THE McNAIR SCHOLARS' JOURNAL 2016

University of Wisconsin - Eau Claire
Ronald E. McNair
Postbaccalaureate Achievement Program

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A Federal Department of Education TRiO graduate school preparatory program whose objective is to assist college students from disadvantaged background to enter graduate schools

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The McNair Scholars' Journal

2016

University *of* Wisconsin

Eau Claire

Ronald E. McNair Postbaccalaureate Achievement Program

2016

Message from Provost and Vice Chancellor Patricia A. Kleine

At many public comprehensive universities, faculty are primarily expected to teach with little or no expectations for conducting research or engaging in creative activities. This does not, however, describe expectations for faculty at UW-Eau Claire. Since 1988, UW-Eau Claire has been recognized as the University of Wisconsin System's *Center of Excellence for Faculty and Undergraduate Student Research Collaboration*. No program exemplifies the institution's commitment to opportunities for students and academic quality in undergraduate research more than UW-Eau Claire's Ronald E. McNair Post-Baccalaureate Achievement Program. (The history of UW-Eau Claire's McNair Program is found on Page II.)

This journal presents the culmination of two years of students working with their faculty mentors on critical questions in their disciplines and preparing their research for professional publication and presentation.

To the students, congratulations on the completion of your research projects and best wishes for continued success in graduate school.

To my faculty colleagues, thank you for mentoring these remarkable students so well. I continue to celebrate your exceptional commitment to student success.

To the reader, I hope you enjoy reviewing this journal and the wealth and breadth of research within it.

Patricia A. Kleine
Provost and Vice Chancellor for Academic Affairs
August 25, 2016

About the McNair Program

Vision

The TRIO Ronald E McNair Postbaccalaureate Achievement Program is a graduate school preparatory program funded by the U.S. Department of Education and sponsored by UW-Eau Claire. Named after American astronaut Dr. Ronald McNair, the McNair program aims at leveling the playing field in graduate education and diversify the American research community by class, socio-economic status, and ethnicity. Nationally there are 158 McNair programs working with over 4,400 students. The TRIO McNair Program was founded in 1989 and initiated at UW-Eau Claire in 2000. The goal of the McNair Program is to increase attainment of PhD degrees by students from underrepresented segments of society, including first-generation low-income individuals and members from racial and ethnic groups historically underrepresented in graduate programs. At UW- Eau Claire, we prefer working with scholars who are ambitious about entering graduate school immediately after graduating from UWEC. Our hope is that eventually our scholars will go on to earn a Master's degree and ultimately, a doctoral degree.

Purpose

The purpose of the McNair program at UW-Eau Claire is to provide disadvantaged college students with effective preparation for research based doctoral study. Each year, the McNair program recruits up to thirteen eligible students, who become "McNair Scholars". Along with a dedicated mentor in the scholar's primary field of research, over a two-year time period, the McNair program prepares them for graduate level studies, with the penultimate goal of completing a research based doctorate degree. Also, the purpose of the McNair program is aligned with the institutional mission of UW-Eau Claire and directly contributes towards the University guidepost goal of closing the opportunity gap in higher education.

Synergy with Institutional Mission

The purpose of the McNair program is aligned with the institutional mission of UW-Eau Claire and directly contributes towards the University guidepost goal of closing the opportunity gap in higher education.

Motivation: Why we Need the McNair Program

A doctorate degree bestows monetary and non-monetary benefits that last over a lifetime. These include highest annual median income compared to lower levels of educational attainment, an unemployment rate of close to zero percent, and a life-time earnings curve that is much higher than lower levels of educational attainment, and a wide array of research and academic employment possibilities.

Despite these benefits, American doctoral recipients are heavily skewed by socio-economic class, parental background, and race/ethnicity. Less than 20% of research doctorates go to students from first generation background. More than 80% of doctoral degrees are earned by White Americans and Asian Americans. Students from lower socio-economic status, whose parents did not complete college, and those from historically underrepresented background are not receiving the benefits of earning doctoral degree and hence suffering from an unlevel playing field in higher education.

The McNair program is a micro level policy intervention that aims at leveling the playing field in graduate level education -one McNair scholar at a time. It derives its purpose and motivation from the goal of leveling the playing field in graduate level education by preparing academically talented students from low income, first generation and underrepresented background for graduate level education, with the ultimate objective of completing doctoral studies. Ultimately, as more and more disadvantaged students go on to earn doctoral degrees, they receive the stated benefits of a doctoral degree, and go on to pass on these benefits to their future generations. The inter-generational cycle of benefits of educational attainment begins with each McNair scholar.

McNair Program Staff

Director

Sanjukta Chaudhuri, Ph.D.

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- Judy Sims, Communication and Journalism

- Matthew Waters, Languages and History

- Joseph Orser, History

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Table of Contents

The Romanticization of Elizabeth Doe Tabor and Alphonsine Plessis
By: **Jordyn Beranek (Year of Graduation: 2014)**
Advisor: Mitra Sadeghpour, Music and Theatre Arts

Courtesans – beautiful, intelligent women who enticed men solely with their sensuality – have been the subject of intrigue for centuries. Notable courtesan figures include Cleopatra and Thaïs from ancient days, Veronica Franco from sixteenth-century Venice, and the nineteenth century Parisians Marie Duplessis, Cora Pearl, and La Païva. A courtesan differs from a prostitute in social and economic circles. Though both prostitutes and courtesans provide sexual favors for money, courtesans move in upper-class circles. They maintain a glamorous and socially active lifestyle. They are well-educated, live independently, and their protectors meet all of their financial needs. There was a resurgence of the courtesan in Romantic literature in the nineteenth century. These courtesans fit this definition but were given redeeming qualities. The Romantic courtesan is defined as a companion to men with positive traits. Even today, the courtesan is still portrayed in movies such as *Pretty Woman* and *Moulin Rouge*.

In America, the glamour of the courtesan has been replaced with the adventurous and often scandalous life of the American woman who have much in common with the sought–after courtesans. Take, for example, the life of Elizabeth "Baby" Doe Tabor. After marrying Harvey Doe, she moved to Colorado to pursue mining with her husband. After her divorce from Doe, she lived a scandalous life as a divorced woman and fell in love with a married man, Horace Tabor. The opera *The Ballad of Baby Doe*, composed by Douglas Moore with libretto by John Latouche, tells the story of Elizabeth Doe Tabor. In the opera, it is evident that there are similarities to the lives of the courtesans, in particular the ideal of the Romantic courtesan.

Alphonsine Plessis, who went by the name Marie Duplessis, is the prototype for the Romantic courtesan. She was preserved in Alexandre Dumas' *La Dame Aux Camélias*, and later written into operatic history by Giuseppe Verdi in his *La Traviata*, one of the earliest operas about a courtesan. A connection to the courtesan figure can be found in the character of Baby Doe. An analysis of the operatic characters of Baby Doe and Violetta, as well as the music of both operas in arias and confrontation scenes show similarities. The real lives of the women who inspired these characters are also examined and compared to the traits of the Romantic courtesan. The women of Elizabeth Doe Tabor and Alphonsine Plessis were romanticized in their operatic portrayal to fit the role of the Romantic courtesan.

Historical Figures

Both *The Ballad of Baby Doe* and *La Traviata* are based upon historical figures. Baby Doe is based upon Elizabeth Doe Tabor, who was born Elizabeth Bonduel McCourt in Oshkosh, Wisconsin in 1854. She was one of eleven children that survived to adulthood, and her parents always emphasized her beauty (Bancroft 1950, 8). She married Harvey Doe on June 27, 1877 and the two moved to Central City, Colorado, where he tried his hand at mining. Because her husband could not make a living in mining, Elizabeth wore men's overalls and worked next to him in the mines. That was when her moniker of "Baby" was created (Bancroft 1950, 17). In Colorado, her life greatly changed. After divorcing her husband, she moved to Leadville, Colorado, where she met and eventually married Horace Tabor (Hoffmann 2005, 34). They had two children, and she stayed with him through poverty until his death (Hoffmann 2005, 42).

Violetta is based upon the courtesan Marie Duplessis, who was born Alphonsine Plessis in 1824 in Saint-Germain-de-Clarfeuille near Lower Normandy (Rounding 2003). She was born to a traveling tinker, Marin Plessis, and his wife, Marie. Her mother died when she was six, and Alphonsine was sent to live on her second cousin Agathe Boisard's farm. She was sent home to her father years later after a scandalous event with a seventeen–year–old farmhand. Alphonsine then was placed in an apprenticeship to a blanchiesseuse (laundress) and eventually went to live with some of her mother's relatives in Paris (Richardson 1967). It was in Paris that she took charge of her own destiny, reinvented herself, and became a celebrated courtesan. Alphonsine's life inspired the novel *La Dame Aux Camélias*, written by Alexandre Dumas. Dumas had a love affair with Alphonsine for a year, only breaking it off because he could not bear the idea of her taking other lovers.

Both of these women changed who they were to create in themselves who they wanted to be. They originated from small provincial areas and ended up moving to areas of adventure. Elizabeth moved to Colorado for the chance of becoming wealthy through mining. Alphonsine moved to Paris, the artistic center of the world at that time, by order of her father. Once there, she decided to take her destiny in her own hands.

Perhaps the most thrilling completion of their transformations is the changing of their names, which they did to finally leave their old identities in their past. It was not until 1877, when Elizabeth and her husband moved to Colorado that the moniker of "Baby Doe" was created. Fellow miners called her "Baby" because of her beauty and their admiration for her work in the mines (Hoffmann 2005, 33). The historic figure that inspired *La Traviata*, Alphonsine, changed her name to Marie Duplessis in 1840. She was living in Paris and had received education –

reading, writing, music, decorum, and deportment – through her patron, Agénor de Guiche. She changed her name as many courtesans have done in order to add glamour and to make her life into a role that she was playing. It has been suggested that she chose "Marie" in honor of her mother, also named Marie, or of the Virgin Mary (Rounding 2003, 37-38).

It is interesting to note that the very lives to which these women aspired became their downfall, as both women died penniless. Elizabeth was found frozen to death in March of 1935. She had been living in the shack on the property of the Matchless Mine, even though she had lost the deed to it years before her death. After Alphonsine died in 1847 of consumption, she left behind so much debt that her possessions were auctioned.

The Characters: Baby Doe and Violetta

American composer Douglas Moore wrote *The Ballad of Baby Doe* in 1956. The operatic character of Baby Doe is new in town, kind, beautiful, and courageous. She is introduced as a young woman who asks Horace Tabor for directions in Leadville, Colorado. Tabor, a local celebrity, is known as the "Silver King" because of his success in mining. Baby Doe and Horace fall in love, but Baby Doe ends their relationship because Horace is married. When Baby Doe is about to leave Colorado and return to her parents in Wisconsin, Augusta Tabor, Horace's wife, confronts her. Augusta's actions convince Baby Doe that she needs to stay in Colorado to be with Horace because she is the only one who truly loves him. Horace divorces Augusta in secret and marries Baby Doe in a grand ceremony in Washington, D.C. Baby Doe is happy with Horace even though the society ladies shun her. Augusta comes to Baby Doe once more to warn her about the silver standard losing value, but Horace has her sent away. When the national currency fails to be backed in silver, Horace and Baby Doe lose everything. They live in poverty for years, and the opera closes with Baby Doe professing her love to Horace as he dies in her arms.

La Traviata was written by Giuseppe Verdi in 1853. The character Violetta Valéry is young, beautiful, ill with consumption (tuberculosis), and has the profession of courtesan. The opening scene is a party hosted by the heroine. Gastone, a count, tells Violetta that a young nobleman named Alfredo Germont is in love with her. The Baron, Violetta's lover, escorts Violetta to the salon, where he is asked to give a toast, but he refuses, so Alfredo and Violetta sing the toast. Violetta feels faint and asks her guests to dance in the next room until she recovers. Alfredo expresses his love to Violetta, and she first refuses him. She then gives him a flower and tells him to return when it has wilted. Violetta and Alfredo fall in love and move to a country house outside of Paris. When Alfredo learns that Violetta has been selling her possessions to support their lifestyle, he leaves for Paris to settle matters. Giorgio

Germont, Alfredo's father, comes to call and demands that Violetta break off her relationship with Alfredo. The engagement of Germont's daughter is threatened because of Violetta's reputation. Violetta agrees to end the relationship and writes a farewell letter to Alfredo and then returns to Paris for a party, which she attends with the Baron. Alfredo sees them and says that he will take her home. After gambling with the Baron and winning large sums of money, Alfredo humiliates Violetta by throwing the money at her feet in payment for her services. Violetta faints and the guests then reprimand Alfredo.

The opera's final act takes place in Violetta's bedroom, where she is ill with tuberculosis. Alone, Violetta reads a letter from Alfredo's father saying that he has revealed the sacrifice she made for their family and that Alfredo is coming to beg for her forgiveness. Violetta senses that it is too late, and that she will die before Alfredo comes to her. Alfredo then rushes in to Violetta, suggesting that they leave Paris. Alfredo and Violetta sing a duet about how tragic it is that she will die so young. Violetta suddenly revives, and as she exclaims that her pain and illness have left her, she dies singing a gloriously high B-flat. The parallel in these operas is evident with each couple losing the ones they love.

The Music

Even though these pieces were composed one hundred and three years apart, the operas have similarities in the harmonic language. They both follow a traditional nineteenth century progression: tonality with additional notes for color. The keys and key changes focus on parallel motion. In important dramatic points of the operas, both of the characters are presented in three note figures. This is seen not only in the time signatures, but also with notes grouped in patterns of three within phrases.

The figures of three are emphasized throughout the entirety of both operas. Baby Doe's first entrance is marked "Waltz – Allegro moderato (in 1)," which connects her rhythmically with three before she even sings a note.

Figure 1. Baby Doe's first entrance. Moore, *The Ballad of Baby Doe*.

In addition, Baby Doe's first entrance and encounter with Horrace corresponds with Violetta and Alfredo's "Brindisi," or toast. The latter couple is introduced at Violetta's party and the toast is when they speak to each other for the first time. The "Brindisi" is also in a waltz tempo, with a marking of *allegretto* and a time signature of 3/8.

Figure 2. Violetta's entrance in the "Brindisi." Verdi, *La Traviata*.

This connection with tempi in three carries through into both Baby Doe and Violetta's first arias. Although Baby Doe's vocalises start in 4/4, by the time she starts the "Willow Song," she is once again in her signature time: 3/4.

Figure 3. Beginning of the "Willow Song." Moore, *The Ballad of Baby Doe*

The movement from four to three can also be seen in Violetta's first scene and aria, "E strano…ah fors' è lui…sempre libera." The recitative starts in common time, and as Violetta expresses her feelings, the piece moves to an *andantino* 3/8, reminiscent of the "Brindisi." The connection to the "Brindisi" and to Alfredo is emphasized as the piece moves from F Minor to F Major. At this point, she sings, for the first time, the love theme that was introduced by Alfredo. This is in F Major, the dominant of B-flat, which is the key of the "Brindisi."

Figure 4. Violetta and Alfredo's love theme in Violetta's first aria. Verdi, *La Traviata.*

This aria is in cavatina-cabaletta form, which is a type of aria from the Bel Canto, or "Beautiful Singing," tradition. It features a slow section and a fast section. As the cavatina ends and the cabaletta begins, the time signature moves from 3/8 to 6/8. As the time moves from a feeling of one to a feeling of two, the emphasis of three can be found in the ornamentation of the piece – with two sixteenth notes followed by an eighth note being the most common, and sixteenth-note triplets appearing as the next most common rhythmic figures. The key here is A-flat, which is the relative major of F Minor – the double aria's beginning key.

Figure 5. The cabaletta section, "Sempre libera," of Violetta's first aria. Giuseppe Verdi, *La Traviata*.

When the heroines confront their antagonists, this use of three continues. In *The Ballad of Baby Doe*, directly after Baby Doe sings of her morals and how she has to leave because it is wrong to be with Horace in "Dearest Mama," Augusta Tabor enters the scene. After Augusta informs her that she knows exactly what has been going on with Baby Doe and Horace, Baby Doe takes over the scene and responds. The time signature changes from 4/4 to 3/4 – with the same marking of "Allegro moderato (in 1)" as her first entrance.

Figure 6. Baby Doe's confrontation with Augusta Tabor. Moore, *The Ballad of Baby Doe*.

This scene and the other confrontation scene with Augusta at Horace and Baby Doe's wedding are the most harmonically complex in the entire opera. The complexity derives from Augusta, and not from Baby Doe, as Baby Doe's music is simplistic and folk-like in nature, with ornamentation to feature the coloratura. This heightens the differences of Baby Doe and Augusta and makes Baby Doe a more sympathetic character.

La Traviata's confrontation scene is complex as well, though this time it is due to the often-changing key. Like *The Ballad of Baby Doe*, *La Traviata's* complexity derives from the antagonist. Germont has control of the entire scene as he forces the keys to change. The scene starts in A Minor and moves to C Minor, and as Germont moves into his demand that Violetta leaves Alfredo, it moves to F Minor to A-flat Major – the same keys as "E strano…ah fors' è lui…sempre libera." Violetta then responds in C Minor, in a 6/8 time signature. As in "Sempre libera," the time is 6/8, but rhythmically three is being emphasized. The return of two sixteenth notes followed directly by a longer note is the same rhythmic figure found in the aria. The return to this rhythmic idea (although the final note is a quarter note instead of an eighth note) indicates that Violetta is terrified of losing her love – the very aspect of life she realized she could not live without. The accompaniment in this section is consistently three eighth notes after her phrases – which move to constant eighth notes under her vocal line as she grows more agitated and realizes she has lost control of the situation.

Figure 7. Violetta's confrontation with Germont. Verdi, *La Traviata*.

Romanticization

Both of these women have been changed in their operatic accounts from the lives of these historical women to fit the role of the Romantic courtesan. In the operas, the characters lack the piety for which the women were known. Elizabeth was raised in a staunch Catholic family, and before the local church was built in 1850, the services were held in the McCourt house (Bancroft 1950, 1). Harvey Doe's mother scorned Elizabeth after their marriage, because the Does were a Protestant family, yet Elizabeth maintained her faith throughout her life. As an older woman, she refused to believe that her daughter, Silver Dollar, had died. Caroline Bancroft (1950, 69) writes of what Elizabeth read:

> The account told of a young woman, who had posed under various aliases but lastly as Ruth Norman. She had been scalded to death under very suspicious rooming circumstances in a rooming house in the cheapest district of Chicago. She was a perpetual drunk, was addicted to dope and had lived with many men of the lowest order. But her doctor knew who she really was. She was Rose Mary Echo Silver Dollar Tabor, who had signed her songs Silver Echo Tabor and her novel, Rose Tabor.

Baby Doe chose to believe that her daughter, Silver Dollar, had taken the vows necessary to become a nun and was living in a convent in the Midwest.

Alphonsine was also known for her faith. She gave at least twenty thousand francs a year to charity and she frequently appeared at mass at the Madeleine church in Paris (Rounding 2003, 58). After she died, an invoice for a velvet prie-Dieu (a prayer desk for kneeling) with gilt nails was found among her possessions (Richardson 1967, 165). Her order of a prie-Dieu shows that although her profession was one of questionable morality, she still had an extremely strong faith in her personal life.

Though the operas took out the contradiction of women with questionable morality being religious, they still portray the characters in a sympathetic light. This is evident in *La Traviata* in the final act's "Addio del passato" when Violetta is desolate. Not only does she know of her imminent death, but she is also alone, having left Alfredo. Baby Doe has a firm moral compass that replaces her religious devotion, as is evident in "Dearest Mama." She tells her mother of her love for Horace, but that nothing will happen with him and she needs to leave the town because it is wrong to be with a married man. Although Baby Doe eventually marries Horace, their marriage only occurs after Horace ends his marriage with Augusta.

Also, the character of Baby Doe loses the independence for which Elizabeth Doe Tabor was known. As a spirited Irish-American girl from Wisconsin, she did not fear hard work or challenging gender stereotypes. This is evident in her competing against all boys and winning an ice skating competition in Oshkosh, as well as her wearing of overalls and working in the mines alongside her husband in Colorado (Bancroft 1950, 15, 24). In the opera, this independence is presented as shrewdness. This cunning is present from her first entrance. After asking Horace Tabor for directions, Baby Doe tells him, "Indeed we'll meet again, Mr. Tabor." This implies that Baby knows of Horace and plans to throw herself at him romantically.

Discovering where the real life of Alphonsine ends and the operatic character of Violetta begins proves more challenging, due to the courtesan's association with Alexandre Dumas. Dumas based *La Dame Aux Camélias* on his own relationship with Alphonsine Plessis, and Verdi's character Violetta is based on Dumas' work. It has been suggested that the novel is an account of Alphonsine and Dumas' relationship. In a letter he wrote to actress Sarah Bernhardt in 1884, Dumas stated that the identity of Armand Duval was himself – he even gave the hero his initials (Rounding 2003, 63). In *La Dame Aux Camélias*, the main character Marguerite is portrayed as innocent and angelic, which are also characteristics of Alphonsine. The innocence of Alphonsine is shown in Violetta during "Sempre libera" when she attempts to convince herself that her freedom is more important than love.

Traits of the Romantic Courtesan

In the operas, both women possess the traits of the Romantic courtesan: companions to men with redeeming qualities. First, they fall in love against their expectations. Violetta falls in love with Alfredo, eventually stops her career as a courtesan so she can be with him, and pawns her jewels in order to support their life together. When his family's honor is threatened, she leaves him. Even though she loves him, she leaves so that he and his family may continue to have a good reputation. Baby Doe falls in love with Horace Tabor, who is then married to Augusta Tabor. Horace divorces Augusta and marries Baby Doe in a whirlwind romance, prompting the townsfolk to believe that she only wants him for his money. However, when the silver standard falls and he loses everything, she stays with him because she loves him, defying the historical courtesan's need for luxury. These women, and the characters they inspired, fit the characteristics of the Romantic courtesan because they fell in love.

Beauty is a trait of the courtesan that both women possessed. Elizabeth was known for her red curly hair and voluptuous curves, and Alphonsine's dark hair, very pale, translucent skin, and slender shape were legendary.

Photograph of Elizabeth Doe Tabor (Bancroft 1950, 41-42). Year and photographer unknown.

A portrait of Alphonsine Plessis (Richardson 1967, 161).

Miniature of Alphonsine Plessis (Richardson 1967, 155). Year and artist unknown.

1935 portrait of Elizabeth Doe Tabor, artist unknown. Accessed from *Legends of America*.

A photograph of Elizabeth Doe Tabor is shown above, alongside the most famous portrait of Alphonsine Plessis. The actual photographic evidence of Elizabeth Doe Tabor contrasts with a portrait painted of her. Her features are more delicate, and she seems sweet, gentle, and innocent. The portrait of Alphonsine Plessis contrasts with a watercolor of her at the theatre, one of her favorite places. Her beauty is the sole focus in this painting as she is alone

in a private box, with others in the background observing her. The bonnet upon her head idealizes her as angelic, as she looks like the Madonna.

Cheekiness and self-confidence are other traits of the Romantic courtesan. Elizabeth had some brash qualities, such as winning a figure skating competition as a child in Oshkosh, Wisconsin, where the only other competitors were men (Bancroft 1950, 8). She also earned her famous nickname of "Baby Doe" while she was working in men's overalls. Similarly, in *The Ballad of Baby Doe*, these characteristics appear in the scene of her wedding. "The Silver Aria" only happens because she interrupts the men in order to make known her opinions. Likewise, Violetta tells Alfredo to meet her at the party she is hosting while accompanied by another man.

Expensive taste and lightheartedness are shown in both the characters and the women. Baby Doe's lightness of heart is seen at her wedding. Her extravagant tastes in both the opera and in Elizabeth Doe Tabor's life show this as well. This same quality is shown in Alphonsine Plessis' life in the extravagant taste she shared with Elizabeth Doe Tabor, as well as her addiction to sweets and her life of pleasure – rise, breakfast, dress, go for a carriage ride and walk, go back, dine, and go to the theater. Once, when she accompanied the Comte de Perrégaux to the races, she wore a gown that had lace on it that was worth 10,000 francs (Richardson 1967, 166). Alphonsine Plessis' gaiety is evident from her love of dancing (Griffin 2001, 26). Violetta's joie de vivre is seen in "Sempre libera," where she is convincing herself that her life is wonderful the way it is because of her freedom.

Timing is perhaps the most important skill of the archetypal courtesan. Completely due to luck, Elizabeth Doe Tabor met Horace at precisely the right time; he and Augusta had major problems in their marriage, so it was easy for Elizabeth to convince him that he was truly in love with her. Baby Doe and Horace's first meeting comes in the first scene, where Augusta has been nagging at him about their evening at the opera when Baby Doe waltzes in (quite literally, as her signature time is in three), a sweet young woman, seemingly lost and abandoned. She implies their future together as she leaves for her hotel. Alphonsine Plessis had a love affair with Alexandre Dumas (fils) for nearly an entire year, but he broke it off because he could not bear her taking other lovers to support her lifestyle. She died two years after their relationship ended, which is when he wrote *La Dame Aux Camélias*. Violetta meets Alfredo at a time when she knows she is ill and is growing bored with the Baron. He expresses his love to her so sincerely, and she decides to allow him to woo her.

The Romantic courtesan fits the stereotype so often dramatized in books, movies, and plays from the Romantic era onward where she is portrayed as the "hooker with the heart of gold." This is characterized in a major

plot point of *La Traviata*. Although Violetta loves Alfredo, her life of debauchery prevents them from having a future together, due to the fact that their relationship would destroy his family's honor. This ideal also appears in *The Ballad of Baby Doe*. After the town of Leadville has spoken horribly about Baby Doe and her morals, she stays with Horace Tabor long after their wealth fades, and even continuing his beliefs after his death.

Romantic courtesans have tragic endings. The endings of Elizabeth Doe Tabor and Alphonsine Plessis are the same as the endings of Baby Doe and Violetta. Horace died, leaving Elizabeth Doe Tabor alone to fend for the rest of her life without her love. She died an impoverished old woman in a shack on the grounds of the Matchless Mine. Alphonsine Plessis died of consumption at the age of twenty-three, remaining eternally in the flower of her youth (Rounding 2003, 52).

Even in their operatic portrayal, these endings are romanticized. *The Ballad of Baby Doe* ends with Horace's death. As Horace dies in Baby Doe's arms, she sings an extended love song to him. It is only after she throws back her hood to reveal gray hair that the audience knows Baby Doe has grown old. *La Traviata* ends with Violetta's death of consumption. Violetta is ill in bed and has just finished singing an extended duet with Alfredo. As Violetta draws closer to her death, she suddenly grows rejuvenated and sings solo. Her final note is a high B-flat. In the operatic world, extremely high notes are only used for the most important dramatic places, because they are quite difficult to do well. If Verdi wanted to realistically portray Violetta's death of consumption, it would have been more drawn-out and agonizing. Death by consumption would have been terrible, as the victims are in pain and cough up blood. Verdi's choice of Violetta's dying note being a high B-flat emphasizes the idea of an angelic heroine. Her death is beautiful and dramatic, which is fitting for a woman who lived such a life of luxury and glamour.

Although the operas are separated by almost one hundred years, both of the characters show the same amount of complexity. They are both characters based upon women who caused major scandals during their lifetimes. It is because of their disreputable lives that they are remembered. Both of these women have been immortalized into books, plays, and operas. Verdi based his *La Traviata* upon Alexandre Dumas' *La Dame Aux Camélias*, and Douglas Moore based *The Ballad of Baby Doe* on books and newspaper articles written about Elizabeth Doe Tabor. Both of these women were preserved because they were subjects of intrigue. By comparing the real-life women and their stories, as well as the musical portrayal of these characters, both Baby Doe and Violetta were romanticized to fit the role of the Romantic courtesan.

References

Bancroft, Caroline. 1950. *Silver Queen: The Fabulous Story of Baby Doe Tabor*. New York: Golden Press, Inc.

Castel, Nico. 1996. *The Complete Verdi Libretti: Volume IV*. Geneseo, NY: Leyerle Publications.

Dumas, Alexandre (fils). 1955. *La Dame Aux Camélias*. New York: The Heritage Press.

Easley, David Bradley. 2005. "Tonality and Drama in Verdi's 'La Traviata.'" Master's thesis, Louisiana State University.

Griffin, Susan. 2001. *The Book of the Courtesans: A Catalogue of Their Virtues*. New York: Broadway Books.

Hoffmann, Kari Regan. 2005. "The Ballad of Baby Doe: Historical Accuracy and Gender Ideology in the Characterization of Augusta and Baby Doe." Doctoral thesis, University of Washington.

Moore, Douglas, and John Latouche. 1956. *The Ballad of Baby Doe*. New York: Chappell Music Company.

Richardson, Joanna. 1967. *The Courtesans*. Cleveland, OH: The World Publishing Company.

Rosmarin, Léonard A. 1999. *When Literature Becomes Opera: Study of a Transformational Process*. Amsterdam: Rodopi B.V.

Rounding, Virginia. 2003. *Grandes Horizontales: The Lives and Legends of Marie Duplessis, Cora Pearl, La Païva, and La Présidente*. London: Bloomsbury Publishing.

Temple, Jody Nolte. 2007. *Baby Doe Tabor: The Madwoman in the Cabin*. Norman, OK: University of Oklahoma Press.

Verdi, Giuseppe, and Francesco Maria Piave. 2007. *La Traviata*. Milan: Ricordi.

Weiser, Kathy. 2015. "Rags, Riches & Scandal - The Tabor Triangle." *Legends of America*. http://www.legendsofamerica.com/co-tabor3.html

Reentry Experiences of Study Abroad Sojourners

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Abstract

For many students, studying abroad is a normal part of the university experience. Each student's experience adjusting abroad — and again at home — varies in symptoms and difficulty. This study explored incidents of reentry culture shock encountered by study abroad students, changes in identity as a result of study abroad, and adaptation skills developed by sojourners. Survey data were gathered by means of an online questionnaire administered to all UW-Eau Claire students (N = 374) who had studied abroad during a specified time period. Textual analysis was used to code and content analyze the qualitative responses. 86% of the sojourners reported they had not prepared for reentry shock. 75% also agreed they had experienced a change in identity. The results show the participants developed a variety of adaptation or adjustment skills during the reentry process. These findings suggest the importance of providing reentry training programs and the necessity of a shift in terminology surrounding reentry shock.

Introduction

For many students, studying abroad is a normal part of the university experience. Each student's experience adjusting abroad — and again at home — is unique and varies in symptoms and difficulty. In order to maximize the outcome of student experiences, encourage individual growth, and highlight newly acquired skills, reentry training needs to be a permanent and well-established fixture of any study abroad program. Furthermore, students need an outlet upon returning home to discuss their experiences, utilize their newly developed skills, and potentially become more involved in activities with a global or intercultural focus. As study abroad has become an important and integral part of many university educational programs, research concerning the reentry experience is essential. This study – which explores incidents of reentry culture shock encountered by study abroad students, the relationship between the study abroad and the sojourner's perception of a change in their identity, and kinds of adaptation skills developed by the sojourners – makes clear the need for reentry training.

Definitions of Reentry Shock

The reentry experience is different for every sojourner in terms of its intensity, length, and breadth of

symptoms. What makes reentry more confusing is that no set term exists to describe this experience, leading some returned sojourners to wonder if their reentry experience and accompanying symptoms are unique. Reentry shock has also been labeled as reverse culture shock, repatriation, reacculturation process, or cross-cultural readjustment, and in more recent literature, as reentry process, reentry adjustment, or reacculturation (Adler 1981; Thompson and Christofi 2007; Gaw 2000; Wang 1997). The wide range of definitions and descriptions regarding reentry shock allows for a deeper look into this complex phenomenon.

Szkudlarek (2009, 2) makes it clear that the literature on the reentry process is fragmented and varies widely by definition. Indeed, the literature reveals a number of definitions of "reentry shock" and other similar terms. According to Gaw (2000, 83), "Reverse culture shock is the process of readjusting, re-acculturating, and re-assimilating into one's own home culture after living in a different culture for a significant time." Adler (1981, 343) writes, "Cross-cultural readjustment is the transition from a foreign culture back into one's home culture. It is the experience of facing previously familiar surroundings after living in a different environment for a significant period of time." Uehara (1983, 240) focuses on the "temporal psychological difficulties returnees experience in the initial stage of the adjustment process at home after having lived abroad for some time." Wang (1997, 116) suggests that reentry culture shock could be defined as "a long-term process of coming to terms with oneself as a more complex, more multicultural individual in a changed but familiar setting." Wang (1997, 115-16) also uses the term "reacculturation" as one which implies opportunities for returned sojourners to interpret their return home as another cross-cultural experience in which they may experience additional growth. The above definitions, while similar is some cases, describe the varying degrees of severity and reach that reentry shock can play in the experiences of returned sojourners.

Expectations of the Sojourner

A significant factor influencing the reentry process concerns the expectations of the sojourner. According to Szkudlarek (2009, 3), "The challenge of returning home is related to issues such as the unexpectedness of the difficulties encountered, a lack of preparation for reentry, and grief for the lost expat life." Szkudlarek (2009, 3) also discusses the Expectations Model framework (see Adler 1981, Black 1992, and Rogers and Ward 1993), which explains how the expectations of the sojourner may influence the reentry process. Furthering this idea, Gaw (2000, 86) states that the sojourner often expects, "to return to an unchanged home as an unchanged individual." The literature suggests that in some cases, readapting to a home culture (in this case the United States), may be the most

difficult portion of the study abroad process. Martin (1984, 122-123) indicates that the reentry experience contrasts with the adjustment experience while abroad in three ways: "expectations about the difficulty of the transition, the unique aspects of returnees' cognitive, behavioral and affective change, and returnees' awareness of those changes." The difficulty of the transition from the host culture back to the home culture is one that often surprises returned sojourners in its severity. The research also indicates that reverse culture shock is more difficult to experience than culture shock, often because the individual does not expect to experience any culture shock upon return from their sojourn (Davis et al. 2008, 4; Gaw 2000, 86; Koester 1984, 252).

Ease of Readjustment

Another factor that affects the reentry process is the amount of ease with which the sojourner readapts to their home culture. In a study conducted by Davis et al. (2008, 13-16), it was found that an easier adjustment abroad resulted in a more difficult transition back home. Sussman (1986) also reported that individuals who adapted more successfully overseas experienced more severe reentry problems than those who did not adapt well. In support, Thompson and Christofi (2007, 2) maintain that sojourners who adapt well to their host culture often experience a more severe reentry experience and offer the explanation that "sojourners who adapt well to the host culture experience changes in their values, attitudes, behaviors, ideas, and perceptions and must subsequently integrate these changes with their home culture behavior and attitudes, thus making reentry difficult." Research also indicates the length of the sojourn may affect the reentry process (Bennett, McKnight, and Passin 1958; Brein and David 1971; Brislin and Van Buren 1974; Davis et al. 2008; LaBrack 1983; Smith 1975). For example, a study by Davis et al. (2008, 13-16) found the longer the sojourn, the more difficult the transition back to the home culture.

