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The Relations among Psychological and Demographic Factors in Individuals with Lower Limb
Amputation

A thesis submitted in partial fulfillment for the Bachelor's Degree in Psychology

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Trinity College

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Abstract

According to Graham et al. (2008) in the United States, there are roughly 1.7 million people living with limb loss. Adams et al. (1999) estimated that one out of every 200 people in the United States alone has had an amputation. The loss of a limb is devastating and requires many life adjustments. Amputation can lead people to a loss of self-esteem, loss of one's independence, and even unemployment. Few studies, however, have explored a) the extent to which depression is associated with other psychological factors such as body image and social support, b) if age at amputation is significantly associated with depression, and c) if depression in female amputees is more/less common than in male amputees. I anticipated that age at amputation would be positively associated with depression in this sample and that females would exhibit lower rates of depression and endorse higher rates of social support compared to males. Lastly, I expected that body image dissatisfaction would be positively correlated with depression and negatively correlated with self-esteem for both male and females.

To conduct this study, I recruited a sample of 35 lower limb amputees (57% male; $M_{\text{age}}=23.56$, $SD=3.67$) from three prosthetics and orthotics clinics at various locations in Connecticut. Patients completed a survey that assessed demographics, quality of life following an amputation, body image, and depression. Consistent with my hypothesis, the younger the participant was at the time of amputation, the more likely s/he was to be depressed. Consistent with previous research, males reported higher rates of depression than females. Contrary to my hypothesis, however, there was no relation between body image and depression. Lastly, depression was positively correlated with social support from friends but not from family, which I had not predicted. Findings from this study may help to inform protocols for medical and mental health personnel who work with lower limb amputee.

The Relations among Psychological and Demographic Factors in Individuals with Lower Limb Amputation

In society, many people are affected by amputation of their lower limbs. These lower limbs could be above the knee (bilateral) or having the feet amputated. According to Graham (2008), in the United States, there are roughly 1.7 million people are living with limb loss. Adams (1999) estimated that one out of every 200 people in the United States alone has had an amputation. In the military, more than 1,500 men and women who have returned from the war in Iraq have lost a limb in battle (Huffington Post, 2012). The loss of a limb is devastating and requires many life adjustments. Amputation can lead people to lose their self-esteem, independence, and/or even employment. In fact, the psychosocial adjustment to limb loss has been compared to coping with the loss of a loved one (Singh, Ripley, Pentland, Todd, Hunter, Hutton, & Philip, 2007) and it is not uncommon for a person who has experienced an amputation to become depressed. Indeed, one study showed that the rate of depression among amputees was as high as 41% (Kashani, 1983). Accordingly, this thesis seeks to elucidate associations among numerous demographic and psychological aspects of lower limb amputation with a heterogeneous population with the ultimate goal of informing the practice of physical and mental health professionals about factors that impact lower limb amputees psychologically.

Background

Lower limb amputation dates back to 5000 BCE (Sellegren, 1982). Most of the amputations performed during this time likely were for ritualistic reasons. Other factors could have included trauma, frostbite or leprosy. However, in the Middle East, it was common for an amputation to be performed as a method of criminal punishment. Seeing that it was used to punish crimes, many people in the Middle East refused to have an amputation for medical

reasons because it was closely connected with criminals. For other conditions that warranted amputation, such as frostbite, patients were issued certificates as proof that they were not criminals. The amputation procedure was done without a proper form of anesthesia or a way to control the loss of blood. In Europe, alcohol or opium was used as a form of anesthesia, whereas in South America, natives used chewed cocoa and alkali that released cocaine. The usage of these techniques meant that the procedure usually had to be done fast (Sellegren, 1982)

In the present day, lower extremity amputation is performed to remove ischemic, infected, necrotic tissue or locally unreachable tumor, and at times, is a life-saving procedure. Peripheral artery disease, alone or in combination with diabetes mellitus, contributes to more than half of all amputations; trauma is the second leading cause. Today, as stated by Ertl (2012), in *Amputations of the Lower Extremity*, amputation wound healing is a concern because most amputations are performed for compromised circulation, therefore making healing more challenging (e.g., Peripheral vascular disease (PVD) damaged soft-tissue envelope in trauma). In order for an amputee to have effective mobility and success with a prosthetic, the healing of the skin is a determining factor. The skin serves as a protective barrier for what is left of the lower limb serving as the end organ for the prosthesis. Therefore the skin must heal in a way that allows it to be mobile (nonadherent muscle) and thick so that pressure can be placed on the bottom of the limb without causing tearing or the bone to breaking through the residual skin (Ertl, 2012). Today, although there are many amputations performed such as a hand amputations, the most common amputations are above the knee (AKA), below the knee (BKA) and a variety of foot amputations (Ertl, 2012). Despite the significant medical advances that have enhanced the quality of life of people living with amputations, such as more localized amputations and highly individualized prosthetic devices, amputations still carry with them definite psychological effects

ranging from depression and anxiety to significant concerns about body image and relearning motor skills.

Psychological Issues with Amputation

Depression. After a leg amputation, psychological adjustment problems are very common. These problems include anxiety, social isolation, decreased sexual desire, and depression. With respect to depression, most studies have reported depression rates of between 20 -30% in the years after amputation (University of Washington Prosthetic Clinic, 2013). One study by Langer (1994) found that depression was highly prevalent (25%-66%) among the amputees she examined (Langer, 1994). The rates reported by Langer far exceed the average rates of 5.8% of men and 9.5% of women in the general population (University of Washington Prosthetic Clinic, 2013). Depression is prevalent among amputees; especially lower limb amputees, due to pain, prosthetic avoidance, lack of social support, a pessimistic outlook on life and a negative body image. In addition, one of the greatest challenges for a person after having an amputation is facing societal stigma (Walde, 2004). People who have experienced an amputation may feel as though they are viewed as incomplete individuals because they are missing a part of their body. In addition, the person must learn to walk with prosthesis, put on and remove the prosthesis, monitor the skin and the presence of any pressure points, learn how to ambulate on difficult terrain (e.g., snow), and use the bathroom at night.

