

THE RELATIONSHIP BETWEEN RECREATIONAL ACTIVITY PARTICIPATION AND  
VISION RELATED QUALITY OF LIFE AMONG ADULTS WITH VISUAL IMPAIRMENT

by

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The purpose of this study was to understand the relationship between number of activities individuals participated in, recreation participation frequency, and the meaning of recreational activity participation and factors associated with vision-related quality of life for adults with visual impairments. Thirty-five usable surveys were completed by visually impaired adults between the ages of 18 and 65, residing in the state of North Carolina. Quality of life was measured by the Vision Quality of Life Index (VisQOL). Results indicated there were significant relationship between quality of life, and the frequency, number of activities, and meaning of leisure activity engagement. Results of the study suggest that social activities had a positive effect on quality of life. Findings also suggest that participation in social activities was related to participation in other types of recreational activities. Research outcomes hold implications for service delivery demands and policy transformation for people with visual impairments in North Carolina. The results also indicate the need for further research in the areas of recreation activity participation, vision-related quality of life, and adults with visual impairments.

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VISION RELATED QUALITY OF LIFE AMONG ADULTS WITH VISUAL IMPAIRMENT

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by

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## Manuscript

Visual impairment is defined as an individual having at least some difficulty with near and farsightedness, or visual acuity lower than 20/50 (Hemrick, 2007). It is estimated that worldwide, one person loses their vision every five seconds (Leske, Suh-Yuh, Nemesure, & Hennis, 2010). In North Carolina, visual impairments affect 31.6% residents aged 40 and over (Hemrick, 2007).

With the number of individuals with visual impairments, the ability to meet the needs of the individual and to offer effective options for community engagement is essential. It is important, therefore, to understand the challenges individuals with visual impairments face. By understanding of the challenges experienced by persons with visual impairments, approaches can be designed to help minimize these challenges and maximize on factors that enhance overall quality of life (QOL) and community engagement.

The World Health Organization (WHO, 1993, p. 153) defines quality of life (QOL) as, “an individual’s perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns”. Misajon et al. (2005) identify six concepts as they relate to quality of life. It is important to consider each of these concepts within one’s perceived quality of life, not just any single area. It is also important to consider how these concepts are impacted by or have an impact on a person’s functioning. In this study concepts included were based on the VisQOL: emotional well-being, social well-being, physical well-being, planning and organization, self-conceptualization, and independence (Misajon et al., 2005).

The International Classification of Functioning, Disability and Health (ICF) (WHO, 2001), identifies multiple functional implications and environmental constraints to activity

participation related to vision loss that may impact quality of life. The ICF provides a classification system that addresses Body Structure, Body Functions, Activities and Participation, and Environmental Factors. Each area has an impact on an individual's ability to engage in the life of the community.

The constraints experienced by individuals with visual impairments impact their ability to adapt to the condition and to engage in the life of the community. One such constraint is the individual's engagement in recreation and leisure opportunities within a given community (WHO, 2001). When a person's physical functioning is restricted, their ability to participate in recreation and leisure activities can also be affected.

Individuals who are physically active report greater participation in community activities tend to report a higher quality of life (QOL) (Mayo, Wood-Dauphinee, Cote', Durcan, & Carlton, 2002; Rimmer, 2006). By minimizing constraints, individuals can remain active and improve their overall well-being and quality of life (Bloodworth, McNamee, & Bailey, 2011). In turn, the ability of individuals with visual impairments to participate in a wide variety of active sports, recreation, and leisure pursuits may impact their quality of life.

While recreational opportunities tend to be accessible for persons without impairments, this is not always the case for people with visual impairment. Individuals with visual impairments typically engage in physical activity less often than sighted individuals (Campbell, Crews, Moriarty, Zack, & Blackman, 1999). This lack of engagement may be due to any number of factors, including transportation, income, accessibility of options, lack of support systems, or secondary conditions (Berger, 2012).

In addition to engagement in physical activities, high levels of social engagement are also often associated with high levels of meaning and happiness (Bailey & Fernando, 2012).

Involvement in specific activities that encourage meaning and well-being (physical, emotional, or social) may also have an impact on the individual's perceived QOL. If this is the case, it is important to understand the relationship between activity engagement and QOL for adults with visual impairments. With this understanding, the planning and delivery of activities that foster an increase in the QOL of persons with visual impairment may be possible. The way a person is engaged in an activity, the fact that they can engage in an activity and the meaning of the activity to the individual may all be important to overall QOL (Berger, 2011).

Frequent participation in physical activity has been demonstrated to have a positive impact on a person's QOL (Lustyk, Widman, Paschane, & Olson, 2004). To date, the majority of the activity participation questionnaires, however, focused on individuals with non-vision physical impairments. For example, previous research has addressed physical impairments (Martin & Whalen, 2012), measured activity on the span of less than a year (Ramulu et al., 2012), were specific to children (King et al., 2009), or measured variables of physical activity that would not be valid to this study (e.g., grip strength, body composition, body mass index, blood pressure) (Çolak, Bamaç, Aydın, Meriç, & Özbeka, 2004).

In addition, the bulk of studies investigating the impact of vision loss on the QOL address the effects of vision loss on individuals in later years of life (Girdler, Packer, & Boldy, 2008; Good, 2008; Heinemann, Colorez, Frank, & Taylor, 1988). Literature focusing on the vision loss for younger individuals, between 18 and 65, however, is limited (Holbrook, Caputo, Perry, Fuller, & Morgan, 2009).

## **Purpose of the Research**

The purpose of this study was to describe any observed relationship between the self-perceived QOL of North Carolina residents between the ages of 18 to 65 with visual impairments and the number of types of activities participated in, recreation participation frequency, and the meaning of their recreation activities. This research addressed a series of related questions:

- 1.0 Is there a relationship between the number of recreational activities in which people participate and the perceived QOL of adults 18 to 65 with visual impairments?
- 2.0 Is there a relationship between the frequency of recreational activity participation and the perceived QOL of adults 18 to 65 with visual impairments?
- 3.0 Is there a relationship between the type of recreational activities and the perceived QOL of adults 18 to 65 with visual impairments?
- 4.0 Is there a relationship between the perceived meaning of types of recreational activities and the perceived QOL of adults 18 to 65 with visual impairments?
- 5.0 Is there a relationship between select demographic variables and number, frequency, meaning, and type of recreational activity participation and QOL?

The goal of this study was to understand the relationship between perceived QOL, a participant's meaning of activity participation, and actual recreational activity participation of adults with visual impairments in order to better develop programs, services, and policies as they relate to recreation and related activity participation.

## Methodology

### Sample and Sampling Technique

The population for this cross sectional study was adults with visual impairments in the state of North Carolina. Participants were adults 18-65, who are classified as “legally blind<sup>1</sup>” by an ophthalmologist, and were participants of at least one of the selected recreation-based statewide listserv for persons with visual impairments.

The sample was drawn from listserv members of the Raleigh Parks, Recreation, and Cultural Resources’ Visually Impaired Program (VIP) and/or Outlaw Bowling League. Both listservs were for individuals with visual impairments throughout North Carolina. The Outlaws Bowling League and the Visually Impaired Program have a combined 500 people on their listservs. Once duplicate names were removed, 416 eligible respondents were available. Of the 416 people, 321 provided the organizations with an email address. Forty-nine (49) individuals were designated via the listserv to be sighted healthcare professionals, volunteers, or sighted members of bowling groups throughout North Carolina. This left a group of 272 of individuals from the two listservs who had a visual impairment from the two listservs. Surveys were disseminated via email to the 272 identified through the listservs. For potential respondents who were not comfortable with online surveys or technology, participants were provided the opportunity to complete questionnaires via phone interview. Parameters for the study were met by eliminating responses from individuals who stated they were over 65 years of age and did not have a visual impairment.

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<sup>1</sup> A person who is legally blind has vision at 20/200 with correction in the better eye or field of vision of less than 20 degrees ([www.cdc.gov](http://www.cdc.gov), 2012).

## **Instrumentation**

For the purposes of this inquiry, an electronic questionnaire was devised that included scales to measure the individual's quality of life and recreation participation patterns.

Demographic information was also collected.

**Demographic information.** Demographic information including age, gender, economic status, visual acuity (Freeman et al., 2007), employment status, education, secondary conditions, accessibility to transportation, and length of time with visual impairment was collected. This information was used to determine relationships between select demographic variables and the participants' Vision Quality of Life Index score (Misajon et al., 2005), as well as the frequency and meaning of participation in selected activity types.

**Vision Quality of Life Index.** The Vision Quality of Life (VisQOL) index (Misajon et al., 2005) was used to determine how individuals with visual impairments perceive their quality of life. The VisQOL was developed to assess quality of life for persons with visual impairments, via a rigorous process that utilized focus groups. The VisQOL measured life dimensions of individuals with visual impairments including physical well-being, emotional well-being, independence, social well-being, planning and organization, and self-actualization. Misajon et al. determined that these six dimensions are highly representative of overall quality of life for individuals with visual impairments.