Finally, the literature suggests that ease of adjustment can be affected by a number of factors, including demographics. In a study conducted by Cox (2004), seven characteristics were tested for a correlation with a more difficult reentry process. These characteristics included age, female gender, single status, fewer sojourns, longer stay abroad, more recent return, and no debriefing. The findings of Cox's study show statistically significant relationships associated with younger age and single status (215). The relationship between young age and a more difficult reentry process is highly relevant, as study abroad participants are typically undergraduates.

Identity and Study Abroad

Research suggests that a change in identity may be one aspect that most sojourners experience or realize as they begin the readjustment process back to their home cultures (Thompson and Christofi 2007). The term "identity"

has been defined as "changes that occur in one's personality as a consequence of time and exposure to a new country (Thompson and Christofi 2007, 60). Martin and Nakayama (2010, 331-32) also describe a component of personal change in the reentry process; they state, "In the reentry phase, the sojourner has changed through the adaptation process and has become a different individual. The person who returns home is not the same person who left home." As Niesen (2010, 37) makes clear, "Personality traits, tastes, likes, and dislikes have changed, relationships are expected to be the same but may not be, support from the organization that facilitated the experience may or may not be there, and changes in society continue to evolve while the study abroad participant was away." According to Grewe and Bradley (2009, 8), sojourning students may undergo "a loss of self, values and their current view of home, self, family and friends upon returning as they have to adjust their new ideals in to their former home environment." Evidence from previous research exists to argue that many sojourners experience a change in identity while abroad and in the readjustment process. Thompson and Christofi (2007) claim that well-adapted sojourners must integrate experiences and ideas obtained abroad back into their home culture lives; such experiences and ideas contribute to the development of their identity. As Adler (1975) contends, such transitional experiences can be the source of higher levels of personality and professional development.

One reason that sojourners may have difficulty incorporating their changed identity in their home culture is explained by Szkudlarek (2009). Szkudlarek (2009, 4) discusses Culture Learning Theory (see Furnham and Bochner 1986), which suggests sojourners acquire a new range of behaviors that are considered normal in the host culture, thus resulting in the forfeiture of behaviors considered normal in the home culture. Constantinian et al. (2008, 4) discuss the internal developmental challenges and issues sojourners often face and suggest that successful sojourning may serve as a "springboard" for students to understand how culture impacts self-development. This "springboard" may be a place for sojourners to begin to realize their newly changed identity. According to Smith (2001, 9), adaptation in "the development and internalization of host cultural patterns of perception, communication…results in the creation of an intercultural identity." Smith (2001, 14) further asserts that sojourners incorporate features and characteristics of the host culture into their sense of self, and their identity moves and becomes more of an intercultural identity. As the sojourner begins to renegotiate their new identity in the home culture, Martin (1984) makes clear the need for the sojourner to communicate these new changes.

Social Support

A key aspect in the reentry process is the social support the sojourner receives and utilizes during the readjustment process. Adler (1981) asserts that "strong external support" has a significant influence on a sojourner's reentry process. This support can come in the form of a relationship with someone who is able to validate and understand the sojourner's experiences abroad, which is vital in the integration of the sojourner's old and new identities. Martin (1986) makes clear that returned sojourners also often convey a lack of social support because those in the home culture are not interested in or willing to hear about the sojourner's experiences abroad. This dearth of social support and understanding from members of the home culture leads the returned sojourners to seek to communicate with those who might listen to or understand stories from their study abroad experience. Koester (1984, 252) argues that communication is the method in which the sojourner begins to conceptualize the new changes within themselves and in their home culture, thus allowing them to better readjust. According to Smith (2001, 8), "better communication skills lead to better adaptation."

The results of the research addressed in this paper originate from a larger study about the influence of study abroad on cultural intelligence conducted by Sims, Cusick, and Jacobson (2011). Data for this study focus on reentry shock and the resulting adaptation and adjustment skills acquired by the sojourner. Since much of the literature is concentrated on the causes of reentry shock and not the consequences of experiencing reentry shock, this study focuses on the sojourner's development of adjustment or adaptation skills obtained as a result of experience reentry shock. This study also involves examination of the relationship between the study abroad experience and the sojourner's perception of a change in their identity. As such, this research is based on the following five research questions: What, if any, incidents of reentry shock do study abroad students encounter? How, if at all, do study abroad students prepare for reentry shock? What, if any, adaption and/or adjustment skills are learned by the study abroad students? What is the most difficult aspect to which students have to adjust upon reentry to their home culture? Do study abroad students report a change in identity as a result of time and exposure to a new country?

Method

Participants

The participants consisted of 161 (132 female, 29 male) UW-Eau Claire students who had studied abroad during the Summer 2011, Spring 2011, and/or Fall 2010 semesters. 95% of the participants reported they had studied abroad only one time. Participants ranged in age from 21-23 years or older. A majority (62%) were 21-22

years old. 91% of participants indicated their racial identity as White, and 3% identified their racial identity as Hispanic or Latino. Details pertaining to the characteristics of the study abroad trips can be found in Table 6 of the Appendix.

Materials and Procedure

Data were gathered by means of an online *Qualtrics* survey composed of closed-ended questions utilizing various scales and open-ended questions. Based on the data and responses gathered from a pilot study, the questionnaire was edited. The questionnaire was sent out in the fall of 2011 to all UW-Eau Claire students who had studied abroad during the Summer 2011, Spring 2011, and Fall 2010 semesters (N = 374). Strategies to increase the response rate included a pre-notification message, cover letter, and two follow-up messages. The overall response rate was 61% (n = 228); according to Babbie (1995), a response rate of 60 percent is good, and 70% is very good (262). The questionnaire completion rate was 71% (n = 161). The sample is purposive as the UW-Eau Claire students had to possess the characteristic of having studied abroad during the specified time period. The sample did not include UW-Eau Claire study abroad students who had graduated, non-UW-Eau Claire students, or international students.

The research was approved by the UW-Eau Claire Institutional Review Board for the Protection of Human Subjects. The participants, who were provided with informed consent, were instructed that results from the questionnaire would not be linked to their names, responses would be anonymous, and internet protocol addresses would be removed from the data set.

Data Analysis

Quantitative data were analyzed with the Statistical Package for the Social Sciences (SPSS) software. To obtain a tabulation of the results, frequencies and cross-tabulations were computed on the nominal and ordinal level data. Chi squares were done for all cross-tabulations to reveal the significance of the associations between the categorical variables. Pearson Correlations were calculated to examine the relationship between variables measured on interval or ratio scales. Qualitative responses were reviewed in "tri-validation" meetings; the three researchers reviewed all of the open-ended responses for each question, discussed the meaning of the responses, created coding categories, and designed the coding forms. Responses then were systematically and independently content-analyzed by each of the three researchers and coded into content categories. The researchers then met to discuss their codes; researchers had the opportunity to change a code based on discussion. In order for a response to be coded into a

category, two of the three coders had to agree. Reliability was calculated using Holsti's (1969) formula. The open-ended data were further analyzed and organized with Nvivo 9 software, which allows users to classify, sort and arrange information, find meaning in unstructured data, uncover trends and examine relationships, and create visualizations to gain new perspective.

Reliability and Internal Validity

To reduce measurement error and increase internal validity, a pilot test was conducted and coders were trained. Two techniques were used to assess reliability. First, reliability was assessed through internal consistency; the same question was asked more than once on the questionnaire, and results were then compared. Second, Holsti's (1969) formula was used to calculate inter-coder reliability of the open-ended data; reliability scores ranged between

.90 and 100% for the entire project. In order to ensure the validity of the research process, researchers asked a gatekeeper question at the beginning of the questionnaire to verify that individuals participating in the study were valid members of the population of interest. The questions featured on the questionnaire clearly inquired about study abroad and reentry shock. As such, the measurement instrument reflects the attributes of the concepts being investigated and evidence exists to claim the measurement is strong in face validity.

Results

Student experiences upon arriving home after any of their times of studying abroad were investigated. Respondents were provided with a list of 17 symptoms which were derived from the literature about reentry shock (Adler 1981; Church 1982; Ferraro 2010; Gaw 2000; Hannigan 1990; Jansson 1975; Kittredge 1988; Locke and Feinsod 1982; Martin 1984, 1986; Raschio 1987; Sahin 1990; Zapf 1991). Students were asked which, if any, of the symptoms they had experienced. The results are shown in Table 1. A small percentage (9%) of the students reported "Other" reentry symptoms, including jetlag, missing some aspect of the host culture or study abroad experience, and disappointment that others were not as interested in hearing their trip.

Table 1. Reentry symptoms experienced as reported by study abroad participants

Reentry Symptoms	% of Study Abroad Participants
Boredom	55.2
Perception of home culture changed or distorted	44.8
Feelings of being misunderstood	41.2
Shift in values	40.6
Frustration, hostility or anger toward home culture	31.5
Stress	29.1

Loneliness	28.5
Alienation from home culture	27.9
Lack of interest in daily life	23.6
Cultural identity conflict	23.0
Depression	21.8
Academic problems	21.2
Inability to express feelings or interpersonal difficulties	21.2
Problem finding a new role in work or personal life	20.6
Disorientation	18.2
Social withdrawal	18.2
I did not experience any of the symptoms listed	17.6
Value confusion	10.9
Other: (Please describe)	8.5

Reentry shock was defined for the participants as "the temporal psychological difficulties returnees experience in the initial stage of the adjustment process at home after having lived abroad for some time (Uehara 1983). Survey participants were then asked to describe what, if any, reentry or reverse culture shock they had experienced upon returning to their home culture after any of their times of study abroad. As shown in Table 2, responses to this question concurred with symptoms indicated in the literature (Adler 1981; Church 1982; Ferraro 2010; Gaw 2000; Hannigan 1990; Jansson 1975; Kittredge 1988; Locke and Feinsod 1982; Martin 1984, 1986; Raschio 1987; Sahin 1990; Zapf 1991). A complete listing of experiences can be found in Table 7 of the Appendix.

Table 2. Most reported reentry or reverse shock experiences by study abroad participants

Reentry or Reverse Culture Shock Experience	% of Study Abroad Participants
Difficulty readjusting to daily life in home culture (roads, mealtimes, values, work, stress, routine)	17.4
Missing some aspect of study abroad experience (friends, host family, culture, lifestyle, values, etc.	9.3
None	8.7
Heightened awareness of home culture; Reflection/realization concerning nature of home culture (value of work, lack of emphasis on family, laziness)	7.5
Academic Problems	6.2
Boredom	5.6
Wish to return to host culture and/or feelings of not belonging in home culture	5.0
Frustration, resentment, bitterness, hostility or anger toward home culture	5.0
Symptoms unclear	5.0

Participants (n = 161) were asked an open-ended question about the way in which they had prepared themselves for reentry culture shock. An overwhelming majority (86%) of participants indicated they had not prepared for reentry culture shock in any way. The remaining participants (14%) indicated they had prepared a

number of ways. As displayed in Table 3, the most reported methods of preparation for reentry shock were a "general

awareness and understanding of reentry shock" (18%) and "making plans for readjustment period in terms of work or

social network" (14%).

Table 3. Methods of preparation for reentry shock as used by study abroad participants who had prepared

Ways of preparation	% of Study Abroad Participants
General awareness and understanding of reentry shock	17.9
Made plans for readjustment period (job, social)	14.3
Unclear/not applicable	14.3
Created a buffer zone (family visit, friend visit, visited England to get used to English)	10.7
Stayed in contact with host culture (study abroad friends) upon return to home culture	10.7
Anticipated others' reactions (to identity change)	7.1
Journaled, wrote	7.1
Stayed in contact with home culture throughout study abroad	7.1
Talked to others with previous abroad experience	7.1
Expected cultural differences	3.6

Participants were asked to indicate how strongly they agreed or disagreed with the following statement:

"Although I adapted successfully overseas, I experienced a more severe reentry adjustment problem." Of the 161

participants who responded, a majority (55%) indicated they agreed or strongly agreed with the statement.

Adaptation or adjustment skills that participants (n = 161) had developed as a result of their experience with

reentry culture shock also were investigated. A strong majority (68%) of participants indicated they had developed

adaptation or adjustment skills, whereas 32% of the participants reported they had not experienced

reentry culture shock and thus did not need to develop adaptation or adjustment skills. Participants who reported they

had developed adaptation or adjustment skills were asked to describe the ways in which they had learned to adapt or

adjust to manage their reentry shock. The most popular responses are indicated in Table 4. A complete list of

responses can be found in Table 8 of the Appendix.

Table 4. Most popular adaptation or adjustment skills learned through reentry shock experiences as reported by study abroad participants

Adaptation or Adjustment Skills	% of Study Abroad Participants
Purposeful involvement (school, family, work, stay busy, friends)	15.5
Communication with friends who studied abroad or others with cross-cultural experience	10.0
Waiting it out, patience, give it time	9.1
Communication with people (loved ones)	9.1
Unclear and/or not applicable	8.2

Reconnect with family, friends, and/or loved ones	8.2
Acceptance of situation, "got used to it"	7.3
Integration/reflection/comparison of wisdom and/or experiences abroad into home culture	7.3
Journaling, scrapbooking, reminiscing	7.3
Flexibility, understanding, open-mindedness, positive attitude	6.4
Re-learn cultural norms and values	5.5
Talk about my experience abroad	5.5

Participants (n = 161) were asked about the difficulty of adapting or adjusting upon reentry to their home culture. According to the results, a majority (68%) of the respondents reported they had experienced difficulty adapting or adjusting. Table 5 lists the most reported aspects. A complete list of aspects can be found in Table 9 of the Appendix.

Table 5. Most popular most difficult aspect of reentry adaptation or adjustment to home culture as reported by study abroad participants with difficulty adapting

Most Difficult Aspect	% of Study Abroad Participants
Boredom (lack of new and exciting experiences, lack of travel)	16.4
Missing aspects of host culture/ country (friends, host family)	11.8
Social life (relationships altered, people-including self- change, feeling disconnected)	8.2
Readjusting to home culture's way of life (U.S. American politics, meal times, drinking age)	8.2
Transportation (lack of public, driving, rules of the road, lack of walking)	6.4
School (study habits, level of effort)	5.5

The concept of identity was also explored; it was defined as changes that occur in one's personality as a consequence of time and exposure to a new country (Thompson and Christofi 2007, 60). Students were asked to respond to a Likert-scale question that investigated to what extent they agreed or disagreed with the statement: "While abroad, I experienced more than just normal maturation; I also experienced a change in identity." Of the 161 students who responded to the question, a strong majority (75%) reported they either "strongly agreed" or "agreed" with the statement; 19% disagreed, and 6% strongly disagreed. A Pearson correlation coefficient was calculated to examine the relationship between the length of the student's study abroad program and a change in their identity. A positive correlation was found (r = .236, n = 161, df = 159, p < .01), indicating a significant linear relationship between the two variables. The longer the students studied abroad, the more they agreed their identity had changed.

Open-Ended Responses

The results clearly illustrate symptoms of reentry shock. A majority of the participants in this study

reported that although they had adapted successfully overseas, they experienced a more severe reentry adjustment problem. The results of this study support the findings of previous research concluding that individuals who adapt successfully during their sojourn experience a more severe reentry adjustment problem than those individuals who do not adapt well (Brein and David 1971; Brislin 1981; Brislin and Van Buren 1974; Thompson and Christofi 2007; Hara 1984; LaBrack 1983; Smith 1975). The symptoms of reentry shock reported by the participants in this study are consistent with those reported in the literature (Adler 1981; Church 1982; Ferraro 2010; Gaw 2000; Hannigan 1990; Jansson 1975; Kittredge 1988; Locke and Feinsod 1982; Martin 1984, 1986; Raschio 1987; Sahin 1990; Zapf 1991). For example, the most frequently reported symptoms were boredom, a perception that their home culture had changed or been distorted, and feelings of being misunderstood. Other reentry symptoms reported in the open-ended question included, "Sadness, missing the city and my host family," "Disappointment that others were not as interested in hearing about my trip as I thought they would be," and "Feeling like I had left everything/everyone behind." These descriptions illustrate the variety of reentry experiences and varying degrees of severity.

After receiving the definition of reentry shock, participants reported their experiences with reentry shock in open-ended text responses: "This, for me, was much worse than anything I experienced while I was studying abroad…It's been almost a year since I got back, and I am still feeling some of these things," "I fell in love with my host country and grew accustomed and familiar with their culture so much so that when I returned, my home country just didn't feel right," and "How stressful American life is. I find myself stressing out over things that shouldn't matter."

Perhaps the greatest concern is the finding from this study that indicates a majority of the study abroad students did not prepare for reentry culture shock. Open-ended responses were provided by those participants who indicated they had prepared for reentry shock; examples of such responses included: "Attempting to foresee other's reactions to my changed identity," "I reminded myself that things would be different and it might not feel like home anymore," and "Talking with my friends who had studied abroad before." This variety of responses concerning ways to prepare for reentry shock exemplifies the confusion surrounding the reentry process. The widely differing methods of preparation for reentry shock illustrate how ill-prepared students are to make the return home and begin the readjustment process. Better communication about the reentry process could allow for each individual to tailor their reentry preparation to the individual experience.

When questioned about skills developed as a result of experience with reentry shock, a strong majority of

participants indicated they had developed adaptation or adjustment skills. Students provided the following types of responses when asked to describe the ways in which they had adapted or adjusted as a result of experiencing reentry shock:

> Trying to go back to the way things were as well as stay[ing] in contact with the close friends I had met abroad.

> Speaking with people about my issues. Sharing my experiences. Establish a routine.

> I had to get back into the mindset of my American culture and slowly work my way "back" to U.S. norms.

> I avoided people at home and also began to dress better and keep my appearance neater.

> I learned, after some time, that it is not fair to judge any culture or its people too harshly, INCLUDING my own.

> I just learned that it takes time. It took time to get used to my schedule over there, and it will take time to adjust over here. It really helped to talk about my abroad experience and promote others to go abroad and study as well.

> Though it may not have been the best way to adapt, I tried to not talk about my experiences abroad because then it would remind me of the differences.

> I learned to clarify and sometimes change my values.

> Just tried to get back into a routine [and] see friends [and] family. That makes a big difference. Isolation only creates more depression and loneliness.

Some of these responses align with the findings of Koester (1984, 252), who found "The returnees often express frustration with the lack of opportunity to talk about their experiences, and thus, indirectly, to validate their experience and newly acquired knowledge." Indeed, some of the sojourners in our study reported a dearth of social support upon reentry and indicated their desire to share their experiences.

The students who reported experiencing reentry shock also provided descriptions of what they considered to be the most difficult aspect to which they had to adapt or adjust upon reentry. The sojourners offered responses such as the following:

> Re-learning my old study habits.

> Back to the daily grind, ordinary life. Things weren't as fun and exciting or new as they had been while studying abroad.

Working again and having a much more strict and busy schedule.

The lack of emphasis on family.

Finding my place again back home.

People asking how my "trip" was and expecting a short, concise answer. After living in a different country for 5 months, that is impossible to do.

Feeling disconnected from my friends.

Reality. Being abroad is an escape, kind of a vacation, and when you get home you're forced to face real life again.

Speaking English all the time and eating unhealthy food again.

Feeling like I changed so much, and so did people from home, but we changed in different directions.
It was hard to adapt to the fact that no one from my home culture knows anything about other cultures.

The most difficult aspect was not being with my host family all the time.

The wide variety of responses illuminates the numerous ways in which individuals cope with readjusting to their home culture. This adjustment process varies in degrees of severity and length. For some students, sharing their experiences was an effective method for navigating the reentry process. For others, returning to their pre-departure routine brought the greatest amount of solace. Above all, these reentry adaptation and adjustment skills highlight the value of experiencing reentry shock. The skills developed by the participants offer a unique perspective into the readjustment process of a returned study abroad student.

Finally, the results from this study indicate that a strong majority of the participants agreed that while abroad, they experienced more than just normal maturation, but rather a change in identity. This change in identity may have occurred for a number of different reasons, but regardless of the cause, a change in identity, no matter the age it occurs, is an important event in an individual's life and should be recognized and accepted. With a strong majority of participants agreeing that their identity had changed, and a strong majority reporting they had not prepared for reentry shock, these two factors create an opportunity for much distress and difficulty during the reentry process.

When the length of the participant's study abroad stay and a change in their identity were examined for a Pearson correlation, a positive correlation was found ($r = .236$, $n = 161$, $df = 159$, $p < .01$), indicating a significant linear relationship between these two variables. In this study, the longer the students studied abroad, the more they agreed their identity had changed. A Pearson correlation coefficient was also calculated for the relationship between

reentry shock and a change in identity. A positive correlation was found ($r = .410$, $n = 161$, $df = 159$, $p < .01$) indicating a significant linear relationship between the two variables. In this study, the stronger the student's degree of agreement regarding the experience of severe reentry shock, the more they agreed their identity had changed.

External Validity

Evidence exists to argue the findings from this study are externally valid and can be generalized to the larger population of interest. First, the questionnaire was administered to a random sample of study abroad students, thus providing the best evidence for a representative sample. This study also was able to replicate some findings from other studies related to reentry shock and identity (Adler 1981; Brein and David 1971; Brislin 1981; Brislin and Van Buren 1974; Thompson and Christofi 2007; Church 1982; Ferraro 2010; Gaw 2000; Hannigan 1990; Hara 1984; Jansson 1975; Kittredge 1988; LaBrack 1983; Locke and Feinsod 1982; Martin 1984, 1986; Raschio 1987; Sahin 1990; Smith 1975; Zapf 1991). Finally, this study is ecologically valid in that data were gathered from students who actually studied abroad and provided "real-life" descriptions of their experiences.

Discussion

The results of this study make clear that effective reentry training for study abroad sojourners is necessary for all study abroad programs. Wang (1997) advocates that a reentry program should start during the sojourner's preparation for their stay abroad, continue through the stay abroad, and remain in place for as long as the sojourner needs it once at home. According to Wang (1997), an effective reentry program should teach sojourners that reentry shock is a serious issue that affects every individual in some way, ask sojourners to reflect on the personal changes they have experienced as well as how things may have changed in their host culture during their time abroad, and assure sojourners there are methods to help them deal with reentry shock to make it a "positive growth experience."

Reentry shock can serve as a second cross-cultural experience in which returned sojourners have the opportunity to relearn their home culture, and with it, reestablish their identity. Wang (1997, 115-16) suggests use of the word "reacculturation," a term which communicates the possibility of a shift in perceptions of reentry shock. If reentry shock is portrayed as a positive experience with opportunities for developing intercultural and adaptation skills, the experiences of sojourners could be viewed in a more positive light. Wang (1997) also proposes the reentry experience be viewed as a second cross-cultural experience, a perspective that could assist sojourners in learning how to negotiate through an often difficult and challenging time. This idea is vital in communicating the worth of reentry programming and experiences to returning sojourners, for by facilitating this often difficult time,

the experiences of sojourners could be maximized as a time for additional growth.

It should be noted that findings from this study are subject to some limitations. First, this study was based solely on self-report data. Although self-report data can provide a good measure of how people behave, observations often can be more accurate (see Howard et al. 1980). Subjects who provide self-report data may not respond truthfully, either because they desire to present themselves in a socially acceptable manner or because they cannot remember accurately. Second, although 228 participants began the questionnaire, only 161 completed it; however, their partial responses were not discarded in order to benefit from their open-ended responses. Third, some of the results are based on perceptions of the participants, rather than actual observations of behaviors. Fourth, although representative of the university's student population, the questionnaire recorded responses from a strong majority (82%) of females and a small group (18%) of males. As such, the findings of this study are representative of the experiences of mostly females of a certain age (21-22). Finally, some of the linear correlations, although statistically significant, could have been stronger.

Two principal recommendations for future research emerge from this study. First, this study suggests that after much research on the topic of reentry shock, study abroad sojourners are still not preparing for the reentry experience. In this study, 86% of participants did not prepare for reentry shock. This high percentage leads one to question if universities are offering adequate reentry training programs and to question the effectiveness of existing programs. A future study should explore what influences the effectiveness of a reentry training program, and which, if any, methods, seem to work well for students at a variety of universities. Second, future research on the topic of reentry shock and change in identity could highlight variables that increase the severity of the reentry process. In this study, participants were asked if their identity had changed, but not how their identity had changed. If asked, this question could yield a wealth of responses and shed light on this aspect of the reentry experience.

One lasting implication from this study is that a change in terminology is needed regarding the term "reentry shock". Szkudlarek (2009, 14) states, "the academic community still needs to carefully consider and elaborate on the vocabulary employed within the field. Delineating the meaning for basic terms…will help to integrate the field and create meaningful distinctions between different categories of individuals in transition." As discussed earlier, the many existing definitions and terms only contribute to the confusion of the reentry experience. Further, the term "reentry shock" is not applicable to the experiences of every returned sojourner. For some returnees, their experiences are not a shock, but rather an uncomfortable experience which varies in length and severity.

References

Adler, Peter. 1975. "The Transitional Experience: An Alternative View of Culture Shock." *Journal of Humanistic Psychology* 15 (4): 13-23.

Adler, Nancy. 1981. "Re-entry: Managing Cross-Cultural Transition." *Group & Organization Studies* 6: 341-356.

Babbie, Earl. 1995. *The Practice of Social Research*. New York: Wadsworth Publishing.

Bennett, John, Robert McKnight, and Herbert Passin. 1958. *In Search of Identity: The Japanese Overseas Scholars in America and Japan*. Minneapolis: University of Minnesota Press.

Black, J. Stewart, Hal Gregersen, and Mark Mendenhall. 1992. "Toward a Theoretical Framework of Repatriation Adjustment. *Journal of International Business Studies* 23 (4): 737-760.

Brein, Michael and Kenneth David. 1971. "Intercultural Communication and the Adjustment of the Sojourner." *Psychological Bulletin* 76 (3): 215-230.

Brislin, Richard. 1981. *Cross-Cultural Encounters*. New York: Pergamon Press.

Brislin, Richard and H. Van Buren. 1974. "Can They Go Home Again?" *International Education and Cultural Exchange* 9: 19-24.

Church, Austin. 1982. "Sojourner Adjustment." *Psychological Bulletin* 91 (3): 540-572.

Constantinian, Patricia, Cynthia Guinyard, Ernesto Hermosisima, Pamela Lehman, and Richard Webb. 2008. "Personal Transformation and Readjustment in "Homecoming."" *Journal of College Student Psychotherapy* 22 (3): 50-60.

Cox, Ben. 2004. "The Role of Communication, Technology, and Cultural Identity in Repatriation Adjustment. *International Journal of Intercultural Relations* 28 (3-4): 201-219.

Davis, Daniel, Damon Chapman, Bethany Bohlin, Brian Jaworski, Colleen Walley, David Barton, and Nicholas Ebner. "Reverse Culture Shock: A Comparison of United States and Japanese Students' Experiences Returning From a Study Abroad Sojourn." Paper presentation at the Annual Meeting of the National Communication Association, San Diego, CA, November 21-24, 2008.

Ferraro, Gary. 2010. *The Cultural Dimension of International Business*. New Jersey: Prentice Hall.

Furnham, Adrian, and Stephen Bochner. 1986. *Culture Shock*. London: Routledge.

Gaw, Kevin. (2000). "Reverse Culture Shock in Students Returning From Overseas. *International Journal of Intercultural Relations* 24 (1): 83-104.

Grewe, Jessica, and Kelly Bradley. "Creating an Instrument to Measure Perceptions of Preparedness to Return Home from Study Abroad." Paper presentation at the Mid-Western Educational Research Association annual meeting, St. Louis, MO, 2009.

Hannigan, Terence. 1990. "Traits, Attitudes, and Skills that are Related to Intercultural Effectiveness and Their Implications for Cross-Cultural Training. A Review of the Literature." *International Journal of Intercultural Relations* 14 (1): 89-1111.

Hara, H. "Problems in Re-entry of (Japanese) Businessmen Who Worked Overseas.*"* Paper presentation at the Ninth Symposium of Community Psychology, Kagoshima, Kyushu, Japan, March 1984.

Holsti, Ole. 1969. *Content Analysis for the Social Sciences and Humanities*. Reading, MA: Addison-Wesley.

Howard, George, Scott Maxwell, Richard Wiener, Kathy Boynton, and William Rooney. 1980. "Is a Behavioral Measure the Best Estimate of Behavioral Parameters? Perhaps Not." *Applied Psychological Measurement* 4 (3): 293-311.

Jansson, D. 1975. "Return to Society: Problematic Features of the Re-entry Process. *Perspectives in Psychiatric Care* 13 (3): 130-145.

Koester, Jolene. 1984. "Communication and the Intercultural Reentry: A Course Proposal." *Communication Education* 33 (3): 251-256.

LaBrack, Bruce. 1983. "The Re-entry Process as a Cultural Universal and the Status of "Returnee" Studies in Japan." In *Meta Report I: Ibasho Saqashi to Ibunka-Taiken [Meta Report I: The Identity Search and Cross-Cultural Experience*], edited by N. Horoiwa and T. Nakazawa. Tokyo, Japan: Meta Press.

Locke, Suan, and Fred Feinson. 1982. "Psychological Preparation for Young Adults Traveling Abroad." *Adolescence* 17 (68): 815-819.

Martin, Judith. 1984. "The Intercultural Re-entry: Conceptualization and Directions for Future Research." *International Journal of Intercultural Relations* 8 (2): 115-134.

—. 1986. "Communication in the Intercultural Reentry: Student Sojourners' Perception of Change in Reentry Relationships. *International Journal of Intercultural Relations* 10 (1): 1-22.

Martin, Judith, and Thomas Nakayama. 2010. *Intercultural Communication in Contexts*. Boston: McGraw Hill.

Niesen, Caroline. 2010. "Navigating Re-entry Shock: The Use of Communication as a Facilitative Tool." Master's thesis, The University of New Mexico.

Raschio, Richard. 1987. "College Students' Perceptions of Reverse Culture Shock and Reentry Adjustments." *Journal of College Student Personnel* 28 (2): 156-162.

Rogers, Joy, and Colleen Ward. 1993. "Expectations-Experience Discrepancies and Psychological Adjustment During Cross-Cultural Reentry." *International Journal of Intercultural Relations* 17 (2): 185-196.

Sahin, Nesrin. 1990. "Re-entry and the Academic and Psychological Problems of the Second Generation." *Psychology and Developing Societies* 2 (2): 165-182.

Sims, J., Cusick, B. M., Jacobson, C. (2011). "Cultivating Cultural Intelligence Through Study Abroad: Mindful Communication, Knowledge of Cultural Values and Sojourner Adaptation Skills." Unpublished.

Smith, Lee. 1975. "The Hazards of Coming Home." *Duns Review* 106 (4): 70-73.

Smith, Shelley. 2001. "An Identity Model of Reentry Communication Competence." *World Communication* 30 (4): 6-38.

Sussman, Nan. 1986. "Re-entry and Research Training: Methods and Implications." *International Journal of Intercultural Relations* 10 (2): 235-254.

Szkudlarek, Betina. 2009. "Reentry—A Review of Literature." *International Journal of Intercultural Relations* 34 (1): 1-21. doi:10.1016/j.ijintrel.2009.06.006.

Thompson, Charles, and Victoria Christofi. 2006. "Can You Go Home Again? A Phenomenological Investigation of Returning Home After Studying Abroad." *International Journal for the Advancement of Counseling* 28 (1): 21-39.

Uehara, A. 1983. "The Nature of American Student Re-entry Adjustment and Perceptions of the Sojourner Experience." *International Journal of Intercultural* Relations 10: 415-438.

Wang, M. 1997. "Re-entry and Reverse Culture Shock." In *Improving Intercultural Interactions: Modules for Cross Cultural Training Programs: Vol. 2. Multicultural Aspects of Counseling and Psychotherapy,* edited by Kenneth Cushner and Richard Brislin, 109-128. Thousand Oaks, CA: Sage.

Zapf, Michael. 1991. "Cross-Cultural Transitions and Wellness: Dealing with Culture Shock. *International Journal for the Advancement of Counseling* 14 (2): 105-119.