Behel, Rybarczyk, Elliot, Nicholas, and Nyenhuis (2002) sought to determine the factors that contribute to psychosocial adjustment in amputees by studying 84 adults who had leg amputations. Specifically, the authors investigated relations among depression, quality of life, self-rated vulnerability (e.g., “do you feel that you are more vulnerable because of your amputation”) and a single item scale to measure psychological adjustment to amputation. The

average time since participants' amputation was 17 years and the participants wore their prosthetics for an average of 14 hours per day. Over a period of 10 months the participants were given a questionnaire distributed by the clinic receptionists. Results showed that high levels of vulnerability were associated with higher levels of depression and lower quality of life. Nearly one quarter of participants (24%) scored in the clinical depression range. Unlike Langer (1994), Behel et al. (2002) used the Center for Epidemiological Scale for Depression CES-D scale instead of the Beck Depression Inventory (BDI); yet still found relatively high rates of depression. This is significant because it highlights that despite the time since amputation, whether a 17 year lapse between time of amputation done by Behel et al. (2002) or a month after amputation by Langer (1994), depression among amputees is still a significant challenge. In addition, in the Behel et al. (2002) study, lacking a social support system, having issues with appearance, and discomfort in society due to personal perceptions about social interactions all increased the likelihood of developing depression, thereby suggesting that there are multiple inter- and intrapersonal factors that may be implicated in an amputee's risk for depression.

The notion that distress and depression are closely associated with amputee's beliefs about their appearance and their sensitivity to public self-consciousness was echoed in the findings of Atherton and Robertson (2006). This study aimed to examine the prevalence of psychological morbidity in lower limb amputees. While these researchers only found depression rates of 13.4% in their study, this may have been due to the fact that their study was related to physical health, as opposed to mental health issues. In addition, Atherton et al. (2006) found that people who exhibit high self-consciousness, meaning they avoid disapproval and rejection based on their appearance, experience severe distress. Similarly, William, Ehde, Smith, Czerniecki, Hoffman, and Robinson (2004) found that there was an increased risk for a functional disability

to develop in an amputee if they have high public self-consciousness.

Singh et al. (2007) investigated anxiety as well as depression among amputees over the course of two to three years. 68 Participants completed the Hospital Anxiety and Depression Scale (HADS) following their discharge from the inpatient rehabilitation center. Similar to the findings of Behel et al. (2002), the study showed that 36.7% of the sample exhibited depressive symptoms. Twelve subjects endorsed anxiety symptoms during the follow-up period, whereas only nine had these symptoms before. It was notable that three additional participants developed significant anxiety symptoms during the follow-up period, which led Singh et al. (2007) to conclude that there is a tendency for some people to be more susceptible to recurring psychological symptoms. Therefore they concluded that depression and anxiety drop after amputation but rise again within a two-three year period. Although Singh et al. (2007) were not able to determine the exact point of when the increase in psychological symptoms happened, they were able to suggest that the symptoms can persist for up to 17 years.

An interesting study done by Dunn (1996) looked at the positive meaning of the disabling experience as well as depression and self-esteem. Dunn hypothesized that participants who reported that something positive or good happening as a result of their amputation would report higher levels of self-esteem and lower levels of depression. A sample size of 138 amputees were used (123 male and 15 female), 38% below the knee, 27% above the knee, 4% below the elbow. The Center for Epidemiological Studies of Depression Scale (CES-D), and Rosenberg Self-Esteem were distributed in a mail survey. Dunn (1996) found that people who had positive meaning in their amputation reported having lower levels of depression. Surprisingly, those who were younger when their amputation occurred reported higher levels of depression. To better explain this phenomenon, Dunn linked activity restriction to age and depression. Moreover,

regarding physical factors, Dunn found that younger amputees were significantly more at risk of developing depression than older amputees the on account of activity restriction. —More specifically, older individuals may accept the activity restriction more readily and younger individuals may experience more appearance anxiety. Overall she found that 18.2% of her sample population reported having depression. 70% of the subjects reported having a positive meaning in their amputation experience, this was percentage was more than a normative sample because participants also attributed positive aspects to their amputation. Age was a factor that helped to explain the differences between participants with respect to of depression and positive meaning. She explained that older people with amputations experienced less depression because they had lower levels of activity due to aging (Dunn 1996). In addition, body image was linked with age and depression. The study showed that younger people had higher levels of depression due to anxiety and social stigma (Dunn 1996).

Hawamdeh, Othman, and Ibrahim (2008) conducted a similar study in which they investigated the prevalence of depression and anxiety with a Jordanian population of lower limb amputation. The study included 56 inpatients and outpatients (47 males and 9 females). All participants had an amputation of one lower limb (22 above the knee and 34 below the knee) and the reasons for their amputations were varied, ranging from PVD to traffic accidents. Their time since amputation was 5.75 to 8.4 years. The methodology used was a qualitative interview that collected socio-demographics (i.e. age, sex, social support, and use of prosthesis), clinical data (i.e. anxiety, depression), and duration since amputation, and problems with amputation.

Hawamdeh et al. (2008) found a similar, although slightly lower rate of depression (20%) in this sample compared to the Langer, and Behel's study. Unlike the study by Behel et al. (2002), the Hadwamdeh's et al. (2008) study showed that the longer the time since the initial amputation,

the less likely participants were to report depression or anxiety. This is significant because it could explain why they found rates of depression lower than previous studies. Taken together, the research on depression in people with amputations has shown that there are significantly high rates of depression among amputees. In addition the magnitude of the depression is closely associated with the perception that the amputee has of himself/herself.