During focus groups, Misajon et al. (2005) discussed with individuals who possessed visual impairments, their perceptions of quality of life based on the valid quality of life questionnaire, Impact of Vision Impairment. The purpose of the focus groups was to determine content validity. Upon analysis of the results of the focus groups, a database of 33 items was related to the identified life dimensions. The final scale had a Cronbach  $\alpha$  measure of 0.88,

suggesting high internal consistency. Each of the six final items factor loaded to only one item, indicating that the scale was accurately measuring the intent of each question (Misajon et al., 2005).

The VisQOL is scored such that lower scores reflect a higher perceived QOL and higher scores reflect a lower perceived QOL. Each dimension has one question with five to seven answers that range from “does not affect” to “definitely affects” their quality of life. Each response is associated with a numerical score. At the end of the six questions, the scores are summed. A low score indicates that a person has a perceived positive QOL despite their visual impairment. The scores of the QOL were correlated with the modified Leisure Behavior Inventory and categorical variables.

**Leisure Behavior Inventory (modified).** The Leisure Behavior Inventory was used by Ragheb (1980) to study the attitudes and sociodemographic factors related to leisure participation of youth and adults in the southern United States. For this study, it was modified to retain the activity categories and to include the level of meaning an activity possessed. The inventory activities were analyzed as six categories including: mass media, sports activities, social activities, cultural events, outdoor activities, and hobbies. Within the questionnaire a few examples of activities listed as a reference were included in each category.

**Number of activities participation.** The number of recreational activities in which subjects participated was determined by recording the total number of types of recreational activity categories in which a person reportedly engaged throughout the course of the year. Rimmer (2006) noted that the number of activity participation in the community may also possess a relationship to quality of life.



**Frequency of participation.** While number of recreational activities offers an indication of the types of activities in which participants engaged, the frequency of participation offers an indication of how often an individual participates in an activity. To measure the frequency of recreational activity participation a Likert type scale was used, “1 – never”, “2 – seldom”, “3 – some of the time”, “4 – often”, and “5 – very often”.

**Meaning (Importance) of participation.** For use in this study, meaning was defined as the importance the participant places on an activity. In addition to number and frequency of activity participation, a measure of the meaning of the activity was collected. The value of an activity may have more impact than the engagement in an activity (Berger, 2011). To measure the meaning or importance of a recreational activity, respondents were asked to rate the level of meaning/importance of leisure activity participation in each of the six leisure activity categories. Participants rated meaningfulness of each activity category using a Likert type scale that included: “1 – not meaningful”, “2 – somewhat meaningful”, “3 – Neutral”, “4 – Meaningful”, and “5 – very meaningful”.

### **Data Collection Procedures**

To ensure questions were appropriate for this study, four reviewers examined the instrument and data collection procedures. The final instrument was pilot tested with a test group of 10 adults with visual impairments. During the pilot test, factors were taken into consideration for potential changes before the final version was released. The factors included: completion time, readability, user friendliness, and ease of completion. The pilot test subjects addressed the readability of the questionnaire to ensure ease of access via the JAWS software.

JAWS is a computer program designed for persons with visual impairments, allowed the individual to navigate their computer with voice or Braille assistance, depending on the user’s

preference (FreedomScientific.com, 2012). Through the use of JAWS, individuals who had computer access were able to complete the questionnaire at their convenience. User friendliness and ease of completion reviews were utilized to ensure adequate and complete response to the survey.

Based on feedback received during pilot testing, no revisions were made. Surveys had been completed in a reasonable amount of time and the JAWS assistive technology worked well with Qualtrics software.

The questionnaires were distributed to persons with visual impairments via the listservs for the City of Raleigh's Visually Impaired Program and the Outlaw Bowling League. Respondents were required to indicate their willingness to participate in the survey prior to starting by selecting "yes" I agree to participate on the first question of the survey.

A modified Dillman Method for data collection via the Internet was employed. A series of five emails were to potential respondents over the course of 48 days (Schaefer & Dillman, 1998). For individuals who had difficulty with email, the facilitator's phone number was included within each email to allow completion of the survey via phone interview. Six respondents completed the questionnaire in this manner.

## **Results**

Questionnaires were sent by email to 272 participants who are visually impaired throughout North Carolina. Of these 272 people, 53 completed the survey; 18 of those did not meet the study's criteria because they were not: visually impaired (n=9), between the ages of 18 to 65 years old (n=4), or responses were incomplete (n=5). The remaining responses (n=35) were used during statistical analysis for this study, resulting in a response rate of 19%.

The hypotheses were tested using descriptive, correlation and cross tabulation analyses. Descriptive statistics were used to establish the profile of the persons with visual impairments responding to the study. These can and should be compared to state values if available. Descriptive statistics included demographic information including age, gender, income, education level, accessible transportation, years of visual impairment, home assistance required, and visual acuity. The number, frequency, and meaning of activity participation were correlated against the individual's quality of life score from the VisQOL. A series of four correlation analyses were conducted. Each analysis was a Pearson's R two-tailed correlation designed to understand if there was a significant relationship between variables tested. Demographic information was analyzed with VisQOL scores, frequency of participation, meaning of participation, and number of activities participated.

Analyses were performed with respect to the demographic information and each of the related research questions. The results for each research question offered insights into the relationship between activity participation and overall VisQOL.

### **Demographic information**

Of the 35 respondents, 20 were males and 15 were females with 62.9% of respondents being 50 to 65 years of age. Only 14.3% of the respondents had been visually impaired for 20 years or less. 60% of respondents had visual acuity ranging from 20/1000 to total visual impairment. 65.7% respondents had completed a 4 year degree, graduate/professional degree, or doctorate degree. While 54.3% of respondents reported working in some capacity (Full-time=15; Part-time=4). Of the group surveyed, 57.1% had a household income level of \$35,000 or lower. Respondents reported that transportation was easily accessible for 60% of the group. With regard to required assistance, 48.6% of the group did not require assistance at home. The

majority of the respondents, 77.1%, did not have a health condition that limited their physical activity. See Table 1.

To better understand barriers of transportation and health conditions, participants were offered the opportunity to provide qualitative information about the barriers they faced. With regard to transportation, three themes were reflected: the lack of access to public transportation, unreliable public transportation, and ease of scheduling transportation for work but not recreation or appointments. Individuals also noted health issues as: asthma, diabetes, hearing impairment, neurofibromatosis, arthritis, varicose veins, knee replacement, Primary Sclerosing Cholangitis, and kidney failure.

### **Vision Quality of Life Index**

The range for the VisQOL is from 0 to 28. Respondents in this study presented scores ranging from 9 to 26. The mean score was 14.35. According to Misajon et al. (2005), respondents who scored 9 to 12 (n=13) are defined as having an important impairment. Those who scored 13 to 16 (n=13) are defined as having a major impairment on their life. Those who scored 17 to 28 (n=9) are defined as having a catastrophic impairment on their life. See Table 2.

### **Number of recreational activities and perceived QOL**

A negative relationship between number of recreational activities in which an individual participated and perceived QOL was found. This meant that as the number of recreational activities increased, the VisQOL score decreased, indicating a higher perceived QOL ( $p < .01$ ). See Table 3.

### **Frequency of recreational activity participation and perceived QOL**

A correlation analysis was undertaken to determine if there was a relationship between perceived VisQOL scores and frequency of recreation participation. As shown in Table 5, there

is a relationship between the respondents perceived VisQOL and social activities, sports activities, outdoor activities, and cultural events. Each of these variables were significantly, negatively correlated with quality of life ( $p < .01$ ). The negative correlation indicates that individuals with greater participation rates reported a greater quality of life. See Table 4.

### **Meaning of recreational activities and perceived QOL**

When the researcher analyzed the relationship between participants' perceived meaning of participation and their perceived QOL, there was a significant relationship between the VisQOL score and social activities ( $p < .01$ ). However, no other correlations were significant between VisQOL and the remaining five activity categories. See Table 5.

### **Frequency of participation and meaning of participation in activity types**

There was a significant relationship between the frequency of recreation participation and the meaning for each type of participation. All activities had a significance value of  $p < .01$ , except for mass media which had a significant relationship at the  $p < .05$  level. The data indicated that the frequency of activity participation and meaning of activity were positively correlated. The more meaningful an activity was to an individual, the more likely they would be to participate in that activity. See Table 6.

### **Demographic Variables and QOL, Frequency, Number, & Meaning of Recreational Activity Participation**

A cross tabulation analysis was conducted to determine relationships between demographic information and QOL/frequency/number/meaning of activity participation. Demographic information with a variety of responses were recoded into two or three response categories. Employment and assistance at home were recoded as a "yes" or "no" response. Income level was recoded as "lower than \$35,000" and "above \$35,000". Education was

recoded as “Some college or less” or “2 year degree or more”. Visual Acuity was coded as “partially sighted” and “totally blind”. Time with vision impairment was recoded as “less than ten years”, “ten to twenty years”, and “twenty or more years”.

