the next semester or he would throw me out of his group. The pressure was on, but by that time I had told him about my disability. He even met with the learning centers’ counselor regarding what assistive technology options that I could use to help me succeed. I also told him of the other professor’s comment to me about my disability, but he went on talking as if I had said nothing.

The next semester was hard for me. The pressure was on to get A’s and to get my GPA back to a 3.0. My advisor made it clear that anything else was unacceptable. As my courses began I took my letters around to each new professor. This time I saw it. Someone who has a learning disability will understand. I saw the look in their eyes when I gave them the letter. The look said that I did not belong in chemistry. One professor even challenged me about the accommodations requested, saying that every person has some learning difficulties. He wanted to know why I should get the accommodations and other students should not. This was the general feeling of many students in the program also. It was hard to make friends when people held some animosity that I was getting preferential treatment that helped me score better on tests. About the middle of my second semester I had decided that a Ph.D. in chemistry was not for me. It was not because of the treatment I was getting. I realized I needed a job where I could socialize with more people. I knew I liked interacting with people and the lab was a lonely place with little interaction. So I told my advisor that I wanted to get a master’s degree. This

was the straw that broke the camel's back. He never told me, but I realized at this point he was putting up with my learning disability and my asthma because I was anything but right. By that time I no longer cared to do anything right. I was tired and frightened of this man. Every time saw him or talked to him in his office I was sick to my stomach. In the first summer of my program he informed me I was no longer welcome in his group. It was hard because I lost my research, but I was happy at the same time. Consequently, I joined another group to finish my master's but that one did not work out either. I had joined another man's group and I was so frightened from my last advisor that I thought this one would be the same. He also knew of my learning disability (by that time the whole department knew) but I do not think he realized how long it truly took me to read and critique articles. We mutually agreed that I should leave his group.

I then joined the chemical education group in chemistry, the best move I ever made. First, my new advisor was a woman with whom I could relate. I had always wondered about the chemistry education program and a career in this field, but I had fought being a teacher because of the negative comments from teachers I had received. However, at Rutgers and Tarrow and even here in Texas, I had been told I could not be a chemist, but that I would be okay as a chemistry teacher in high school.

After I joined the chemical education group, I finished my master's degree in one year. I loved this program; it was the perfect fit for me. I knew I always wanted to be a professor, and I soon realized that it was because I loved teaching. The best part of my program as a Ph.D. student was being a teaching assistant. Based on this new realization,

I joined an alternative certification program at Texas University and became a high school chemistry teacher.

Goodness of Fit is fitting oneself to an environment in which one can succeed and his or her skills can be optimized (Gerber *et al.*, 1992). Although at this point I am truly recognizing my positives and negatives of graduate programs and teaching traits to find what is the best fit for me.

I found a job that fit my strengths! First it, was science --my passion-- and second it was teaching. I truly love teaching and interacting with students. Like all of the participants in this study, we all found careers that incorporated our love for science and our other strengths.

Teaching

I started teaching at a challenging school. In my first school assignment most of the kids did not go to college. They began working in high school and continued in labor positions for their whole lives. This was a new culture for me, I was used to teaching at the college level where grades were important for future careers. Beginning at this school challenged me to become a better teacher. I was challenged me to evaluate my thoughts on learning science in the classroom. I loved my students and wanted them to have the passion that I had for chemistry. Most importantly, I wanted the kids with learning disabilities to realize they too could succeed in science. The phrase that I heard when my students with learning disabilities walked in the room was, "Miss, I have a learning disability so I am stupid and I cannot do science." This broke my heart. I would then challenge my students. I would say, "I have dyslexia and if I can do science, you

can do science.” Teaching made me begin to wonder why our students with disabilities were shocked when they did succeed in my science classroom. I began to question why students with disabilities were so determined they could not succeed in science.

These teaching experiences led me to a program at Texas University that was called information technology in the science classroom. This program offered a graduate assistantship to pursue a Ph.D. I applied to the program and was accepted into the science and technology program and the Ph.D. Program in Curriculum and Instruction with an Emphasis in Science Education. My goal has always been to be a professor and teach. This was another great opportunity to begin again.

This point is another demonstration of desire and persistence (Gerber *et al.*, 1992; Goldberg *et al.*, 2003; Rose, 2000).