Body Image

In 2002, Murray and Fox investigated the relationship between having a prosthesis and body image in lower limb amputees. The sample consisted of 44 subjects (24 male, 17 female, and 3 unspecified) and the mean age was 42 years. Limb loss was as follows: 22 below the knee, 14 through the knee, 6 above the knee, 1 double amputee above knee, and 1 partial foot amputation. The participants reported wearing a prosthesis for 8.1 years. The scales used were the Trinity Amputation and Prosthesis Experience Scale (TAPES), the Amputation Body Image Scale (ABIS), and the McGill pain questionnaire. The results showed that body image disturbance (BID) was moderately to highly correlated with levels of satisfaction, meaning that having a prosthetic did not necessarily distort the individual's image of him/herself. Surprisingly, men were more satisfied with their prosthetic if they could still provide for their family. Whereas, women were happier with the cosmetics of their prosthesis. Women expressed feeling more feminine and satisfied if others who did not know them couldn't tell they were an amputee (Murray 2002).

Atherton and Roberston (2005) also examined body image. They wanted to identify variables that contributed to distress related to self-consciousness and appearance. The sample size was 67 participants that were recruited from two artificial limb and appliance centers in the U.K. The amputation procedure had been done on an average of five years prior to the interview.

There were 51 males and 16 females. 43 of the participants were below the knee, 16 above the knee, and 8 were double above the knee (bilateral) amputees. The ages ranged from 32-97 years. Similar to Murray and Fox (2002), Atherton and Robertson (2005) used the Trinity Amputation and Prosthesis Experience Scale (TAPES), the Self Consciousness Scale (SCS), and the Appearance Schemas Inventory (ASI). The SCS is a 23-item scale that assesses individual differences in self-consciousness. This scale is composed of three subscales: Public self-consciousness (i.e., general awareness of the self as a social being that has a effect on others), private self consciousness (i.e., propensity of self examination of moods and cognition process), and social anxiety (i.e., discomfort in the presence of others).

Results showed that prevalence of depression (13.4%) in this sample was lower than that reported by other studies. Psychosocial adjustment data within the adjustment to limitation subscale were positively skewed indicating that most people had some difficulties in adjusting to the limitation. Scores on the social adjustment subscale and the general adjustment were negatively skewed such that participants appeared relatively well adjusted in these areas. There was a positive correlation between public and self –consciousness and anxiety, and between depression and psychosocial adjustment to amputation. In contrast, however, the private self-consciousness scale was not significantly associated with any of these outcomes. Also, there were significant correlations among general and social adjustment, anxiety and depression, and both body image vulnerability and the ASI total score. In addition there was also a significant correlation between the HADS depression scores and appearance stereotypes scores. This study is significant because it highlights that depression and anxiety are two variables that contribute to self-consciousness and appearance. This could be beneficial for clinicians because it provides

them with other variables that influence how an amputee views himself/herself instead of just being a person who lost a limb.

Social Support

Another critical influence on amputee adjustment and depression is social support, or the extent to which an amputee feels s/he can trust and depend on his/her family and friends to help meet his/her needs. The loss of a limb can cause decreased self-esteem, social isolation, vulnerability, body image problems and stigmatization (Rybarczyk, 2000) in the individual but also affects their family. That is, it is challenging for both amputees and their family members because having a lower limb amputation compromises the person's mobility, ability to work and body image (Geertzen et. al (2001), and, as a result, these individuals may have to depend on their family members for support with a variety of everyday tasks, in addition to emotional support. Therefore, support from family is vital for an amputee to adjust. Seeing that an amputee will spend most of his/her time initially in the house becoming accustomed to wearing a prosthetic, help from family is needed. This support can be provided by aiding the amputee with way in which they can reach items that are on shelves is important. The family allowing the amputee to lift themselves in a chair but standing close by in case they need help getting in the chair, is an example of how support can be provided.

A study conducted by Unwin et al. (2009) sought to examine associations among mood, hope, and social support among those with a lower limb amputation. This study was done in the U.K with a 2-3 year follow up after the patients were released from rehabilitation. There were 120 subjects in the first study and 99 subjects in the follow-up. 16 participants were female and 83 were male. There were 54 participants that had transibial amputations, 45 with transfemoral

amputations and none with knee disarticulation. Participants wore prosthetic for 7.1 hours per day and the average age was 60.7 years of age.

Unwin et al. (2009) used the Trinity Amputation and Prosthesis Experience Scale (TAPES), Perceived Social Support Scale (PSSS), a Hope Scale, and a General adjustment was measured by a subset of the TAPES scores, and the Positive and Negative Affect Scale (PANAS). Hope in this study was defined as a person's thoughts about their ability to find ways to reach their goals and finding motivation to reach those steps (Snyder, 1991). Results showed that pain, age, gender, and level or cause of amputation did not influence the outcome of a lower limb amputee in relation to their positive mood. However, when looking at social support and hope, these were major predictors of positive mood for a lower limb amputee, results from the follow up could not be compared to the initial results as the sample size had decreased and 103 was needed for a multiple regression to be done. These findings are important because they show how significant social support is to a positive adjustment of a lower limb amputee.

Another study that also examined social support was done by Williams et al. (2004). In her study she investigated social support and social integration for a two year period after a lower limb amputation in order to better understand the impact of social support on aspects such as depression and life satisfaction. The sample included 89 adults (69.7% male) with a mean age of 44.2 years of age. The majority of the amputations were below the knee (66.3%) and 18.0% were above the knee. Each participant completed a telephone interview with trained interviewers that were familiar with the questionnaires and completed three practice interviews to ensure that they understood how to enter data accurately into the database. Scales used were the Perceived Social Support Scale (MSPSS), The Social Integration (SI) subset of the Craig Handicap Assessment and Reporting Technique (CHART), the Center for Epidemiological Studies Depression Scale

(CES-D) used for depression, and the Satisfaction with Life Scale (SWLS). Findings showed that there was a change in SI over time. Specifically this change was significant for those who experienced an amputation due to trauma who reported lower initial levels of SI. In addition, married people reported higher SI levels. The researchers felt that this could be due to the fact that married people have more social support the support may be more constant compared to those who are unmarried.