Significant relationships included: income and frequency of outdoor activity participation  $\chi^2(4, N = 31) = 10.363, p = .035$ , accessible transportation and number of activities  $\chi^2(6, N = 29) = 16.763, p = .010$ , secondary conditions and number of activities  $\chi^2(6, N = 29) = 15.217, p = .019$ , and time with visual impairment and frequency of cultural activity participation  $\chi^2(8, N = 33) = 16.908, p = .031$ . No other variables reflected a significant relationship. See Tables 7 and 8.

## **Discussion**

The results of the study lead to several implications for services, support systems, and policies related to adults with visual impairments. While the results are limited to the 35 respondents in this study, they may have broader implications for all persons with visual impairments.

### **Impact of Social Activities on QOL**

Similar to the findings of Horowitz, Reinhardt, Boerner, and Travis (2003) and Stevens-Ratchford and Krauss (2004), there was a positive relationship between participation in social activities and participation in sports activities, outdoor activities, and cultural events. Social events typically nurture positive bonds and relationships between two or more individuals. Sports activities (spectator sports or participation in sports), outdoor activities (hiking, fishing), and cultural events (plays, concerts, museum visits) are more often social in nature and done within a group setting (two or more persons). There may be merit in providing individuals with vision impairments social opportunities with others without visual impairments. Such

relationships between those with visual impairments and other individuals, sighted or with visual impairments may have a positive impact on overall QOL.

Suggestions to enhance social opportunities include increasing face-to-face social contact, social media, or other technological advances. Opportunities to interact with others outside of a person's home environment can be a rare opportunity for individuals where transportation is not easily available. Several communities in North Carolina offer support groups for individuals with visual impairments (NC Division of Services for the Blind, 2013; NC Federation of the Blind, 2013). In addition, support groups are offered through local Division of Services for the Blind (through Department of Health and Human Services), North Carolina Federation for the Blind, and other related advocacy organizations. Groups such as these play an important role in creating new opportunities for social relationships with individuals in similar situations across the community (Larner, 2005). Providing opportunities to gain access through transportation and other support mechanisms will continue to be a challenge for service providers. Promoting activities that facilitate social relationships (e.g., beepball or social outings) between sighted and visually impaired individuals may offer options for addressing both transportation and social activity participation.

Depending on the size of the community in which a person lives and the availability of support groups, it may be easier for a person to engage socially through social media or other technology. Since Facebook, Twitter, and other social media options have been created, multiple opportunities for individuals to engage in social activities exist. Visually impaired computer users are able to utilize JAWS software, Braille readers, or screen enlargement programs to facilitate the use of the Internet and other technologies. Cell phones provide access to options

enabling users to navigate through phone calls, text messages, email, applications, or most other tasks via voice commands.

### **Frequency of Activity Participation and Number of Activities**

There was a relationship between the frequency of activity participation and the number of activities engaged and the perceived quality of life for the respondents. Similar results were found by Lustyk, Widman, Paschane, & Olson (2004) as related to engagement in physical activities. In the case of this study, quality of life was related to both the number of activities (different types) and the frequency of participation in these activities.

From a programmatic perspective, there is a need for service providers to offer a broad variety of activity options for individuals with visual impairments as well as more opportunities for more frequent engagement. Challenges may arise including the need to expand offerings for individuals with visual impairments as separate programs or services, as well as providing inclusive services. By responding on both fronts, more opportunity for engagement is promoted and a greater variety of activity options would be made available to the consumer with a visual impairment.

### **Inclusive Recreation Opportunities**

Before offering adaptive or inclusive recreation opportunities, programming professionals in management must ensure that the front-line staff are trained adequately to best serve the participants. Staff training should include: general information about vision loss, how to modify activities, ADA guidelines for facilities, and in general communications (e.g., how to be descriptive, methods of information delivery (large print, email, audio cassette, or Braille)), use of service animals, and the process for making facilities more accessible to those with visual



impairments. Once staff are trained to work with individuals with visual impairments, it is important to survey the layout and arrangement of the facility or building.

Most individuals with vision impairments use a mobility aid, which could be a cane or guide dog. While guide dogs are trained to keep their handler as safe as possible, patrons who use white canes are at greater risk of injury when in a new location. The arrangement of furniture and equipment within a facility can be important to encouraging participation in recreation opportunities (Rimmer, Riley, Wang, Rauworth, & Jurkowski, 2004). If arrangements are difficult for persons with visual impairments to follow or if objects create obstructions, safety hazards may exist for those with visual impairment.

Providing recreational opportunities to individuals with vision impairments does not have to require a total program overhaul. While it may or may not be feasible to offer programs for a specific set or group of people to ensure all programming is age-appropriate and functionally suitable, adaptations can be made to current standing programs. A trend in local recreation agencies is inclusive recreation programming. With an inclusive program, instructors or coaches are trained and provided information about what to expect with an individual who has a particular impairment, as well as information of how to make modifications to best help the participant. There is usually an Inclusion Specialist who is assigned to individuals with disabilities to provide support them to be successful within that program. Not all programs or activities will require an Inclusion Specialist. Some adaptations can be made to make regular programming inclusive include: delivery of information (Braille, audio, email, or large print documents), hands-on or tactile demonstrations, and audio description of videos or movies.

## **Accessibility of Transportation and Impact on QOL**

Transportation was an issue for 40% of the respondents in this study. This may be higher or lower depending on where the respondents live. For those who said transportation was not easily accessible, it may be that they live in a city where transportation is not as easily scheduled or non-existent. The lack of accessibility to public transportation for persons with visual impairments is one of many factors that can lead to increased social isolation (Rubinstein, Lubben, & Mintzer, 1994). Based on research (Ibrahim, Abolfathi Momtaz, & Hamid, 2012; Rubinstein, Lubben, & Mintzer, 1994), social isolation can be detrimental to all dimensions of a person's vision-related QOL.

To participate in community-based activities, transportation must be available and easily scheduled, or individuals have a social support system that can transport them to and from activities. Within Raleigh and other major cities in North Carolina, transportation assistance is available at a nominal fee. It is typical for individuals to schedule trips a minimum of one day in advance. While this makes getting to work and regularly scheduled appointments easy, it is not the same for recreation and leisure opportunities that may come up on short notice.

For participants of the City of Raleigh's Visually Impaired Program, transportation is available to the majority of program participants for a fee. This allows persons who may not qualify for public assistance for transportation to participate in programs, as long as they reside within Raleigh city limits. Offering transportation options for programs will be easier in cities that have established systems. A program similar to this may be possible in rural areas, if small communities shared their resources to be more accessible for individuals with vision impairments (Rimmer, Riley, Wang, Rauworth, & Jurkowski, 2004).

For instance, the data indicated that access transportation, private or public affects an individual's participation in recreation activities. Local government entities may consider offering assistance to city and county residents in accessing transportation as a means to increase access and engagement in a range of community activities and thus improve perceived quality of life. Partnerships among rural communities may be required to facilitate recreation engagement for person with visual impairments. The key is the provision of personnel, services and programs, and policies that promote what the ICF reflects as participation in the life of the community.

### **Relationship of Demographic Variables, VisQOL, and Activity Participation**

When examining the relationship of demographic information and frequency, number, meaning of recreation activity participation, and VisQOL scores, significant relationship were found with several variables, (e.g., income and frequency of outdoor activity participation, accessible transportation and number of activities, secondary conditions and number of activities, and time with visual impairment and frequency of cultural activity participation).

**Income and Frequency of Outdoor Activity Participation.** Individuals who made less than \$35,000 per year (n = 18) were more likely to participation in outdoor activities. One explanation could be that outdoor activities are typically low cost activities (e.g., camping, fishing). For those with less economic support, a Certified Therapeutic Recreation Specialist (CTRS) could help them explore free or low-cost activity options in the other activity categories in their local community. For activities that may not be affordable, a financial assistance program may provide the needed support to expand activity options. In addition, organizations are able to access organizations that offer grants or price discounts to individuals with visual impairments to encourage participation in particular types of activities may be warranted.

**Accessible Transportation and Number of Activity Types.** Individuals who reported to have transportation easily accessible to them (n = 18) were more than likely to participate in a larger number of activity types. The majority of this group participated in four to six of the activity categories. As noted in the results section, an increase in participation in number of activity types indicated a higher perceived QOL. Being able to easily access transportation is important to a person's participation in recreation activities. Increased attention to transportation to persons with visual impairment may further influence activity participation and, thus, quality of life.

**Secondary Conditions and Number of Activity Types.** Individuals who reported no having a secondary condition (i.e., health) that limited their activity engagement (n = 24) were more than likely to participate in a wider variety of activity types. The majority of those individuals who did not report a secondary condition participated in four to six of the activity categories. Secondary or co-existing conditions that limited activity participation may decrease an individual's perceived ability to participate in a particular activity type. For instance, someone who participates in beepball who acquires a hearing impairment may choose not to engage in beepball depending on the level of real or perceived impairment. In this example, hearing is essential for participation in the sport.