Appendix

Table 6. Characteristics of Study Abroad Experiences

Characteristic	% of Study Abroad Participants
Studied during spring semester	52
Studied during summer semester	31
Studied during fall	15
Studied abroad 4-6 months	61
Studied abroad 1-3 months	31
Studied abroad less than one month	6
Studied abroad greater than six months	2
Studied in Scotland	15
Studied in Spain	13
Studied in England	11
Studied in Costa Rica	10
Studied in Australia	10
Lived with a host family	30
Required to speak a language other than English often or very often	42

Table 7. Complete list of reentry or reverse shock experiences as reported by study abroad participants

Reentry or Reverse Culture Shock Experience	% of Study Abroad Participants
Difficulty readjusting to daily life in home culture (roads, mealtimes, values, work, stress, routine)	17.4
Missing some aspect of study abroad experience (friends, host family, culture, lifestyle, values, etc.	9.3
None	8.7
Heightened awareness of home culture; Reflection/realization concerning nature of home culture (value of work, lack of emphasis on family, laziness)	7.5
Academic Problems	6.2
Boredom	5.6
Wish to return to host culture and/or feelings of not belonging in home culture	5.0
Frustration, resentment, bitterness, hostility or anger toward home culture	5.0
Symptom unclear	5.0
Alienation from home culture (feeling left out of social activities or relationships)	4.3
Feelings of being misunderstood	4.3
Dearth of psychological support	3.1
Cultural or personal identity conflict or crisis	2.5
Loneliness (emptiness)	2.5
Depression	1.9
Emotional reaction (sadness, anger, confusion, disappointment)	1.9

Inability to express feelings or interpersonal difficulties	1.9
Problem finding a new role in work or personal life	1.9
Readjustment to pace of home culture	1.9
Feeling that something intangible had changed	1.2
Value confusion	0.6
Social withdrawal	0.6
Disorientation	0.6
Physiological reaction (jetlag, sleep cycle)	0.6
Shift in values	0.6
Social withdrawal	0.6

Table 8. Complete list of adaptation or adjustment skills learned through reentry shock experiences as reported by study abroad participants

Adaptation or Adjustment Skills	% of Study Abroad Participants
Purposeful involvement (school, family, work, stay busy, friends)	15.5
Communication with friends who studied abroad or others with cross-cultural experience	10.0
Waiting it out, patience, give it time	9.1
Communication with people (loved ones)	9.1
Unclear and/or not applicable	8.2
Reconnect with family, friends, and/or loved ones	8.2
Acceptance of situation, "got used to it"	7.3
Integration/reflection/comparison of wisdom and/or experiences abroad into home culture	7.3
Journaling, scrapbooking, reminiscing	7.3
Flexibility, understanding, open-mindedness, positive attitude	6.4
Re-learn cultural norms and values	5.5
Talk about my experience abroad	5.5
They are still adjusting/adapting	4.5
Create a sense of normalcy (back to the way things were)	4.5
Scheduling, managing time, establishing routine	4.5
Communication with friends from host culture (e.g. mail, virtual communication, Skype)	3.6
Avoid communication about experiences abroad with home culture (no one interested)	2.7
Diet and/or exercise	2.7
Start afresh (new friends, activities)	2.7
They were required to adapt (working, home)	1.8
Advocate and/or promote study abroad	1.8

Catch up with home culture	1.8
Communication with counselor (other resources)	1.8
Dealt with symptoms on own	1.8
Communication with friends at home (building/maintaining support systems)	0.9
Didn't adjust	0.9
Change outward appearance (dress better, appearance neater)	0.9
Make plans to return to host culture	0.9
Read	0.9
Set or focus on new goals	0.9

Table 9. Complete list of most difficult aspect of reentry adaptation or adjustment to home culture as reported by Study abroad participants with difficulty adapting

Most Difficult Aspect	% of Study Abroad Participants
Boredom (lack of new and exciting experiences, lack of travel)	16.4
Missing aspects of host culture/ country (friends, host family)	11.8
Social life (relationships altered, people-including self- change, feeling disconnected)	8.2
Readjusting to home culture's way of life (U.S. American politics, meal times, drinking age)	8.2
Transportation (lack of public, driving, rules of the road, lack of walking)	6.4
School (study habits, level of effort)	5.5
Differences in values (lack of emphasis on family)	4.5
Feelings of being misunderstood	4.5
Deadlines, schedule, routines	3.6
Dearth of social support	2.7
Unclear/not applicable	2.7
Facing reality (thinking about future)	2.7
Work (amount of, back to)	2.7
Feelings of isolation	2.7
Finding my place again (back at home, in social network)	2.7
Food	2.7
Greetings (not kissing, proximity)	2.7
Independence issues	2.7
Living situation (proximity to friends, living with parents)	2.7
Pace of daily life	2.7
Climate	1.8
Coming to terms with end of study abroad	1.8
Sleep cycle adjustment	1.8
Inability to share/communicate experiences from abroad with others	1.8
Language	1.8
Loss of diversity (home culture's ignorance of other cultures	1.8
Not able to spend enough time with family or friends	1.8
Noticing characteristics of home culture (immaturity, laziness, lack of properness)	1.8

Responsibility issues	1.8
Self-reflection (selfishness)	0.9
Lack of resources	0.9
Other's expectations	0.9
Reconciling study abroad experience	0.9

Xenia in Practice: From Homer's Epics to Herodotus
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Abstract

The ancient Greek custom known as *xenia* is found in many of the Greeks' literary works, but was the custom really practiced? Using the Homeric epics, this paper defines an ideal execution of *xenia* and then determines the economic feasibility of the custom in Periclean Athens.

Introduction

The Greeks frequently filled their literature with the custom of *xenia* ("hospitality" or "guest-friendship"). Praising and idealizing the custom, ancient authors wrote of great heroes performing acts of *xenia* to demonstrate the character's honor, virtue, and nobility. Although scholars have long written about the implications of *xenia* within the literary works and on the early development of gift-exchange economies, the custom has not been related to later Greek societies with more developed economic structures. The plays, poems, and other ancient literature certainly did not see a reduction in the mention of the custom, so what significance did *xenia* have in these later societies? Examining the large corpus of works from this period would be a monumental task. Herodotus is the most influential historian of his time, and so this paper defines *xenia* in its most ideal state and then attempts to compare the practices to those described in Herodotus' history.

ual*Xenia* in the Homeric Epics

Scholars' understanding of *xenia* and its conventions largely derive from extensive examinations of the *Odyssey*. The epic poem provides several episodes which can be regarded as paradigmatic *xenia,* including Nestor's reception of Telemachos and Athena, Menelaus' reception of Telemachos and Peisistratus, and Eumaeus' reception of Odysseus. These events contrast with less paradigmatic episodes such as Odysseus' encounters with the Cyclops, Circe, and Penelope's suitors.[1] The basic formula of these episodes alters only slightly and with purpose from the following pattern. First, a stranger arrives to a household and is invited to rest and feast with the family and any other guests who may be present. Only after the guest has had sufficient time – usually following the initial meal – may the host ask for his guest's name, land, and other personal information. In addition to the meal, the host offers his guest a bath and rest. Finally, when the guest is departing, the host provides splendid gifts. Thus, a guest-friendship is established, and the original guest would turn host should his guest-friend visit his city. The expectation

was that the hospitality and, most importantly, the gifts given should be of roughly equal value to those received. The *Odyssey* is a compilation of encounters more or less following this formula.

In Book 1 of the *Odyssey*, the hospitality Telemachos, Odysseus' son, shows toward Athena – disguised as Mentes, leader of the Taphians (105) – is the first example of *xenia* in the epic. When Athena first arrives in Ithaca, she discovers the rowdy suitors and grieving Telemachos in Odysseus' home. Once Telemachos realizes he has a visitor, he immediately feels shame for his delay: "With such thoughts, sitting among the suitors, he saw Athene / and went straight to the forecourt, the heart within him scandalized / that a guest should still be standing at the doors" (*Od.* 1.118-120).[2] Telemachos' virtue compels him to practice *xenia* with the stranger, establishing a standard of nobility for the rest of the epic.

Despite her being a stranger (*xeine*), Telemachos welcomes Athena, seats her, and has his servants attend her as they are the suitors (*Od.* 1.123-149). After eating, Telemachos begins the discussion by expressing his sorrows but quickly changes the topic to Athena's story (*Od.* 1.158-168). He asks, "What man are you, and whence? Where is your city? Your parents? / What kind of ship did you come here on? And how did the sailors / bring you to Ithaka? What men do they claim that they are?" (*Od.* 1.170-173). Thus, Telemachos has respected the guest's anonymity according to the standard formula for *xenia* by waiting until after the meal for such questions. After further discussing their backgrounds, Telemachos makes a final offer to his new guest-friend:

> But come now, stay with me, eager though you are for your journey,
>
> so that you may first bathe and take your ease and, well rested
>
> and happy in your heart, then go back to your ship with a present,
>
> some prized, altogether fine, which will be your keepsake
>
> from me, what loving guests and hosts bestow on each other. (*Od.* 1.309-313)

Telemachos completes the remainder of *xenia*'s conventions through his offer of rest and a gift and even acknowledges that these actions are not unique but rather consent to the cultural norm. Odysseus' virtuous son proves his good character with his willingness and eagerness to fulfill his duties. Athena kindly rejects his offer, but not without reminding Telemachos (and the audience) of the potential for honorable gain through proper gift exchange. She answers him,

> Do not detain me longer, eager as I am for my journey;
>
> and that gift, whatever it is your dear heart bids you give me,

save it to give when I come next time, so I can take it

home; and choose a good one, and a fair exchange will befall you. (*Od.* 1.315-318)

Therefore, even though Telemachos' final actions as a host are negated, his presumed aspirations of building a lasting, mutually-beneficial relationship are met with a positive response. In Archaic societies, gift exchange was the entirety of the economy, so Telemachos certainly made his initial offer with the hope of recompense whether it would be immediate or long delayed.[3]

Another aspect of *xenia* which the Telemachos-Athena example demonstrates is the longevity of the relationship. In more than one instance, guest-friendships are passed down from fathers to their sons. Athena's supposed reason for visiting Ithaca is to visit her guest-friend Odysseus (*Od.* 1.194-195). She claims that they inherited their guest-friendship: Athena from her fictional father (*Od.* 1.255-264) and Odysseus from his father Laertes (*Od.* 1.187-190). Therefore, Telemachos' kindness to Athena – according to Athena's fictional story which she uses with her guise – has existed between their families for at least three generations. In any case, there are not references to a guest-friendship being renounced in the Homeric epics. A relationship may slowly expire over time, but never is one explicitly declared to be terminated.

Xenia in Herodotus

One does not have to look long in Herodotus' *Histories* to find *xenia* and its related words. The first appearance of *xenia* occurs in the iconic exchange between Croesus and Solon.[4] In book one, Herodotus states that during Solon's ten years abroad the Athenian arrived in Croesus' court. There, Croesus receives him as his guest.

> αὐτῶν δὴ ὦν τούτων καὶ τῆς θεωρίης ἐκδημήσας ὁ Σόλων εἵνεκεν ἐς Αἴγυπτον ἀπίκετο
>
> παρὰ Ἄμασιν καὶ δὴ καὶ ἐς Σάρδις παρὰ Κροῖσον. ἀπικόμενος δὲ <u>ἐξεινίζετο</u> ἐν
>
> τοῖσι βασιληίοισι ὑπὸ τοῦ Κροίσου· μετὰ δὲ ἡμέρῃ τρίτῃ ἢ τετάρτῃ…
>
> Because of these things [Solon's decision to leave Athens for ten years after his reforms] and for
>
> sight-seeing, Solon, having gone abroad, arrived in Egypt beside Amasis and in Sardis beside
>
> Croesus. And having arrived at Croesus' palace, [Solon] was <u>received as a guest</u>. And on the
>
> third or fourth day…[5] (Hdt 1.30)

Thus, Herodotus' listeners or readers are meant to understand that when Solon arrived in Lydia, Croesus received, entertained, and was a good host to Solon (all of which are implied by ἐξεινίζετο). Herodotus begins the next thought with "on the third or fourth day" ("μετὰ δὲ ἡμέρῃ τρίτῃ ἢ τετάρτῃ"). Thus, although Herodotus never

describes any of the formulaic qualities of *xenia* identified above, he does allow enough time for any or all such acts to occur. In other words, by the third or fourth day Croesus likely offered several meals to Solon, probably entertained the wise man, and surely provided baths and a place to rest. Therefore, Herodotus makes it possible for Croesus to have been a good host, and Herodotus implies that he in fact was in his use of the word ἐξεινίζετο.

The episode proceeds with Croesus' display of his wealth before inquiring as to whom Solon considers to be the most fortunate ("ὄλβιος") man in the world. Solon awards this title to the deceased Athenian Tellus (Hdt. 1.30.3-4) and then names the deceased Argives Cleobis and Biton as the second most fortunate men (Hdt. 1.31). This infuriates Croesus who considers himself to be most fortunate, and even after Solon explains that a man's fortune cannot be measured until his life has ended, Croesus sends Solon away ("ἀποπέμπεται"), displeased with the wise man's words (Hdt. 1.32-33). Herodotus makes no mention of any gifts of friendship from Croesus, which would be expected at the time of departure. Remembering that the initial hospitality which begins a lasting guest-friendship usually concludes with such gifts from the host, one can determine that Croesus was so angered by what Solon said that he ended the guest-friendship before it formally began. Of course, his wise guest is proven right when Herodotus immediately follows Solon's departure with the death of Croesus' son (Hdt. 1.34-45) and Persia's conquest of Croesus' kingdom (Hdt. 1.46-56, 1.69-84).

Already in this first example, Herodotus is at odds with the *xenia* of the Homeric epics. The very fact that Croesus may decide to either begin a reciprocal relationship or not with his guest conflicts with Homeric "obligatory hospitality" (a term Walter Donlan uses to distinguish hospitality for a stranger from "formal hospitality," hospitality for a friend).[6] As Donlan explains, *xenia* is protected by the gods, and humans were obliged to offer their hospitality:

> In addition to the explicit naming of the gods, obligatory hospitality is hedged about with powerful
>
> moral terms like *kalon*, *eoike*, *epeoike*, *themis*, *dikaion* (*Il.* 11.779; *Od.* 6.193; 7.159; 9.268; 14.56;
>
> 17.483; 20.294).[7]

Therefore, either Herodotus intentionally adds a violation of *xenia* to Croesus' immoral acts or else the historian demonstrates a change from the Homeric *xenia*. Similar episodes of *xenia* also not portraying any divine authority over the custom[8] and the lack of immediate divine retribution against Croesus would suggest the latter (i.e. a change between Homeric *xenia* and Herodotus' perception of the custom) is more likely. Some may wonder if the destruction of Croesus' kingdom could be interpreted as divine retribution; however, the fact that his demise only

occurs after he attempts to expand his prosperous kingdom even farther by invading Persian territory makes the cause proposed by Solon (the god's jealousy against overly fortunate men) more fitting. Nevertheless, although *xenia* plays a secondary role to Solon's philosophy, it still holds importance

The exchange between Solon and Croesus sets precedence for future events in the *Histories* because of its prominent position in the work and the reoccurring themes it introduces.[9] And so through this episode, *xenia* is connected with several themes carried on throughout the work. It is hard to determine if here Herodotus is making a commentary on the custom of hospitality or if he simply uses the custom as a means to bring the two characters together. What is certain is that Herodotus draws attention to the guest-host relationship between Solon and Croesus.

Throughout the exchange, Croesus only addresses Solon as "ὦ ξεῖνε Ἀθηναῖε" ("[my] Athenian guest") (1.30.2, 1.32.1). At the time of the first such address, Croesus praises Solon for his wisdom and then asks initially asks his question of who is most fortunate. In the second, Herodotus states that Croesus has become agitated ("σπερχθεὶς"), and his address is followed by accusations against Solon. Therefore, there is no positive or negative connotation associated with the address with ξεῖνε, so why does Herodotus use it in place of Solon's name? It may in fact be a means of distancing the two characters until Croesus' recognition of Solon's argument at 1.86. Here Croesus is defeated, and the Persian king Cyrus places him atop a pyre to burn him alive (Hdt. 1.86.1-2). As the flames approached, Croesus recalled Solon's words and "called out 'Solon' three times" (Hdt. 186.3). This captured Cyrus' interest, who orders his men to bring Croesus down from the flames (Hdt. 1.86.4-6), but their attempts are unsuccessful until Apollo extinguishes the flames with a rainstorm (Hdt. 1.87). Although the focus of this iconic scene is largely to relate the definition of an ὄλβιος ("fortunate, rich, blessed, happy") life and to introduce the first grim effects of war,[10] Herodotus' choices to put his characters in a guest-host relationship and to have Croesus avoid addressing Solon as anything except "guest" until his epiphany connect the overarching themes of the *Histories* with the role of guest-friend as a wise advisor.

In book three, Herodotus relates a tale directly connected with the Solon and Croesus episode. After Polycrates had taken control of Samos, he began a guest-friendship with Amasis, king of Egypt, by sending and receiving gifts: σχὼν δὲ ξεινίην Ἀμάσι τῷ Αἰγύπτουβασιλέι συνεθήκατο, πέμπων τε δῶρα καὶ δεκόμενος ἄλλα παρ᾽ ἐκείνου (Hdt. 3.39.2). However, as Polycrates' good fortune continued with more conquests, power, and fame (Hdt.3.39.3-4), Amasis began to worry. He offered the same warning Solon had provided to Croesus concerning the

jealousy of the divine and the disaster which follows food fortune (Hdt. 3.40.1-3). Herodotus implicitly links these two episodes with the parallel theme and with an explicit connection made in book one. Herodotus writes:

> αὐτῶν δὴ ὦν τούτων καὶ τῆς θεωρίης ἐκδημήσας ὁ Σόλων εἵνεκεν ἐς Αἴγυπτον ἀπίκετο παρὰ
>
> <u>Ἄμασιν</u> καὶ δὴ καὶ ἐς Σάρδις παρὰ Κροῖσον.
>
> Because of these things [Solon's decision to leave Athens for ten years after his reforms] and for
>
> sight-seeing, Solon, having gone abroad, arrived in Egypt beside <u>Amasis</u> and in Sardis beside
>
> Croesus. (Hdt. 1.30.1)

As with the first episode, guest-friendship is a great tool for Herodotus to introduce a wise advisor. However, here again, the advice will fail to save the fortunate king from his fated demise.

In an attempt to save his guest-friend, Amasis advised Polycrates to rid himself of his most valuable possession so that he may change his fate (Hdt. 3.40.4). Polycrates agreed, tossed his ring in the sea, but then decided Amasis was wrong when the ring miraculously returned inside a caught fish (Hdt. 3.41-3.42). Amasis then realized one cannot alter his fate, and therefore, sent a herald to end the guest-friendship so he will not suffer as greatly when Polycrates meets his downfall:

> πέμψας δέ οἱ κήρυκα ἐς Σάμον διαλύεσθαι ἔφη τὴν <u>ξεινίην</u>. τοῦδε δὲ εἵνεκεν ταῦτα ἐποίεε, ἵνα μὴ
>
> συντυχίης δεινῆς τε καὶ μεγάλης Πολυκράτεα καταλαβούσης αὐτὸς ἀλγήσειε τὴν ψυχὴν ὡς περὶ
>
> <u>ξείνου</u> ἀνδρός. (Hdt. 3.43.2)

Herodotus specifically has Amasis write to Polycrates that "his soul will not suffer from so great and terrible an incident as he would if Polycrates were [still] a guest-friend." Polycrates is later tricked by false promises of money to travel to Magnesia to visit Oroites, who claimed to be in disfavor with the Persian king (Hdt. 3.122). Thus – as Susan O. Shapiro points out – Polycrates is "lured to his death through the promise of even greater wealth and power,"[11] which suggests that he forgot or ignored the wise words of his guest-friend.[12] Again, *xenia* proves to provide a proper and practical advisor to a character fated for destruction.

Before leaving the example of Amasis and Polycrates, the initiation and the termination of the relationship deserve reflection. Herodotus states in 3.39.2 that Polycrates forged the guest-friendship through "sending and receiving gifts" ("πέμπων τε δῶρα καὶ δεκόμενος ἄλλα παρ᾿ ἐκείνου"). The two characters, one king of Samos and the other king of Egypt, seem to have never exchanged the initial qualities of hospitality which initiate all guest-friendships in the *Odyssey*. Nevertheless, Herodotus clearly means for them to have a very real relationship forged.

Moreover, in the Solon and Croesus episode – which included all of the initial qualities of hospitality except for gift exchange – the guest-friendship ends immediately or arguably never began. In joining these two examples, Herodotus seems to suggest that gift exchange is the only necessary quality to initiate a guest-friendship with another man.

With Amasis and Polycrates, the relationship ends as abruptly as it began unlike relationships in the Homeric epics. Although there are no statements in the *Iliad* or the *Odyssey* suggesting guest-friendships must be maintained, there are suggestions that a sense of longevity was expected. The hereditary nature of some guest-friendships is not the least of these examples. For example, in *Iliad* 6.230-231, Glaucus and Diomedes exchange their shields with sole purpose of displaying their family's long guest-friendship to the Greek and Trojan soldiers around them. Therefore, they suspect that the honor they will win for their lasting relationship in *xenia* will surpass any dishonor they may earn for avoiding an enemy soldier on the battlefield. Thus it is valuable for them to rekindle a relationship that had become benign – after all, the two great heroes did not know each other's identity until after they proclaimed who their ancestors were (*Il*. 6.123-225). Elsewhere in the Homeric epics, it is possible that guest-friendships become inactive, but there is no reference to any being renounced. Therefore, the examples from the epic poems contradict Amasis' termination of his guest-friendship. The only honorable quality of Amasis' decision is his reason for ending the relationship and ending so abruptly: his deep love for his guest-friend would cause Amasis too much pain if he continued the guest-friendship to Polycrates' death.

Amasis is not the only character in the *Histories* to terminate his guest-friendship. Etearchos, king of Axos on Crete, remarries, but his new wife abuses his daughter (Hdt. 1.154.1-2). Eventually, his wife even convinces him that his daughter has acted immorally, so he sends the girl to his guest-friend Themison of Thera, a merchant (Hdt. 1.154.2-3). Etearchos first has Themision swear to do as he instructs, and then Etearchos orders his loyal guest-friend to throw his daughter in the sea ("καταποντῶσαι") (Hdt. 1.154.3). Themision immediately ends his guest-friendship with Etearchos ("διαλυσάμενος τὴν ξεινίην") and cleverly dips Etearchos' daughter in the sea with a rope in order to fulfill his oath without harming the girl (Hdt. 1.154.4). Thus, Themision meets his obligations without unjustly ending the life of an innocent victim of her stepmother. Phronime, Etearchos' daughter, gives birth to Battos who fulfills the Pythia's prophecy that he would become king of Libya (Hdt. 4.155-159), and so Themison's decision to go against his guest-friend's intentions proves to be both just and necessary in order for the destined dynasty to begin.

So far, this paper has identified several Greek, one Lydian, and one Egyptian guest-friend, but now examples of Persian participation in *xenia* will be examined. Being that the wars between the Greeks and the Persians are the focus of Herodotus' work, it comes as no surprise that *xenia* scenes with the Persians are the most striking.

In five of the *Histories*, Herodotus relates the tale of Amyntas and his son Alexandros of Macedon. These Macedonians invite seven Persian messengers to be their guests ("ἐπὶ ξείνια") and so they have dinner together (Hdt. 5.18.1). The Persians – addressing Amyntas as simply "ξεῖνε Μακεδών" to call on his duties as host and maybe even as guest-friend – request that the Macedonian women join them as they drink their wine (Hdt. 5.18.2). Amyntas reluctantly obliges his masters' request even though it defies Macedonian custom. The women sit opposite the Persians at the table (Hdt. 5.18.3). The Persians then request that the women sit beside them, and Amyntas, whom Herodotus describes as "being compelled" ("ἀναγκαζόμενος"), submits again which allows the Persians to touch the Macedonian women inappropriately (Hdt. 5.18.4-5). Amyntas departs, but Alexandros, addressing the Persians as "ξεῖνοι," convinces them to let the women leave (Hdt. 5.19.1-5.20.2). He then orders an equal number of men to dress in the women's garments, and thus being able to sit close to the Persians, Alexandros' men slay his guests (Hdt. 5.20.3-4).

The use of *xenia* for such misdeeds certainly goes against the formula provided by the Homeric epics. Alexandros fatally harms his guests even though guests were thought to be protected by Zeus himself according to the epic poems. The Persians also violate *xenia* in demanding more than is due to them to the point of compelling Amyntas to break his nation's customs – an offense for which Herodotus is unforgiving elsewhere.[13] Therefore, this episode in many ways resembles the Cyclops scene in book 9 of the *Odyssey*. The Cyclops encounter has been called a "hospitality-scene gone awry" in that both guest and host fail to perform their duties.[14] Both parties are duly punished under the supervision of the divine.[15] However, Herodotus does not relate any divine retribution or explicit commentary on the Alexandros-Persians episode. In fact, Herodotus instead follows the episode with several of Alexandros' accomplishments. The murderer of his guests successfully hides his crime from the Persians (Hdt. 5.21), wins the right for the Macedonians to compete in the Olympics, and ties for victory in the footrace (Hdt. 5.22), and later in the *Histories*, Herodotus describes how Alexandros successfully aided the Greeks in the war against Persia (Hdt. 7.173.3, 9.44-45). And so Herodotus once again provides an example of *xenia* being used for practical advantage without any retribution for such actions. However, before Amyntas leaves the episode – and the

Histories entirely – he says that he does not want Alexandros to act rashly "so that you do not cause our demise" ("ἵνα μὴ ἐξεργάσῃ ἡμέας") (Hdt. 5.19.2). Yet this caution proves unnecessary in Herodotus' *Histories,* and all precaution leaves with Amyntas.

Xerxes, like Croesus and Polycrates, has a few guest-friends who act as wise advisors despite having their advice ignored. For example, Pythios generously offers hospitality to Xerxes' army and is rewarded with guest-friendship (Hdt. 7.29). Xerxes' last words to Pythios before Herodotus proceeds with another narrative are "[what you do] at this time, you will not regret" ("οὔτε ἐς χρόνον μεταμελήσει") (Hdt. 7.29.3). In a later passage, the audience finds irony in these words. When Pythios witnesses a bad portent, he requested that the eldest of his five sons be discharged from Xerxes' army even if the rest remain drafted (Hdt. 7.38), but Xerxes is infuriated by Pythios' request. He instead orders the eldest son to be executed and cut in two so the army may walk between the two halves (Hdt. 7.39). However, as Herodotus' audience already knows, the portent which frightened Pythios is correct and Xerxes' expedition does fail.

Finally, Herodotus explicitly has Xerxes state the importance of a guest-friend's advice, but the Persian king still disregards the advice he is presented with in its entirety. Following the defeat of the 300 Spartans at Thermopylae, Xerxes asks Demaratos how to overtake the Spartans (Hdt. 7.234). Demaratos provides advice which the audience's hindsight proves to be sound (Hdt. 7.235), but Xerxes' brother Achaimenes argues against Demaratos and convinces Xerxes (Hdt. 7.236.1-7.237.1). Yet Xerxes still praises the advice of a guest-friend:

> ξεῖνος δὲ ξείνῳ εὖ πρήσσοντι ἐστὶ εὐμενέστατον πάντων, συμβουλευομένου τε ἂν συμβουλεύσειε
>
> τὰ ἄριστα. οὕτω ὦν κακολογίῃς τῆς ἐς Δημάρητον, ἐόντος ἐμοὶ ξείνου πέρι, ἔχεσθαι τινὰ τοῦ
>
> λοιποῦ κελεύω.
>
> A guest-friend is the kindest of all to a guest-friend who does well, and being consulted, provides
>
> the best advice. So since he is my guest-friend, I forbid anyone to bear bad words against
>
> Demaratos any longer. (Hdt. 7.237.3)

And so Herodotus offers praise for the advice of a guest-friend as the very character proclaiming the praise rejects the advice which would save him from the epitomical demise of an overreaching king.

In summation, Herodotus emphasizes the practical benefits of guest-friendships and holds no qualms over a terminated relationship if it no longer provides gain for one or more of the parties. For example, Amasis ends his guest-friendship which he knew would cause him greater pain than pleasure if maintained. Also, Croesus negates his

obligation to become a guest-friend to Solon since he considers the Athenian to be incorrect in his wisdom. In other examples where the relationship is no longer beneficial, the desire to end is even greater due to the treacherous acts committed by the guest-friend. Themision ends his guest-friendship which otherwise would have compelled him to commit an immoral murder, and Alexandros not only negates his obligation as host but even destroys his guests who have offended him and his people. In the episodes with the Persians – especially those regarding Xerxes – Herodotus uses *xenia* as another means to demonstrate the Persians' arrogance and disregard for others' customs. The relationships are still practical sources for advice (e.g. Demaratos) or wealth (e.g. Pythios), but Persian arrogance hinders their ability to obtain the greatest benefit from these relationships.

Overall, Herodotus' work places *xenia* in a key role almost to the same degree as the Homeric epics. The fifth century historian is not unique in his incorporation of the custom. Around Herodotus' period, three plays contain a violation of *xenia* as their major focus and at least three others contain a violation of *xenia* as a secondary focus. These include works by Sophocles, Aeschylus, and Euripides.[16] And so *xenia* was still present in the minds of classical Athenians, and the connotations of the custom should not be disregarded as these and other works are being analyzed.

Economic Factors

The Homeric society (i.e. the society present in the Homeric epics meant to portray the Heroic Age but containing anachronistic characteristics of the late eighth and early seventh centuries BCE) portrays an early chiefdom society predating Greek money.[17] Without money, gift exchange or reciprocity dominates the economy which is embedded into society through relational exchanges and redistributions of goods during hardships such as droughts.[18] The common people in these early Greek societies relied on aristocratic *oikoi* ("households") for redistributing goods, protection, and other services. Analyzing solely exchanges between aristocrats – since aristocrats vastly outnumber the common people in the literature – gift exchange economies require more personal relationships between distant traders. Essentially, *xenia* is the Greek formula for building such relationships which would allow trade outlets.

The perceived values of the exchanged goods also affect these relationships between economic partners. The value of goods is perceived in different ways between gift exchange and monetary societies. Whereas money can act as a universal measure of worth, value in a gift exchange society varies more greatly because some objects cannot be easily compared.[19] For example, a tripod for sacrifices and a vase cannot be easily compared since they

perform such varied functions. The necessity of the object, therefore, affects its value more greatly than in a monetary society where a standard price may be in place. In a gift exchange, the source of the gift also affects its value. However, in a monetary transaction, numeric values are placed on individual products which facilitate arbitrary comparisons of value and the seller often adds no greater value to the product. Therefore, returning to the gift exchanges of *xenia*, the product exchanged is unique in that that it is *the* sword given to Ajax from Hector or *the* armor Diomedes received from Glaucos rather than just being any other sword or armor. In comparison, the extravagant textiles Clytemnestra convinces Agamemnon to trample pose no value other than their monetary worth (Aeschylus, *Ag.* 958-974).[20] As Richard Seaford explains, the textiles do not differ from the textiles that can be purchased to replace them; thus the textiles are not unique and do not hold any added value.[21] The monetary value, no matter the price, is also insignificant to Clytemnestra because of the household's great wealth (Aeschylus, *Ag.* 961-962). Therefore, the development of money reduced the necessity of personal trade partners whose prestige added to the honor of the received gifts. Money itself could provide for the household in its entirety.

So then if *xenia* was a means to an outdated end, why did the Greeks continue to praise it? The immediate answer is that most of the Greek literature of Periclean Athens is set durng the Heroic Age, during which, *xenia* may have occurred at its purest levels – or at least the Greeks strongly believed it occurred so. Second, monetary exchanges, although efficient and effective, could easily lure men to corruption. Writers including Solon (seventh-sixth centuries), Sophocles (fifth century), Aristophanes (early fourth century), Plato (early fourth century), and Aristotle (mid-fourth century) warn against the evils which money leads men to commit. Bribery is the most common warning. For example, Sophocles makes Creon state the following while listing the sources of discontent with his edict:

> I know that some of these [sources of discontent] perverted others
>
> And bribed them to this act. Of all vile things
>
> Current on earth, none is so vile as money.
>
> For money opens wide the city-gates
>
> To ravishers, it drives the citizens
>
> To exile, it perverts the honest mind
>
> To shamefulness, it teaches men to practice
>
> All forms of wickedness and impiety. (Sophocles, *Antigone* 294-301)[22]

Such sentiments seemed to be commonplace, but reciprocity safeguarded against the corruption of bribery or profit-making. Profit-making through trade was disgraceful and shunned by the Greeks, but equal exchanges were praised.[23] For example, Herodotus writes about Alcmaeon and Croessus. Croessus grants Alcmaeon all the gold he can manage to carry from Croessus' treasury in gratitude for Alcmaeon's services (Hdt. 6.125). This is not a bribe, but a reciprocal payment. Herodotus uses the event to prove how honorable Alcmaeon's family is by showing their history of making prestigious guest-friends (6.124). Therefore, ceremonial exchanges still protected men from being portrayed as deceitful or manipulative in their actions.

Finally, the majority of gifts exchanged through *xenia* were not practical, everyday items. Most of these items were stored until displayed for new guests or used as a gift to someone else. Money has the added benefit of being both prestigious and easy to store.[24] Thus it can earn honor for its owner by being of impressive value while requiring little or no work to keep and store. In addition, it is of practical use in that its value will remain should there be a desperate need for practical wealth. Objects may be traded but only for its changing monetary worth.

Conclusion

In conclusion, the Greeks in classical Athens were well aware of *xenia* and were hopeful in maintaining the custom. Their society was perceived as tainted by the temptations of money, but *xenia* maintained their ancient purity in economical exchanges and relations with other leading figures. *Xenia* evolved from an economic necessity to a ritual gesture of goodwill and allegiance. In Herodotus, the practical benefits of these relationships rise in priority over the obligation from the divine to perform the custom and the honor gained from the act. Thus the aristocrats, despite finding other sources of production for their economies maintained the custom for a gain in influence and military and political allegiance. *Xenia* was still pure in their literature but treated more as a tool in their everyday lives.

Notes

[1] Alice Webber, "The Hero Tells His Name: Formula and Variation in the Phaeacian Episode of the Odyssey," *Transactions of the American Philological Association (1974-)* 119 (1989): 3, http://www.jstor.org/stable/284256.

[2] Homer, *Odyssey,* translated by Richmond Lattimore (New York: Harper Perennial Modern Classics, 2007). This is the translation used for other *Odyssey* references.

[3] M. I. Finley, *The World of Odysseus* (New York: Viking Press, 1954), 64.

[4] Please note that any reference to Croesus, Solon, and any other key figures refers to Herodotus' character of that name and does not refer to the historical figure himself.

[5] Translations from Herodotus are my own.

[6] Walter Donlan, "Reciprocities in Homer," *The Classical World* 75, no. 3 (1982): 148, http://www.jstor.org/stable/4349350.

[7] Ibid., 149.

[8] There are numerous examples of *xenia* being violated without divine retribution. Consider the Spartans who remove Hippias from Athens by force despite his being their guest-friend (ξείνους) (Hdt. 5.91.2). No divine retribution is identified, and the relationship is only mentioned to help demonstrate the Spartans' regret over the act. Also consider Amasis' (Hdt. 3.43.2) and Themision's (Hdt. 1.154.4) decisions to end their guest-friendships and Alexandros' killing of his Persian guests (Hdt. 5.18-20). These latter three examples will be examined later in this paper.

[9] Susan O. Shapiro, "Herodotus and Solon," *Classical Antiquity* 15, no. 2 (1996): 348-349, http://www.jstor.org/stable/25011045.

[10] Carolyn Dewald, "Happiness in Herodotus," *Symbolae Osloenses* 85, no. 1 (2011): 52-54, doi: 10.1080/00397679.2011.631357.

[11] Shapiro, 354.

[12] However, such statements questioning the character's decisions to heed or ignore advice cannot be taken out of the context of fate. One must always wonder whether advice, no matter how correct, can change fate if it is obeyed in the world of Herodotus.

[13] For Herodotus' defense of customs, see his criticism of Cambyses for violating the Egyptians' sacred custom regarding the Apis calf (3.38.1) and his expansion on the topic to argue that custom determines what each people determine as moral (3.38.2-4).

[14] Rick M. Newton, "Assembly and Hospitality in the Cyclôpeia," *College Literature* 35, no. 4 (2008): 2, http://www.jstor.org/stable/25114372.

[15] Polyphemus, a host who devours his guests, is blinded by Odysseus and left unhealed by the divine. Odysseus, a guest who enters his host's home and devours his goods without allowing him the privileges due to a host, loses all his ships and companions during his delayed voyage home.

[16] Elizabeth Belfiore, "Harming Friends: Reciprocity in Greek Tragedy," in *Reciprocity in Ancient Greece*, eds. Christopher Gill, Norman Postlethwaite, and Richard Seaford. (Oxford: Oxford University Press, 1998): 153.