Demographic factors as moderators of psychosocial adjustment

Gender and age. Cansever, Uzun, Yildiz, et al. (2003), noted that how one responds psychologically to an amputation may be determined by age, sex, type and level of amputation. (Hawamdeh et al., 2008). In terms of psychological well-being following amputation, most studies have found no difference in psychosocial outcomes between men and women (Bradway, Malone, Racy 1984; Williamson 1995; Williamson & Walters 1996). But the data from Hawamdeh et al.'s study revealed that females suffered from more reactive depression and anxiety symptoms than males. This result is similar to those of previous studies performed by Kashani and colleagues (1983), which reported that women were more likely to experience depression, and to perform more poorly on a measure that includes an assessment of emotional adaptability. Hawamdeh et al. also examined socio-demographics and found individuals' perceptions of social support were associated with their ability to adjust. Hawamdeh et al. (2008) found that subjects with a high prevalence of psychological symptoms (i.e., anxiety and depression) were those who were female, did not have adequate social support, their amputations were from a traumatic cause, and they were unemployed.

Gaps in previous research

Although previous research has explored an impressive number of factors related to lower limb amputation, there are some notable limitations of this research. First, several studies were done in another part of the world, such as the U.K conducted by Unwin et al. (2009), that could make depression of amputees not generalizable to the U.S. In places such as the UK, health care is free; in the U.S, not all prosthetics are covered by Medicare or Medicaid, which could have contributed to greater body dissatisfaction. Lack of coverage also would lead to greater depression because if the insurance does not cover the specific prosthetic then a lower grade of that prosthetic will be used in instead. For example when it comes to different knees used in prosthetics, the C-Leg knee is very popular and the best. However, it is only covered by Medicare/Medicaid in Connecticut and not in Illinois. So amputees in Illinois are still using a total knee that does not function as well as the C-Leg Knee.

Although the previous research has examined depression and its relation to social support, gender, and body image, many of the studies did not explore how factors such as age and gender are related to depressive symptoms in this population. This poses a limitation because clinicians are not aware of the impact of these variables on an amputee together especially a younger person. Moreover, because many of the studies examined an elderly population, there is not much data on correlates of depression for younger individuals. Finally, some of the methodology used, such as the mail surveys, may limit the participation rates and therefore the generalizability of the findings.

The Current Study

The current study closes these and other gaps in the extant research by examining how depression, gender, social support, and body image are correlated. Based on previous research it is anticipated that:

- Age at time of amputation will be positively associated with depression in this sample for both males and females. That is, older adults at the time of amputation will be more likely to experience higher depression levels than younger adults at the time of amputation.
- Females will exhibit lower rates of depression. In light of Hawamdeh et al.'s (2008) findings showing that females suffer more from depression than males, in this study females were predicted to cope better than men because from experience personally with amputees women are better at coping.
- Social support from family and friends will be negatively correlated with depression because support is a vital component to successful adjustment and would be related to lower rates of depression.
- Body image dissatisfaction will be positively correlated with depression due to lack of ability fully adjust to the amputation and prosthetic (Engstrom, 1985)

Findings from my study could help to inform protocols for medical and mental health personnel who work with lower limb amputees.

Method

Participants

The participants consisted of 35 male (57%) and female (43%) lower limb amputees between the ages of 18-40 residing in the state of Connecticut. These participants are patients of

prosthetics and orthopedics clinics located in various areas of Connecticut. The response rate in the current study was 11%. The breakdown of the race/ethnicity was 52% Caucasian, 29% African American, 11% Latino, and 8% Asian. The mean age of the participants was 25.79 years ($SD=6.90$). Many of amputations in this study were caused by a trauma ($M=1.84$, $SD=1.00$) (i.e., motor accident, or meningitis) and were below the knee amputees ($M=4.02$, $SD=.51$)

Measures

Demographic questions. This section inquired about age, sex, and time since initial amputation. These questions were asked so that the data could be compared and analyzed when trying to see if there were differences in the study variables by these demographic factors.

Quality of Life. The Trinity Amputation Scale (TAPES) (Gallagher, MacLachlan 1977), $\alpha=.85$ for the psychological adjustment, and $\alpha=.93$ is a self report, 54 item measure, used to assess how lower limb amputees adjust to their prosthetic. It consists of three sections (psychological adjustment, activity level, and satisfaction). Part one; psychological adjustment ($\alpha=.85$) assessed how well the amputee had adjust to their prosthetic (i.e. I have adjusted to having a prosthesis, although I have had my prostheses, my life has still been full for). A 5 point likert scale was used to measure the answers of the participants from strongly disagree to not applicable. The TAPES measure was scored using a mean.

Body Image. The Appearance Schemas Inventory (ASI) (Cash, 1996) ($\alpha=.83$) in the current study is a 20 item measure that looked at the core of appearance related cognitive assumptions. Similarly higher scores on this scale mean the greater the body dissatisfaction. There are three subsections of this questionnaire. The Body Image Vulnerability has six items that assess the assumptions of an individual concerning their appearance if to see if appearance is defective or socially acceptable (e.g., I spend little time on my physical appearance). The Self-

Investment subsection has five questions and gets at the beliefs of a person that their appearance is central to their self-concept. Lastly, the Appearance Stereotyping that consists of three questions examines the assumptions about attractive/unattractive appearance. This measure was scored using a mean as well.

Social Support. The Perceived Social Support Scale (Procidano & Kenneth, 1983) ($\alpha = .83$), is a 14 item measure that measures the extent of support, information and feedback from family and friends perceived by participants. Sample questions included “my friends/family give me the moral support I needed, I wish my friends/family were much different”. A 7 point Likert scale was used to assess answers, that ranged from strongly disagree to strongly agree. The higher the scores, the more support was perceived.

Depression. In order to assess the depressive symptoms, the Center for Epidemiological Studies Depression Scale (CES-D, Radloff, 1997) was used. This scale consist of 20 items that are scored on a 4-point scale, and measures the frequency of a the occurrence of a symptom during a given week, (e.g., “my sleep was restless”). The Scores range from 0 to 60, with higher scores indicating more symptoms of depression. CESD scores of 16 to 26 are considered indicative of mild depression and scores of 27 or more are indicative of major depression (Zich et al. 1990, Ensel 1986). Zich, Attkisson & Greenfield (1990) found the stringent cut-off score of 27 more useful for screening medical patients for depression than the standard cut-off score of 16.