Science Education

From the experiences I had with my learning disability and professors I decided not to disclose my learning disability in this program. I went through my first year of classes without accommodations. It went well, but I felt I was hiding a major part of myself. After a year of struggling I decided to disclose my learning disability. For the first time in my life my accommodations were met. The professors in education did care for my disability. I will admit that there are still times when I feel I cannot do it. I read at a much slower rate and get writer’s block at awkward times (usually when a paper is due).

After years of struggling, failures, and successes I became proud of who I was and where I had come. With that pride, I decided to do my dissertation. I tried to begin

my research from an outsider's view of scientists with learning disabilities and realized I could not be an outsider. With guidance from my advisor and a wise professor, we decided to include my story. My story will continue after this dissertation. It will not be easy, but I know I can succeed. Through this program in science education I have come to realize that my learning disability has given me many unique opportunities, and this is one I am proud to complete.

Now I am at the time of writing this dissertation. I have to admit it is not easy. I still have problems and sometimes am frustrated. I look at all of the data I have and feel overwhelmed. I am having a hard time putting what is in my head down on paper. This is true for my disability but I realize I have to persevere. Is it easy? No! Are there days where I just want to quit? Yes! Then I realize that giving up would let all of my critics be right and I will never let that happen!

I truly feel that I am close to completing the reframing process described by Gerber *et al.* (1992). The steps are: getting the label, accepting the label, understanding the label, and finally, taking action. My personal experience is that this process is reflexive and ongoing.

This is where I have to question if I have fully accepted my learning disability like some of the other participants in my study. Have I fully accepted it as Mont has? Have I become an advocate? My goal is to be similar to him and his "don't give a shit" attitude about what others think of his learning disability. But realistically I do still care. Like Sharon I have been rejected one too many times and am still frightened when I divulge my disability. I would like to think I have fully accepted my learning disability,

but I truly have to say that I am still in the process and with this research I am learning more about what full acceptance means to me.

The last research question I asked my participants was, “What do you want to tell future students with learning disabilities who want to be scientists?” By sharing my story, I hope you realize that a long, hard road awaits someone like me who has the desire to become a scientist. I think keys to my success are a sense of humor, determination, and the ability to get up from the failures, dust myself off and go on. Many times persons will be told that they are “inferior” due to the disability and many times they will believe it. My advise is to take time to heal the wounds and do not give up on your dreams. They are YOUR dreams and you can do it! Believe me, if I can do it, you can do it too!

I would like to end with this reflection on what I have learned in the process of researching and writing this dissertation. While keeping a reflexive journal during this time I look back at some of my entries and realize that this has been an emotional time for me. When I started this research I felt alone and wondered what other scientists with learning disabilities went through. I felt like the ugly duckling. I did not quite fit in any where. After my first interview with Tim, things began to change. I realized that we, meaning scientists with learning disabilities, go through similar things and that there were others who understood me. The interesting part of this whole research was completing the interviews and understanding what each person was saying without the need for clarification. Interviewing with Sharon was particularly emotional. It was as if I was sitting down and talking with myself; it was a healing time for me. Overall, I have

learned I can do it! It is not easy, it is not rosy! It includes times when my advisor had a candid talk with me about how far I truly have progressed and what I still need to do. I have faced the weakest part of my learning disability (writing) and have painstakingly proved to myself that I can do this. Overall I have learned much about myself and that amazingly there are a group of individuals (at least four and most likely more) who can relate and understand. I am amazed by their stories and honored that I was allowed a glimpse of their very personal stories.

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APPENDIX A

Interview questions sent to each participant:

Every person's life can be written as a book. I would first like you to think about your life now as if you were writing a book.

First, think about the chapters of this book. Begin from zero, the day you were born. When did the first stage end? Then go on to the next chapters, and put down the age that each one begins and ends for your life story. Go on till you reach your present age. You can use any number of chapters or stages that you find suitable to your own life.

Second, please think about the title you would give each one of the chapters.

After you have noted each chapter I want to ask you questions about each of the stages you propose.

1. Tell me about some significant episodes or memories that you remember from this stage.
2. Describe yourself at this stage.
3. Who were the significant people for you during this stage, and why?
4. What is your reason for choosing to terminate this stage when you did?

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