[17] Donlan, 138; Mark S. Peacock, "The Origins of Money in Ancient Greece: The Political Economy of Coinage and Exchange: Review Article," *Cambridge Journal of Economics* 30, no. 4 (2006): 641-642, doi: 10.1093/cje/bel020.

[18] Donlan, 139.

[19] Richard Seaford, "Tragic Money," *The Journal of Hellenic Studies* 118 (1998): 121, http://www.jstor.org/stable/632234.

[20] It must be noted that Aeschylus' *Agamemnon* is set in the Heroic age just as the Homeric epics are. However, the fifth-fourth centuries playwright anachronistically portrays Argos as a monetary society similar to how Aeschylus' own Athens was.

[21] Seaford, 125.

[22] Sophocles, *Antigone*, translated by H. D. F. Kitto (New York: Oxford University Press, 1994).

[23] Peacock, 641.

[24] Ibid.

Bibliography

Belfiore, Elizabeth. "Harming Friends: Reciprocity in Greek Tragedy." In *Reciprocity in Ancient Greece*, edited by Christopher Gill, Norman Postlethwaite, and Richard Seaford, 139-158. Oxford: Oxford University Press, 1998.

Dewald, Carolyn. "Happiness in Herodotus." *Symbolae Osloenses* 85, no. 1 (2011): 52-73. doi: 10.1080/00397679.2011.631357.

Donlan, Walter. "Reciprocities in Homer." *The Classical World* 75, no. 3 (1982): 137-175. http://www.jstor.org/stable/4349350.

Finley, M. I. *The World of Odysseus.* New York: Viking Press, 1954.

Homer. *Odyssey.* Translated by Richmond Lattimore. New York: Harper Perennial Modern Classics, 2007.

Newton, Rick M. "Assembly and Hospitality in the Cyclôpeia." *College Literature* 35, no. 4 (2008): 1-44. http://www.jstor.org/stable/25114372.

Peacock, Mark S. "The Origins of Money in Ancient Greece: The Political Economy of Coinage and Exchange: Review Article." *Cambridge Journal of Economics* 30, no. 4 (2006): 637-650. doi: 10.1093/cje/bel020.

Seaford, Richard. "Tragic Money." *The Journal of Hellenic Studies* 118 (1998): 119-139. http://www.jstor.org/stable/632234

Shapiro, Susan O. "Herodotus and Solon." *Classical Antiquity* 15, no. 2 (1996): 348-364. http://www.jstor.org/stable/25011045.

Sophocles. *Antigone*. Translated by H. D. F. Kitto. New York: Oxford University Press, 1994.

The Path of our Father: A History of Hmong Refugee Men
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Introduction

In a dentist's lobby in Eau Claire, Wisconsin, a Hmong father sat quietly with his daughter, waiting patiently for her appointment. When the daughter's turn came, the father talked with the dentist's assistant, asking him to fix the tooth instead of extracting it, since extracting it would eventually make the rest of the teeth unbalanced and crooked. The assistant told the father that since his daughter's tooth was half decayed, the process would be complicated, and he recommended taking it out. The father disagreed and insisted on fixing the tooth. The assistant, feeling frustrated, went into the back. After a few minutes he returned, this time bringing a doctor with him. The doctor introduced himself and recommended that the tooth be extracted. The father responded that he too was a dentist for six years in Thailand and the tooth did not have to come out. The father explained to the doctor how he would fix the tooth by taking a wire to wrap around the tooth then fill it in. The doctor agreed with the father's technique, but he did not approve in these circumstances. If the father did not agree with the dentist, then he and his daughter could leave. The Hmong father's expertise, from another place and culture, was not worth much in the eyes of the Western doctor.

Born December 3, 1962 in a small village in northern Laos, located in Military Region II or Xieng Khouang Province, called Nayue, the Hmong man had been given the name Cher and been born into the "Hawj (Her)" clan.[1] He lived with his five sisters and five brothers, his mother, Zoua Vang, and his father, Chai Her. By the end of the decade, Communist forces had attacked Nayue, forcing Cher's family to leave their home and begin a long journey that would ultimately take them across the Mekong River into Thailand.

Following the Geneva Conference in 1954, Laos gained its independence and became a country, proclaiming its neutrality in the global struggle between the United States and the Soviet Union. All outside influences were to withdraw their troops from Laos. However, North Vietnam did not retreat. The United States, believing in the domino theory, feared that if Laos were to fall to Communism, the surrounding countries in Southeast Asia would fall as well.[2] Because of the Geneva Agreement, the United States could not station any troops in Laos. Therefore, they sent in the Central Intelligence Agency (CIA).

In order to stop the transportation of weapons from North Vietnam to South Vietnam through the Ho Chi Minh Trail in Laos during the Vietnam War, Hmong leader Vang Pao was contacted by CIA agent Bill Lair in 1961; Lair later recruited the Hmong to fight against the threat of Communism.[3] Eventually the United States could not afford to fight anymore. On April 30, 1975 the last United States helicopter left Saigon, taking their military support with them. On May 9, 1975, the Communist Lao Party called for the extermination of the Hmong who had aided the United States forces.[4]

In recent decades, scholarly work done on the Hmong has focused on aspects such as culture, religion, gender roles, and exodus, and personal accounts also exist to capture the stories of the Hmong.[5] Past scholarly works have painted a great picture of Hmong history and their journey, yet there is another important piece that needs to be added: the story of Hmong refugee men. Work has already been done on Hmong refugee women, such as anthropologist Nancy D. Donnelly's ethnographic *Changing Lives of Refugee Hmong Women*.[6] However, there is much to be understood about Hmong men that scholarly work has not yet covered.

It is important to understand that the Hmong are from a patriarchal society, and therefore the majority of past leaders were men. However, this is only looking at Hmong history through a political perspective. Additionally, work done on Hmong men has mainly looked at their stories as soldiers in Laos, and not many works have looked at their struggles as refugees. One piece of work addressing this is Doctor Kou Yang's article "Hmong Mens' Adaptation to Life in the United States," which explores the struggles these Hmong men faced as they started a new life.[7] Writing about Hmong men does not mean women are being ignored, since women are important in shaping these men's experience. Along with understanding gender roles, it is crucial to understand Hmong men's experiences in Laos, refugee camps, and the United States.

To understand Hmong masculinity, it must be understood that there is more than one concept of masculinity. Therefore, it is hard to pinpoint the definition of a masculine man. Clint Eastwood's 2008 film *Gran Torino* shows a scene where the Hmong neighbor, Thao, is washing dishes and his grandma criticizes him for not being a man.[8] While Eastwood is dealing in stereotypes, in reality Hmong families might see a hard-working boy who can take care of himself and his family. Another scene involves Eastwood's

character Walt taking Thao to a barber shop and teaching him how to be a man by acting tough while using profanities.[9] This might be seen as ridiculous and immature in the Hmong community. To fully understand Hmong masculinity, it is necessary to understand that there are cultural barriers. This essay will use Cher Her's life story as the main narrative to help understand how Hmong refugee men understood masculinity and their experiences in Laos, the refugee camps in Thailand, and their new lives in the United States.

The Refugee Camps

As America pulled out of Laos in 1975, Cher's family decided to take the long journey across the Mekong River into Thailand to follow their leader, Vang Pao. The family consisted of ten members, and their journey was one of constant danger as they hid from Communist Laotian soldiers. Once they reached Vientiane, the capital of Laos and the last stop before crossing the Mekong River, Cher and his family split into groups of two and three. Cher and his family hid inside Hmong residents' homes to stay hidden from Laotian guards and police officers until they contacted people to take their family across the river. In order to make it into Thailand, they spilt up their big family into smaller groups, Cher with his sister, Pa, and her daughter, Chao. They hired a taxi to drive them to the riverside. Once there, they hired a boat ferry to take them across the Mekong River. Each group waited three to four days to leave Vientiane to make it less suspicious. Although the journey was long, difficult, and exhausting, Cher and Pa both reached their first refugee camp in Thailand, Nong Khai, on June 17, 1975.[10]

In 1972, the United Nations High Commissioner for Refugees (UNHCR) started camps for incoming refugees from Laos, Vietnam, and Cambodia. 21 camps were constructed throughout Thailand; five of those camps were predominately filled with Hmong refugees. The more famous camps were Ban Vinai, Phatnat Nikhom, Chiang Kham, and Nong Khai.[11] Life within the camps brought challenges to many Hmong men, as it was a dramatic change. New laws and regulation were enforced upon them by the UNHCR and Thai officials. Hmong refugees were limited on what they could do around the camps and rarely had any paying jobs to the point where the camps were seen as a prison.[12] If permitted by the camp authorities, some Hmong people were allowed to go out and work for Thai farmers; however, since they were refugees, the pay was low, and others snuck out to find work on their own.[13] Sometimes they made barely enough for a bowl of noodles and broth for their family. Back in Laos, the Hmong depended mainly on their gardening and hunting skills to support their families. This was allowed at a few camps. Some Hmong refugees were able to go outside the campground to garden; hunting, however, was prohibited.

The culture started to change slowly due to limited supplies and new regulations in the camps. For example, the number of bulls allowed to be butchered during a traditional Hmong funeral was changed. In Laos, a cow was butchered for each son and daughter of the deceased. Since supplies were limited in the camps, a maximum of three cows were butchered.[14] The UNHCR and many voluntary agencies such as Alliance Church, Catholic Relief Service, and World Vision helped introduce transportation, electricity, Western medicines, and informal education to the refugees. Although these outside sources helped provided resources to better aid the Hmong, they did not always have a positive effect on their social lives. Most family members sought to survive on their own and did not believe in sharing resources anymore due to the limited amount they had. Extended family members competed against one another in economic situations. This idea of the Hmong being a community was dissolving in the camp and would soon continue in America.[15]

Within the refugee camps, there were many issues that surfaced. Sanitation was a problem due to the growing population within the camps. Disease and sickness were uncontrolled. There was a scarcity of food, so malnutrition was common, especially amongst the children.[16] There were some Thai that were hostile to the Hmong outside of the camp and within. The rules were extremely strict in some camps; some were fenced while others were not. There were many Hmong who were heavily stressed and depressed about their situation. Some even died by suicide.[17]

Living conditions in Nong Khai were terrible. The refugees lived in long barracks, and households were separated by blankets to mark the living areas given to them by camp administers. Others did not even have barracks when Cher and his family first arrived. Numerous people died every day from chickenpox and diarrhea. They were not allowed to go outside the camp unless it was to the market a block away or to fetch water in the morning when the water trucks came. When leaving Nong Khai to go out into the market, the chances of getting robbed or beaten were high. According to some Thai officials, these Hmong were only refugees and did not have any rights. Therefore, they did not pay much attention to the issues that surrounded the Hmong refugees.[18] Mistreatment was not only seen outside the camp, but also within. There were guards who threatened and stole from the camp inhabitants.[19] With robberies and rapes going on, Cher started to learn Kung Fu in Nong Khai to protect himself and his family. He and other Hmong men would teach themselves by practicing together while watching Bruce Lee films. Cher was taught by two other men during his youth: a Hmong man and a Chinese man who was married to a

Hmong woman. After living in Nong Khai for about a year, Cher's family wanted to transfer to a different camp, but they were not allowed to do so since the Thai government was constructing a new camp across from Nong Khai.

Food and supplies were brought into the camp by UNHCR trucks twice a month. Sometimes they would not show up, or they would arrive with rotten food. Resources were rationed based on household size.[20] Water was a scarcity, and there was a limit to how much a family could get. There was a scheduled time for each building to go get water, and water could only be collected during that time. Some camps only allowed select Thai vendors to sell goods within the camps. The Thai vendors that were approved would overcharge the Hmong. Sometimes the Hmong would sneak outside of the camps to buy vegetables, chickens, and produce from Thai vendors at a cheaper price.[21] If they were caught buying from the outside, they were tied up and thrown into jail.

Around seven in the morning, the Thai national anthem was played. During this time, those sleeping had to get up, and those up had to stop whatever they were doing, salute the Thai flag, and sing the anthem. Everyone had to do this, even the children; if the children did not stand still and sing, their parents would be tied up by Thai guards.[22] The Hmong came from a society where they did not have a state or nation to pay respect to, and they were now forced to respect a nation-state that was not their own. The Thai bureaucracy introduced the Hmong to a system where they had to follow rules and laws in order to have a peaceful life in the camp. Although the Hmong did have a system of their own to govern their people, it did not require paperwork or devotion. In addition to singing the national anthem, refugees in the camps were required at all times to carry ID cards with them, especially when going in and out of the camps. If they did not have them, they would be in trouble. If children slipped through the gates, the guards usually did a short chase. Otherwise they did nothing at all, since the children usually returned back to their parents inside the camps.[23]

One of the more lenient refugee camps was Ban Vinai, which was constructed in 1976 and located in Loei Province of northeastern Thailand, with nine centers holding the Hmong, Mienh, Kouei, and Thin.[24] Refugees were allowed to go in and out of the camp at their own free will, and some Hmong found opportunities and jobs within and outside of this camp.[25] Ban Vinai quickly became one of the largest camps to hold Hmong refugees.[26]

In contrast to Ban Vinai, many of the refugees saw other camps not as safe havens, but more as jails.[27] They were fenced in, surrounded by barbed wire and sometimes bamboo thickets and stalks. They were not allowed to go out without permission or permit. There were hundreds of Hmong people that would line up by the gate just to

get permission to go outside the camp to buy supplies and food. Most of them did not even have money. Those that snuck out and got caught were usually tied up, beaten, or killed. Even peeking out of the fences at other camps was prohibited. If caught by the guards, the potential of being thrown into jail or killed on the spot was high.[28]

In April of 1976, Cher and his family snuck out of Nong Khai's refugee camp and headed for Ban Vinai, which was four hours west of Nong Khai. The family went to the market and hired a taxi driver to drive them to Ban Vinai. They decided to split up into smaller groups just like when they left Laos. Again, there was one taxi per group and each group left after a three to four day period to avoid suspicion. In the morning, people lined up to fetch water outside the camp while Cher and Pa secretly placed their belongings near the fence. The fences that surrounded the camp were only barbed wire, which made it easy to reach through and grab their belongings from the other side. Cher and Pa walked as if they were going to fetch water that the morning like everyone else. After passing the guards and gate, they quickly walked towards the meeting spot, reached through the barbed wire fence to grab their things, and left in the taxi. They avoided all the big roads, since there were Thai patrols in search of refugees who snuck out of the camps. When recalling the experience, Cher said, "I was not as scared or worry as the first time we split. This time my parents were close and we knew we would meet again at Ban Vinai."[29]

The taxi driver dropped them off near the jungle next to the camp. Since the camp was open and people were going in and out freely, Cher, who was then 15, and Pa, who was 26, walked in with the others. During the first week in Ban Vinai, they lived with some of their in-laws. Cher and Pa had not yet registered with the camp since they were waiting for the rest of the family to arrive. Cher said, "After a week, I started to cry because we have not registered yet and could not get any food when they distributed it. Since we could not get any rations, we had to share with our in-laws. However, they would complain and said things like, 'no more food and no name to eat, so why are you eating so much when you do not have a name to eat.'"[30] Cher did not know how to respond back, but he cried and thought, "How come my parents are not dead yet and people are treating me like a dog? I cried a lot and went around to visit my friends from Laos who also made it to Ban Vinai to eat. I would pretend like I was not hungry when they asked me to eat, but I was in fact hungry."[31] After three weeks, Cher's whole family arrived. "When my parents got there, we registered and got two section of the long house," he said.[32] One section was about 10 feet by 20 feet. Cher, two of his older brothers, and his sister-in-law lived in one section and his parents and the rest of the kids lived in the other. There were 10 sections in each long house.[33]

Around 1978, gender roles started to shift in the camps. Men could not provide as much as they used to for their families. All their money and belongings had been lost during the flight from Laos. They ran out of ideas on how to live and depended on supplies from UNHCR.[34] Men began to do what were deemed to be women's chores: looking after the children, cooking, and staying home to watch the house. The women took on the role of financial supporters by making *paj ntaub* (embroidery cloth), which they sold to foreigners who came into the camps or sent to America to have their relatives sell and send the money back.[35] Hmong women now had a strong independent role in place of men in their families.

This dramatic change in gender roles and power started when the Hmong women were introduced to relief workers. They taught the women that they could earn money through their needlework and stitchery. This experience planted an independent seed in some women. The men were unemployed, and there was little to do; they felt useless while the women made most of the income through their stitchery and needlework.[36] Coming from a patriarchal background, most men in Laos disregarded women's capability to do anything special, and now that women were able to make money, the men were in shock to see their new earning power.[37]

The lives of Hmong men were slowly taken apart, since they often could not be providers for their families. Many of the men who used to be soldiers had lost limbs or were incapable of doing anything without the aid of their children or wives. In some cases, wives left their husbands for other men who were healthier, nondisabled, and possessing a more stable income. This caused harm to the men's pride and egos. At the same time, Hmong men who were rich took advantage of this situation; some married multiple wives.[38] The Hmong men who fell into these bad situations were depressed and filled with anguish due to the loss of their manhood.

Not only were external factors such as laws and regulations affecting Hmong men, but also internal factors such as changes in family structure. As more Western education was introduced to the Hmong, many of them started adopting a Western sense of individualism. Brothers competed against one another, forgetting about bonds and respect. Sons belittled their fathers and threatened them, since they had more education and awareness of the situation in the camps. Women were learning new laws, which made them rebel against their husbands. Many threatened their husbands that they would marry two husbands now that they had equal rights. These Hmong men who were once respected for being leading figures were now facing new threats to their notion of being the head of the family as new views were placed among the Hmong refugee communities.

Transit Camps and Phanat Nikhom

Before delving into these Hmong men's final destination of Phanat Nikhom, it is important to know that before this transit camp was established in 1981, there were already other transit camps for refugees. In 1976, two areas next to Buriram Airport in Bangkok were rented out by the United Nations: the Lumphini Process Transit Camp and the Transit Processing Center. These two camps were about 20 minutes away from the airport. Cher recalled standing on the roof of the housing building and seeing the airport and planes landing. The two camps held Hmong, Laotian, Khmer, and Vietnamese refugees approved for relocation by the UNHCR. Refugees only stayed in these transit camps for three days, then left on the earliest flight to their destination. However, Cher ended up staying there for a month and a half with his wife and younger sister.

In order to be approved for relocation, a person had to pass their interview and have no criminal record or diseases.[39] In 1980, at the age of 22, Cher, his wife Oa, and his younger sister Mao applied together, passed the interview process, and moved to the Transit Processing Center. During their first night, Cher realized leaving the country without his parents was wrong. Wanting to go back to Ban Vinai, Cher told the workers at the transit camp he still owed people money and was running away. The family's processing was stopped, and they had to wait in the transit camp until they were cleared to leave Thailand or return to Ban Vinai.

Conditions in the transit camp were no better than the refugee camp. The camp was closed in by aluminum fencing with barbed wired on top. Refugees and their families were packed into two apartment buildings that were six rooms across and six stories high, each room packed with six families or more. Refugees slept next to each other, and if they wanted privacy, they used plastic or cloth sheets to divide their area. The daily routine for refugees in the transit camp involved waking up, grabbing breakfast at 8:30 a.m., walking around the camp, playing sports with other refugees, and lastly grabbing lunch at 5:00 p.m. According to Cher, the vegetables and meat being prepared for the refugees were chopped on this big sheet of wood being used as a cutting board and then were shoved into the pot to cook. The chef would add water to make it seem like there was more food to feed to refugees. However, it always ended up looking like pig slop.[40]

When the first few groups of refugees arrived in America and started their new lives, it was not as easy as they had hoped. Having very little exposure technology and to a Western way of life, refugees hit a wall. Knowing very little to no English, refugees had trouble with communication. Hmong refugees did not know how to operate the toilet or shower. Complaints were coming back to the Join Voluntary Agency (JVA), which was an aid agency in

the camps that helped process Hmong refugee resettlement outside Thailand.[41] Cher recalled that during one of the meetings with JVA workers, they discussed a Hmong man who went to America but wanted to come back. The new way of living was too strange for him. The Hmong man's sponsor had taken him shopping, and when the sponsor asked a question about what the man liked to eat or drink, he would always reply back with "Yes." Therefore, the sponsor bought him anything, and the man got frustrated.

With more cases coming back to Thailand, the JVA called a meeting to find a way to help refugees assimilate better in America. If they could not assimilate to Western society, then they could not leave the country. After a few months, the UNHCR closed the two transits camps and built Phanat Nikhom as a replacement. Refugees were only allowed to go to Phanat Nikhom if they were seeking or approved for permanent resettlement. They were to receive training in English and Western culture for six months before they were deported. The refugees who had been in the two transits camps before had two options: go to Phanat Nikhom and live there for an additional six months or go to Malina in the Philippines and stay in a processing center similar to Phanat Nikhom.[42] Although this was an option, only about 20 Hmong families chose to go to Malina, and the majority went to Phanat Nikhom.

Upon returning back to Ban Vinai, Cher obtained dental training and became a dentist in 1981. In 1989, Cher was promoted to a team leader at the JVA. He said, "I taught English at six in the morning to eight then went to work at 8:30 till 4:30."[43] In 1988, Cher met a man named Father Brady and worked with him to teach English to the Hmong.[44] Cher said, "He asked me if I wanted to go to France or America to get a better education, but since I had a family I did not want to."[45] A few months later, news came about the closing of the refugee camp. There were only two options for the refugees at that point: go back to Laos or register for resettlement in a new country.

Within Phanat Nikhom, the Hmong were taught basic English and shown videos about the Hmong who had arrived first and known nothing about using the bathroom or stove, buying food, or spending money.[46] In Phanat Nikhom, Cher became an assistant English teacher for consortiums that prepared the Hmong to go to America. After four months, he was offered to work permanently with the JVA.

As news of closures hit the camps, Hmong refugees realized their dream of returning to their birth place as free people was gone, and the conditions in Laos were not going to change. Those who were still in the refugee camps were given a few options by the UNHCR: get repatriated back to Laos or transferred to Phanat Nikhom and subsequently apply for resettlement in the United States.[47] Hearing the news, Cher knew going back to Laos was not an option for his family, and he went to Phanat Nikhom. When Cher arrived, he was offered a position at the JVA

office in the camp as an interviewer processor. Taking the offer, Cher got his own office and would not be transferred around anymore.

A New Journey

Some refugees were happy they were leaving Thailand behind and going to a better place. On the other hand, some refugees knew they did not have the education or experience to find jobs and support their families. When the plane took off into the air, some turned around and looked back at Bangkok and cried, knowing they were leaving behind their homeland, loved ones, and identity. As the planes moved further away and sun slowly diminished, so did these Hmong men's masculinity without them realizing it. [48] Cher said, "From the moment we left, our future as Hmong men changed into being kids living under other people's rules, following them, and becoming dependent."[49] Neng Her added, "Therefore coming to America, we are sad, and we hear of man killing themselves because of stress."[50] In addition, Ger Vang said, "They [Hmong men] lost everything, dying was ok since they had no land, pride, or manhood left with them…We miss our land since we miss equal treatment and that is one of the main reason why Hmong men today are stress because they miss their land and families."[51] Hmong men would never be treated the same again after they left for their new home.

When the Hmong and other Southeast Asian refugees arrived in America, they did not receive a warm welcome. Americans did not know who these refugees were and questioned why they were here. Additionally, the Hmong and other Indochinese refugees arrived in the United States around the same time as other immigrants. There were increases in anti-foreign sentiments in regards to immigration, undocumented aliens, and asylum seekers from the Caribbean and Latin America.[52] Being used to Chinese and Japanese immigrants, the United States lumped these new refugees together into the model minority theory and expected them to easily assimilate. It was believed that the easiest way for this to happen was to separate them. This was also done to calm the fear of creating another culture group concentration in the United States. Therefore, the dispersal policy for Hmong refugees designated 53 cities in 25 different states.[53] However, many refugees were sponsored by religious groups, such as Christian, Catholic, and Lutheran churches in the Midwestern regions of America, as well as relatives and friends.[54] Often, the Hmong ended up near each other or sought out their relatives upon arrival. Despite cold winters in the Midwest, many Hmong refugees found it necessary to stay close to their families and settled in Minnesota and Wisconsin.

Though together as a community, there were still struggles these refugees faced. As a whole, they lacked the experience to work in the United States. Refugees had job experiences, they had educations, and they knew how

to live. What they did not know were the language and expectations of a capitalist society. As individuals, the Hmong and Laotian refugees were mainly agricultural people. Therefore, their experiences were slightly different from the Vietnamese, causing policymakers to fear that Hmong refugees would not survive in America.[55]

For Hmong men, it did not matter if they had been a general or a governor in Laos. In America, they were seen as just a new group of Asians from a third world country. These men had served as leaders and role models to their friends, immediate families, and extended families. They had been responsible for keeping their families together and serving as supervisors and directors of conflicts. They held on to their religious rituals and were cultural leaders.[56] Now in the United States, these men faced new challenges within their households, the Hmong community, and greater society.

Cher arrived in Outagamie County Regional Airport on July 20, 1993 around 5:20 in the evening, greeted by older siblings and their families. The reunion was filled with tears and joy as dreams of seeing each other again were fulfilled. The years that had separated the siblings and the fears of never seeing each other again disappeared. Sponsored by his sister, Pa, who had left the camp in 1979, Cher and his family of six went to stay with Pa and her husband for the first month. Pa had a family of five living in a small single house with three bedrooms. Cher and his family slept on the ground in the living room. The first few days of living with Pa and her family were fine, but eventually it started to get harder. Living under Pa's husband's house meant Cher had to respect and obey his choices. "We were told to go to sleep at 9 p.m. and can only flush after the third or fourth used, unless it was solid waste," Cher said.[57] Pa and her husband decided it would be best for Cher's family to live on their own and found them an apartment without letting Cher know. A Hmong family was moving out of an apartment, and Pa thought it would be fine for Cher's family. She quickly signed them up and gave the deposit money not to the landlord, but to the Hmong family, and she told them that Cher would keep their deposit money when he eventually moved out. Later, Cher never got the money, since the landlord would only give it to the family before them, and they had never said anything to the landlord.

The experiences of Hmong refugees who came to the United States and lived with their relatives varied. When living with someone close to their family, the experience depended on their respect and patience. Even if a man was living with his brother, it could still be a disaster if the wives of the brothers disliked each other. The brother and his wife had to both accept the family of whoever was coming to live with them. Within the Hmong community, this caused many families to break their bonds and go their separate ways. Being a Hmong man and

living in someone else's household was difficult, since they had to follow the rules of the head of the house. Those who respected each other might have had more of a say, but this was not an option in Cher's case. Another challenge Cher faced while living with his sister was that he still held on to his traditional shamanistic beliefs. In Hmong culture, it is important for the male of the household to set up a shrine to protect his family and bring in good luck and fortunes.[58] Pa, on the other hand, had taken up Christianity.

Hmong refugees were helped out by federal funding for a period of six months and then expected to live on their own. After the reauthorization of the Refugee Act in 1979, Hmong refugees were allowed to become permanent residents, which allowed them to access domestic assistance and federal funding.[59] Upon arriving in America, they went to school and were taught basic English. Cher did not like these classes. He knew English already from working in the refugee camps and felt like he was treated like a kid. He wanted to put his experience to use, but he had no degree. After taking a few English courses, Cher decided to apply to a technical college and got in. However, after a few months of having to take care of his family and attend school at the same time, Cher dropped out to work as a janitor.

Hmong men who came to the United States with a family or who were older did not have much of a chance to pursue higher education. Their top priority was to take care of their family, or they had to rely on their children to support them. Refugee men came to America for a better life and future for their children, and they knew they had to work to support their families, because it was their families that kept them going.

As years passed, many Hmong families fully assimilated or were assimilating to Western culture. Similar to immigrants before them, the children of these refugees soon became active contributors to the family's income.[60] Being dependent on this caused tension between fathers and sons, as a son might have seen himself as the primary provider, leading him to think he ran the household. As the second generation of Hmong in America started to grow, they picked up on Western norms and soon sought their own independence. The elder generation still held on to their culture, and they faced difficulties as some of the newer generation found it no longer important to do so. Their children were becoming Americans, rejecting their identity as Hmong by adopting an American lifestyle and set of values, realizing Western culture was easier since it was all around them.[61] Therefore, there was a clash between the two generations, one with the mindset of preserving the culture, and the other seeing the culture as backwards and Westernization as a modern and civilized way of living. This caused Hmong fathers to lose their sense of parenting

and responsibility. On the other hand, there were also Hmong parents who adapted or assimilated a little and accepted a household where their daughters could step outside traditional gender roles.

Hmong men still held on to their pride as fathers within the household, and therefore they thought that the majority of decisions should be subject to their approval. The children of refugee men soon grew up in a different society and started to challenge family and gender roles. Although many Hmong parents still tried to hold on to having their daughters indoors doing chores and being the ideal Hmong woman, many daughters soon sought their freedom. No longer listening to their parents, daughters would roam around the city with their friends. As night fell, parents worried. Yet children had nothing to fear since this was America, and the elders could only do so much to affect them. Sons rose up and started not taking their time to listen to their fathers, seeking a Western understanding of situations and starting to hate their own fathers. Fathers, not being able to speak English or understand America, had to seek help from their sons and daughters. As these children came to understand their father's role from a Western perspective, they soon treated their father as a child. Their children not listening to them and thinking their ways of thinking were outdated caused these men to grieve. They understood they might not have made the right choice in coming to America. They wanted their childhood homeland in Laos, where Hmong culture was acknowledged and their way of living was still the same.

Conclusion

Following the life of Cher Her, the hardships Hmong men went through are clear. Although Hmong history revolves around men being warriors, Cher was not a soldier. However, this does not mean he did not suffer from the war, for civilians suffered the most. Not many people think about Hmong men as civilians leaving their homeland and loved ones behind. Not only did Cher leave behind his parents, but a thousand more did the same. Husbands left wives, children left parents, parents left children, and siblings left each other. It was a time of survival. Everyone was for themselves.

Making the journey across the Mekong River into Thailand was a new start for these men and their families. With the assumption that their safety and care were being tended to, they were fenced in and not allowed to enjoy the land. They were robbed, beaten, and even killed. Husbands or boyfriends would be beaten and forced to watch Thai officials mistreat their family or rape their loved ones. Although the camp was a new start for the Hmong, this new world also cost the men their identities as men. Their achievements were of no importance, and they were told to go back to Laos if they brought up their ranks in the camps. Many thought life in the camps was

not bad, and they would have lived there forever, but eventually the camps closed down, and this forced them to make another choice: resettlement in Laos or another country.

Not knowing what awaited them and hearing from relatives of how rich the outside world was, Hmong men registered themselves and their families to leave Thailand. Since life in the camps was filled with anguish and poverty, many thought it would be a better choice to leave. As these Hmong men reached the final transition camp, Phanat Nikhom, Western ideals were taught to them. Many men lost their power when women were introduced to women's rights. Women used to be inferior, but now women had the chance to claim independence and an identity for themselves. After learning Western customs, these men worried about their lives, since they would no longer be running the family. Women left behind their customs and adopted Western traditions so they could rise from the oppression of men. As the time came closer to going to America, many Hmong men knew their lives were over, as in the new world they would become dependent on others for support and help.

As the older Hmong generation was dying out and the newer generation was assimilating, Hmong youth no longer found it useful to hold on to such a long and difficult history that was not written down. When Hmong history is told, it starts with the war and the refugees that came to America. This causes people to think that there is only one Hmong history and that all Hmong stories are the same. Many scholars might agree that everything has been covered already. Being of Hmong descent, however, I know for a fact that there are still many stories to be told about Hmong history.

Although every Hmong story may have the same context, Hmong lives are different, and how they see the world will help shape history. Therefore, exploring the same topics in Hmong history is worthwhile. The victorious have always written history and shaped how they want the world to remember them, but this story follows one who did not emerge as a victor from the war, but rather as a survivor.

Cher's life is a wonderful story. It recounts all the struggles he has been through and shows what a Hmong man had to endure. Like many other Hmong men, his pride and manhood were demolished as he grew up in the camps and came to America, but he did all of it for his children's future. Cher is not only one of my interviewees, but also someone who is very dear to me. He is my father, and he is a huge influence in enabling me to pursue what I do.

Notes

[1] During this time period, Hmong people kept track of dates by seasons. Therefore, it is hard to pinpoint Cher's actual birthday, but for the purpose of this project, the date given to him when he registered for resettlement in the United States is used.

[2] Keith Quincy, *Hmong: History of a People* (Cheney, WA: Eastern Washington University Press, 1988), 149.

[3] Paul Hillmer, *A People's History of the Hmong* (Saint Paul: Minnesota Historical Society Press, 2010), 3.

[4] Jane Hamilton-Merritt, *Tragic Mountains: The Hmong, the Americans, and the Secret War for Laos, 1942-1992* (Bloomington, IN: Indiana University Press, 1993), 424.

[5] Such works include Hillmer's book *A People's History of the Hmong,* Hamilton-Merritt's book *Tragic Mountains: The Hmong, the Americans, and the Secret War for Laos,* Chia Youyee Vang's book *Hmong America: Reconstructing Community in Diaspora,* Kao Kalia Yang's memoir *The Latehomecomer: A Hmong Family Memoir,* and Anne Fadiman's book *The Spirit Catches You and You Fall Down: A Hmong Child, Her American Doctors, and the Collision of Two Cultures.*

[6] Nancy D. Donnelly, *Changing Lives of Refugee Hmong Women* (Seattle: University of Washington Press, 1994).

[7] Kou Yang, "Hmong Mens' Adaptation to Life in the United States," *Hmong Studies Journal* 1, 2 (1997).

[8] *Gran Torino,* directed by Clint Eastwood (2008; Burbank, CA: Warner Home Video, 2009), DVD.

[9] Ibid.

[10] Cher Her, interviewed by author, Eau Claire, WI, September 11, 2013.

[11] Lillian Faderman and Ghia Xiong, *I Begin My Life All Over: The Hmong and the American Immigration Experience* (Boston: Beacon Press, 1998), 66.

[12] Ibid., 71.

[13] Cher Her, interview, September 11, 2013.

[14] Yia Her, interview by author, Appleton, WI, June 24, 2014.

[15] Cher Her, interview, September 11, 2013.

[16] Faderman and Xiong, 66.

[17] Ibid., 69-70.

[18] Hamilton-Merritt, 473.

[19] Cher Her, interview, September 11, 2013.

[20] Faderman and Xiong, 71.

[21] Ibid.

[22] Ibid., 73.

[23] Cher Her, interview, September 11, 2013.

[24] Kou Chang and Sheila Pinkel, *Kou Chang's Story: The Journey of a Laotian Hmong Refugee Family* (New York: Visual Studies Workshop Press, 1993), 26.

[25] Faderman and Xiong, 73-75.