Procedure

I recruited my sample from four separate clinics (Wethersfield, Waterbury, and Farmington, Connecticut) within the Hanger Prosthetics and Orthotics group practice. Specifically, I used a survey composed of various questions to assess depression, body image,

social support, and gender. IRB approval was secured prior to the administration of the survey. When patients came in for their regular appointments at the clinic, they were offered the opportunity to participate. To ensure that all participants were recruited using the same approach, the receptionists at the Hanger clinics followed a script (see Appendix A). The survey did not require participants to include their name and thus, was anonymous. The only identifier used by the researcher was the first letter of the location and a participant identification number. All the surveys were placed in an envelope and stored in a secure location. Participants wrote their name on the separate paper and all participants were entered into a lottery for one of two \$25 gift cards from Amazon.com.

Data Analysis Plan. Correlations were run in order to examine if there were relations among age at amputation, depression, and body image dissatisfaction. In order to determine if males were more depressed than females, an independent t-test was conducted. To test if there was a significant difference between the amounts of social support endorsed by men and women an independent 2-tailed t-test was run. And lastly, to compare males and females on body image dissatisfaction an independent t-test was run. A *p*-value of less than .05 was used to determine whether a finding was statistically significant.

Results

Descriptive statistics. Descriptive statistics and internal reliability scores for the TAPES, CES-D, ASI, and Perceived Social Support measures are presented in Table 1. A one-way ANOVA showed that there were no differences on any of the continuous study variables by site. There was a greater proportion of females at site 1 (80%) and males at sites 2 (80%) and 3 (100%) than one would expect by chance: $\chi^2(2, N=35) = 15.40, p < .001$. The mean depression

scores ($M=10.29$, $SD=8.04$) were than the normative sample done in a study by Radloff ($M=13.31$, $SD=10.86$), the difference was significant [$t(34) = -13.31$, $p=.03$] (Radloff, 1991). The mean body dissatisfaction scores ($M=2.82$, $SD=.513$) were lower than that of normative samples [$t(34) = 3.47$, $p=.001$], respectively. For the TAPES measure of quality of life, participants reported overall in the wearing of a prosthetic for females ($M=3.32$, $SD=.514$) and to males ($M=3.15$, $SD=.410$) indicating adjustment to the prosthetic. The TAPES activity overall reported by females was ($M=2.06$, $SD=.74$) and for males ($M=1.97$, $SD=.53$); lower scores indicate more restriction from activities the prosthetic caused.

Correlations. Correlations among the study variables are presented in Table 2. Age at time of amputation was found to be significantly and inversely related to depression, $r(34) = -.37$, $p < .05$, such that the younger the person was at the time of amputation the more likely s/he was to be depressed compared to a person who was older at the initial time of amputation. This was contrary to my hypothesis but is consistent with previous research from Dunn (1996). Interestingly, time since initial amputation and time with the current prosthesis was not correlated with depression $r(35) = -.198$, $p > .01$ ns. And $r(35) = -.137$ $p > .01$, ns, respectively. Moreover, depression was positively correlated with social support from friends but not from family $r(35) = .58$, $p < .01$. This was contrary to my hypothesis and to previous research by Murray and Fox (2002), who reported that having a support system would be inversely related to the amount of depression that someone was experiencing. Social support from friends was positively correlated with social support from family $r(32) = .57$, $p < .001$, indicating that there was some overlap between these variables, but one was not a proxy for the other.

Depression was inversely correlated with TAPES Activity (i.e., the activity that can be performed by an amputee while wearing their prosthetic) [$r(35) = -.496$ $p = .001$] and TAPES

wearing (i.e., how the prosthesis fits the amputee) [$r(35) = -.582$, $p = .003$]. Although I did not make a prediction about the association between these variables, it makes sense that as the activity level of a prosthetic and the comfort in the prosthetic increases an individual would experience less depression. As expected, body image dissatisfaction was positively correlated with depression $r(32) = .41$, $p < .05$.

T-tests. In order to determine if gender had an impact on depression, an independent t-test was run. As expected, there was a significant gender difference for depression, $t(33) = -2.68$, $p < .05$; specifically women were less depressed than men. There was no significant difference between males' and females' report of body image dissatisfaction $t(33) = -0.27$, *ns*. Although not hypothesized, there was a significant difference between gender and the TAPES activity $t(33) = .622$, $p = .032$, $p < .05$.

Discussion

Age at Amputation and Depression

My first hypothesis was that the participant's age at the time of amputation would be positively correlated with depression. Contrary to my hypothesis, the younger the participant was at the time of amputation, the more likely s/he was to be depressed. This finding is consistent with previous research. Dunn (1996) found that people who had positive meaning in their amputation reported lower levels of depression. Those who were younger when their amputation occurred reported higher levels of depression. To better explain this phenomenon, Dunn (1996) linked activity restriction to age and depression. Moreover, regarding physical factors, Dunn found that younger amputees were significantly more at risk of developing depression than older amputees on account of activity restriction. More specifically, older individuals may accept the activity restriction more readily and younger individuals may experience more appearance

anxiety. In addition, perhaps older adults were less depressed because they have had time to deal with the amputation and find adequate resources whereas if the amputation occurs when one is younger, it could be more challenging to cope (Dunn 1996).

Gender and Depression

In the general population, average rates of depression reported by the Clinic of Washington (2013) found that women exhibit higher rates of depression (9.5%) compared to males (5.8%). However, I predicted that females would exhibit lower rates of depression, because due to my personal experience with amputees, women tend to be able to cope better. Consistent with my hypothesis, men were more depressed than women. Hawamdeh et al.'s study also revealed that females suffered from more reactive depression and anxiety symptoms than males. This result is similar to those of previous studies performed by Kashani and colleagues (1983), which reported that women were more likely to experience depression, and to perform more poorly on a measure that includes an assessment of emotional adaptability. Seeing that males had more activity restriction on the TAPES Activity scale, this could have also contributed to the men reporting more depression than males. As stated earlier, the higher rates of depression could have been associated with the fact that men are not able to perform the duties that they once did before they lost their limb such as lifting heavy boxes.