Similarly, other health conditions may impact an individual's functional performance and therefore, limit their engagement. The qualified CTRS professional may need to further modify activities or engage the individuals in treatment oriented activities that improve functional performance in order to compensate for the impact of the secondary condition.

**Time with Visual Impairment and Frequency of Cultural Activity Participation.** Individuals who had a visual impairment of 20 years or more (n = 29) were more than likely to

participate in cultural activities. Since these participants had been visually impaired for 20 or more years, the majority of the respondents were in the 50-65 year old category. There was an insufficient number of respondents (n=4) with a visual impairment of less than 20 years. It may be beneficial, however, to ensure that individuals with more newly acquired visual impairment be exposed to a full range of activity options. Therefore, programmers may consider the number of activity options available across the entire population of individuals with visual impairments.

### **Limitations**

There were several elements that resulted in limitation to this study. Due to the low number of respondents, the response rate was considered a limitation. The modified Dillman method was utilized in this study as a means maximize on the response rate, only 53 individuals out of 272 responded to the survey. Of this group 35 respondents met the criteria for participation, resulting in a response rate of 19%. Due to the low response rate and use of internet as primary means to collect data, it is possible that the data collected is skewed.

### **Delimitations**

Efforts were employed to reduce the impact of each limitation, however, some limitations remained. The participants were delimited to include only those who are members of groups/organizations that have electronic (web-based) listservs for persons with visual impairments within North Carolina. Therefore, individuals who are isolated by their visual impairment may not have been included in the sample. The results of this study may have greater implications for persons with visual impairments and their perceived quality of life.

Furthermore, participation was restricted to individuals between the ages of 18 and 65.

## Summary

Certified Therapeutic Recreation Specialists (CTRS) in a community-based or clinical setting and recreation service providers may use the information from this study to better plan programs and services for adults with visual impairments. The access and engagement in quality community-based services does impact an individual's overall perceived quality of life.

The number of recreation and leisure offerings also seems to have an impact on the perceived quality of life of the study participants. While the research sample for this was small, the results may apply to the larger population of persons with visual impairments.

Since the sample size in this study was small, the demographic information may not be completely representative of the population. Further research with a larger sample size is necessary to establish a more confident understanding of the quality of life needs of this population. In addition, this study did not include a means to compare responses of urban versus rural dwellers with visual impairments. The challenges of rural dwellers may be significantly different or of different magnitude than urban dwellers. Access to public transportation alone impacts social networks, access to program offerings, and engagement with the local community.

In general, the results of this study confirmed outcomes of prior studies (Horowitz, et al., 2003; Rimmer, et al., 2004; Stevens-Ratchford & Krauss, 2004). Access to and engagement in a number of community activities has an impact on the physical, social, and emotional well-being of individuals with visual impairments.

Local governments can use the data on accessible transportation and its impact on a person's quality of life to lobby for grants and services. This would allow individuals with vision impairments, and even other physical disabilities, the chance to become more independently engaged within their community.

The challenges confronting individuals with visual impairments are significant. Through well planned programs and services and appropriate modifications, the person with a visual impairment can engage in the life of the community. Active engagement is one means in which an individual's quality of life can be impacted in a positive manner.

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Table 1

*Demographic Information of 35 Respondents with Visual Impairment after Recoding of Responses*

Questions	Frequency	Percent
<b>What is your gender?</b>		
Male	20	57.1
Female	15	42.9
<b>What is your age?</b>		
18 to 34	9	25.7
35 to 49	4	11.4
50 to 65	22	62.9
<b>How long have you been visually impaired?</b>		
Less than 10 years	3	8.6
10 to 20 years	2	5.7
More than 20 years	30	85.7
<b>Which best describes your visual acuity?</b>		
Partially Sighted	20	25.7
No light perception/ total visual impairment	15	42.9
<b>What is the highest level of education you have completed?</b>		
Some College or less	9	25.7
Completed a 2 Year Degree or more	26	74.3
<b>Are you employed?</b>		
Yes	19	54.3
No	16	45.7
<b>What is your household income level?</b>		
Under \$35,000	20	57.1
\$35,000 or More	14	40
<b>Do you feel transportation is easily accessible to you?</b>		
Yes	21	60
No	14	40
<b>How often do you require assistance at home?</b>		
Yes	18	51.4
No	17	48.6
<b>Do you have other disabilities or conditions that limit your physical activity?</b>		
Yes	8	22.9
No	27	77.1

Table 2

*Summary of Answer Selections of the Vision Quality of Life Index of 35 Respondents with Visual Impairments Ages 18 to 65*

VisQOL Dimension	Lesser Impact			Greater Impact				MEAN
	1	2	3	4	5	6	7	
Physical Well-Being	16	18	1	0	0	NA	NA	1.57
Social Well-Being	4	6	16	8	1	0	NA	2.89
Emotional Well-Being	0	21	12	1	1	0	0	2.49
Planning & Organization	12	15	6	1	0	0	NA	1.83
Self-Actualization	6	4	15	7	2	1	NA	2.94
Independence	1	18	11	3	2	0	NA	2.63
Mean Sum Score								<b>14.35</b>

Note: Scores on the VisQOL result from the individual's perceived impact of vision on each of the six dimensions of QOL. Scores must be used as a summative score, as individual question scores are meaningless on their own. The mean score was a 14.35, indicating a major impairment on life (Misajon et al., 2005). The numbers within the table indicate the number of times each answer was selected. NA indicates that the option was not available.

Table 3

*Correlation of VisQOL Score and Frequency of Recreation Activity Participation of 35 Respondents (Pearson Correlation; 2-Tailed)*

	VisQOL Sum	Social Activities	Mass Media	Sports Activities	Outdoor Activities	Cultural Events	Hobbies
VisQOL Sum	1.000	-.589**	-.015	-.459**	-.558**	-.415**	-.199

Note: Responses to frequency of participation was as follows: “1 – Never”, “2 – Seldom”, “3 – Some of the time”, “4 – Often”, and “5 – Very often”. VisQOL values were negatively correlated due to a lower QOL score indicating a higher perceived QOL. A negative correlation was to be expected.

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

Table 4

*Correlation between Number of Categories of Recreational Activities Participated and Perceived QOL (Pearson Correlation; 2-Tailed)*

	Number of Activities	VisQOL Score
Number of Activities	1.000	-.478**
VisQOL Score		1.000

Note: Responses were collected through a summation of the total number of types of recreation activities selected by the respondent. VisQOL values were negatively correlated due to a lower QOL score indicating a higher perceived QOL. A negative correlation was to be expected.

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).



Table 5

*Correlation of VisQOL Scores and Meaning of Participation in Six Categories of Recreation Activity Types (Pearson Correlation; 2-Tailed)*

	Social Activities	Mass Media	Sports Activities	Outdoor Activities	Cultural Events	Hobbies
VisQOL	-.476**	-.033	-.139	-.245	-.317	-.163
Sum						

Note: VisQOL values were negatively correlated due to a lower QOL score indicating a higher perceived QOL. A negative correlation was to be expected.

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

Table 6

*Correlation of Frequency and Meaning of Recreation Participation among Six Categories of Activities (Pearson Correlation; 2-Tailed)*

		Meaning						
		Examples	Social Activities	Mass Media	Sports Activities	Outdoor Activities	Cultural Events	Hobbies
Frequency	Social Activities	Being with others	.781**					
	Mass Media	TV Time or News		.404*				
	Sports Activities	Spectator or Playing Sports			.723**			
	Outdoor Activities	Hiking or Fishing				.551**		
	Cultural Events	Concerts, Theater, or Opera					.656**	
	Hobbies	Sewing or Pottery						.921**

Note: Responses to frequency of participation was indicated as follows: “1 – Never”, “2 – Seldom”, “3 – Some of the time”, “4 – Often”, and “5 – Very often”. Responses to meaning of participation were indicated as follows: “1 – Not Meaningful”, “2 – Somewhat Meaningful”, “3 – Neutral”, “4 – Meaningful”, and “5 – Very Meaningful”.

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

Table 7

*Cross Tabulation Analysis of Demographic Information and Frequency of Recreation Activity Participation with Significant Relationships*

		Never	Seldom	Some of the Time	Often	Very Often	Total
Time With Visual Impairment and Cultural Activities	Less than 10 Years	0	1	1	0	0	2
	10 to 20 Years	2	0	0	0	0	2
	More than 20 Years	3	11	2	11	2	29
	Total	5	12	3	11	2	33
Income Level and Outdoor Activities	Less than \$35,000	0	9	5	3	1	18
	More than \$35,000	3	1	3	3	3	13
	Total	3	10	8	6	4	31

Table 8

*Frequency Table of Demographic Information and Number of Recreation Activities with Significant Relationships*

		0	1	2	3	4	5	6	Total	
Transportation	Accessible	Yes	0	2	0	3	4	8	1	18
		No	1	1	5	0	3	0	1	11
		Total	1	3	5	3	7	8	2	29
Secondary Conditions		Yes	1	0	1	2	0	0	1	5
		No	0	3	4	1	7	8	1	24
		Total	1	3	5	3	7	8	2	29

Appendix A  
Expanded Literature Review

## **Extended Literature Review**

Literature on persons with visual impairments is diverse. This review is divided into three broad areas. The first section addresses the background on the prevalence and causes of visual impairments. The second section focuses on the challenges and constraints individuals with visual impairment face. The final section addresses recreational activity participations and the impact on quality of life including the impact on quality of life with relation to vision loss.