[26] Hamilton-Merritt, 14.

[27] Ibid., 71.

[28] Faderman and Xiong, 73.

[29] Cher Her, interview, September 11, 2013.

[30] Ibid.

[31] Ibid.

[32] Ibid.

[33] Ibid.

[34] Ger Vang, interview by author, Brooklyn Center, MN, October 4, 2013.

[35] Neng Her, interview by author, Eau Claire, WI, October 26, 2013.

[36] Lynelln Long, *Ban Vinai: The Refugee Camp*, (New York: Columbia University Press, 1993), 93.

[37] Faderman and Xiong, 70.

[38] Ger Vang, interview, October 4, 2013.

[39] Cher Her, interview by author, Eau Claire, WI, August 14, 2014.

[40] Ibid.

[41] Ibid.

[42] Ibid.

[43] Ibid.

[44] Neng Her, interview, October 26, 2013.

[45] Cher Her, interview, September 11, 2013.

[46] Faderman and Xiong, 73-75.

[47] "Thailand Closes Long-Used Refugee Camps," *The New York Times,* May 18, 1986.

[48] Neng Her, interview, October 26, 2013.

[49] Cher Her, interview, September 11, 2013.

[50] Neng Her, interview, October 26, 2013.

[51] Ger Vang, interview, October 4, 2013.

[52] Jeremy Hein, *States and International Migrants: The Incorporation of Indochinese Refugees in the United States and France*, (San Francisco: Westview Press, 1993), 33.

[53] Donnelly, 35.

[54] Hein, 82.

[55] Vang, Chai Youyee, *Hmong American: Reconstructing Community in Diaspora*. (Chicago: University of Illinois Press, 2010), 44.

[56] Ibid., 19.

[57] Cher Her, interview, August 14, 2014.

[58] Cher Her, interview, September 11, 2013.

[59] Hein, 46.

[60] Steven Mintz, *Huck's Raft: A History of American Childhood,* (Cambridge, MA: Belknap Press of Harvard University Press, 2006), 208.

[61] Ibid.

Bibliography

Chang, Kou and Sheila Pinkel. *Kou Chang's Story: The Journey of a Laotian Hmong Refugee Family*. New York: Visual Studies Workshop Press, 1993.

Chan, Sucheng. *Hmong Means Frees: Life in Laos and America.* Philadelphia: Temple University Press, 1994.

The Dark Night of the Hmong, May-June 1978, Folder 10, Box 3, Ogden Williams Collection, The Vietnam Center and Archive, Texas Tech University. Accessed 22 January. 2015. <http://www. vietnam.ttu. edu/virtualarchive/items. php? item=15250310005 >.

Donnelly, Nancy D. *Changing Lives of Refugee Hmong Women*. Seattle: University of Washington Press, 1994.

Faderman, Lillian, and Ghia Xiong. *I Begin My Life All Over: The Hmong and the American Immigrants Experience.* Boston: Beacon Press, 1998.

Fadiman, Anne. *The Spirit Catches You and You Fall Down: A Hmong Child, Her American Doctors, and the Collision of Two Cultures.* New York: Farrar, Straus, and Giroux, 1997.

Hamilton-Merritt, Jane. *Tragic Mountains: The Hmong, the Americans, and the Secret Wars for Laos, 1942-1992.* Bloomington: Indiana University Press, 1992.

Hein, Jeremy. *States and International Migrants: The Incorporation of Indochinese Refugees in the United States and France.* San Francisco: Westview Press, 1993.

Hillmer, Paul. *A People's History of the Hmong*. Saint Paul: Minnesota Historical Society Press, 2010. Long,

Lynelln. *Ban Vinai: The Refugee Camp.* New York: Columbia University Press, 1993.

Mattison, Wendy, Laotou Lo, and Thomas Scarseth, comps.. *Hmong Lives: From Laos to La Crosse: Stories of Eight Hmong Elders = Hmoob Neej: Tuaj Los Tsuas Rau La Crosse: Lub Neej Ntawm 8 Tus Laus Neeg Hmoob.* La Crosse, WI: Pump House Regional Center for the Arts, 1994.

Mintz, Steven. *Huck's Raft: A History of American Childhood.* Cambridge: Belknap Press, 2006.

Quincy, Keith. *Hmong: History of a People.* Cheney: Eastern Washington University Press, 1988.

Vang, Chai Youyee. *Hmong American: Reconstructing Community in Diaspora*. Chicago: University of Illinois Press, 2010.

Vang, Thomas S. *A History of the Hmong: From Ancient Times to the Modern Diaspora*. N.p., 2008.

Yang, Kao Kalia. *The Latehomecomer: A Family Memoir.* Minneapolis: Coffee House Press, 2008.

Analysis of Structure and Conformation of a Linear MUC-1 Peptide

By: **Michael O. McAnally**

Faculty Mentor: Thao Yang, Chemistry

Abstract

MUC-1 peptides are based on the amino acid sequence of the tandem repeat domain of mucin expressed by cancer cells. MUC-1 peptides have been used as antigenic agents in the development of cancer vaccines.[1] This research investigated the specific conformation of a free MUC-1 peptide. We synthesized an 11-mer peptide with the sequence GVTSAPDTRPA that spans the main portion of the tandem repeat domain of mucin that is known to bind to the MUC-1 monoclonal antibody. This study includes data on the characterization of the MUC-1 peptide by preparative HPLC, LC-MS, 2D NMR, and computational modeling of the peptide. These data were used to evaluate the peptide conformation in buffer solution.

Introduction

Mucous consists of many different proteins known as glycoproteins, a family of high molecular weight and heavily glycosylated proteins (such as proteins covered with sugar molecules). These are encoded by the gene MUC-1 and are known as mucins (or MUC-1 mucins).[1] MUC-1 mucins are expressed by many types of epithelial cells within the human body, including tissues of the breast, lung, prostate, pancreas, ovaries, and testes.[2, 3, 4] Mucins appear to protect the cell surface; however, when epithelial cells become cancerous, the mucins are overexpressed and under-glycosylated.[5, 6] Research demonstrates that the under-glycosylation on the surface of mucin can induce

Figure 1. 11-mer MUC-1 peptide with the seuqence GVTSAPDTRPA.

immune responses in patients with cancer.[7] This immune response is thought to be caused by a certain region or segment of the mucin structure, more specifically the Tandem Repeat Domain (TRD) of the mucin structure, which consists of the 20-amino acid sequence (G)lycine-(V)aline-(T)hreonine-(S)erine-(A)lanine-(P)roline-(D)Aspartic

Acid-(T)hreonine-A(R)ginine-(P)roline-(A)lanine-(P)roline-(G)lycine-(S)erine-(T)hreonine-(A)lanine-(P)roline-(P)roline-(A)lanine-(H)istidine (typically written as GVTSAPDTRPAPGSTAPPAH).[8] Numerous publications have cited the possibility of using mucin peptides as cancer vaccines due to their potential for acting as synthetic antigenic agents that induce an immune system response.[9, 10, 11]

This study focuses on a single 11-mer MUC-1 peptide, also referred to as an eleven-residue peptide or an eleven amino acid peptide with the sequence GVTSAPDTRPA, which corresponds to part of the TRD. This portion of the TRD binds to specific MUC-1 monoclonal antibodies, the characteristic that makes it particularly interesting to this study.

The main goal of the research was to determine the specific structural and conformational elements of the peptide in solution by use of Nuclear Magnetic Resonance Spectroscopy (NMR).

Experimental Method

Synthesis of the MUC-1 peptide was carried out manually by fluorenylmethyloxycarbonyl (FMOC)-chemistry, using Solid-Phase Peptide Synthesis (see Figure 2). The synthesis began with a solid resin (Wang Resin), from which

Figure 2. Solid-Phase Peptide Synthesis.

the peptide chain was synthesized via coupling subsequent amino acids to form the sequence of the peptide. Once the desired sequence was obtained, the peptide chain was cleaved from the resin by reacting 95% trifluoroacetic acid (TFA), which left the desired crude product in solution. The peptide solution was then prepared using a series of ether and water extractions to clean byproducts from the synthesis.

Purification of the MUC-1 peptide was done using a preparative High Performance Liquid Chromatography (HPLC) in which it was possible to isolate the peptide from any impurities. HPLC purified MUC-1 peptide was then analyzed on the Agilent 6210 Time-of-Flight Liquid Chromatography-Mass Spectrometry (LC-MS) Spectrometer. The peptide, passed through a C_{18} column, was analyzed by the mass spectrometer via the Electro-Spray Ionization (ESI) technique. The chromatogram in Figure 3 shows the Total Ion Current (TIC) identical to the traditional HPLC
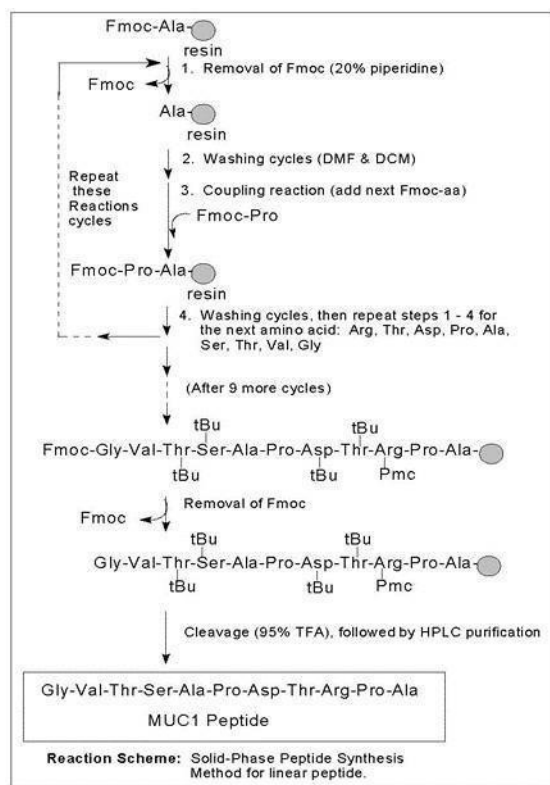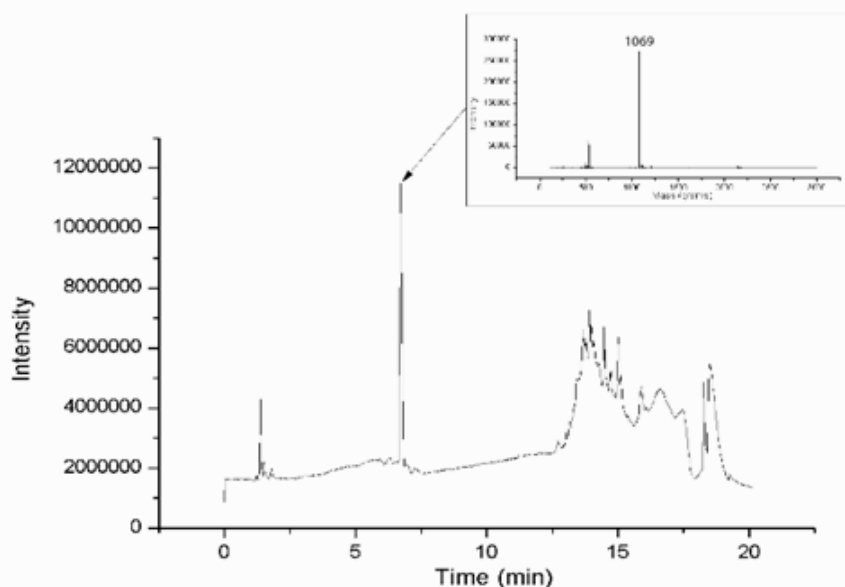
chromatogram in intensity versus retention time. The indicated peak contains the 11-mer MUC-1 peptide, and the inset graph shows the mass spectrum of the MUC-1 peptide with an indicated mass of 1069.54 (m/z), an amount very close to the theoretical mass of 1070.17 (m/z). The difference in the experimental and theoretical masses of the peptide is due to the mass spectrometer running in

Figure 3. TIC versus retention time.

negative mode in which 1 m/z unit is lost.

Further identification and analysis of the peptide was performed utilizing a 400MHz Bruker-Avance NMR spectrometer. The NMR spectrometer made it possible to run several experiments, including TOCSY (Total Correlation Spectroscopy), which shows the interaction of two ^{1}H atoms within 3 bonds of each other; ROESY (Rotating Frame Overhauser Effect Spectroscopy), an experiment that shows distance between protons lying in close proximity to each other in space; NOESY (Nuclear Overhauser Enhancement Spectroscopy) experiments which, while typically showing the same data as a ROESY, can at times provide new data on previously unseen resonances; HSQC (Heteronuclear Single Quantum Coherence) experiments; and pH and temperature variant 1D [1]H (one-dimensional proton) experiments. Experiments employed numerous solvents, including a phosphate buffer, SDS (Sodium Dodecyl Sulfate and phosphate buffer in solution), and DMSO (Dimethyl Sulfoxide). Data obtained from the NMR experiments provided input data for the program XPLOR-NIH (Version 2.19) which calculated the probable structure of the peptide.

Results

The results of the NMR spectroscopy experiments provided notable observations regarding the structure of the MUC-1 peptide. The 2D experiments revealed that the peptide has a relatively compact

structure between the Asp7 and Arg9 residues (Figures 4 and 5), with a general overall view of ROEs

(Rotational Overhauser Effects) (Figure 6). Here, blue lines represent ROEs observed from αH's to NH's

(nitrogen hydrogens) of neighboring amino acids and red lines represent ROEs observed from αH's of one

amino acid to the αH of the neighboring amino acid

Figure 4. Structure of the peptide.

Figure 5. Further analysis of the structure of the peptide.

Figure 6. General overall view of ROEs.

Two main conclusions emerge from the 1D data. The first is that the terminal residue's NH, the NH of the Gly1 residue, is rapidly exchanging with the solvent, as validated by its rapid disappearance in differing pHs. The second, more significant, conclusion is that the NH on the Thr8 residue is hydrogen bonded, as evidenced by

consistent experimental data of peptide pH changes (see Figure 7) as the rightmost peak that exists at all pHs.

Combining all observations from the NMR experiments, one can conclude that a dominant secondary structure of

the peptide backbone exists.

Figure 7. Experimental data of peptide pH changes.
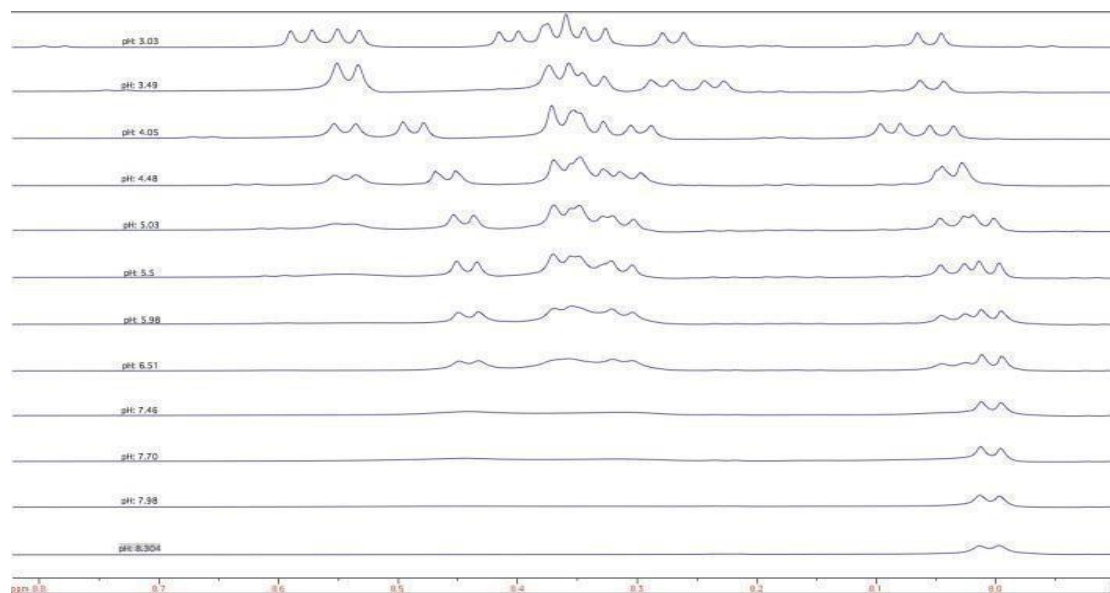
The computational chemistry program XPLOR-NIH assisted examination of this secondary structure. The

observed ROEs were used as constraints on calculated structures of the peptide. Figure 8 shows numerous calculated

structures overlaid on one another where a consistent form appears along the Ala5-Thr8 residues. This form led the

researchers to believe that a β turn occurred along this region of the peptide. To fully examine the turn, it proved

necessary to reexamine some of the 2D NMR experiments, specifically the ROESY experiments. The ROE pattern

of the peptide in both the DMSO and SDS solutions (see Figures 4 and 5) indicate a consistent β turn since the

ROEs observed are in a relatively compact region, and are observed in numerous environments.[12] Figure 9, resulting

from the computational chemistry program Spartan, presents a model of a β turn.

Figure 8. Ala5-Thr8 residues.
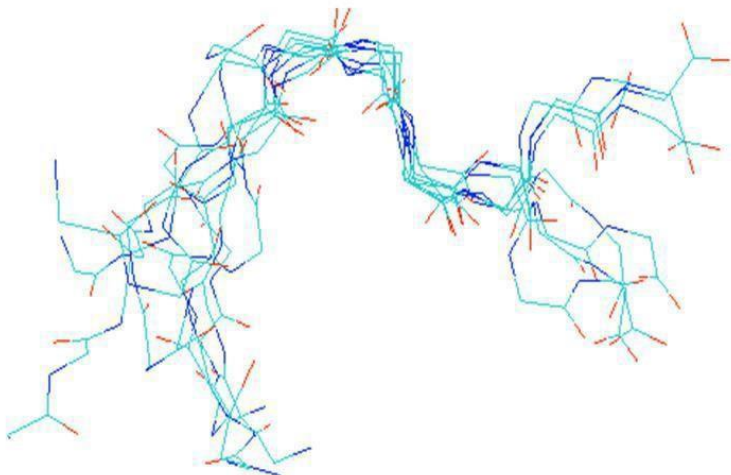
Figure 9. A model of a β turn
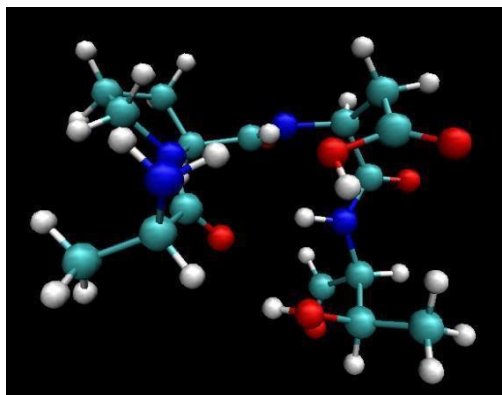
Conclusions

Two main conclusions arise from this research. The first is that the 11-mer linear mucin peptide with the

sequence GVTSAPDTRPA contains a β turn localized on the Ala5-Thr8 residues, as evidenced by the observed

ROEs and as referenced in the literature. The second conclusion is that the turn of the targeted 11-mer linear mucin

peptides appears to be consistent given the negligible change in ROEs observed in different environments.

Notes

[1] Jeffrey S. Grinstead, Jason T. Schuman, and Ann P. Campbell, "Epitope Mapping of Antigenic MUC-1 Peptides to Breast Cancer Antibody Fragment B27.29: A Heteronuclear NMR study," *Biochemistry* 42, no. 48 (2003): 14293-14305.

[2] Choon Kit Tang et al., "Oxidized and Reduced Mannan Mediated MUC-1 DNA Immunization Induce Effective Anti-Tumor Responses," *Vaccine* 26, no. 31 (2008): 3827-34.

[3] Brigitte Gückel et al., "Pre-existing T-cell Immunity Against Mucin-1 in Breast Cancer Patients and Healthy Volunteers," *Journal of Cancer Research and Clinical Oncology* 132, no. 4 (2006): 265-274.

[4] J. Creaney et al., "Overexpression and Altered Glycosylation of MUC-1 in Malignant Mesothelioma," *British Journal of Cancer* 98, no. 9 (2008): 1562-1563.

[5] Ibid.

[6] Mia Phillipson et al., "The Gastric Mucus Layers: Constituents and Regulation of Accumulation," *American Journal of Physiology. Gastrointestinal and Liver Physiology* 295, no. 4 (2008): G806-812.

[7] Jeffrey S. Grinstead et al., "Effect of Glycosylation on MUC-1 Humoral Immune Recognition: NMR Studies of MUC-1 Glycopeptide-Antibody Interactions," *Biochemistry* 41, no. 31 (2002): 9946-9961.

[8] Ibid.

[9] G. Curigliano et al., "Breast Cancer Vaccines: A Clinical Reality or Fairy Tale?" *Annals of Oncology* 17, no. 5 (2006): 750-762.

[10] T. Becker et al., "Synthetic Glycopeptides from the Mucin Family as Potential Tools in Cancer Immunotherapy," *Current Cancer Drug Targets* 6, no. 6 (2006): 491-517.

[11] Scott Wilkie et al., "Retargeting of Human T Cells to Tumor-Associated MUC-1: The Evolution of a Chimeric Antigen Receptor," *Journal of Immunology* 180, no. 7 (2008): 4901-4909.

[12] An-Qiang Sun et al., "A 14-Amino Acid Sequence with a β-Turn Structure Is Required for Apical Membrane Sorting of the Rat Ileal Bile Acid Transporter," *Journal of Biological Chemistry* 278, no. 6 (2003): 4000-4009.

Bibliography

Becker, T., S. Dziadek, S. Wittrock, and H. Kunz. "Synthetic Glycopeptides from the Mucin Family as Potential Tools in Cancer Immunotherapy." *Current Cancer Drug Targets* 6, no. 6 (2006): 491-517.

Creaney, J., A. Segal, G. Sterrett, M. A. Platten, E. Baker, A. R. Murch, A. K. Nowak, B. W. Robinson, and M. J. Millward. "Overexpression and Altered Glycosylation of MUC-1 in Malignant Mesothelioma." *British Journal of Cancer* 98, no. 9 (2008): 1562-63.

Curigliano, G., G. Spitaleri, E. Pietri, M. Rescigno, F. de Braud, A. Cardillo, E. Munzone, A. Rocca, G. Bonizzi, V. Brichard, L. Orlando, and A. Goldhirsch. "Breast Cancer Vaccines: A Clinical Reality or Fairy Tale?" *Annals of Oncology* 17, no. 5 (2006): 750-62.

Grinstead, Jeffrey S., R. Rao Koganty, Mark J. Krantz, B. Michael Longenecker, and Patricia A. Campbell. "Effect of Glycosylation on MUC-1 Humoral Immune Recognition: NMR Studies of MUC-1 Glycopeptide-Antibody Interactions." Biochemistry 41, no. 31 (2002): 9946-61.

Grinstead, Jeffrey S., Jason T. Schuman, and Ann P. Campbell. "Epitope Mapping of Antigenic MUC-1 Peptides to Breast Cancer Antibody Fragment B27.29: A Heteronuclear NMR study." *Biochemistry* 42, no. 48 (2003): 14293-305.

Gückel, Brigitte, Christine Rentzsch, Maria-Dorothea Nastke, Alexander Marme, Ines Gruber, Stefan Stevanovic, Simone Kayser, and Diethelm Wallwiener. "Pre-existing T-cell Immunity Against Mucin-1 in Breast Cancer Patients and Healthy Volunteers." *Journal of Cancer Research and Clinical Oncology* 132, no. 4 (2006): 265-74.

Phillipson, Mia, Malin E. V. Johansson, Johanna Henriksnäs, Joel Petersson, Sandra J. Gendler, Stellan Sandler, A. Erik G. Persson, Gunnar C. Hansson, and Lena Holm. "The Gastric Mucus Layers: Constituents and Regulation of Accumulation." *American Journal of Physiology. Gastrointestinal and Liver Physiology* 295, no. 4 (2008): G806-12.

Sun, An-Qiang, Rachita Salkar, S. Sachchidanand; Shuhua Xu, Lei Zeng, Ming-Ming Zhou, and Frederick J. Suchy. "A 14-Amino Acid Sequence with a β-Turn Structure Is Required for Apical Membrane Sorting of the Rat Ileal Bile Acid Transporter." *Journal of Biological Chemistry* 278, no. 6 (2003): 4000-9.

Tang, Choon Kit, Kuo-Ching Sheng, Dodie Pouniotis, Sandra Esparon, Hye-Youn Son, Chul-Woo Kim, Geoffrey A. Pietersz, and Vasso Apostolopoulos. "Oxidized and Reduced Mannan Mediated MUC-1 DNA Immunization Induce Effective Anti-Tumor Responses." *Vaccine* 26, no. 31 (2008): 3827-34.

Wilkie, Scott, Gianfranco Picco, Julie Foster, David M. Davies, Sylvain Julien, Lucienne Cooper, Sefina Arif, Stephen J. Mather, Joyce Taylor-Papadimitriou, Joy M. Burchell, and John Maher. "Retargeting of Human T Cells to Tumor-Associated MUC-1: The Evolution of a Chimeric Antigen Receptor." *Journal of Immunology* 180, no. 7 (2008): 4901-9.

The Effect of Methotrexate on the Anxiety-like Behavior of Rats

By: **Courtney L. M. Nelson (Year of Graduation: 2013)**

Advisor: David Jewett, Psychology

Abstract

The purpose of this experiment was to determine if methotrexate, a common therapeutic agent, possesses anxiolytic or anxiogenic properties. An elevated plus maze was used to assess anxiety-like behavior in adult rats after administration of either methotrexate or a control. A floor effect was observed for the open arm exploratory behavior during the first exposure. A second trial was conducted to determine if manipulations to the chosen variables (illumination, light cycles, etc.) would increase open arm exploratory behavior. No open arm exploratory behavior was observed following these manipulations. Changing the operational definition of an open arm entry allowed for a significant effect to be observed in the amount of time spent in the closed arms of the maze, with more time being spent in the closed arms by drug-treated rats.

Introduction

Methotrexate (MTX) is a compound that inhibits dihydrofolate reductase, an enzyme involved in DNA synthesis, repair and cellular proliferation. MTX is currently prescribed as a chemotherapeutic agent for the treatment of non-Hodgkin's lymphoma, acute lymphocytic leukemia, breast cancer, and cancers of the uterus, lungs, head, and neck. It is also prescribed for a number of other conditions including psoriasis, juvenile idiopathic arthritis, irritable bowel syndrome, and systemic lupus erythrocytosis. Side effects include headache, nausea, fever, and abdominal pain (da Fonseca and Casamassimo 2011, 70-71). Administration of MTX has been shown to cause impairment in learning and memory of rats (Li et al. 2010, 454-463). Adriamycin, another chemotherapeutic agent that inhibits DNA synthesis, has been shown to induce anxiety-like behavior in the elevated plus maze (Merzoug et al. 2011, 642). However, the potential anxiogenic properties of methotrexate have not been investigated using the elevated plus maze.

The elevated plus maze (EPM) is a widely-used behavioral assay that detects a compound's anxiolytic (anxiety reducing) or anxiogenic (anxiety inducing) properties. Behavior in this apparatus reflects a conflict between a rodent's desire for protected areas and its natural tendency to explore new environments. Increased open arm entries and time spent in the open arms are interpreted as an anxiolytic effect, or a decrease in anxiety-like behavior. Decreased open arm entries and time spent in the open arms are indicative of an anxiogenic effect or an increase in

anxiety-like behavior (Walf and Frye 2007). The EPM has been validated physiologically and pharmacologically. Forced or voluntary entry into an open arm of the EPM is associated with increased plasma corticosterone concentrations (Hogg 1996, 21). Clinically effective anxiolytic drugs increase time spent in the open arms and known anxiogenic compounds decrease time spent in the open arms (Pellow et al. 1985).

Between laboratory-differences in the methods used during EPM experiments are based on variations to more than one variable (Hogg 1996, 21). When analyzing the literature, it is clear that there are disparities in the methods used and variables altered when conducting EPM experiments. Variations are observed in the time of experimental sessions, lighting used (white or red), housing conditions (single or group housing), transportation to testing rooms, amount and type of handling that occurs before testing, and occasionally the operational definitions of the standard measures.

Participants

25 experimentally naive male Sprague-Dawley adult rats (Harlan, Madison, WI, USA), weighing 341-427 g at the beginning of experimental procedures, were individually housed in transparent polycarbonate cages with a 12:12 hour light/dark cycle (lights on at 7:30 a.m. and off at 7:30 p.m.). Food (Harlan Teklad rodent chow, Madison, WI, USA) and tap water were available ad libitum. To reduce stress due to transportation, tests did not occur for at least two weeks after subjects arrived at the lab. Subjects were weighed daily to monitor health. Subjects were maintained in accordance with the National Institutes of Health Guide for the Care and Use of Laboratory Animals. The University of Wisconsin – Eau Claire Institutional Animal Care and Use Committee approved all experimental procedures.

Materials

Elevated Plus Maze

The elevated plus maze, constructed with white plastic, consisted of four arms (two opposite open arms without walls and two opposite arms enclosed by 21 cm high walls) 40 cm long and 10 cm wide. The maze was elevated 50 cm above the ground, and a 60 W light bulb hung above the maze. A video camera looking down onto the maze recorded the test sessions.

Drug

Methotrexate (Tocris Bioscience), dissolved in 68% DMSO and 32% saline solution, was administered

subcutaneously (1 mg/kg or 10 mg/kg) one hour before experimental sessions.

Procedure

Subjects (N = 25) received a single subcutaneous injection of either control (68% DMSO, 32% saline), 1 mg/kg MTX, or 10 mg/kg MTX. An experimenter administered injections between 11:00 a.m. and 4:00 p.m. under a portable fume hood located in the colony room and returned the subjects to their individual home cages. After a one hour pretreatment, a different experimenter brought the subject to the adjacent testing room and immediately placed him at the center of the EPM facing a closed arm. Behaviors were measured for five minutes by an observer blind to the experimental conditions. The following measures were recorded: number of entries into closed and open arms (an arm entry was counted when all four paws had crossed the line of the central platform into the arm), percent of time spent in the open and closed arms (time started when the fourth paw crossed into the arm and was stopped when the first paw crossed out of the arm), rearing (standing on hind legs with both front paws off the ground), risk assessment (at least one paw and head were extended into the open arm without making an entry), grooming, defecation, and/or urination. After five minutes elapsed, the experimenter returned the subject to the colony room. The maze was thoroughly cleaned with Nolvasan solution and dried before the next test occurred.

Data analysis

A one-way analysis of variance (ANOVA) was calculated (SPSS, Chicago, IL, USA) assessing the effects of methotrexate (1 mg/kg or 10 mg/kg) on the mean number of entries and the mean percent of time spent in the closed and open arms of the elevated plus maze. Significant effects were noted if $p < 0.05$. Outliers were not excluded from data analysis. One subject was randomly chosen to be excluded from analysis to maintain equal numbers in each group. Prior to the analysis, the Levene test for homogeneity of variance was conducted. A significant violation was found for open arm entries ($F_{(2, 21)} = 8.02$, $p = .003$) and time spent in the open arms ($F_{(2, 21)} = 7.60$, $p = .003$).

Results

A one-way ANOVA found no significant differences in the number of closed arm entries, the percent of time spent in the closed arms, the number of open arm entries, or the percent time spent in the open arms among the three groups. A floor effect was observed for the open arm exploratory behavior, with the mean number of open arm entries for the control group being zero. There were no significant differences in the behavioral measures risk assessment, rearing, grooming, urination or defecation between the three groups.
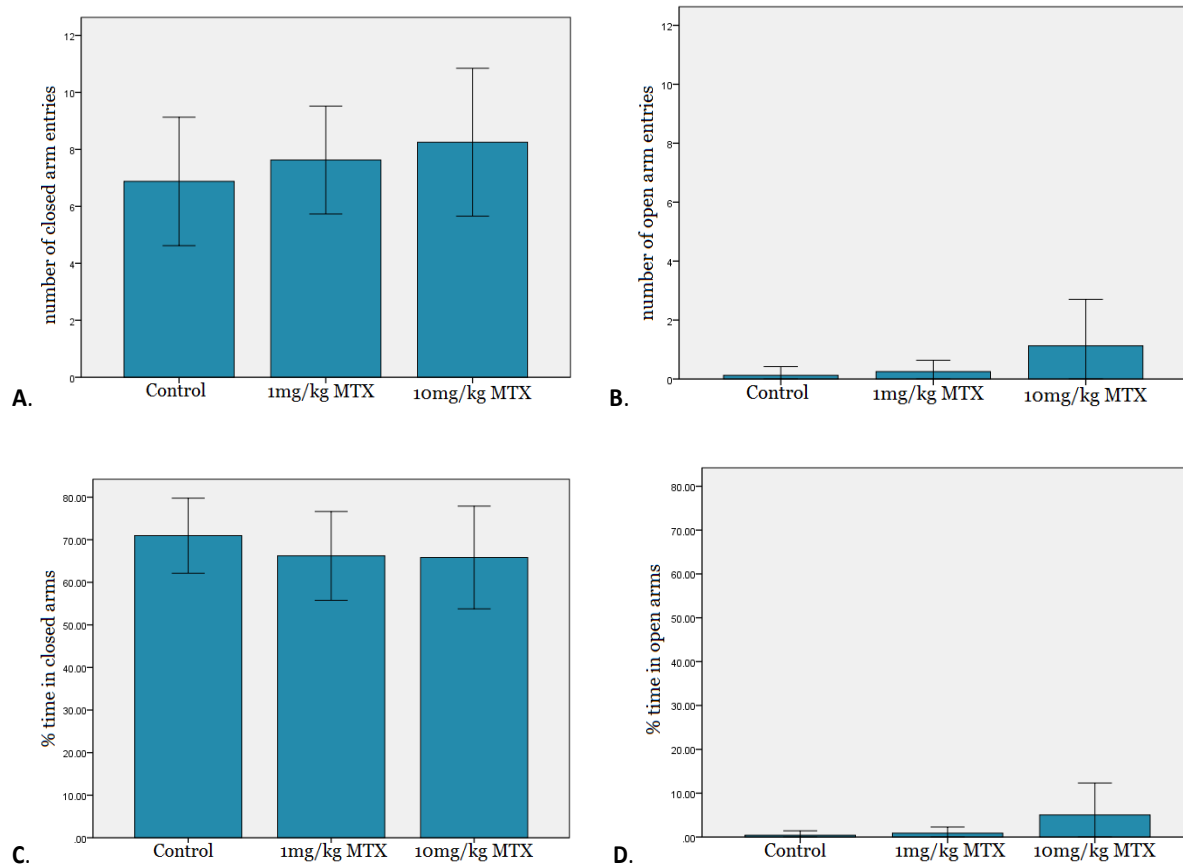
Figure 1: Elevated plus maze behavior after a single injection of control (N = 8), 1 mg/kg MTX (N = 8) or 10 mg/kg MTX (N = 8). Graphs display closed and open arm entries (A and B respectively) and time spent in the closed and open arms (C and D respectively). Data represents mean values with 95% confidence intervals.