I believe that the higher depression scores in males could be due to the fact that men may not be seeking adequate help needed to successfully adjust. Moreover, males may view the disabling experience as an end to them being able to fulfill the role of a man, which is very important in our western culture as men are still often regarded as the providers for their family. Not having a limb may limit the type of work that a man can do such as stocking and lifting heavy amounts. Socially, a man may feel that if he tries to seek out help from others that he is

less of a man. In addition, males may view therapy as more of empathy first and then problem solving. Consequently, since men are often regarded more as problem solvers they may feel like therapy is not for them (Anselmi, 2013). Lastly, in my personal experience with amputees, women have been more open to sharing how they feel the amputation has impacted their life and what it will mean for them in the future. Conversely, oftentimes men state that they are doing well and do not openly express how the amputation has affected them.

Social Support and Depression

My third hypothesis was that social support from family and friends would be negatively correlated with depression. My results showed that depression was positively correlated with social support from friends but not from family, which I had not predicted. This is a very interesting finding because other studies have shown that the lack of a support system was associated with increased the levels of depression in amputees (Behel et al. 2002). Moreover, Unwin et al. (2009) concluded that when looking at social support and hope, these were major predictors of positive mood for a lower limb amputee. Despite previous research showing that having a support system means lower depression rates, I believe it could be the case that amputees who are feeling depressed more actively reach out to friends. Although these amputees may seek out support from friends, they may still be depressed because the support provided by friends may be limited, especially if one's friends have not experienced an amputation and thus, cannot relate to the amputee. Perhaps support from family did not show this same relation because although family members haven't experienced the amputation directly, they might have a better sense of the amputee's experiences on account of more time and exposure to the amputee.

Body Image Dissatisfaction and Depression

My fourth hypothesis was that body image dissatisfaction would be positively correlated with depression. Consistent with my hypothesis, I did find that body image was positively correlated with depression. This finding fits with other findings such as those from Engstrom (1985), who found amputees who express dissatisfaction with their prosthesis are doing so because of a lack of ability to cope with the prosthesis. Atherton and Roberston (2005), who also examined body image, reported that there were significant correlations among general and social adjustment, anxiety and depression, and both body image vulnerability and the Appearance Schemas Inventory as well.

Implications

The current findings suggest that clinicians working with persons who have lower limb amputations should be mindful of the fact that men with lower limb amputations may be at higher risk for depression than men in the general population. Secondly, the presence of social support does not guarantee the absence of depression. Clinicians may explore the composition of amputees' social support networks to better understand the extent to which amputees feel that their family/friends can relate to their difficulties. Clinicians might also help amputees determine what kinds of specific support they need from family and friends and how to best ask for that support. In addition, perhaps clinicians could use the information from my study to inspire future amputees that there is hope and that they can be successful. Given that amputees in the current study were less depressed than a normative population suggests that amputees might be an especially resilient group and/or might have experienced post-traumatic growth following their amputation. Moreover, clinicians need to be aware of the fact that body image dissatisfaction is not limited to female clients, so they should be cognizant of this issue for both male and female

clients. Finally, it may be helpful for clinicians to connect amputees with other amputees who have coped successfully, as this could be an additional and potentially powerful form of social support. Hearing stories from people who have had a successful time coping could be inspirational and could help an amputee feel less alone in his/her experience.

Limitations and Future Directions

Some limitations of the present study include the small sample size. The small sample might have precluded me from finding significant differences between males and females on the body image dissatisfaction measure. In addition, the season in which I collected my data, the winter, could have had an impact on the mood of the sample such that they may have appeared to be slightly more depressed than normally. However, they were less depressed than the normative sample, which suggests that season may not have been a significant influence on mood. By sampling participants in the spring or summer, I might have been able to recruit a larger sample and/or I might have been able to see greater variations in the depression or body dissatisfaction measures. During the winter, many amputees are not very ambulatory due to the snow being difficult to walk on because of unlevelled surfaces. This challenge in the winter months may affect mood and body dissatisfaction as well.

In future research, I would further examine the relationship between depression and social support to see if the fact of an amputee having prior contact with another amputee pre-amputation or post amputation has an impact on their mood or perceived social support. Moreover, I would also like to look at age more closely because from my own prior experience with amputees, the older a person is, the less resilient they have appeared to be, so I would like to focus on what makes an amputee more resilient or less resilient. I would also like to conduct this study with a younger sample under the ages of eighteen and then those above the age of eighteen

to compare and contrast these different age groups. I think this addition for future research may be interesting because from experience seeing that I am an amputee as well I understand that children are more resilient than adults. I also believe that by adding children the age gap can be better assessed as much of the literature was done on the elderly or young adults.

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Table 1

Descriptive Statistics and Internal Consistency Reliabilities for Continuous Study Measures in Overall Sample and by Gender

	<i>M(SD)</i> Overall sample	<i>M(SD)</i> Males	<i>M(SD)</i> Females	α
Study Measure				
Age	25.79(6.90)	23.52(3.67)	28.66(8.89)	
TAPES Activity ^a	2.00(.62)	1.98(.53)	2.06(.74)	.932
TAPES Wear ^b	3.22(.46)	3.15(.41)	3.32(.51)	.858
CES-D	10.28(8.04)	13.3(8.39)	6.27(5.59)	.873
Appearance Schemas Inventory	2.80(.51)	2.83(.53)	2.878(.51)	.826
Social Support From Friends ^c	5.25(1.12)	5.43(1.29)	5.00(.828)	.768
Social Support from Family	5.53(1.63)	5.50(1.90)	5.57(1.27)	.939

Note. $N = 35$. TAPES= Trinity Amputation and Prosthetic Scale , CES-D= Center for Epidemiological Studies Depression Scale

^a note: lower scores indicative more activity restriction., ^b higher scores indicative that the amputee has adjusted well ^c higher scores on this scale indicates greater perceived support.