### **Prevalence, Causes, and Background Information**

Visual impairment is defined as having at least some difficulty with near and farsightedness or visual acuity lower than 20/50 (Hemrick, 2007). It is estimated that worldwide, one person will lose their vision every five seconds (Leske, Suh-Yuh, Nemesure, & Hennis, 2010). By 2020, in the United States, it is estimated that the number of blind persons, 40 years or older, will increase by approximately 1.6 million. By 2020, projections indicate there could be a total of 5.5 million Americans with visual impairments (Congdon et al., 2004). Visual impairments affect 31.6% of North Carolina residents, aged 40 and over (Hemrick, 2007).

Visual impairment is identified by the decrease of eye function, which can be hereditary, congenital, or acquired (Freeman et al., 2007). Though the causes for vision loss vary greatly by age and race, in the large majority of cases, visual impairment is caused by disease processes, such as cataracts, age-related macular degeneration, and glaucoma (Congdon et al., 2004). While these are not the only reasons for vision loss, these are the most common.

### **Cataracts**

Worldwide, cataracts are one of the primary causes for blindness (Congdon et al., 2004). Cataracts are most common among people over the age of 40, although children can also have cataracts. The distinguishing sign of cataracts is a cloudiness of the eyes lens. The lens is

located behind the pupil and iris. The cloudiness occurs when proteins in the eye begin to form clusters, which turn the lens a brownish-yellow. Cataracts are not formed spontaneously and will only require treatments when vision decreases (Hildreth, Burke, & Glass, 2009). It is only necessary to remove the cataracts when it impedes activities of daily living.

Besides the discoloring of the lens, other cataract symptoms include: blurry vision, faded color, light colored halos around objects, glares, double vision, and reduced night vision.

Excessive exposure to ultraviolet rays and long-term use of corticosteroids can contribute to the formation of cataracts. Previous eye injuries, extreme alcohol use, smoking, aging, and diabetes can all accelerate cataract development (Torpy, Lynn, & Glass, 2003).

### **Glaucoma**

Glaucoma is a permanent and irreversible impairment. Glaucoma is the leading cause of blindness and visual impairment in the world (Foster & Johnson, 2001). It occurs when damage is done to the optic nerve due to rising pressure in the eye. The pressure is raised when the aqueous humour flow is insufficient. This causes the volume of fluid to build up in the eye, which raises the intraocular pressure. While this disease is preventable, it has to be detected and treated early. The higher the pressure is allowed to build, the quicker the onset of damage. The lower the pressure, the more likely the damage will be more gradual and slower. When one eye becomes damaged, the other eye will compensate. This can result in tunnel vision and total vision loss. There are four major types of glaucoma: Chronic (primary open-angle), Acute (primary closed-angle), Secondary, and Congenital.

Chronic glaucoma occurs most frequently, is usually painless, and does not affect eyes in the same way. Over a period of time, the intraocular pressure builds. An unexplainable, partial blockage prohibits the drainage of channels between the iris and the cornea. Treatment for

Chronic glaucoma includes the use of daily eye drops, regular eye doctor visits, and potentially surgery (Plester, 2008).

Acute glaucoma is intense, painful and requires immediate medical attention. Acute glaucoma occurs with the sudden rise of intraocular pressure due to the iris lying too close to the trabecular meshwork. This causes an incomplete or full blockage of the aqueous flow to the pupil. In the early stages, persons will experience light colored halos around white lights, red eyes, nausea, and vomiting. With the proper diagnosis and instant treatment, vision can be recovered. Women, people between the ages of 40 to 70, and people of south-east Asian descent are the most susceptible (Plester, 2008).

Secondary glaucoma occurs when the aqueous flow is blocked due to another eye condition. Secondary open angle glaucoma (SOAG) and secondary angle closure glaucoma (SACG) are the two most basic types. SOAG is caused by underlying pathological reasons. They are as follows: Trabeculitis, which is the inflammation of the angle damage, with blockages by plasma proteins; Obstructions by cellular substance of the intertrabecular spaces; abnormal materials blocking the outflow system; Meshwork cells change of metabolic activity; and increasing pressure in the episcleral veins. SOAG is caused by a different set of causes, such as: Irregular vessels or fibrous downgrowth or inflammatory infiltrate closing the synechial angle or ciliary body swelling causing non-synechial angle closure (Hall, 2000). Treatment will depend upon the root cause (Plester, 2008) and should be individualized in each case (Hall, 2000).

Congenital glaucoma occurs when anterior chamber of the eye is underdeveloped. This affects 1 in 10,000 babies, usually males. Onset can occur at any time between birth and sixteen years of age (Plester, 2008), but most commonly in the first year of life (Bar-Yosef et al., 2010). Congenital glaucoma is an autosomal recessive developmental defect of the anterior chamber



and the trabecular meshwork, preventing adequate drainage of aqueous humor (Bar-Yosef et al., 2010).

The most dependable way to identify glaucoma is through yearly and routine checkups by an optometrist. There are three early detection tests that can be done: fundoscopy, tonometry, and perimetry. Fundoscopy is the examination of the back of the eyes by a bright light. The light makes the optic nerve easily observed. Level of damage is determined by comparing the overall size of the optic disc to the pale centre ratio. Tonometry is a painless, pressure test that can be completed in one of two ways. The first way is puffs of air blown on the front of the eye by use of a machine. The second way is an instrument that is placed on the front of the eyes, after they have been numbed by eye drops. Perimetry tests the field of vision by the perception of a person's periphery and categorizes vision field loss. Each eye is tested separately. People who are at the highest risk of suffering from glaucoma include: people over the age of forty, those who have diabetes, have a family history of glaucoma, have almond shaped eyes, are short-sighted, use steroids, antiparkinsonian, antihistamine, and anticholinergic drugs, and people diagnosed with Graves' disease (Plester, 2008).

### **Age-Related Macular Degeneration**

Age-related macular degeneration (AMD) is the leading cause of loss of vision in people over 65 years of age (Quillen, 1999). It is estimated that at least fourteen million people in the United States suffer from some level of visual impairment due to age-related macular degeneration (Lamoreux et al., 2008). Though total vision loss is rare with AMD, central vision loss occurs regularly. This results in a person only having their peripheral vision. Only 10-20% of serious cases are due to non-exudative (dry) AMD, even though it is the most common form (Quillen, 1999).

Non-exudative AMD can be in the form of drusens or geographic atrophy. Drusens are light yellow colored deposits build up in both eyes, and normally do not interfere with vision except for some blurriness. On the other hand, geographic atrophy causes almost all vision loss due to non-exudative AMD. Signs of geographic atrophy include: circular atrophy patches on the retina, retina pigment epithelium and/or underlying choroid. Geographic atrophy patches can grow in number and size over time and tends to affect both eyes. It is typical to experience blurry and distorted vision, have trouble reading and/or driving, and assistive devices or require brighter lights to complete tasks using fine visual acuity to affect patients (Quillen, 1999).

With the number of individuals with visual impairments growing daily, it is important to understand the constraints individuals with visual impairments face. Once an understanding of the constraints is established, approaches can be designed to help minimize these constraints for individuals that experience a perceived low quality of life.

### **Challenges Due to Vision Loss**

Within population of those with visual impairments, approximately 70% are within the 18 to 65 age- range (Leonard, 2002). These individuals, as a result of vision loss, are confronted with a range of challenges. Understanding the challenges is important to a person's rehabilitation and quality of life.

One mechanism for understanding and classifying the functional impacts of visual impairment is the use of the International Classification of Functioning, Disability, and Health (also referred to as the ICF) (World Health Organization, 2001). The International Classification of Functioning, Disability and Health (ICF) Model has been used by health care professionals for over a decade (Stucki, 2012). The ICF allows for the classification of functioning in most

aspects of everyday life and offers a standardized language across healthcare disciplines. Figure 1 illustrates the ICF Model and how a condition interfaces with various aspects of a person's life.

Through the ICF classification system, functioning is classified via: Body Structure, Body Functions, Activities and Participation, and Environmental Factors (WHO, 2001). The model lends to the idea that each aspect affects the others, which also affects the levels a person can participate in activities. As a person's overall functioning changes, other aspects of their life are also impacted. The terms provided below are used within the ICF and a description of what each entails.