Discussion

　　Floor effects are common in EPM experiments, and there are a number of reasons for the minimal open arm exploratory behavior that occurred during the first experiment: the tests were conducted during the rats' light phase in which they are generally less active, the EPM was illuminated with white light, and the rats were housed individually, which is important as long-term social isolation is considered a stressor (Walf and Frye 2007, 324). Additionally, the rats may not have been adequately habituated to the handling procedures used during drug administration and/or the injection itself may have induced a stress response. Another potential factor could have been the large size of the rats (341-427 g) which may have affected the measure of arm entries, because for all four paws to have crossed into the open arm, the rat would be close to the end of the arm.

Procedure 2

In an attempt to increase baseline open arm exploratory behavior and assess the effect of manipulating

some of the variables, subjects were tested again. Between-laboratory differences in the methods used during EPM

experiments are based on variations in more than one variable. Decreased open arm exploratory behavior is typical

during a second exposure to the maze (Walf and Frye 2007, 323). Consequently, an inter-trial interval of 69 days

elapsed between the first and second trial. The procedure was the same with the following exceptions: the 12/12

hour light cycle in the colony room was changed (lights now on at 2:00 a.m. and off at 2:00 p.m.), injections and

tests were conducted within the first three hours of the subject's dark phase (between 2:00 p.m. and 5:00 p.m.), no

light hung above the maze, the testing room was flooded with red light, rodents were subjected to gentle handling

for three weeks prior to the second trial to habituate them to the handing that occurs during injections, the

pretreatment was extended to 72 hours, subjects received either a control or 10 mg/kg MTX, and open arm entries

were recorded separately when four paws crossed into the open arm, and when only the front two paws crossed into

the open arm.

Data Analysis

A one-way between subjects ANOVA was performed to compare the mean number of entries and the mean

percent of time spent in the arms of the EPM for rats who received either 10 mg/kg MTX or the control. Prior to the

analysis, the Levene test for homogeneity of variance was conducted, but no significant violations were found. One

subject fell off the maze and was excluded from the data analysis.

Results

No open arm entries occurred with all four paws crossing into the arm. The ANOVA revealed no

significant differences in the number of two paw open arm entries between the two groups or in the percent of time

spent in the open arm with two paws. There was no significant difference in the number of closed arm entries. The

difference in mean percent time spent in the closed arms was statistically significant, $F(2, 21) = 5.01$, $p = .049$. The

mean percent time spent in the closed arms by the control group was 57.2% while the mean percent of time spent in

the closed arms by the drug treated rats was 69.8%. This corresponded to an effect size of $\eta^2 = .40$, meaning about

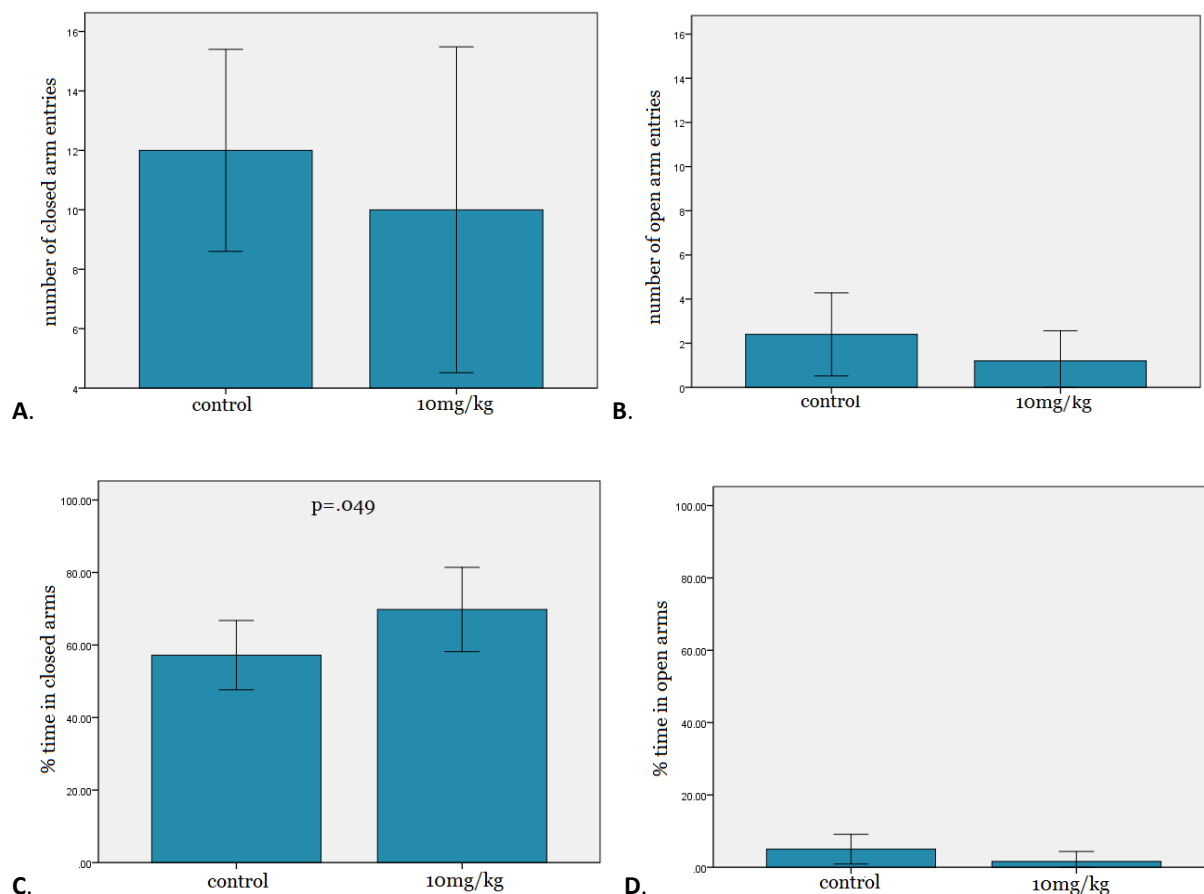40% of the variance in closed arm time was predicted by the experimental condition.

Figure 2: Elevated plus maze behavior after a single injection of control (N = 5) or 10 mg/kg methotrexate (N = 5). Closed and open arm (2 paw) entries (A and B respectively). Percent of time spent in the closed and open arms (2 paws) (C and D respectively). Data represents mean values with 95% confidence intervals.

Discussion

The goal of the present experiment was to assess the effect of methotrexate on the anxiety-like behavior of rats in an elevated plus maze. Although there was no difference in the anxiety-like behavior between drug-treated rats and control group rats during the first experiment, the floor effect observed with the control group makes it difficult to confidently conclude that the drug has no effect on anxiety-like behavior. Methotrexate did increase the percent of time spent in the closed arms of the elevated plus maze during a second exposure. However, because open arm entries are typically reduced during a second exposure, a replication should be performed with new rats to determine if this effect is observed during the first exposure when the open arms represent a novel environment.

References

da Fonseca, Marcio and Paul Casamassimo. 2011. "Old Drugs New Uses." *Pediatric Dentistry* 33 (1): 70-71.

Hogg, Sandra. 1996. "A Review of the Validity and Variability of the Elevated Plus Maze as an Animal Model of Anxiety" *Pharmacology, Biochemistry and Behavior* 54 (1): 21-30.

Li, Yan, Veena Vijayanathan, Maria E. Gulinello, and Peter Cole. 2010. "Systemic Methotexate Induces Spatial Memory Deficits and Depletes Cerebrospinal Fluid Folate in Rats." *Pharmacology, Biochemistry and Behavior* 94 (3): 454-463.

Merzoug, Sameha, Mohamed Lamine Toumi, Nadia Boukhris, Bruno Baudin, and Abdelkrim Tahraoui. 2011. "Adriamycin-Related Anxiety-Like Behavior, Brain Oxidative Stress and Myelotoxicity in Male Wistar Rats." *Pharmacology, Biochemistry and Behavior* 99 (4): 639-647.

Pellow, Sharon, Philippe Chopin, Sandra E. File, and Mike Briley. 1985. "Validation of Open : Closed Arm Entries in an Elevated Plus Maze as a Measure of Anxiety in the Rat." *Journal of Neuroscience Methods* 14 (3): 149-167.

Walf, Alicia and Cheryl Frye. 2007. "The Use of the Elevated Plus Maze as an Assay of Anxiety-Related Behavior in Rodents." *Nature Protocols*. 2 (2): 322-328. doi:10.1038/nprot.2007.44.

Academic Libraries and Collaboration: An Expanded Paradigm

By: **Angela Stangl (Year of Graduation: 2012)**

Advisor: John Pollitz, Director, McIntyre Library

Introduction

Though much scholarly work exists about collaboration between academic libraries and university academic departments, there is much less literature about joint ventures that academic libraries undertake with student affairs units such as writing or academic skills centers. Typically, collaborations are joint ventures between two or more parties of similar interests. In collaborating, parties pool their resources, time, and energy to reach their end goal. The authors of this current study explored current trends in collaboration that academic libraries pursue with their new partners. By gauging the effectiveness of current collaborative efforts, and in particular, evaluating the involvement of "information literacy" in such ventures, the researchers sought to understand more about the nature of such collaborations and the dynamic between or among the collaborating units. Information literacy in an academic library setting encompasses teaching members of the university community to successfully locate and evaluate information sources like books, articles, and web sites. It also involves teaching these populations to use information in an ethical manner and in accordance with copyright laws (Association of College & Research Libraries 2007). By creating and distributing a survey via an e-mail to librarians and directors of small-to-medium sized academic libraries, researchers identified common types of collaboration, polled library staff members' evaluation of collaboration's effectiveness in reaching student populations, and finally, tracked whether information literacy figured as a prominent factor in the collaborations.

Literature Review

Libraries have always stored and provided information, but today, as access to information changes, library staff members work hard to keep up with innovations such as social media in order to teach students and faculty about these changes. Such efforts have led libraries to reach beyond collaborations with academic departments and look to other campus units that provide education in its larger sense to students.

No new concept for libraries, collaboration has long defined the mutually supportive relationship that exists between faculty in academic departments and library staff. Some libraries have successfully expanded collaboration beyond the traditional partners by employing an "information commons" model where libraries and sometimes outside services like technology help are combined to reach student needs (Gayton 2008). This change in scope

prompted shifts in the nature of collaboration and consequently in the "feel" of the academic library. In "Libraries and Student Affairs: Partners for Success," Swartz, Carlisle and Uyeki (2007, 114) illustrated the collaborative efforts of the University of California – Los Angeles' (UCLA) College Library with the Office of the Dean of Students to implement academic integrity training for incoming students in regards to plagiarism.

Productive collaborations involve parties' sharing a vision for student success and a common goal. In UCLA's case, this was to help teach students to properly use information sources. Though student service personnel may employ nomenclature for information literacy that differs from librarians, the two groups can unite to help create a stronger learning experience for students (Swartz, Carlisle, and Uyeki 2007, 112). In the article "Forging Inroads," Emily Love and Margaret B. Edwards (2009, 21) agree that libraries and student services are good partners because they have similar visions for shaping students learning experiences. They offer examples in library literature of collaborations with career centers, writing centers, multicultural offices and even registered student organizations that have been occurring more frequently since about 2005.

Much literature pertaining to libraries and collaborations presents examples from large academic libraries. This study, on the other hand, sought to explore whether parallel collaborations existed between medium-sized academic libraries and student service units — in other words, if many academic libraries like the researchers' home institution's (McIntyre Library at the University of Wisconsin – Eau Claire) had invested on a large scale in an information literacy commons experiment or if this was unique to larger libraries.

Methodology

Selection of Participating Libraries

The Carnegie List of Classification supplied the names of 219 academic libraries that met the criteria for a four-year medium-sized academic library (M4): not-for-profit at either a public or a private university. Libraries that were for-profit were not included. Researchers contacted two individuals from each library: the director or dean of the library and a reference or information literacy librarian to total 406 surveyed participants.

Design of the Survey Instrument

The survey was comprised of three parts to help researchers get a better picture of libraries and how they collaborate. Part One contained two sections. The first determined determines whether or not libraries had participated in any form of collaboration (information literacy could be a component, but for this section it was not required). This section asked participants to name who they were collaborating with and the length of the

collaboration. The next section determined whether or not the libraries engaged in information literacy

collaborations. Again, this section also asked about who they were collaborating with and the length of the

collaboration. Part Two of the survey inquired about how libraries evaluated their collaborative ventures. The first

tract pertained to libraries that completed formal assessment measures and the second tract pertained to libraries that

only completed informal assessment. In both of these tracts, researchers asked if librarians felt that collaborations

were successful and whether they felt the students and faculty involved felt the collaborations were successful. The

end of Part Two inquired as to whether or not the collaboration would continue. Part Three gathered non-identifying

demographic information about the academic libraries.

Distribution of the Survey Instrument

Researchers distributed the survey using *Qualtrics*, an online survey software. The *Qualtrics* survey

software allowed researchers to craft questions that were multi-faceted and gather data on not only who libraries

were collaborating with, but how long they were collaborating with particular organizations. *Qualtrics* also enabled

researchers to ask questions that would allow the respondents to rank their collaborations in comparison to one

another by simply dropping and dragging. Finally, *Qualtrics* enabled researchers to divide the survey into the

previously described sections in order to aptly determine who was collaborating, how they were collaborating and if

formal assessment was involved.

On-Site Focus Groups

Researchers also conducted two site visits to speak first hand with librarians and library directors at

libraries that fit the same size criteria as the survey. The questions asked in focus group were similar to the survey.

The focus group questions yielded similar results and offered anecdotal evidence to support some of the trends

apparent in the survey data.

Results

The survey brought back 132 usable responses from academic libraries across the United States. Responses

were considered unusable when participants were on the online survey for less than one minute or only answered the

first question. The margin of error is $\pm 4.9\%$.

The results show that academic libraries of small to medium size are collaborating. When asked if they

participated in collaboration, 83% said yes and 17% said no. When asked if the library had engaged in some sort of

collaboration with student service units, some of the top-ranked organizations included (highest to lowest) computer/technology support, writing centers, and the tutoring/academic skills center. Lowest was financial aid.

Further, academic libraries are also participating in collaborations that promote information literacy initiatives. These collaborations have a component of information literacy that could include: workshops, course-integrated events, or web-based interactive guides. The results showed when asked if they were participating in a collaboration that involved information literacy, 84% said yes and 16% said no. When asked if the library engaged in information literacy instruction as a part of the collaboration, some of the top-ranked organizations included (highest to lowest) academic affairs, international studies, and the writing center. Lowest ranking (highest to lowest) were counseling services and financial aid.

When it came to assessment of the collaborative efforts, 48% did some sort of formal evaluation and 52% used informal evaluation methods. Of those who completed formal evaluation 100% said their main collaboration(s) would continue. Of those who used informal evaluation 93% said their main collaboration(s) would continue and 7% said maybe.

In the focus groups, it was apparent that librarians were interested in reaching students in new ways. Researchers visited two libraries and spoke with two librarians and one library director. Each visit provided unique insights into libraries and how they reach out to students. Collaborations varied in how formal they were and whether or not they would continue year to year. For Library A, some of the longest standing collaborations now have a librarian embedded into the program. In the less formal collaborations such as the one they have with the art department, there isn't a librarian directly answering research questions or teaching. Instead, the physical library is acting as a host in the form of space for students to display their latest artwork (both throughout the library and in a gallery near the entrance).

In the case of Library B, one of their collaborations is with the residence halls on campus. Each residence hall has a librarian. This librarian offers office hours as well as makes sure students are aware of library events and services. Each librarian approaches their work with the halls differently, but so far it seems to help make students more comfortable with the library in general and gives them someone specific to contact when they have a question. Visiting these two libraries and talking with librarians added much depth to the conversation. It is clear that libraries, even smaller ones, are doing whatever they can to reach students. Often, these efforts involve collaborating with other entities on campus and going beyond simply working with academic departments.

Conclusion

Academic libraries are indeed collaborating with student service units. The academic libraries that are collaborating at a basic level are participating in collaborations that were commonly mentioned across the literature review. However, due to the nature of the survey, researchers do not know the scope of these collaborations, yet many of the general collaborations have existed for quite a long time. Academic library collaborations with student service units often involve some sort of information literacy initiative. The current survey did reinforce the importance of assessing collaborative ventures. It is apparent that small-medium sized academic libraries are collaborating. Most importantly, their collaborations go beyond traditional departmental collaborations. Additional research on the nature of these collaborative endeavors could be very helpful, specifically on *how* small-medium sized academic libraries are incorporating information literacy initiatives and with whom they continue to collaborate.

References

Association of College & Research Libraries. 2007. "Information Literacy Competency Standards for Higher Education." *American Library Association*. www.ala.org/acrl/standards/informationliteracycompetency.

Gayton, Jeffrey T. 2008. "Academic Libraries: "Social" or "Communal?" The Nature and Future of Academic Libraries." *Journal of Academic Librarianship* 34 (1): 60-66.

Love, Emily, and Margaret B. Edwards. 2009. "Forging Inroads Between Libraries and Academic, Multicultural and Student Services." *Reference Services Review* 37 (1): 20-29.

Swartz, Pauline S., Brian A. Carlisle, and E. Chisato Uyeki. 2007. "Libraries and Student Affairs: Partners for Student Success." *Reference Services Review* 35 (1): 109-122.

Attraction and Attractiveness in Male-Female Dyads

By: Heather A. Williquette (Year of Graduation: 2015)

Advisor: April Bleske-Rechek, Psychology

Abstract

To investigate asymmetries in opposite-sex friends' attractiveness and attraction, researchers approached, surveyed, and photographed 77 male-female dyads (friends as well as romantic couples) in a high-traffic lounging area. In this naturally-occurring sample, attraction between opposite-sex friends varied widely and was not mutual, whereas attraction between romantic partners was consistently strong and mutual. Contrary to expectation, men did not report more attraction on average to their opposite-sex friend than women, and naïve judges did not rate females in friendships as more attractive than males in friendships. However, both men and women rated their opposite-sex friends as more attractive than their friend rated him/herself and far more attractive than outside judges rated their friend, a pattern observed among dating partners as well. Researchers conclude that attraction in opposite-sex friends is common but not mutual; participants' biased perceptions of their friend's attractiveness suggests that both men and women befriend those whom they deem potential mates.

Introduction

Compared to same-sex friendships and romantic relationships, opposite-sex friendships are a historical novelty unique to western societies (O'Meara 1989). Opposite-sex friendships are especially common among college students (Kaplan and Keys 1997) and are similar to, but also different from, both same-sex friendships and romantic relationships (Afifi and Faulkner 2000). In the current study, researchers investigated the roles of attraction and attractiveness in understanding the unique dynamics of opposite-sex friendships.

Previous research on opposite-sex friendships suggests they share much in common with same-sex friendships. For example, both same-sex and opposite-sex friendships are voluntary relationships that provide support and companionship (Bleske and Buss 2000). However, one unique aspect to opposite-sex friendships, relative to same-sex friendships, is the potential for romance. Are opposite-sex friends, then, more comparable to romantically involved couples? Indeed, romantic relationships and many opposite-sex friendships frequently involve feelings of romantic and sexual attraction, despite the latter pair calling themselves "just friends" (Kaplan and Keys 1997; Bleske and Buss 2000; Bleske-Rechek et al. 2012). One of the unique challenges in opposite-sex friendships, according to O'Meara (1989), is convincing others of the "true" platonic nature of the relationship. The risk of

sexual contact can be high (Bleske-Rechek et al. 2012). Sometimes, men and women in opposite-sex friendships end their friendship because of disparate romantic intent (Bleske-Rechek and Buss 2001).

In accordance with men's greater interest in short-term mating relative to women's, men appear to perceive opposite-sex friendships as sexual opportunities more than women do (Bleske-Rechek et al. 2012). For example, men are more likely than women to report having had sex with a friend who was interested in them (Bleske and Buss 2000). Men also are more likely to consider sexual access to their opposite-sex friends more beneficial to the friendship than women are (Bleske and Buss 2000) and men but not women also over-perceive their friend's sexual interest (Bleske-Rechek et al. 2012; Koenig 2007). Afifi and Faulkner (2000) conducted a study on sexual relations between opposite-sex friends and found over half of them to have reported initiation of some kind of intimate activity with their friend. It is a common finding that men feel more attraction toward their female friend than women do toward their male friend (Bleske-Rechek et al. 2012; Kaplan & Keys 1997; Koenig et al. 2007). They also prefer attractiveness in a female friend more than women do in a male friend (Bleske-Rechek and Buss 2001). Also, whereas men rate long-term romantic potential as one of the ten ideal characteristics in an opposite-sex friendship, women rate the *absence* of long-term romantic potential as one of the ten ideal characteristics in an opposite-sex friendship (Bleske and Buss 2000).

Because men prioritize attractiveness in opposite sex friends more than women, and because men view the potential for sexual opportunity in opposite-sex friendships more positively than women (Bleske-Rechek and Buss 2001), it is possible that men befriend those whom they find attractive more than women do. If this is the case, then in opposite-sex friendships, the female partners might be objectively more attractive than their male partners.

Previous studies (Afifi and Faulkner 2000; Bleske and Buss 2000; Bleske-Rechek et al. 2012; Kaplan and Keys 1997) have not determined whether sex differences in attraction are due to discrepancies in men's and women's attractiveness. In previous research on opposite-sex friendships, men and women were asked to think about and then report on attraction toward a specific friend, or they were asked to bring a specific opposite-sex friend to the lab. In doing this, the possibility that men and women provide different reports for the type of person who comes to mind when they think of "opposite-sex friend" cannot be controlled. Men may think of their most attractive female friend, and women may think of their most reliable male friend. In the current study, researchers approached male-female dyads interacting in their natural environment. This allowed for the simultaneous elimination of self-selection bias and the assessment of male-female friends in a naturally occurring state.

The aim of the current research was to replicate the previously-documented sex difference in attraction toward opposite-sex friends and determine whether that sex difference in attraction is explained by discrepant levels of attractiveness (as evaluated by self and outside judges). By approaching male-female dyads in a high-traffic university cafeteria, researchers obtained a naturally-occurring sample of opposite-sex friends and romantic couples for comparison.

Method

Participants

Participants were 77 male (M_{age} = 19.61, SD = 1.28) and 77 female (M_{age} = 19.40, SD = 1.22) undergraduate students enrolled at a large public university in the midwestern United States. Participants were male-female dyads, 37 of whom reported being romantically involved and 40 of whom reported being opposite-sex friends. (Researchers did not include eight dyads that were: family members (2), homosexual (2), or had discrepant views on the status of their relationship (4).) The majority of participants were Caucasian, mirroring the ethnic representation of the student population.

Materials

The questionnaire included a few filler items and data validation checks that were not analyzed. For example, participants rated their partner's personality and confidence levels. Each member of the dyad also reported how they had met, how long they had known each other, how often they spent time together, and the status of their relationship. Researchers retained for analysis dyads whose responses about the status of their relationship concurred. The main objective was to measure attraction and perceptions of attractiveness among the men and women in both types of dyads – friends and couples.

Attractiveness. Participants rated their own physical attractiveness compared to others of their age and sex, and their partner's physical attractiveness compared to others of their age and sex. Participants provided their responses on a seven-point scale ranging from *Much less attractive* to *Much more attractive*.

Attraction. Participants reported their level of attraction toward their partner. The seven-point response scale ranged from *Not at all attracted* to *Moderately attracted* to *Extremely attracted*.

Procedure

Initial data collection. A male-female team of researchers visited the univeristy student union on multiple weekdays. The team approached each prospective male-female dyad and, upon telling the dyad they were

conducting research on male-female pairs, asked if they would each be willing to seperately complete a brief paper and pencil questionnaire about themselves and their partnership. Upon completion of the questionnaire, researchers asked permisson to take the dyad's photo and have it judged for research purposes only. All dyads consented. Students were given candy in appreciation after the photo and survey were completed.

Photo ratings. Upon the completion of data collection, researchers cropped each photo so the man and woman in each dyad were split into two separate pictures. Researchers then placed the photos into slideshows. In one slideshow, all the women were presented and then the men; in a second slideshow, the men were presented before the women in exact reverse order from the previous slideshow. A total of 71 (28 male and 43 female) traditional-aged college students from another university served as judges. Each judge was randomly assigned to one of the two slideshows. Each judge viewed each picture for 5 seconds and used paper slips to rate the physical attractiveness of each individual, relative to their same-sex same-age peers on a seven-point scale ranging from *Much Less Attractive* to *Much More Attractive*. Judges did not know they were rating men and women who were in friendships or relationships. Judges' ratings were highly reliable, $\alpha = .98$.

Results

Researchers ran various analyses (Paired Sampes T-Tests, Descriptive Statistics) to test the variables of self-perceived attractiveness, perceived attractiveness of partner, and outsiders' perceptions of partner's attractiveness, as well as the rated level of attraction among men and women in both opposite-sex friendships and romantic relationships.
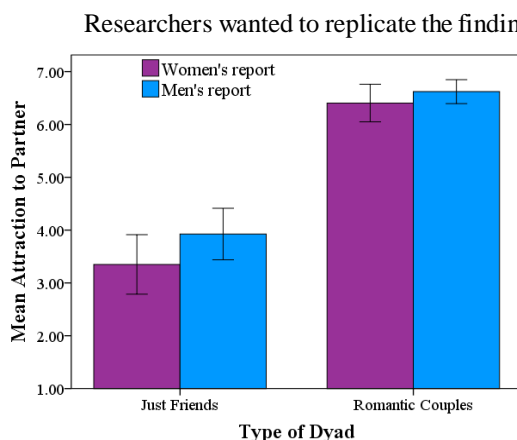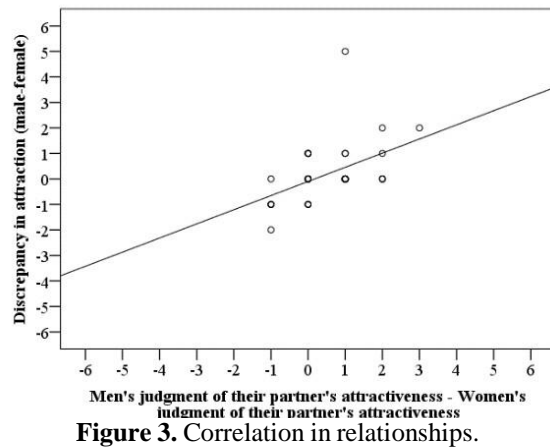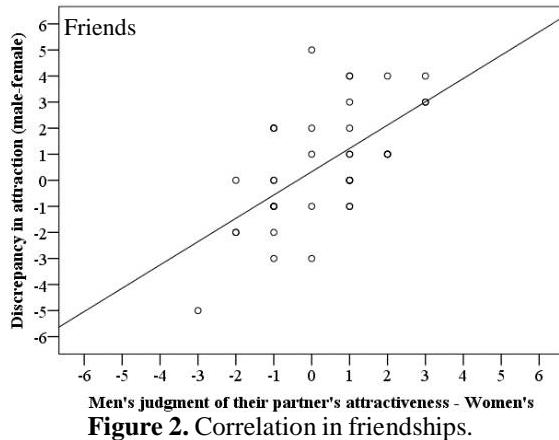
Researchers wanted to replicate the finding that men in opposite-sex friendships are more attracted to their female friend than women are to their male friend. However, men did not report significantly more attraction to their female friend than women did to their male friend, $t(39) = -1.64$, $p = .109$, $d = -.26$. Overall, men's and women's attraction to their opposite-sex friend varied widely. Researchers speculate this is due in part to obtaining a sample of naturally-occurring dyads, and thus it is a more realistic estimate of attraction between opposite-sex friends. In romantic couples, attraction between men and women was consistently high and mutual, $t(36) = -1.14$, $p = .264$, $d = -0.19$.

Figure 1. Participants' reported attraction to their partner.

Moreover, in opposite-sex men's attraction to their female friend and women's attraction to their male friend were not correlated, $r(40) = .10$, $p = .556$. This means that in friendship pairs, one friend's attraction to their partner did not predict their partner's attraction toward them.

Researchers did find that attraction to one's partner is predicted by the perceived physical attractiveness of one's partner. In the friendship pairs, both men's and women's perceptions of how physically attractive their partner is correlated positively with how physically attracted they reported being to their partner (Women: $r(40) = .66$, $p < .001$. Men: $r(40) = .70$, $p < .001$) and the same trend showed in romantic partners (Women: $r(37) = .41$, $p = .011$. Men: $r(37) = .66$, $p < .001$). The two scatterplots on the left show that as a consequence of how attractive men and women rated their parter, it predicted discrepant levels in attraction to their partner. This effect was unique to physical attractiveness. In opposite sex friendships, men's and women's attraction to their partner was not significantly related to their perceptions of their partner's personality (Women: $r(40) = .21$, $p = .187$; men: $r(40) = .30$, $p = .061$) or confidence (Women: $r(40) = .07$, $p = .661$; men: $r(40) = .08$, $p = .621$). Also, in romantic relationships, men's and women's attraction to their partner was not related to their perceptions of their significant other's personality (Women: $r(37) = -.11$, $p = .504$; men: $r(37) = .10$, $p = .565$) or confidence (Women: $r(37) = .20$, $p = .226$; men: $r(37) = .15$, $p = .391$).

Figure 2. Correlation in friendships.

Figure 3. Correlation in relationships.

When rated by outside judges, men and women in opposite-sex friendship pairs were rated as similarly attractive, , $r(40) = .36$, $p = .024$. The similarity for romantic partners is not statistfcally significant, $r(37) = .21$, $p = .217$. This finding suggests that women in opposite-sex friendships and romantic relationships are not objectively more attractive than men are. When men and women in both dyads were asked to rate their partner's physical

attractiveness relativbe to peers of their same age and sex, researchers found that in both opposite sex friendships and
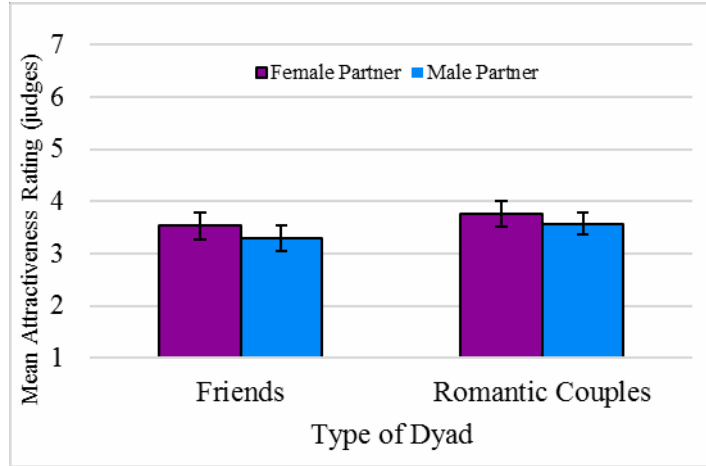

Figure 4. Judges' attractiveness ratings.

dating relationships, men and women held positive illusions about one another's attractiveness. In opposite-sex friendships, men and women gave higher ratings of their friend's attractiveness, relative to what their friend said about themselves and relative to what outside judges said about their friend's attractiveness. Among dating couples, this bias was so strong that participants' perceptions of

their romantic partners' attractivess was not even correlated with outside judges' ratings of their partners' attractieness (Men $r(37) = .08$, $p = .655$; Women $r(37) = .04$, $p = .837$).

Discussion

One objective of the current study was to replicate the finding that men are more attracted than women are to their opposite-sex friends. In past studies of opposite-sex friendship, men and women have been asked to nominate a specific friend to describe or participate with them. In those studies, men have consistently reported more physical and sexual attraction toward their friends than women have However, in natural samples, men did not report significantly more attraction toward their opposite-sex friends than women did; in fact, both men's and women's attraction ratings varied widely. These findings suggest that men's and women's everyday experiences with opposite-sex friends might differ from their mental characterizations of opposite-sex friends. Researchers
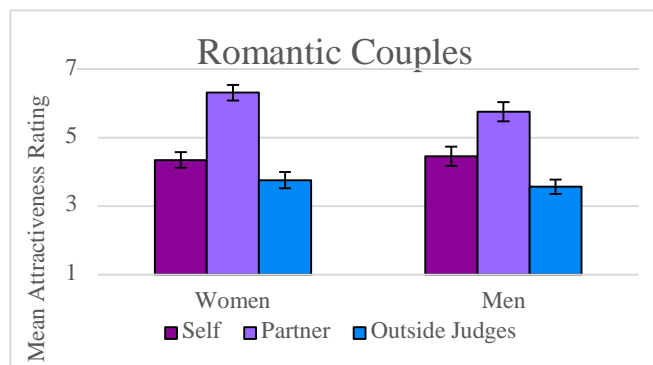

Figure 5. Attractiveness rating for romantic couples.

speculate that men more often mentally define an opposite- sex friend as "a member of the opposite sex to whom I am attracted and would pursue given the opportunity," and women more often mentally define an opposite-sex friend as "a friend of the opposite sex."

Another objective of this research was to determine whether opposite-sex friends are similar in attractiveness and rate their friend as more attractive than their friend

rates themselves. As expected, opposite-sex friends were rated by outside judges as similarly attractive, and both men and women held positive illusions about their friend's attractiveness. In this way, opposite-sex friends are similar to dating couples.

References

Afifi, Walid, and Sandra Faulkner. 2000. "On Being 'Just Friends': The Frequency and Impact of Sexual Activity in Cross-Sex Friendships." *Journal of Social and Personal Relationships* 17 (2): 205-222.

Bleske, April L., and David M. Buss. 2000. "Can Men and Women Be Just Friends?" *Personal Relationships* 7 (4): 131-151.

Bleske-Rechek, April, and David M. Buss. 2001. "Opposite-Sex Friendship: Sex Differences and Similarities in Initiation, Selection, and Dissolution." *Personality and Social Psychology Bulletin* 27 (10): 1310-1323.

Bleske-Rechek, April. L., Mark W. Remiker, and Jonathan P. Baker. 2009. "Similar From the Start: Assortment in Young Adult Dating Couples and Its Link to Relationship Stability Over Time." *Individual Differences Research* 7 (3): 142-158.

Bleske-Rechek, April, Erin Somers, Cierra Micke, Leah Erickson, Lindsay Matteson, Corey Stocco, Brittany Schumacher, and Laura Ritchie. 2012. "Benefit or Burden? Attraction in Cross-Sex Friendship." *Journal of Social and Personal Relationships* 29 (5): 569-596.