Table 2

Correlations among the study variables

Variable	1	2	3	4	5	6	7	8	9
1 Age	----								
2 Gender (Female=1, Male=2)	-.375*	----							
3 Months Since Amputation	-.239	-.057	----						
4 TAPES Wear	-.010	-.183	.578**	----					
5 TAPES Activity	.052	-.077	.478**	.906**	----				
6 ASI	-.185	.046	.141	-.205	-.230	----			
7 CES-D	.372*	.439**	.137	-.582*	-.486**	.360*	----		
8 Social Support Friends	-.210	.190	-.343*	-.242	-.098	-.071	.580**	----	
9 Social Support Family	.067	-.022	-.117	.051	.123	-.279	.246	.572**	----

Note. * $p < .05$, ** $p < .01$

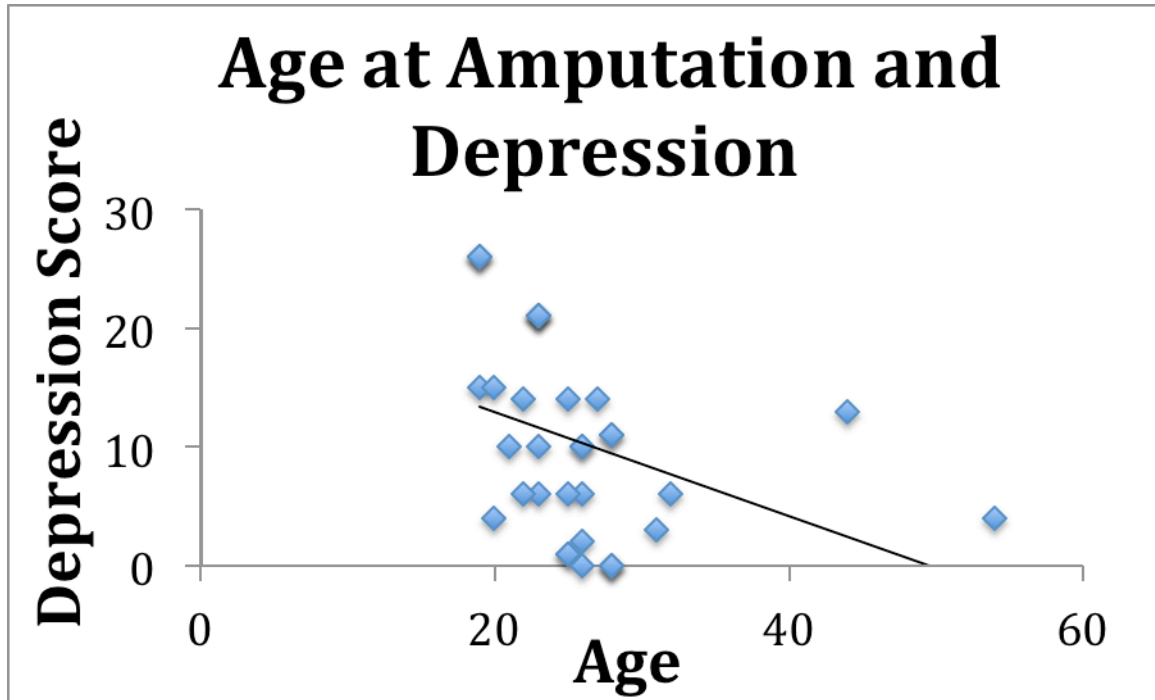


Figure 1. Age at amputation was negatively correlated with depression

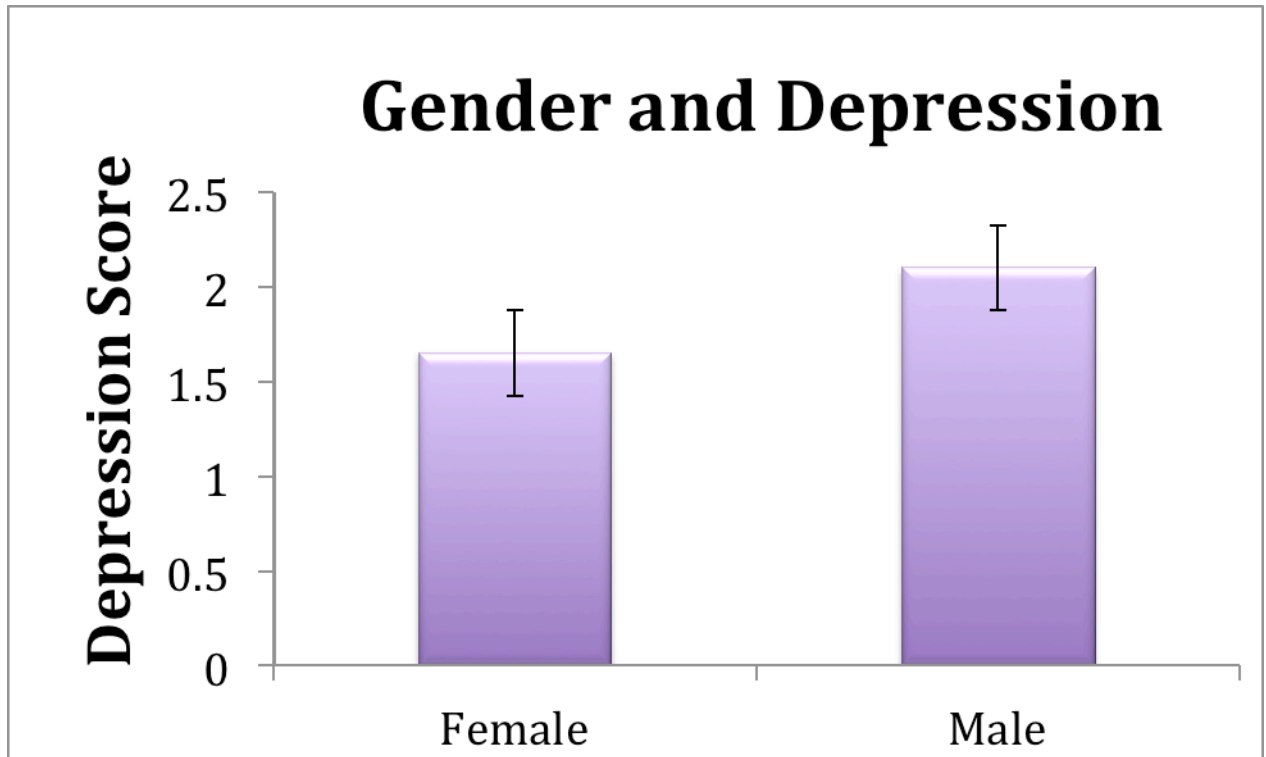