- 1) Health Conditions - An umbrella term for diseases or disorders – naturally occurring or trauma related
- 2) Body Functions - The physiological functions of body systems and psychological functions
- 3) Body Structure - The anatomical parts of the body, such as organs, limbs, and other components
- 4) Activities - The execution of a task or action by an individual
- 5) Participation – The involvement in any life situation
- 6) Environmental Factors - Assistive/adaptive technology; natural or human made changes in environment; support and relationships; attitudes; and services, systems, and policies
- 7) Personal Factors - Internal influences functioning and disability and a person's background

The ICF identifies multiple functional implications and environmental constraints to activity participation that apply to individuals with a loss of vision. Table 1 offers a brief example of the ICF classification system as it may relate to vision loss, and the subsequent functional constraints.

While a person experiencing vision loss may not be able to remove challenges, they can work to minimize these challenges. By minimizing challenges, individuals can remain active and improve their overall well-being (Bloodworth, McNamee, & Bailey, 2011). The ultimate outcome is the individual's engagement (participation) in the life of the community.

The resulting challenges for individuals with visual impairments to adapt to the condition and to engage in the life of the community are extensive. Challenges, such as transportation, income, access to typical lifestyle options, social support systems, public policy, or secondary conditions all impact the individual with a visual impairment (Bambara et al., 2009). Often times, these challenges have an impact on the overall quality of life of the individual and their emotional well-being (Casten & Rovner, 2008).

### **Understanding Quality of Life**

The World Health Organization (WHO, 1993, p. 153) defines quality of life as, “an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns”. QOL is reflective of how a person's disability, impairment, and/or experiences affect their daily life (Hamming & De Vries, 2007). However, when working with people who have different diseases, treatments, or cultures, it is inevitable to have varying definitions of quality-of-life (Barofsky, 2012).

Subjective and objective domains can be indicative of quality of life. However, by themselves, they usually have a weak relationship (Cummins, 2005). While some people and/or groups define QOL as only a subjective or only an objective construct, others see it as a multi-dimensional construct.

Quality of life has often been viewed by several authors as a multi-dimensional (both subjective and objective) construct (Camfield & Skevington, 2008; Cummins, 2005; Gomes, Pinto, & dos Santos, 2010). According to Cummins (2005), there are four principles of QOL that support a multi-dimensional construct. These principles conclude that QOL:

- 1) Is multidimensional and influenced by personal and environmental factors and their interactions;
  - 2) Has the same components for all people;
  - 3) Has both subjective and objective components; and
  - 4) Is enhanced by self-determination, resources, purpose in life, and sense of belonging
- (p.610)

Within the above principles of QOL are five critical characteristics. These characteristics suggest that QOL: “exists in different forms (objective and subjective); should not be defined as only subjective or objective; should have the same components; should not be defined by needs; and should not be defined based on opportunities” (Cummins, 2005, p. 700). These characteristics should be embedded within principles in order to have a well-rounded conceptualization of QOL.

There are numerous QOL assessments in the literature today. Many of the QOL assessments focus on a specific condition or disability (Cummins, 2005). Therefore, they do not focus on aspects of QOL that are common to all individuals. When assessing QOL, one must ask questions about variables other than satisfaction in order to compile an all-inclusive assessment (Camfield & Skevington, 2008).

## **Vision Quality of Life Index (VisQOL)**

During focus groups, Misajon and colleagues (2005) discussed with individuals who possessed visual impairments, their perceptions of quality of life based on the valid quality of life questionnaire, Impact of Vision Impairment. Upon analysis of the focus groups results, a database of 33 items was developed on the identified life dimensions. The items that contained the weakest psychometric properties and factor loading and the lowest pooled principle component analysis loading were deleted from further testing. By removing the weak items, the content validity of the VisQOL was increased (Haynes, Richard, Kubany, 1995). The final scale had a Cronbach  $\alpha$  measure of 0.88, suggesting high internal consistency. Each of the six final items factor loaded to only one item, indicating that the scale was accurately measuring the intent of each question (Misajon et al., 2005).

With the Vision Quality of Life Index (VisQOL) (Misajon et al., 2005), goals, expectation, standards, and concerns are addressed within six concepts: emotional well-being, social well-being, physical well-being, planning and organization, self-conceptualization, and independence. Within these concepts, it should be understood that individuals with similar levels of functioning may perceive their QOL differently (Hamming & De Vries, 2007). It is important to consider all concepts within one's perceived QOL, not just any single variable. Within the VisQOL, these concepts are interdependent and important to a person's QOL (Misajon et al., 2005). See Table 2 for scoring procedures of the VisQOL and Table 3 for the interpretations of the scores.

**Emotional well-being.** Because of the emotionally disabling consequences of visual impairments, it is important for individuals to be able to properly cope with their new disability (Horowitz, Reinhardt, Boerner & Travis, 2003). A person's spirituality, faith, or belief systems

often offer guidance on how they live their life. For others, it could be self-esteem or status among peers or family members that have the most impact (Felce & Perry, 1995). Through a series of nationwide focus groups, consumers with physical disabilities indicated that fear of the unknown, requesting assistance, lack of support and perceptions of disability from friends, family, facility staff, and self-consciousness were emotional barriers to participation in recreational and leisure pursuits amongst individuals with physical disabilities (not limited to visual impairments) (Riley, Rimmer, Wang, Rauworth, & Jurkowski, 2004). For someone who has recently lost their vision, the thought of having to relearn how to operate in their new normal life can be overwhelming.

Research on vision loss explores the experience of vision loss rather than the adaptation process (Lindo & Nordholm, 2009). Increasing the focus on the adaptation process allows individuals with vision loss to increase functioning within the six concepts of QOL (i.e., emotional well-being, social well-being, and independence). When a person is unable to adapt and overcome the challenges and constraints of vision loss, there is a decrease in quality of life. The decline in visual function along with the decrease in quality of life could result in depression (Casten & Rovner, 2008).

Depression is greater in individuals with low/ no visual acuity than those that have normal vision (Rovner, Casten, & Tasman, 2002). Research shows that depression can lead to excessive disability<sup>2</sup> if not detected and treated, which will have a negative effect on quality of life (Casten & Rovner, 2008). Higher depression ratings correlated most strongly with overall

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<sup>2</sup> Excessive Disability – When a person’s functional decline is more rapid or greater than expected with a particular condition (Fenn, Luby, & Yesavage, 1993)

quality of life rating and greater activity loss (Bailey et al., 2009). Depression can worsen when a person becomes socially isolated.

**Social well-being.** An individual's ability to maintain positive social supports among family and peers, as well as involvement within the community is important for individuals with or without disabilities (Horowitz, Reinhardt, Boerner, & Travis, 2003; Stevens-Ratchford & Krause, 2004). Everyone has the desire to be accepted and participate within their community. High levels of social engagement were often associated with high levels of meaning and happiness (Bailey & Fernando, 2012). In a study by Mayo, Wood-Dauphinee, Co'te', Durcan, and Carlton (2002) that focused on individuals post-stroke, it was determined that the inability to participate in a meaningful activity (social, recreational, or occupational) was an issue for those with limitations (51%) and almost a non-issue for those without limitations (5%).

It may, therefore, be important to understand which types of activities have a higher meaning to adults with visual impairments. With this understanding, the planning and delivery of activities that foster an increase in QOL for persons with visual impairment may be possible. As a person's visual function decreases, the less they may be able to participate in meaningful activities (Casten & Rovner, 2008). The way a person is engaged in an activity may be less important than the fact that they can engage in an activity, if the activity is very meaningful to the participant (Berger, 2011).

In the 2011 Berger study, 26 older adults, ages 70-92 (mean = 80 years), participated in a survey in order to help understand how acquired vision loss relates to participation and engagement in leisure activities. Three themes emerged from this study: changes in relationships due to decreased vision, the influence of vision loss on time use, and achieving meaning through leisure. The ability to participate in activities, even in a different role, was very meaningful to



participants (e.g., candy maker taught others how to make candy instead of making candy herself). Vision loss creates challenges in participating in activities that were once simple to participate. The inability to partake in recreational activities is a concern of adults with visual impairment (Bambara et al., 2009).

**Physical well-being.** Physical well-being focuses on the physical abilities and general health of a person (Felce & Perry, 1995). If a person is not able to be independently mobile, then their physical well-being is greatly affected. When a person is less dependent on mobility aids, they may be more likely to be physically active due to the confidence in their mobility. Individuals with moderate to severe visual impairment are typically dependent on mobility aids, such as white canes or guide dogs. Poor physical well-being could be due to secondary health concerns and lack of physical activity (Capella-McDonnall, 2007; Holbrook, Caputo, Perry, Fuller, & Morgan, 2009; Longmuir & Bar-Or, 2000).

In Holbrook, et al.'s, 2009 study, twenty-five adults, aged 18 to 60 with best corrected vision acuity from 20/200 to no light/dark perception, and no mobility impairments were selected to participate in two sessions with study facilitators. The first session was an interview to determine mobility status, visual acuity, use of mobility aids, and perceived QOL (Low Vision Quality of Life Questionnaire - LVQOL), as well as measurements of height, weight and skinfold thickness. During this session, participants were given Step Activity Monitors (SAM) to record physical activity for the next week. During the second session, the SAMs were collected and participants had opportunity to give their insights of barriers to and opinions of health status and physical activity.