Kaplan, Daniel L., and Christopher B. Keys. 1997. "Sex and Relationship Variables as Predictors of Sexual Attraction in Cross-Sex Platonic Friendships Between Young Heterosexual Adults." *Journal of Social and Personal Relationships* 14 (2): 191-206.

Koenig, Bryan L., Lee A. Kirkpatrick, and Timothy Ketelaar. 2007. "Misperception of Sexual and Romantic Interests in Opposite-Sex Friendships: Four Hypotheses." *Personal Relationships* 14 (7): 411-429.

Luo, Shanhong, and Eva C. Klohnen. "Assortative Mating and Marital Quality in Newlyweds: A Couple-Centered Approach." 2005. *Journal of Personality and Social Psychology* 88 (2): 304-326.

O'Meara, J. Donald. 1989. "Cross-Sex Friendship: Four Basic Challenges of an Ignored Relationship." *Sex Roles* 21 (7-8): 525-543.

Penton-Voak, Ian S., Angela Rowe, and Jenna Williams. 2007. "Through Rose-Tinted Glasses: Relationship Satisfaction and Representations of Partners' Facial Attractiveness." *Journal of Evolutionary Psychology* 5 (1-4): 169-181.

Prichard, Ivanka, Janet Polivy, Véronique Provencher, C. Peter Herman, Marika Tiggemann, and Kathleen Cloutier. "Brides and Young Couples: Partners' Weight, Weight Change, and Perceptions of Attractiveness." 2014. *Journal of Social and Personal Relationships* 32 (2): 263-278.

Analysis of Top US Orchestra Excerpts and Auditions for Violoncello

By: **Kaitlyn Witherspoon (Year of Graduation: 2015)**

Advisor: Tulio Rondón, Music and Theatre Arts

The violoncello, commonly abbreviated cello, is an instrument of the strings family that originated from Bologna, Italy during the sixteenth century.[1] It has four strings tuned in perfect fifth intervals and a range of four octaves: two octaves below a piano middle C to two octaves above. Music for the cello is written most commonly in bass clef, but also can be written in tenor and treble clef. Music written for the cello includes solos, accompaniments, chamber ensembles, and orchestral arrangements.

Some of the most popular original luthiers, people skilled in building stringed instruments, include Andrea Amati (1505-1578), Andrea Guarneri (1606-1698), and Antonio Stradivari (1644-1737).[2] Stradivari in particular is known for making significant improvements to the style and quality of the cello. The cello received its official appellation in the seventeenth century and finally became well known in the eighteenth century when the instrument's popularity expanded past the boundaries of Italy.[3] It quickly became one of the most popular string instruments and was used as an accompanying instrument; it also appeared in solo, chamber, and orchestral music.[4]

Before the cello could become widely used, it had some competition from other instruments. The viola da gamba, which translates to viol of the legs, was a very popular instrument before the cello appeared. Because the gamba was so loved, the superiority of the cello had to be shown. The style and body of the cello allowed the sound to resonate and project louder and further, making it a better instrument to play in larger ensembles or in bigger concert halls.[5] This ability of the cello to produce a larger sound was the edge the cello needed to become favored over the viola da gamba.

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[1] Joan Peyser, *The Orchestra: Origins and Transformations* (New York: Charles Scribner's Son, 1986).

[2] Robin Stowell, *The Cambridge Companion to the Cello* (Cambridge: Cambridge University Press, 1999).

[3] Elizabeth Cowling, *The Cello* (New York: Charles Scribner's Sons, 1975).

[4] J. Peter Burkholder and Claude V. Palisca, *Norton Anthology of Western Music* (New York: W. W. Norton & Company, 2010).

[5] Peyser, *The Orchestra*.

The cello that overpowered the viola da gamba is different from the cello that people know today. Modifications to the cello occurred over time in order to create an instrument that would produce a better sound. While there are set sizes for cellos today that include ½, ¾, and full size, there were no set sizes at first.[6] Having no standard size meant that every luthier's cello production was different and a person seeking to procure a cello would have to find a luthier that catered to the size they wanted. Acquiring a cello in a size that one wanted became much more simple once sizes were set. However, luthiers would sometimes make small alterations to the build of a cello in accordance with a person's wishes. These alterations could be to increase or decrease the height, width, or fingerboard width of the cello body.

A second modification to the cello was a change in the standard number of strings. Competing with the viola da gamba, an instrument with six or seven strings, it was likely that cellos originally had more strings as well. However, since the instrument's strings were tuned differently than the gamba strings, it was soon found that four strings would be sufficient to cover the range the cello needed.

A third modification to the cello was done on the type of strings it used. Originally, strings were made out of sheep guts, the same strings as a viola da gamba. However, it was soon clear that these did not provide enough sound. A gradual switch to metal strings allowed the cello's sound to amplify and carry much further.[7] These metal strings were both louder and stronger. Another benefit to metal strings is that they stay in tune longer and allow musicians to play much lengthier works.

A fourth modification was the addition of the endpin. Initially, the cello was held and suspended between a player's legs. This was not comfortable, and one's legs would get tired after holding a cello for a long period of time. The endpin was added as a spike that would extend from the base of the cello to the ground, which allowed a performer to simply put their legs on either side of the instrument.[8] This allowed players to worry less about holding the instrument and more on technique. Additionally, a performer could play longer works since their legs did not get tired.

One last modification to the cello was the change in construction of the bow. Initially, the cello bow was

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[6] Daniel Koury, *Orchestral Performance Practices in the Nineteenth Century* (Ann Arbor, MI: UMI Research Press, 1986).

[7] Cowling, *The Cello*.

[8] Ibid.

similar to the viola da gamba bow. The wood from the bow was shaped so it curved outward in a convex fashion away from the bow hair. This caused the ends of the bow to have little power and control. Another downside to this shape was that the balance point, the place where a player is supposed to hold the bow, was roughly one-fourth of the way through the bow, which made it much harder to utilize the entire bow while playing. Bow makers flipped the wood part of the bow so that the wood was concave and curved inward toward the bow hair .[9] This allowed the performer to have more power and control over the tip and base of the bow, which gave them more ability to create different articulations. This style of bow also made the base of the bow heavier, moving the balance point nearer the base so the entirety of the bow hair could be used while playing.

Each of these modifications has allowed the cello to thrive throughout its existence. While the cello itself was being modified over the course of time, new performance techniques were also developed. Two of the most important musicians who developed new performance techniques for the cello are Franciscello (1691-1739) and the Duport brothers (1700-1800's).[10] Modifications to the construction of the cello offered performers an improved instrument to play. However, with such an array of new improvements and capabilities, it was necessary to instill players with technical skills so they would be able to play new and demanding compositions.

Franciscello developed a new technique for holding the bow. Instead of holding it from beneath, a player now held the bow from above to allow better control as well as to create weight from the arm, which allowed the bow to have better contact with the strings of the cello.[11] Franciscello is also known for developing thumb position as a left hand technique.[12] Previously, cellists had used only four fingers of their left hand to play music. This sometimes was limiting when the range of a melody required another finger or position. The thumb also serves as an anchor for the hand, meaning one can rely on the position of the thumb to know where one is located on less familiar parts of the cello's range. The ability to use the thumb allowed cellists to play harder passages with more ease.

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[9] Koury, *Orchestral Performance Practices.*

[10] Antony Hopkins, *Sounds of the Orchestra* (New York: Oxford University Press, 1993).

[11] Ibid.

[12] Wilhelm J. Wasielewski, "Cello Playing in 18th Century Italy," *Internet Cello Society*, accessed August 12, 2014, http://www.cello.org/heaven/wasiel/18italy.htm.

The Duport brothers were another force that expanded cello performance techniques.[13] Both brothers were cellists who published books with different studies for cello. Each study was geared towards teaching a player a different kind of technique. These techniques included learning difficult key signatures, rhythm exercises, shifting, bow articulation, and bow control. Although the Duport brothers expanded on the techniques of Franciscello, there were also many others who participated in the expansion of technique for the cello.

While the cello was developing through new methods of production and technique, ensembles were evolving to become the modern orchestra. Renaissance ensembles were the first to emerge. These ensembles allowed any sort of instrumentation or number of instruments, since the music had few specific guidelines.[14] This allowed great variability in the sound of the composition. If a melody was played by a viola da gamba, it would have sounded much different than a trumpet.

The Baroque orchestra emerged next. This ensemble was still not instrument specific, but it varied from Renaissance ensembles in that there were a specific number of musical parts.[15] The different forms of instruments commonly found in this ensemble were strings, winds, and a basso continuo voice, which was typically played on a harpsichord and/or cello. This was one step in the process that began to create the uniformity that composers desire when their music is performed.

Other forms of more uniform ensembles were also very popular around this time. Ensembles formed with groups of multiple people playing the same instrument within different ranges.[16] One composer who commonly wrote for this kind of ensemble was Antonio Vivaldi, who wrote music for large groups of violin players. Vivaldi worked at the Ospedale della Pietà, an orphanage for young girls, many of whom were well-trained musicians.[17] This kind of ensemble is the origin of the idea of having multiple similar instruments playing similar and different

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[13] Ibid.

[14] John Spitzer and Neal Zaslaw, *Birth of the Orchestra* (New York: Oxford University Press, 2004).

[15] Ibid.

[16] Ibid.

[17] Michael Talbot, "Vivaldi, Antonio." *Oxford Music Online*, last modified October 20, 2006, accessed December 16, 2014, http://www.oxfordmusiconline.com/subscriber/article/grove/music/40120.

parts.

Another ensemble that led to the creation of the orchestra is what Spitzer and Zaslaw call a "nested" ensemble. This ensemble is the formation of multiple separate ensembles within one.[18] Each person still plays his or her own part and is supported by other instruments that provide another part of the texture, whether it be the harmony or melody.

Finally, the orchestra emerges when musicians play the same instrument and one part. The different sections of the orchestra include strings, winds, brass, and percussion. Each section and groups within sections have their own role. The low strings and brass most often convey harmony while the winds and upper strings provide the melody. The percussion provides timbral effects that enhance parts of the music. These instruments also have the ability to create dynamics and different articulations. Sections allow for a more blended sound and a better balance among instruments. Over the course of time, the orchestra has grown in size to create the full sound that composers desire for large symphonic works.[19]

Each instrument in the orchestra reflects a different voice. The cello's role is specific, but it has developed greatly since the origination of the full orchestra. The cello is a bass and tenor voice, usually conveying the harmony and direction of the music.[20] The basses have the ability to control both pitch and tempo.[21] Instruments tune to the harmony, so the bass voice has an important task of keeping the intonation. The bass voice also usually has the steadiest rhythm, so they are responsible for keeping the tempo consistent. Another important role of the cello is to connect the low strings to the high strings. The range between the upright bass and the violas and violins is wide. Without the cello, these instruments would not be able to blend well. The cello connects the range of the bass and viola, eliminating the gap between the voices.

There are distinct roles within the cello section itself. The principal cellist is the leader of the section who decides which fingerings and bowings to apply to the music. This person has artistic responsibility for the whole section and sits in the front of the section. This person is also unique because it is their responsibility to play any

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[18] Spitzer and Neal, *Birth of the Orchestra*.

[19] Burkholder and Palisca, *Norton Anthology of Western Music*.

[20] Ibid.

[21] Koury, *Orchestral Performance Practices*.

written cello solos. The principal cellist's stand partner is called the co-principal. This cellist is the second-in-command of the section. If the principal is unable to be present, the co-principal takes over the section. This person must still look to the principal cellist for artistic ideas and must be ready to play the principal's solo parts if necessary. The rest of the section is called the tutti. These players are all equal and must all follow the principal's ideas for fingerings, bowings, and phrasing.[22] This hierarchy is present within each of the string sections of an orchestra and is very important in order to retain the blended sound of an orchestra.

To obtain a position in an orchestra, one must be willing to go through an arduous process. When orchestras first emerged, it was typical for a person to simply get a seat by knowing the right people or by being a famous performer.[23] There would have been no announcement that the seat was open and no way of knowing how to apply for an audition. Today, the process has changed to be fairer. An individual who desires to play in an orchestra should always stay informed for current openings, which are rare and typically only happen when a member has retired or died.[24] Openings are now publicized in newspapers or on orchestra websites.

To apply for an audition, one must first find out about an opening and inquire about the requirements. Usually an orchestra will want a copy of a resume as well as a preliminary screening recording to see if an individual is worthy of receiving a live audition. The recording will include multiple orchestra excerpts as well as one or two solo works. If a person is one of the more qualified candidates, they will be invited to a blind round. This audition is in person. However, there are many factors that ensure that each candidate receives a fair treatment. The judges cannot see each other and cannot see the candidate. Carpet is laid on the floor to eliminate the knowledge of whether the candidate is male or female. These factors stop judges from influencing others' decisions and also remove sex or race bias. If an applicant makes it past the blind round, they will be invited to audition again in the semi-final round. Finally, if they make it past the semi-final round, they will be asked to be a finalist.[25] The final

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[22] Norman Del Mar, *Anatomy of the Orchestra* (Los Angeles: University of California Press, 1981).

[23] Claudia Goldin and Cecilia Rouse, "Orchestrating Impartiality: The Impact of 'Blind' Auditions on Female Musicians," *The American Economic Review* 90 (2000): 715-41, accessed July 8, 2014, http://www.jstor.org/stable/117305.

[24] Jutta Allmendinger, J. Richard Hackman, and Erin V. Lehman, "Life and Work in Symphony Orchestras," *The Musical Quarterly* 80 (1996): 194-219, accessed June 12, 2014, http://www.jstor.org/stable/742362.

[25] Goldin and Rouse, "Orchestrating Impartiality."

round is usually between only two candidates. Each round is more difficult and requires more perfection and a higher level of skill. There may be thousands of people who send in audition recordings, but only one person will receive the spot.

The orchestras and excerpts chosen for this research are listed in the charts below. The orchestras are not listed in any specific order, but they are some of the most prominent in the United States, chosen because of their national recognition, concerts per season, and average salary per member. The excerpts listed are ten of the most common required for auditions. Listed next to each piece is the composer and the year it was written. These excerpts are listed and analyzed chronologically to emphasize the changing role of the cello throughout time. Though these are not the most commonly played pieces in an orchestra's repertoire, the excerpts are important because they cover different time periods and styles. It is intended that this research will be of aid to cellists who aspire to play in an orchestra as they prepare their audition.

Orchestras
Chicago Symphony
New York Philharmonic
Los Angeles Philharmonic
San Francisco Symphony
Boston Symphony
Cleveland Symphony
Minnesota Orchestra
Cincinnati Symphony
Philadelphia Orchestra
National Symphony

Excerpts	Composer, Composition Date
Symphony No. 35	W. A. Mozart, 1782
Symphony No. 5	L. v. Beethoven, 1808
Symphony No. 9	L. v. Beethoven, 1824
A Midsummer Night's Dream	F. Mendelssohn, 1842
Symphony No. 2	J. Brahms, 1877
Symphony No. 4	P. I. Tchaikovsky, 1878
Symphony No. 3	J. Brahms, 1883
Don Juan	R. Strauss, 1888
Eil Heldenleben	R. Strauss, 1898
La Mer	C. Debussy, 1905

Analyses of the following excerpts are color coded to help direct the reader's eye to specific techniques. Some techniques, such as intonation, are necessary all the time; however, specific sections are highlighted where these techniques are more difficult. The techniques and the respective colors are listed below.

Red   – dynamics   Blue   – bow control

Orange   – intonation   Pink   – articulation

Yellow   – rhythm   Purple   – tempo

Green   – clarity   Black   – phrasing

Mozart – *Symphony No. 35,* mov. 4, measures 134-181

Wolfgang Amadeus Mozart (1756-1791) was a composer during the Classical Era, which ranged roughly from 1750-1825. In this period, the common belief was that music was supposed to lift one's spirits. As a result, the features of the music include clear texture, light and upbeat articulation, short melodies, and an increased interest in the use of dynamics.[26]

27

This excerpt includes many of the stylistic features of the Classical Period, and it is important to focus on these qualities. First, the section outlined in green tests the ability to play a passage clearly while playing smoothly with the bow, yet articulated in the fingers. Because the bow is not able to articulate each note, the challenge is to

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[26] Burkholder and Palisca, *Norton Anthology of Western Music*.

[27] Wolfgang Amadeus Mozart, *Symphony 35. Wolfgang Amadeus Mozart-Orchesterwerke*, series 4 (Kassel, Germany: Barenreiter, 1970), 145-164.

articulate each note with the left hand by placing each finger down clearly. A player runs the possibility of creating a muddy sound where the notes are not discernable. The second two areas marked in green require clarity, which is done by the proper bow stroke. The bow stroke desired for this passage would be détaché, which is a separated stroke that is neither completely legato (connected) nor staccato (short and bouncy). This détaché bow stroke provides a sound that is light and upbeat, creating a clear texture that allows other sounds of the orchestra to be evident while still conveying the harmony.

The next feature, outlined in red, is the use of dynamics. In the score, the only markings are *piano* (soft), *forte* (loud), and *sforzando* (suddenly loud and then less). There are no gradual markings such as crescendos and decrescendos, but instead the dynamics look rather abrupt. While this is true in most cases, measures 172-176 implicate a fast-moving harmonic progression. Though there are no dynamics written in, it is expected that there would be a slight crescendo through the passage in order to lead to and emphasize the resolution on the A-natural in

measure 176.

Another feature is the articulation markings, which are marked in pink. Some of these notes are placed without the context of other notes, and because of this it is often difficult to make meaning out of them. In this case, it is important to look at the melody line, which is in the violins, and determine how to shape the cello part to fit with the violin part. When looking at the violin part, it is clear that the melody moves up in pitch to a resolution on A. The upward motion would indicate a slight crescendo, similar to the cellos in the section mentioned before in red. To support the violins, the cello part should slightly crescendo from measure 143 to the downbeat of measure 145. The staccatos marked are also important to articulate correctly. Because they occur either after a slur or a legato idea, the quick switch to a short bouncy bow is difficult without preparation.

Lastly, the feature marked in orange represents the technical difficulty of playing octaves. This kind of passage is very challenging because it requires perfect intonation. If the cello is not completely in tune here, it will

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[28] Mozart, *Symphony 35*.

be very obvious. Octaves are also difficult because the range is so large that most people have to play this interval in

thumb position, with the thumb on the bottom note and third finger on the top note of the octave. This excerpt

incorporates each of these features and requires the player to perfect their left hand dexterity, bow articulation,

dynamics, and knowledge of harmony.

Beethoven – *Symphony No. 5*, mov. 2, measures 1-10, 50-59, 98-106, 114-123

Ludwig van Beethoven (1770-1827) was a composer during the late Classical and early Romantic Periods.

The second movement of his Fifth Symphony is a theme and variations movement. This means that Beethoven

created an initial melody that he then developed in different ways. The melody is introduced at the beginning and

with each return it is embellished differently. In the excerpt shown below, the top line is the initial theme, the second

line is the first variation, the third line is the second variation, and the last two lines are the third variation. The

cellos and violas first state the original melody, also called the theme.

29

The section of the theme outlined in yellow highlights the importance of keeping the rhythm extremely

precise. The shortest rhythmical value in this section is thirty-second notes, so it would be wise for a musician to

subdivide thirty-second notes while playing the longer notes in order to keep the rhythm exact. The marking of this

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29 Ludwig van Beethoven, *Symphonien, Nr. 5: Ludwig van Beethoven's werke* (Leipzig, Germany: Breitkopf & Härtel, 1862), 22-36.

melody is *dolce*, which translates to mean sweet. This, with the addition of the *piano* marking, is used to create a lullaby-like sound.

Marked in red are the dynamic markings Beethoven used. Looking throughout his music, it is evident Beethoven enjoyed using sudden dynamics. As such, each dynamic marking should be a sudden contrast to whatever dynamic came before.

The section marked in black is part of the first variation and highlights the technical problem of shifting over slurs. Often when a player shifts, there is a small glissando between positions. A glissando is the slide from one pitch to another. An additional problem that can occur while shifting is an overcompensation of the bow. If the bow stops to eliminate the sound of a glissando, there is a gap of silence between notes. This is problematic because the phrase needs to remain fluid.

The next variation incorporates a new technical challenge which is outlined in blue. Most of this variation requires string crossings for every note. This means that the bow is constantly switching between a higher and lower string. It is important that there is no break between string crossings and that the melody does not sound jerky. One difficulty about this excerpt in general is the phrasing of each variation. Though the slur markings cover each measure separately, it is important that a player keeps the phrase leading throughout the whole variation instead of playing each measure as an individual idea. These variations are supposed to be long, smooth, and elegant lines, and breaking the phrasing would ruin the effect Beethoven desired.

The third variation is unique because it has a grace note marked in pink. This note should be played as part of the melody. To make it important enough, the weight should be stronger than that of the note it is slurred to. Another difficulty with this excerpt is keeping a steady tempo throughout each excerpt. Each variation becomes more active with the notes being shorter and faster. To emphasize the difference among each variation, especially the first and last, it is important to keep the tempo steady so an audience can find the differences among each variation.

Beethoven – *Symphony No. 9,* mov. 4, measures 1-96

30

The most important aspects of this excerpt of Beethoven's *Ninth Symphony* have been selected and shown above.

Similar to the excerpt of his *Fifth Symphony* above, Beethoven enjoys the use of sudden dynamics, which are

outlined in red. The beginning of this movement starts with the cellos and basses playing a strong, resolute melody

marked *forte*. Marked in pink is the articulation, which should be long and smooth through the use of lots of bow

and speed. This is starkly contrasted by the sudden staccato markings outlined in blue. This staccato means the bow

should bounce off the string to create space between each note. In this case, the staccato does not change the heavy

direct character of the melody line. Beethoven liked to make sudden contrasts in his music, so it is necessary to

emphasize these different articulations.

The next features to pay attention to are the tempo changes marked in purple. Beethoven changes the tempo to

facilitate mood changes between the different sections. Throughout this section of the last movement, Beethoven

takes ideas from the first three movements and condenses and connects them all together. It must be clear that each

section from a previous movement has the same character of its original introduction. The next difficult section in

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[30] Ludwig van Beethoven, *Symphony No. 9 in D minor op. 125. Ludwig Van Beethoven Complete Edition of All His Works* (New York: Edwin F. Kalmus, 1968), 174-276.

this excerpt is outlined in yellow. This rhythm at the *Allegro ma non troppo* is fast and must be completely accurate and unwavering in tempo. These sextuplets are the only steady rhythm throughout this section and as such, other sections must listen to know when to play. If the cello section is not steady, other sections will not enter correctly and the orchestra will fall apart.

Lastly, part of this excerpt, outlined in black, is an important transition between characters, which can also be thought of as the mood. This transition occurs in the measure where the B-natural repeats multiple times. The initial mood is strong and determined, but the music transitions into a quiet and more lethargic cadence. A player would signify this ritardando, or slowing down, as a winding down both in tempo and decreased agitation. A more articulated bow stroke at the beginning of the measure would emphasize each note. As each B-natural is played, it should become less accented and more legato with a long and smooth bow. This gradual bow articulation will help a single repeated note transition into the new character.

Beethoven wrote this symphony with the idea of brotherhood in mind. It is fitting that his idea for society, bringing all of man together as one, is imitated in his music. Beethoven represents this by his amalgamation of each movement into the beginning of the fourth.

Mendelssohn – *A Midsummer Night's Dream*, Scherzo letter C-D

Felix Mendelssohn (1809-1847) was another composer during the Romantic Period. While having a style different from Beethoven, Mendelssohn admired him and sometimes used aspects of his works within his own compositions. His work titled *A Midsummer Night's Dream* is music based off the play by Shakespeare. Mendelssohn's composition represents the characters and scenes within the play. The Scherzo, which is only one movement of the entire piece, is a fast, light, and playful movement.
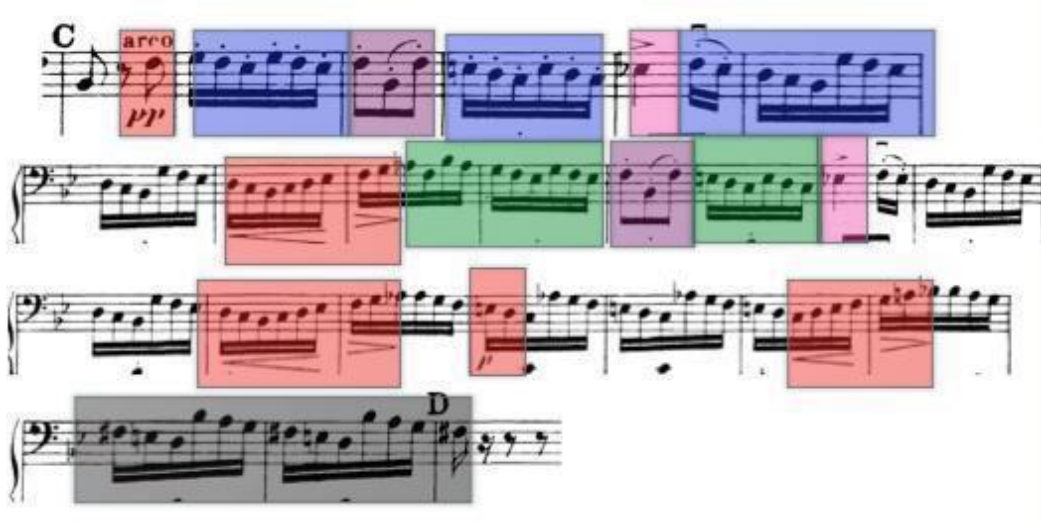
31

Firstly, the dynamic marking starts *pianissimo*, which is very quiet. There are quick hairpin dynamic swells that grow louder and quickly fade back to the initial dynamic, but it should never reach above a *mezzo piano*. The difficulty with this is the diminuendo back to the *pianissimo*. Most often it is easy to crescendo, but it is more difficult to diminuendo completely back to the original dynamic.

Another difficulty of this passage is the staccato section marked in blue. Though the staccato dots are only written for the first few measures, Mendelssohn intends for these dots to appear throughout the entire excerpt. This staccato is light and bouncy, contrasting with the staccato Beethoven uses in his *Ninth Symphony*. This bouncing bow stroke must be the same for each note, with no note longer or louder than the others. To create this staccato *pianissimo*, only part of the hair of the bow should be used, and only a small amount of bow for each note. The contact with the string should be crisp. The section marked in green indicates that even though the notes are no longer notated staccato, this should continue through to keep the character the same as well as keep the passage as clear and crisp as possible.

Next, marked in pink are the sudden accents. These accents should still be in the quiet character of the piece, so they should not be too loud or startling; however, they should stand out from the rest of the passage

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[31] Felix Mendelssohn, *A Midsummer Night's Dream. Felix Mendelssohn Bartholdy's Werke*, series 15 (Germany: Gregg Press Limited, 1967), 55-73.

because of the fast bow speed at the beginning of each note. The entire passage is comprised of sixteenth notes except for the section in purple. In this section, the notes are double the length of the other notes. For these eighth notes, subdivision of sixteenth notes is necessary to keep a solid tempo. Since the sixteenth note is the tempo for the rest of the passage, it is easy to continue counting sixteenth notes while playing the longer eighth notes.

Lastly, at the end of the excerpt, it is necessary to shape the cadence so the end does not seem sudden. This approach to the cadence is marked in black. To shape this approach, the tempo must remain the same. The same scalar idea, starting on B-flat and descending down to D-natural, repeats twice before it cadences, going from the B-flat to the fourth note of the pattern, the F-sharp. Each time this pattern occurs the sound should seem more distant, like it is moving away. Using less bow hair, less bow speed, and a decrescendo the last time the pattern is repeated will accomplish this effect.

Brahms – *Symphony No. 2,* **mov. 2, measures 1-17**

Johannes Brahms (1833-1897) is a composer known for his introspective and emotional works. Similar to Beethoven, his works express hardship and unrequited love. Accordingly, Brahms is another composer who idolized Beethoven's works. This movement of Brahms's *Second Symphony* is an example of a work full of longing and heartache.
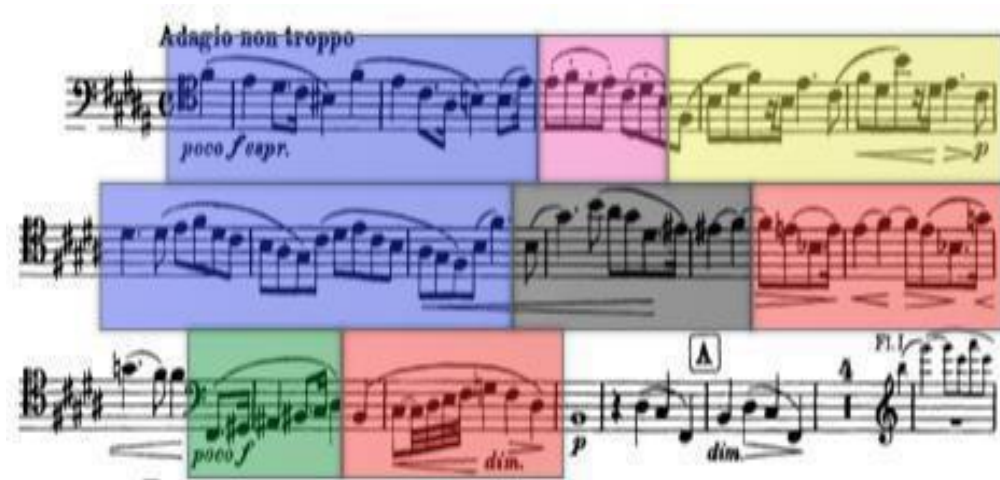
The beginning of this excerpt, marked in blue, is the beginning of the second movement. The cellos are featured with a soli, which is a solo for the entire cello section, with a beautiful harmony provided by the winds. The melody is marked *forte* and *espressivo*, which means both loud and expressive. To accomplish this, it is important to use a lot of bow and vibrato. Vibrato is the slight wavering of pitch by shaking the finger forwards and backwards. Creating a consistent production of sound over these long slurs requires a slow bow speed and the use of the whole bow. The bow speed must remain steady over each note to create this consistent sound.

Marked in pink is a staccato articulation mark. This staccato is different than Beethoven's heavy articulation and Mendelssohn's light playful articulation. This staccato should be a legato bow stroke with a small separation between each note. The rhythm marked in the yellow box is also important to pay attention to. The most crucial notes are right before and after the sixteenth rest. Commonly, a player will see the rest and cut the note before the rest too short in order to prepare for the note that comes after the rest. Instead, a player should subdivide sixteenth notes to account for each beat of the measure, including the dotted eighth on beat three.

Dynamics, shown in red, are very apparent in this excerpt. All dynamic changes are gradual through crescendos or decrescendos. These gradual dynamics are important because they help shape the phrasing shaded in black. For example, the crescendo starting in measure eight leads to the E-sharp on the down beat of measure ten, where the crescendo stops and then immediately a decrescendo begins.

Lastly, the entire excerpt is not a cello soli. Marked in green is the transition into the accompanying voice. The cellos return to a low range, and provide harmonic accompaniment for the violins which have taken over the melody. It is important to be aware of this transition and change to a more appropriate accompanimental style of playing.

Tchaikovsky – *Symphony No. 4,* mov. 2, measures 21-41

Pyotr Ilyich Tchaikovsky (1840-1893) was a Russian composer during the Romantic Period. Much of his

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[32] Johannes Brahms, *Zweite Symphonie: von Grosses Orchestre von Johannes Brahms op. 73 partitur* (Berlin, Germany: N. Simrock, 1878), 29-37.

music is thought to portray his life and emotions. His music commonly incorporates repetition, which conveys the theme of fate he envisioned for this piece.
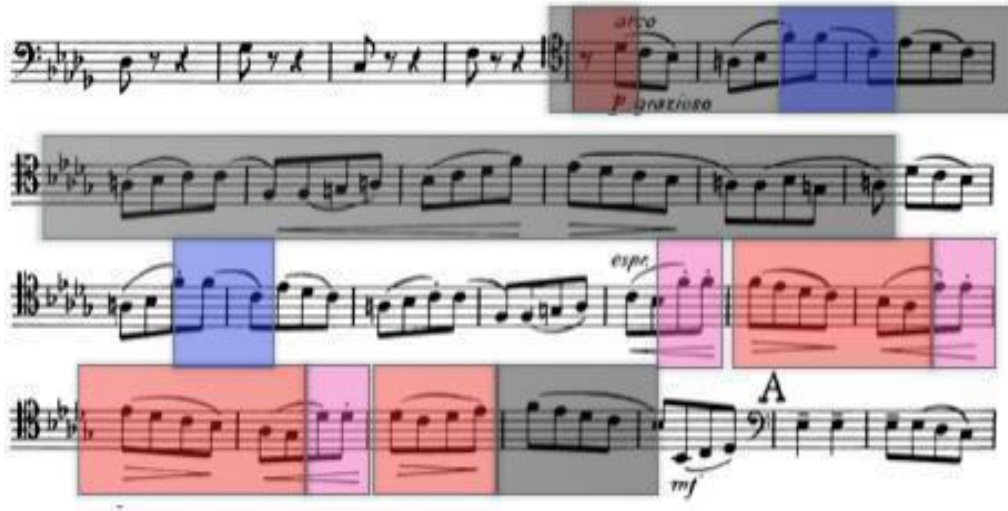
33

This repetition is noticeable in this excerpt because the beginning of each phrase starts exactly the same. The beginning of the second movement begins with an oboe solo. Once the oboe is done, the cello section picks up the melody. The melody should be played similarly to how the oboe soloist played; however, because an entire section is now playing the melody, it must be much more controlled in order to stay together. An individual does not have to worry about staying with a section or the orchestra because everyone must adapt to them. Conversely, a section must stay together and take less individual liberty, instead flowing with the others of the section.

Outlined in black is one entire phrase. It is important not to shape the phrases based on the slur markings over the notes. Rather each small part of the phrase should lead or fall into the next part, continuously driving until the end. At that point the same melody comes back, so it is important to take a small break with the bow or breath to signify the new start. The last area marked in black is to signify the passing of the melody onto another section. The phrasing should be accompanied by a decrescendo into the *mezzoforte* section. The staccato notes are marked in pink if not already highlighted within the section of another color. Every staccato note in this excerpt should be a

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[33] Pyotr Tchaikovsky, *Symphonie No. 4 op. 36* (Moscow, Germany: P. Jungerson), 105-136.

suspension, where the player lifts the bow in suspense of the notes that follow. These following notes are always leading down to a resolution, so this split second of suspension is similar to holding one's breath before falling.