Figure 2. Females reported lower levels of depression compared to males

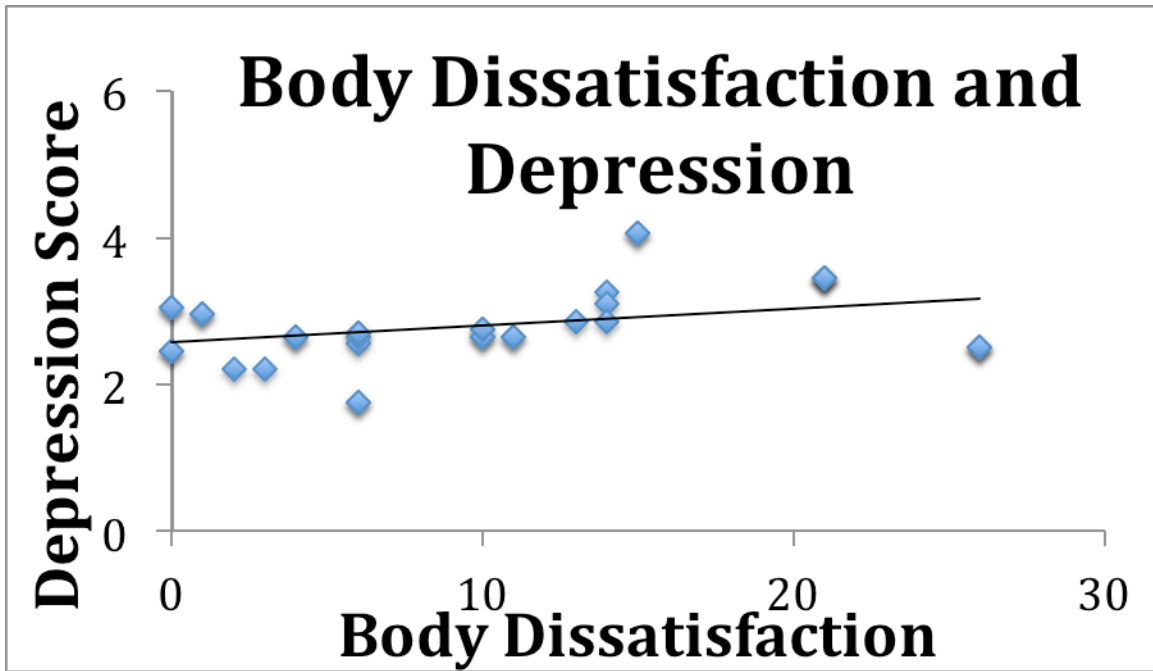


Figure 3. Depression scores were positively correlated with body dissatisfaction.

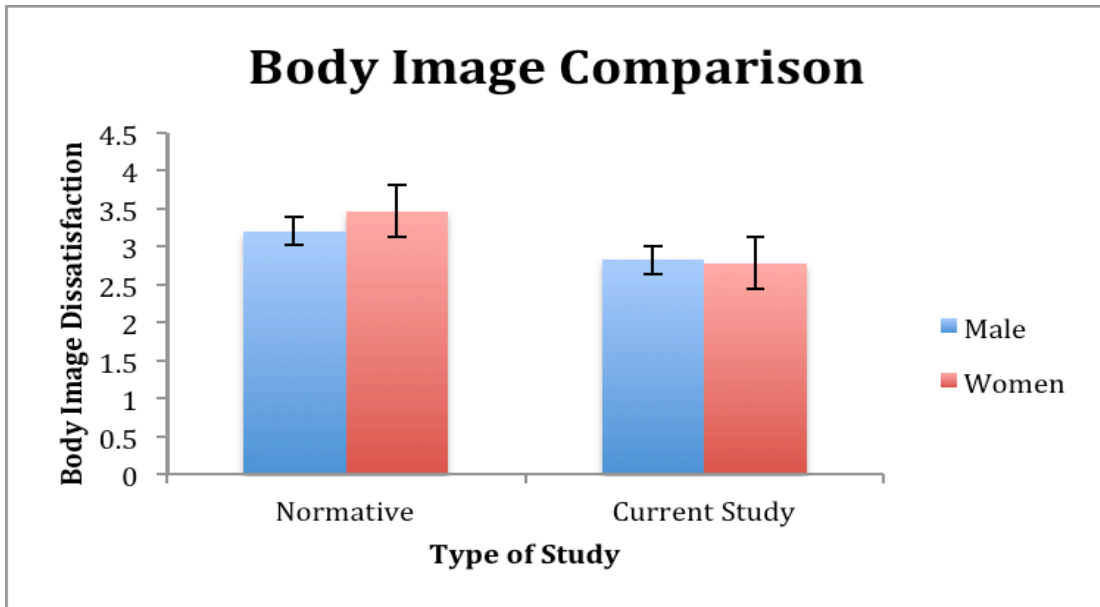


Figure 4. Body Image dissatisfaction scores were lower than those of the normative sample.

Appendix A

Hi (Patient Name)

While you wait, would you like to contribute to the research about amputation and depression? A senior student at Trinity College is conducting research for her thesis. She is also a double amputee above the knee and a patient at this clinic. The survey will take 10-15 minutes and you will be entered into a drawing for a \$25 Amazon gift card. She would really appreciate your participation. Thank you.