Upon analysis of the results, many outcomes were reflected. For gender and perceived QOL, there was indication that across levels of visual impairment, men scored higher (97.5) on

the LVQOL than women (79.3); Severity of impairment on QOL was not statistically significant  $F(2,19) = .51, p=.61$ ; mean daily activity levels were much lower than the activity levels of health adults of the same age range; and 44% of participants had a BMI of 30 kg/m<sup>2</sup> or higher. Results determined that education of individuals about health-related well-being was a necessary component for healthy lifestyles.

Capella-McDonnall (2007) discussed the importance of health promotion for adults who are visually impaired. “Overweight and obesity have been associated with a greater risk of eye diseases or a faster progression of certain eye diseases such as macular degeneration, maculopathy, cataracts, glaucoma, and diabetic retinopathy”, (as cited in Capella-McDonnall, 2007, pg. 134). Capella-McDonnall further discussed the lack of interventions to increase physical activity, stating that she found two such interventions in the literature. She used the ICF as the basis for the framework of several outcomes to improve implementation of poorer health and physical activity levels or adults with visual impairments. These outcomes include: healthier lifestyle education, fitness plans, nutrition, adaptive sports introduction, and cooking classes. These interventions can be done in rehabilitation or community-based setting. By utilizing these interventions in rehabilitation or community-based settings, individuals who are adjusting to their vision loss can work to enhance their independent living skills.

**Planning and organization, self-conceptualization, and independence.** The related concepts of planning and organization, self-conceptualization and independence are inter-related and impact an individual’s engagement in life activities and quality of life. The planning and organization of one’s skills may help increase one’s independence in work, recreation and leisure, productiveness and education (Larner, 2005). Self-conceptualization is the ability to implement one’s skills in order to function independently affects self initiative and participation

(Felce & Perry, 1995). The maintenance or loss of independence can be one of many results of vision impairment effecting the individual's engagement in the community (Casten & Rovner, 2008).

### **Recreation and Adults with Visual Impairment**

Individuals who are physically active and report a stronger participation in community activities tend to report a higher quality of life (Mayo, Wood-Dauphinee, Co'te', Durcan, & Carlton, 2002; Rimmer, 2006). Research has suggested that recreational sports participation among individuals with disabilities may positively influence concepts related to QOL (Lundberg, 2011).

One avenue for overcoming the challenges faced by individuals with visual impairments may be their participation in a wide variety of adaptive sports, recreation, and leisure pursuits. While recreational opportunities tend to be accessible for persons without impairments, this is not always the case for persons with visual impairment. Many recreational opportunities require sight to be able to participate independently. Even though reasonable accommodations can be made to increase participation, individuals with visual impairments tend to engage in physical activity less often than sighted individuals (Campbell, Crews, Moriarty, Zack, & Blackman, 1999).

Within the scope of recreation and disability, youth with visual impairments tend to lead sedentary lifestyles (Longmuir & Bar-Or, 2000). Given the lack of research on adults with visual impairment and recreation, conclusions may be drawn to support the same conclusions for adults with visual impairments and the tendency to lead sedentary lifestyles (Capella-McDonnall, 2007).

Recreation and leisure activities are an important part of a person's life. When a person loses their vision, their daily activities are impacted, typically in a negative way. A 2012 study by Berger focused on the lack of participation in leisure activities outside of the home in older adults. This qualitative research study utilized purposive sampling to select participants. Twenty-six older adults, aged 70 or older, participated in semi-structured interviews and observations by the facilitator. Participants had to be in relatively good health, speak English, and have vision ranging from no vision to 20/70 best corrected visual acuity. Personal and environmental factors were the main deterrents of leisure participation outside of the home. The common barriers to participation included: transportation, perceived vulnerability, lack of energy and decreased assertiveness.

Understanding of the challenges individuals with vision loss face, as well as their experiences and perspectives, is important to providing recreational opportunities for this population. Individuals with vision impairments are able to participate in most recreational opportunities with minimal modifications. Many factors play a role in engagement of home-based activities (mass media and hobbies) and community-based activities (sports activities, social activities, cultural events or outdoor activities) (Mannell & Kleiber, 1997).

Examples of some home-based activities include watching television or movies, reading newspapers or magazines, collections of various kinds, painting, needlework, arts, or music making (Mannell & Kleiber, 1997). While these activities are can be high on mental and/or emotional stimulation, they can lack in other concepts of QOL such as social and physical well-being. As noted by Berger (2012), some of the dominant reasons persons with visual impairment may chose to engage in home-based activities rather than community-based activities include: transportation issues, need for assistance, decrease in energy, decrease in cognitive functioning,

fear of falling or becoming lost, and the environment not being suitable for individuals with visual impairments. These reasons for engaging in home-based activities can be seen as challenges or constraints to individuals with vision loss (Stevens-Ratchford & Krause, 2004). If these constraints can be minimized, it is more likely for an individual with vision loss to remain active within the community (Berger, 2011).

Community-based activities, such as sports activities, social activities, cultural events, or outdoor activities, are typically done in groups of two or more. With the ability to participate in community-based activities, individuals are more likely to enhance aspects of QOL in some way. Activities in the community-based realm can assist in the development of physical well-being, planning and organization, and self-actualization. Sport activities can be home-based such as watching a sporting event in the home, but can also be community-based as well.

Within the visually impaired community, there are several available adaptive sport opportunities. Some of the sports specific to adults with visual impairments include: bowling (SportsVision, 2012), audio darts (SportsVision, 2012), beepball (National Beep Baseball Association, 2012), and goalball (International Blind Sports Federation, 2012). Participation in these activities result in multiple benefits including increased independence, increased recreation participation, fewer secondary health risks, and greater accessibility to recreational opportunities (Recreation and Sports Coalition, 2001).

Research suggests that sport participation, as both spectator and participant, can allow people to remain active, remain social, increase socialization, and increase mobility (Lundberg, Bennett, & Smith, 2011). Lundberg, et al, selected 18 Veterans with multiple acquired physical disabilities (including visual impairments - 38%) to participate in one of three weeklong programs of therapeutic and adaptive sports at Sun Valley Adapted Sports in Idaho. Participants

were given a pre and post-test. The instrument utilized in this study utilized the following questionnaires: WHO's Quality of Life Assessment, the Profile of Mood States-Brief, and Perceived Competence Scale. The post-test scores on all three instruments resulted in a high  $\alpha$  score, suggesting high reliability amongst the questionnaires (WHOQOLA = .92; POMS-Brief = .87; PCS = .92). The POMS-B (mood states) showed a significant decrease in overall mood disturbance after participation in the adaptive sport program [ $t(17) = 4.515, p < .001$ ]. Findings indicate adaptive sport and recreation opportunities can help with increased perceived competence and sense of vigor, as well as a reduction of negative mood states.

### **Summary**

Vision loss is a prevalent impairment affecting thousands of new persons each day (Congdon et al., 2004). There are multiple reasons people lose their vision, however glaucoma, age-related maculate degeneration, and cataracts are some of the most common (Congdon et al., 2004; Foster & Johnson, 2004; Quillen, 1999). Adaptation to everyday life can be overwhelming when a person loses their vision, no matter their age. Individuals with vision loss are tasked with overcoming barriers to participation in order to maintain a higher quality of life. Participating in positive recreation pursuits, regardless of the nature, is a factor that keeps participants active and engaged in social activities. Active engagement in recreation and leisure for persons with visual impairments assists in making the transition into life with their new normal vision.