The sections in blue highlight the areas where bow control will be more difficult. It is necessary to acknowledge the staccato mark at the end of the slur. To play this section properly, one should lift the bow off the string for the last note in the slur, and have the bow back down on the string in time to play the two-note slur legato and not rushed.

Last, hairpin dynamics are marked in red. There is one long swell in the yellow highlighted area, which leads to the highest point of the entire phrase. These dynamics are not marked in red, but it is necessary for the dynamics to lead to this high F-natural to signify the high point of the phrase. Marked in red are three two-measure hairpin dynamics. The most important note in these two bar passages is the downbeat to the second measure of each group, the measure with the decrescendo. Each time this same idea is repeated the most important note is one whole note lower in pitch than the previous. The first grouping has an F-natural as the main note, the second has an E-flat, and the third has a D-flat. Though these dynamics look like they should all start at the same dynamic and swell the same amount, the pitches within each section are lower than the previous. This signifies that the dynamics for each section should get quieter as well to help with the transition into the final cadence of the melody.

Brahms – *Symphony No. 3*, mov. 3, measures 1-39

The third movement of Brahms's Third Symphony is another beautiful melody first introduced by the cello

section

The other instruments in the orchestra support the melody and provide harmonic foundation and additional colors. Dynamic swells are very important in the movement, as outlined in red four out of seven times. These two-measure swells guide the phrasing as well as present lovely rising and falling scenes. The top note in each grouping is the point of each swell, so the emphasis must be placed on the highest note in range. In measure 2, the climb reaches the G-natural, and in measure 4 the ascent rises past to reach a B-flat. This happens in many cases, even where the hairpin dynamics are not present. Measures 12 and 14 both have a phrase that starts on a high note and cascades down. Measure 12 begins on a G and measure 14 begins on an A-flat. Though this A-flat is only one half step higher than the G that comes before, it is clear that the idea is growing, and therefore the A-flat should be emphasized more than the G-natural. Contrastingly, in measures 17 and 18, the D-natural in measure 17 is higher in range than the C-natural in measure 18. Therefore, the D should be emphasized more, and the following C should be emphasized less.

A second feature within this excerpt, outlined in yellow, is the complexity of the rhythm. Mostly based off sixteenth notes, subdivision throughout would aid in keeping the rhythm steady and the tempo exact, not allowing the thirty-second notes to become too long. It is important not to let the dotted sixteenth to the thirty-second note sound like a triplet passage. The quintuplet in measure 5 must be precise as well. For the quintuplet, an eighth beat subdivision may be more helpful in order to feel the entire quintuplet within one beat instead of attempting to divide it.

The next feature to notice is the need for bow control, which is marked in blue. This passage indicates two bar phrases, where each phrase is slurred to use only one bow. This requires a constant speed of bow to create the *dolce,* or sweet sound, as well as a slow bow speed so that this constancy can occur. This slow bow speed means that one should save bow on the first two eighth notes as well as the third eighth note, which is tied over to another eighth note in the next measure.

The black marks the phrasing ideas for this section. It starts a stagnant place in the music where the cellos and violins unite to play the same rhythmic idea. The dynamic should be still and the amount of bow should be

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[34] Johannes Brahms, *Dritte Symphonie: von Grosses Orchestre von Johannes Brahms op. 90 partitur* (Berlin, Germany: N. Simrock, 1884), 56-65.

limited to create this effect with the exception of the hairpin dynamics, which should be a large crescendo. The last measure outlined in purple is a new idea that is started by the cellos and passed around the orchestra. This triplet line must lead into another instruments triplet line, so the dynamics may crescendo slightly, and the last note of the measure should be held until the next group picks up the line.

Strauss – *Don Juan*, letters R-T

Richard Strauss (1864-1949) was famous not only for his operatic work, but also his works written for orchestra. Strauss's works for orchestra are mainly symphonic poems, which are pieces written for orchestra, that depict the plot of a story or another work of art. One of these is based on the idea or myth of Don Juan, a man who is proud of his many intimate relationships with women. This excerpt is part of the climax of the piece, which is why the entire excerpt is either *forte* or *fortissimo*. The ability to sustain sound for this long period of time is difficult and requires stamina. Strauss covers a wide range on the cello within only a few measures. This, with the addition of rhythm changes from sixteenth notes to triplets, makes this section difficult for tempo and intonation.


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[35] Richard Strauss, *Don Juan* (Munich, Germany: J. Verlag, 1890).

119

In addition to the loud dynamics marked in red throughout the excerpt, the pink boxes indicate Strauss's use of accents. These accents must be even louder and more articulate than the rest of the excerpt, which is already both loud and articulate. This requires a heavy bow pressure and a very fast bow speed. The blue section, while difficult to be in tune, is also a place where bow control is difficult. With the long slurs, it is necessary to use an even bow speed over the entire slur while also keeping intonation in mind.

Lastly, shown in orange is the challenge of intonation for accidentals. Almost every note in this excerpt has a sharp accidental, which signifies that the piece is in a transposed key from the original. The piece begins and ends in E-major, however the beginning melody first starts on G-natural, the minor third up from E. This section is in C major and begins on F-sharp, a tritone up from C. A tritone is a displeasing interval to the ear and has been deemed the "Devil's Interval." Since the melody is now a half step down from the original key and a displeasing interval from the current key, it signifies this section is the major conflict of the piece.

Strauss – *Ein Heldenleben,* beginning to 5 measures after number 5

Ein Heldenleben, subtitled "A Hero's Life" is one of Strauss's more famous symphonic poems. There are six movements to the composition, but they are played without pause. This excerpt is the opening of the piece, the entrance of the hero. The melody at the beginning is a leitmotif, a melody that represents a character. This character is the hero, and thus must be bold and powerful. To achieve this, Strauss has marked the dynamics *forte*. As shown in red, the dynamics are either very loud being *forte, fortissimo* or *sforzando*, or a stark contrast of *piano* or *pianissimo*. The piece starts *forte*, which is loud, but it is important to save dynamics for crescendos to *fortissimo*.
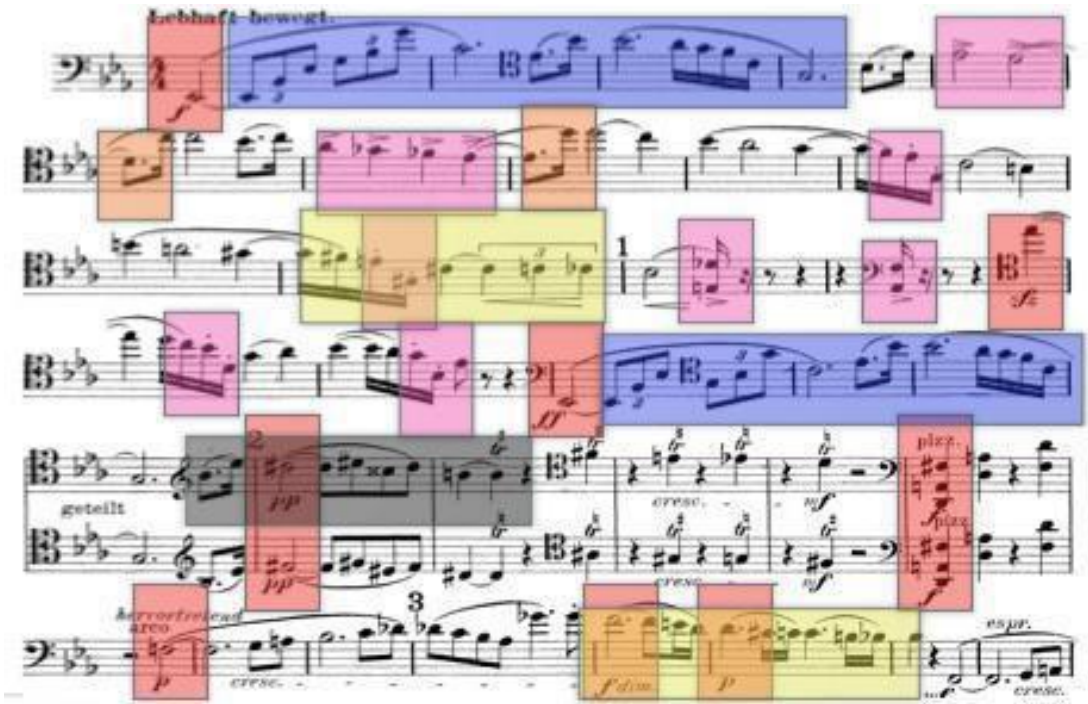
36

The beginning, marked in blue, is a challenge of crossing a wide range in a short period of time as well as managing the bow over the shifts and string crossings. This is difficult because each shift must be very fast and exactly in tune. The accents marked in pink must be very heavy; however, the accents should not seem like accents pushing down, but rather accents pushing forward. This whole section is the musical description of the hero. If accents feel like they are pushing down, it symbolizes that the hero is defeated or slow. Instead, the accents must describe the hero as strong and resolute.

Also shown in pink are staccato markings. Most of the opening section is legato, marcato, or accented. These staccatos must be light compared to the rest of the articulation and must lead to the long note that follows. The contrasts in rhythm, outlined in yellow, are important places to be exact with the notes. It is important to make a distinction between the sixteenth notes and quarter triplets. A subdivision of eighth notes would help keep the pulse between the different rhythms connected as well as accurate. The two sections marked orange outline two possible areas for intonation problems. These sections require a player to shift to a higher register in a short amount of time.

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36 Richard Strauss, *Ein Heldenleben* (Mineola, New York: Dover Publications, 1979).

In order to hit these notes, one should shorten the dotted eighth note slightly to create space to shift.

Finally, shown in black is where the dynamics are *pianissimo*. This dynamic marking helps facilitate the change in mood. This part should be played not only in a different dynamic but also in a different style. This style is lighter and more playful, aided by the trills. To make this passage effective, a lighter bow weight and a faster bow speed will help with this light sound.

Debussy – *La Mer,* 2 measures before number 9-7 measures after number 9

Claude Debussy (1862-1918) was a French composer who wrote impressionistic music. His music strove to capture an image of some kind of scene, typically having to do with nature or the natural world. This excerpt, for example, is called *La Mer*, or "The Sea." His piece captures the atmosphere and character of the sea through the use of many techniques.
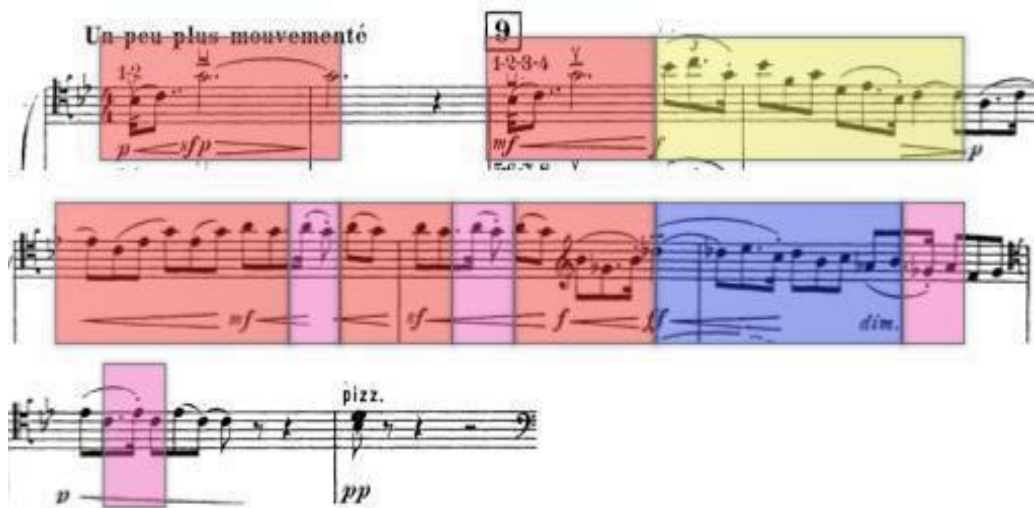
37

First, outlined in red is Debussy's use of dynamics. The continuous crescendos back to a sudden quiet crescendo help represent the waves of the ocean. Perhaps the loudest part of each crescendo signifies the capsizing of each wave, or it simply produces the idea of ebb and flow of the waves. Marked in yellow are sections that

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[37] Claude Debussy, *La Mer* (Moscow: Muzyka).

require extremely precise rhythm. The fact that Debussy takes the time to write the exact rhythm he desired means it is important for a player to play exactly what is written. Even though the next note must either be shifted to or on a different string, it is important to hold out the first note for exactly its value. Long quarter notes tied over to an eighth note are also another point of concern. Though it is important to hold the note for long enough and not cut it short, tied notes have the tendency to get behind. Therefore, it is important to hold these notes for exactly as long as asked for by the composer.

Next, marked in pink are short staccato notes. These staccato marks are incorporated to further the unpredictability of the sea. These notes should be short, light, and playful. It is important that the staccato notes do not affect the articulation of the notes that come directly before or after.

Last, areas with eighth notes, like the measure marked in blue, must be neither completely legato nor staccato. The bow control requires a player to manage the bow properly after a long slur and crescendo. These notes should have a détaché bowing, somewhere in the middle, and should be thought of in a sixteenth note subdivision so they are not rushed or slowed. A difficult aspect about this excerpt is that since the piece is about the sea, there should be no clear beat. The ocean does not move to time; it moves in an unplanned fashion. While being exact with the tempo and feeling the subdivision, it is important to remember that the beat should not come out through the music in order to portray this unpredictability of the sea.

Conclusion

The information collected from the technical analysis of these excerpts will hopefully help aspiring orchestra performers understand and prepare these excerpts, either as music students learning the excerpts or professional musicians preparing for orchestra auditions. The difficulty of these excerpts shows that individuals playing in top orchestras need to have a solid background in technique and a thorough knowledge of many historical periods and composers. Technique and knowledge are both essential components to a successful career as a professional orchestral musician, and it is clear there are many necessary technical abilities a player must acquire in order to perform each excerpt perfectly; however, technique only covers part of the necessary skills a musician. Knowledge of music and patterns within music are also important because one must be able to recognize and apply the same skill to different musical scenarios. This critical thinking ability is necessary, especially in a principal position where one has the responsibility for making artistic decisions.

The most prominent techniques a player must perfect before auditioning for an orchestra are:

1. Intonation/Shifting

2. Rhythm

3. Dynamics

    a. Suddenchanges

    b. Hairpin/swells

4. Articulation

    a. Staccato

    b. Legato

    c. Marcato

    d. Accents

5. BowControl

    a. Short/Longbow

    b. Slow/Fastbow

6. Phrasing

    a. Implieddynamics

    b. Noinappropriatebreaks

The technical abilities listed above were also identified in a study done by John M. Geringer and Clifford K. Madsen, called "Musicians' Ratings of Good versus Bad Vocal and String Performances." This study had musicians rate performances of other musicians based on six different factors: Phrasing/Expression, Intonation, Rhythm, Dynamics, Tone Quality, and Other. The results of this experiment showed that musicians reliably agreed on whether a performance was good or bad and that the most obvious qualities missing from bad musical performances are intonation and tone quality.[38] This means that in an orchestra audition, if intonation and/or tone quality is lacking in a musician's playing, they will not be considered skilled enough to move on to the next round. The results also found that each technique was evenly distributed in a good performance; however, intonation and dynamics were the most highly chosen techniques present in a good performance.[39] This means that while every factor is present at some level, intonation and dynamics were the best-developed skills in a musician's playing.

This study supports the idea that each of these technical characteristics is important and outlines in detail the most important skills to have. When preparing for an orchestra audition, focus first on perfect intonation and tone quality. Once a musician's playing is considered a "good performance," it is important to continue working on intonation and dynamics, as those are the top skills of a good performance, and then focus on other techniques evenly. The perfection of each of these important skills will greatly increase the likelihood of completing a successful orchestral audition.

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[38] John Geringer and Clifford Madsen, "Musicians' Ratings of Good versus Bad Vocal and String Performances," *Journal of Research in Music Education* 46, no. 4 (1998): 522-534, accessed August 6, 2014, http://www.jstor.org/stable/3345348.

[39] Geringer and Madsen, "Musicians' Ratings of Good versus Bad."

References

Allmendinger, Jutta, J. Richard Hackman, and Erin V. Lehman. "Life and Work in Symphony Orchestras." *The Musical Quarterly* 80 (1996): 194-219. Accessed June 12, 2014. http://www.jstor.org/stable/742362.

Beethoven, Ludwig van. *Symphony No. 9 in D minor op. 125. Ludwig Van Beethoven Complete Edition of All His Works.* New York: Edwin F. Kalmus, 1968.—. *Symphonien, Nr. 5. Ludwig van Beethoven's werke.* Leipzig, Germany: Breitkopf & Härtel, 1862.

Bekker, Paul. *The Orchestra.* New York: W. W. Norton & Company, 1936.

Brahms, Johannes. *Dritte Symphonie: von Grosses Orchestre von Johannes Brahms op.*

90 partitur. Berlin, Germany: N. Simrock, 1884.—. *Zweite Symphonie: von Grosses Orchestre von Johannes Brahms op. 73 partitur.* Berlin, Germany: N. Simrock, 1878.

Burkholder, J. Peter, and Claude V. Palisca. *Norton Anthology of Western Music*. New York: W. W. Norton & Company, 2010.

Burton, William. *Conversations about Bernstein.* New York: Oxford University Press, 1995.

Cowling, Elizabeth. *The Cello*. New York: Charles Scribner's Sons, 1975.

Debussy, Claude. *La Mer*. Moscow: Muzyka.

Del Mar, Norman. *Anatomy of the Orchestra*. Los Angeles: University of California Press, 1981.

Geringer, John, and Clifford Madsen. "Musicians' Ratings of Good versus Bad Vocal and String Performances." *Journal of Research in Music Education* 46, no. 4 (1998): 522-534. Accessed August 6, 2014. http://www.jstor.org/stable/3345348.

Gilliam, Bryan, and Charles Youmans. "Strauss, Richard." *Oxford Music Online*. Last modified February 24, 2010. Accessed December 17, 2014. http://www.oxfordmusiconline.com/subscriber/article/grove/music/40117.

Goldin, Claudia, and Cecilia Rouse. "Orchestrating Impartiality: The Impact of "Blind" Auditions on Female Musicians." *The American Economic Review* 90 (2000): 715-41. Accessed July 8, 2014. http://www.jstor.org/stable/117305.

Hopkins, Antony. *Sounds of the Orchestra.* New York: Oxford University Press, 1993.

Hurd, Michael. *The Orchestra*. New York: Quarto Publishing, 1980.

Koury, Daniel. *Orchestral Performance Practices in the Nineteenth Century.* Ann Arbor, MI: UMI Research Press, 1986.

Landowska, Wanda. *Landowska on Music.* New York: Stein and Day, 1965.

Mendelssohn, Felix. *A Midsummer Night's Dream. Felix Mendelssohn Bartholdy's Werke*, series 15. Germany: Gregg Press Limited, 1967.

Mozart, Wolfgang Amadeus. *Symphony 35, Wolfgang Amadeus Mozart-Orchesterwerke,* series 4. Kassel, Germany: Barenreiter, 1970.

Peyser, Joan. *The Orchestra: Origins and Transformations.* New York: Charles Scribner's Sons, 1986.

Spitzer, John and Neal Zaslaw. *Birth of the Orchestra*. New York: Oxford University Press, 2004.

Stowell, Robin. *The Cambridge Companion to the Cello.* Cambridge: Cambridge University Press, 1999.

Strauss, Richard. *Don Juan.* Munich, Germany: J. Verlag, 1890.

Strauss, Richard. *Ein Heldenleben*. Mineola, New York: Dover Publications, 1979.

Talbot, Michael. "Vivaldi, Antonio." *Oxford Music Online*. Last modified October 20, 2006. Accessed December 16, 2014. http://www.oxfordmusiconline.com/subscriber/article/grove/music/40120.

Tchaikovsky, Pyotr. *Symphonie No. 4 op. 36.* Moscow, Germany: P. Jungerson.

Wasielewski, Wilhelm J. "Cello Playing in 18th Century Italy." *Internet Cello Society*. Accessed August 12, 2014. http://www.cello.org/heaven/wasiel/18italy.htm

Exploring the Effect of Mutations to Conserved Residues within the Communication Pathways of Escherichia Coli Leucyl tRNA Synthetase

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Advisor: Sanchita Hati, Chemistry

Background

The focus of this research was to understand the molecular mechanism of allosteric communication in a class of multidomain proteins known as aminoacyl-tRNA synthetases (aaRSs). These proteins are involved in an important reaction in the process of protein synthesis, making them crucial players in the transfer of the genetic code as it is translated from mRNA to protein. The distinct domains of these proteins each perform different functions, and it has been found that these domains interact through allosteric communication pathways to bring about their functions. The fact that *three* pathways were generated in the current study goes along with the currently accepted model that there are multiple allosteric communication pathways within a protein.[1] These pathways, which were generated using computational techniques, consist of evolutionarily-conserved residues. These being highly conserved amino acid residues indicates their importance in the process of catalysis. It has been suggested that conserved residues that are dynamically coupled are critical for domain-domain communication.[2] In order to determine the extent of communication between distinct sites on this protein, site-directed mutagenesis was performed on several residues within the pathways. The mutant proteins were then purified and their catalytic activity was tested along with that of the wild type (wt) protein via kinetics studies to determine the catalytic changes that occur presumably due to the mutations that have been made.

The model of study was the Leucyl-tRNA synthetase (LeuRS) of *Escherichia coli (E. coli)*. This enzyme catalyzes a two-step reaction. In the first step, leucine (Leu) binds to ATP to form a leucyl-adenylate intermediate and releases inorganic pyrophosphate (PP_i). In the second step, the enzyme transfers the leucyl-adenylate onto

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[1] Antonio Del Sol, Chung-Jung Tsai, Buyong Ma, and Ruth Nussinov, "The Origin of Allosteric Functional Modulation: Multiple Pre-existing Pathways," *Structure* 17, no. 8 (2009): 1042-50.

[2] Kristina Mary Ellen Weimer, Brianne Leigh Shane, Michael Brunetto, Sudeep Bhattacharyya, and Sanchita Hati, "Evolutionary Basis for the Coupled-Domain Motions in Thermus Thermophilus Leucyl-tRNA Synthetase," *The Journal of Biological Chemistry* 284, no. 15 (2009): 10088-99.

tRNA^{Leu}, releasing the AMP and forming the leucyl-tRNA product (Leu-tRNA^{Leu}). This is the process catalyzed by all aaRSs to result in what is known as a "charged tRNA" (it has been *charged* with its cognate amino acid). In addition to catalyzing the leucylation reaction (attachment of Leu to tRNA^{Leu}), *E. coli* LeuRS also catalyzes the misaminoacylation of tRNA^{Leu}, forming Ile-tRNA^{Leu}. This error is due to the fact that Leu and isoleucine (Ile) have such similar structures, and the synthetase cannot distinguish between the two amino acids very well. The editing domain of LeuRS is an important evolutionary feature that hydrolyzes the Ile-tRNA^{Leu} in a process known as "post-transfer editing." This editing activity of LeuRS is important because it prevents the noncognate amino acid Ile from being passed on to the growing polypeptide chain in the next step of protein synthesis, maintaining faithful copying of the genetic code.

Method

Mutant Cloning

Mutants of *E. coli* LeuRS were made and cloned by means of PCR amplification using the wt LeuRS plasmid as the DNA template (50 ng), primers containing the given base pair mutation (0.5 µM), Pfu polymerase (2.5 U/µL), dNTPs (1 µL), and 10x Pfu buffer (2.5 µL). The PCR cycle started at 95°C, then went to $T_M - 5$°C, then to 72°C for 30 cycles, ending with an after temperature of 4°C. The two mutants that were made in August 2010 and tested the following summer were G225A and L327A. DPN1 (a restriction enzyme (RE)) was then added to the PCR products to get rid of any template DNA (wt LeuRS). DPN1 cuts methylated DNA (the parent strands) to shreds; the PCR products are unmethylated so they are left untouched. After PCR and RE were digested, a 1% agarose gel was made for electrophoresis of PCR products to confirm that each mutant was properly replicated. Clones were then transformed into XL1 Blue competent cells. The plasmids were then purified from these cells and sent for sequencing. Once sequences were confirmed, plasmids were transformed into BL21 cells.

Overexpression and Purification

A starter culture of BL21 cells was grown with 50 mL LB, 50 µL AMP (100 mg/mL) and 50 µL KAN (25 mg/mL) at 225 RPM and 37°C for 16-18 hours. This starter culture was then poured equally into two flasks containing 750 mL LB, 750 µL AMP and 750 µL KAN each, and cells were grown at 225 RPM and 37°C until the growth rate became linear (absorbance at 600 nm is between 0.4 and 0.6). At this time, BL21 cells were induced with 1 M Isopropyl β-D-1-thiogalactopyranoside (IPTG) (750 µL in each flask) and put back on the shaker at 225 RPM and 37°C for 4 hours. IPTG causes the *E. coli* to begin rapidly synthesizing the LeuRS protein on the plasmid;

this rapid expression of the desired protein is what is meant by *overexpression*. Protein pellets were obtained by centrifugation, weighed, and stored at -80°C. Researchers ran an 8% SDS PAGE gel with samples that were taken each hour during overexpression to show that the protein was indeed overexpressed (see Figure 1). Protein was purified using a Co^{2+} affinity column and eluted using 10 mM and 100 mM imidazole. Protein was then concentrated using centriprep and centricon centrifuge tubes. Finally, 80% glycerol and 1 M dithiothreitol (DTT) were added to make the final concentration of DTT 1 mM and the final concentration of glycerol 40%; this glycerol stock solution of the protein was stored at -20°C. The protein was quantified using a Bradford (BioRad) assay with bovine serum albumin (BSA) as the protein standard and at an absorbance value of 595 nm.

tRNA Plasmid Preparation/Transcription/RNA Extraction

The tRNA^{Leu} pellet was obtained and used in the Qiagen Maxi Prep procedure for purifying plasmids (p. 19-23 starting with step 4).[1] The DNA eluate pellet remaining at the end of this procedure was then resuspended with 400 µL sterile H_2O and quantified with an absorbance value of 260 nm. The following equation was used to find the plasmid concentration: $concentration = \frac{50\ \mu g}{mL} \times ABS_{260} \times dilution factor$. This purified plasmid was then subjected to BstN1 digestion in order to linearize it. After BstN1 digestion, phenol/chloroform extraction of the cut plasmid was performed to get rid of the BstN1 so that it would not interfere with the action of T7 polymerase during transcription. This extremely pure plasmid was then dried and used in the transcription (trxn) mix (containing 5x trxn buffer, 100 mM of each rNTP (ATP, CTP, GTP, UTP), $MgCl_2$ (1 M), and DTT (1 M)), which was incubated with T7 polymerase for 4 hours at 37°C. After transcription, RNA loading buffer (containing the dyes bromophenol blue and xylene cyanol) was added to the samples, which were subjected to electrophoresis in an 8% polyacrylamide gel. After being cut out of the gel, tRNA^{Leu} was extracted and precipitated using an RNA extraction buffer, sodium acetate (300 mM), and 100% ethanol. Next, it was spun at max speed in the cold room, the supernatant removed, and the pellet washed with 100 µL of 70% ethanol. After drying, the tRNA^{Leu} was quantified by spectrophotometry and used in the pyrophosphate assays. Quantification was performed with an absorbance value of 260 nm and by using the following equation:

$$concentration_{tRNA}(\mu M) = \frac{ABS_{260} \times dilution\ factor\ (100)}{molar\ extension\ coefficient\ (60.4 \times 10^4)} \times 10^6.$$

[3] QIAGEN®, *QIAGEN® Plasmid Purification Handbook* (2012), https://www.qiagen.com/resources/download.aspx?id=46205595-0440-459e-9d93-50eb02e5707e&lang=en, 19-23.

Pyrophosphate Assays

The pyrophosphate assay method was used to indirectly determine the amino acid activation and aminoacylation activities of the wt and various mutant proteins (G225A and L327A) by measuring the amount of inorganic pyrophosphate (PP_i) released. The reaction mixture contains amino acid (1 mM), mutant (or wt) protein, ATP (100 mM), DTT (100 mM), 2-amino-6-mercapto-7-methylpurine ribonucleoside (MESG), purine ribonucleoside phosphorylase (PNP), and pyrophosphatase (PP_iase) which cleaves any PP_i produced into free phosphate (P_i). In the presence of P_i, MESG is cleaved by the enzyme PNP to form ribose 1-phosphate and 2-amino-6-mercapto-7-methylpurine, a compound with a high absorbance at 360 nm relative to the nucleoside. This provides a spectrophotometric signal (indicating the progression of the reaction) that was monitored throughout the aminoacylation process.

Charging and mischarging assays were also performed with the above reaction mixture and the addition of tRNA^{Leu}. For the *charging* assays, the amino acid *leucine* was used in the reaction to determine the efficacy of the enzyme (either wt or mutant) in carrying out the charging of the tRNA to form Leu-tRNA^{Leu}, which is the inherent activity of the LeuRS enzyme. For the *mischarging* assays, the amino acid *isoleucine* was used in the reaction mixture to determine the extent of mischarging (which is also a normal activity of the enzyme and generally leads to editing to correct the mistake) in both wt and mutant proteins.

Results

Preliminary results indicate that the catalytic activity of mutants G225A and L327A has been altered compared to the wt enzyme. Both mutants are defective in charging tRNA^{Leu} and hydrolyzing Ile-tRNA^{Leu}. Figure 2a shows that the charging activities of G225A and L327A have decreased by 50% and 70% respectively. Interestingly, higher Leu activation activity (formation of the leucyl-adenylate intermediate) was observed in both mutants, meaning G225A and L327A bind Leu and form Leu-AMP at a higher rate than the wt enzyme (see Figure 2b). In addition, G225A and L327A appear to mischarge tRNA^{Leu} with Ile at a reduced rate compared to the wt enzyme (see Figure 2c). This is a possible indication of hindrance within the hinge motion that maintains the anticorrelated motion between the editing and catalytic domains of *E. coli* LeuRS and allows tRNA^{Leu} to bind and release from the active site.

Future Work

Additional analysis could be performed using the methods described above with other unstudied residues within the communication pathways to further understand the mechanism(s) of allosteric communication within the *E. coli* LeuRS system. It would also be potentially useful to focus on learning more about the hinge region of LeuRS and which residues are crucial to its function. Once this information is known, site-directed mutagenesis could be performed on the hinge residues in order to validate their importance in the enzymatic and editing functions of *E. coli* LeuRS.
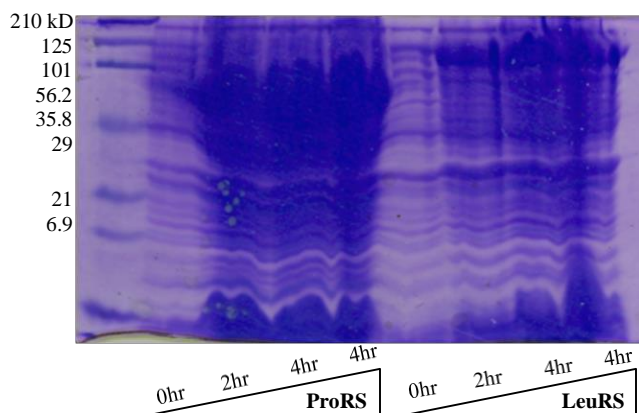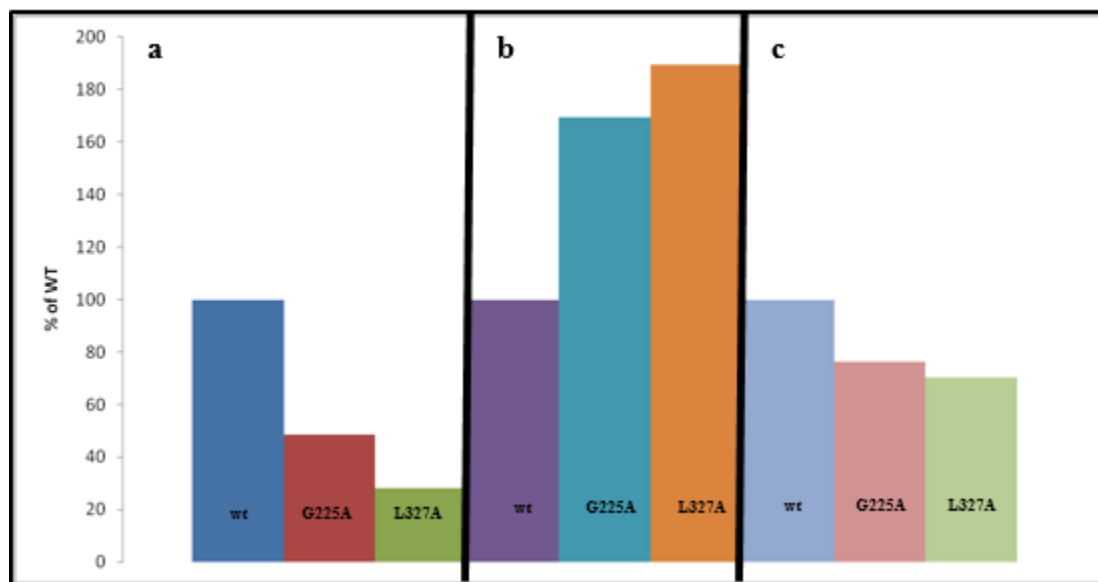

Figure 1. Gel of Overexpression.

Figure 2. (a) The ability of mutants (G225A and L327A) and wt to form Leu-tRNA^{Leu}. 250 pm enzyme, 1 mM Leu, and 5 µg tRNA^{Leu} were used in each assay. Data based on 3 trials. (b) The ability of mutants and wt to form the leucyl-adenylate intermediate. 250 pm enzyme and 1 mM Leu were used in each assay. Data based on 7 trials. (c) The ability of mutants and wt to mischarge tRNA^{Leu} with isoleucine. 250 pm enzyme, 5 mM isoleucine and 5 µg tRNA^{Leu} were used in each assay. Data based on 4 trials.

References

Del Sol, Antonio, Chung-Jung Tsai, Buyong Ma, and Ruth Nussinov. "The Origin of Allosteric Functional Modulation: Multiple Pre-existing Pathways." *Structure* 17, no. 8 (2009): 1042-1050.

QIAGEN®. *QIAGEN® Plasmid Purification Handbook*. 2012 https://www.qiagen.com/resources/download.aspx?id=46205595-0440-459e-9d93-50eb02e5707e&lang=en.

Weimer, Kristina May Ellen, Brianne Leigh Shane, Michael Brunetto, Sudeep Bhattacharyya, and Sanchita Hati. "Evolutionary Basis for the Coupled-Domain Motions in Thermus Thermophilus Leucyl-tRNA Synthetase." *The Journal of Biological Chemistry* 284, no. 15 (2009): 10088-10099.