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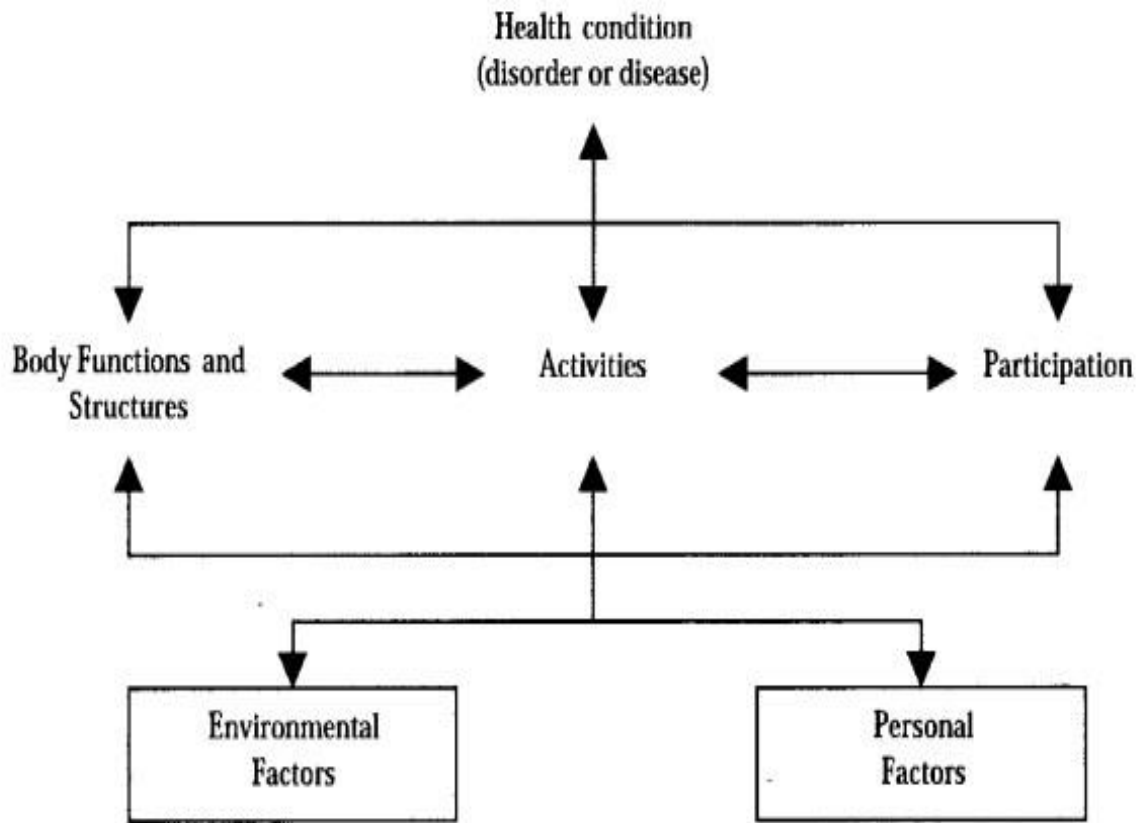
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Figure 1

*Flow Chart of ICF Model*



(World Health Organization, 2001)

Table 1

*Examples of Direct & Indirect Challenges of Vision Loss According to the ICF*

Code	Constraints
b134	Sleep Functions
b152	Emotional Functions
b210	Seeing Function
d110	Watching
d240	Handling stress and other psychological demands
d315	Communicating with-receiving nonverbal messages
d920	Recreation & Leisure
e445	Attitudes of Strangers
e460	Societal Attitudes

(World Health Organization, 2001)

Table 2

*How to Score the Vision Quality of Life Index*

	A	B	C	D	E	F	G
Q1	0	1	2	3	4	NA	NA
Q2	0	1	2	3	4	5	NA
Q3	0	1	2	3	4	5	Mean (Q1+Q2+Q5+Q6)
Q4	0	1	2	3	4	Mean (Q1+Q2+Q5+Q6)	NA
Q5	0	1	2	3	4	5	NA
Q6	0	1	2	3	4	5	NA

Note: Each letter selection indicates the value of the score to be included in the summation of the scores. Scores can range from 0 to 28. A higher score indicates a greater the living impairment due to loss of vision. See Table 3 for interpretation of scores.  
(Misajon et al., 2005)

Table 3

*Interpretation of Level of Impairment Explained by VisQOL Scores*

Score	Interpretation
0	Awareness of vision enhancing quality of life (must have selected both question 3 & 6 the response option enhancing life)
1 – 4	No living impairment due to vision loss, or very little impairment
5 – 8	Small impairment
9 – 12	Important impairment
13 – 16	Major impairment on life
17 – 28	Catastrophic impairment on life

(Misajon et al., 2005)



Appendix B  
Results & Extended Discussion

## **Results & Extended Discussion**

Questionnaires were sent by email to 272 participants who are visually impaired throughout North Carolina. Of these 272 people, 53 completed the survey; 18 of those did not meet the study's criteria because they were not: visually impaired (n=9), between the ages of 18 to 65 years old (n=4), or responses were incomplete (n=5). The remaining responses (n=35) were used during statistical analysis for this study, resulting in a response rate of 19%.

The hypotheses were tested using descriptive, correlation and cross tabulation analyses. Descriptive statistics were used to establish the profile of the persons with visual impairments responding to the study. These can and should be compared to state values if available. Descriptive statistics included demographic information including age, gender, income, education level, accessible transportation, years of visual impairment, home assistance required, and visual acuity. The number, frequency, and meaning of activity participation were correlated against the individual's quality of life score from the VisQOL. A series of four correlation analyses were conducted. Each analysis was a Pearson's R two-tailed correlation designed to understand if there was a significant relationship between variables tested. Demographic information was analyzed with VisQOL scores, frequency of participation, meaning of participation, and number of activities participated.

Analyses were performed with respect to the demographic information and each of the related research questions. The results for each research question offered insights into the relationship between activity participation and overall VisQOL.

### **Demographic information**

Demographic information was measured by the following questions. The time a person was visually impaired was measured in years as: "1 – less than one year", "2 – more than one

year, but less than five”, “3 – more than five years, but less than ten”, “4 – more than ten, but less than fifteen”, “5 – more than fifteen, but less than twenty”, “6 – more than twenty”, “7 – since birth”, and “8 – I do not have a visual impairment”. Economic status was determined by asking the respondent to indicate whether they were employed: “1 - full-time”, “2 - part-time, “3 – a homemaker”, “4 – retired”, “5 – Unemployed, but seeking work”, or “6 – unemployed”. Household income level utilized the income levels used in the United States Census Bureau. Education level was determined by asking about the highest level of education completed: “1 – less than high school”, “2 – completed high school”, “3 – some college”, “4 – completed a 2 year degree”, “5 – completed a 4 year degree”, “6 – completed a graduate degree/professional degree”, or “7 – doctorate degree”. Assistance required at home was measured by the respondent selecting: “1 – daily”, “2 – one to two times per week”, “3 – one to two times per month”, or “4 – never”. Visual acuity was determined by respondents selecting the closest description of their visual acuity: “1 – 20/200 to 20/400”, “2 – 20/500 to 20/1000”, “3 – 2/1000 or less”, or “4 – no light perception/total visual impairment”.

Of the 35 respondents, 20 were males and 15 were females with 62.9% of respondents being 50 to 65 years of age. Only 14.3% of the respondents had been visually impaired for 20 years or less. 60% of respondents had visual acuity ranging from 20/1000 to total visual impairment. 65.7% respondents had completed a 4 year degree, graduate/professional degree, or doctorate degree. While 54.3% of respondents reported working in some capacity (Full-time=15; Part-time=4). Of the group surveyed, 57.1% had a household income level of \$35,000 or lower. Respondents reported that transportation was easily accessible for 60% of the group. With regard to required assistance, 48.6% of the group did not require assistance at home. The

majority of the respondents, 77.1%, did not have a health condition that limited their physical activity. See Table 1.

To better understand barriers of transportation and health conditions, participants were offered the opportunity to provide qualitative information about the barriers they faced. With regard to transportation, three themes were reflected: the lack of access to public transportation, unreliable public transportation, and ease of scheduling transportation for work but not recreation or appointments. Individuals also noted health issues as: asthma, diabetes, hearing impairment, neurofibromatosis, arthritis, varicose veins, knee replacement, Primary Sclerosing Cholangitis, and kidney failure.

### **Vision Quality of Life Index**

The range for the VisQOL is from 0 to 28. Respondents in this study presented scores ranging from 9 to 26. The mean score was 14.35. According to Misajon et al. (2005), respondents who scored 9 to 12 (n=13) are defined as having an important impairment. Those who scored 13 to 16 (n=13) are defined as having a major impairment on their life. Those who scored 17 to 28 (n=9) are defined as having a catastrophic impairment on their life. See Table 2.

### **Number of recreational activities and perceived QOL**

A negative relationship between number of recreational activities in which an individual participated and perceived QOL was found. This meant that as the number of recreational activities increased, the VisQOL score decreased, indicating a higher perceived QOL ( $p < .01$ ). See Table 3.

### **Frequency of recreational activity participation and perceived QOL**

A correlation analysis was undertaken to determine if there was a relationship between perceived VisQOL scores and frequency of recreation participation. As shown in Table 5, there

is a relationship between the respondents perceived VisQOL and social activities, sports activities, outdoor activities, and cultural events. Each of these variables were significantly, negatively correlated with quality of life ( $p < .01$ ). The negative correlation indicates that individuals with greater participation rates reported a greater quality of life. See Table 4.

**Meaning of recreational activities and perceived QOL.** When the researcher analyzed the relationship between participants' perceived meaning of participation and their perceived QOL, there was a significant relationship between the VisQOL score and social activities ( $p < .01$ ). However, no other correlations were significant between VisQOL and the remaining five activity categories. See Table 5.

#### **Frequency of participation and meaning of participation in activity types**

There was a significant relationship between the frequency of recreation participation and the meaning for each type of participation. All activities had a significance value of  $p < .01$ , except for mass media which had a significant relationship at the  $p < .05$  level. The data indicated that the frequency of activity participation and meaning of activity were positively correlated. The more meaningful an activity was to an individual, the more likely they would be to participate in that activity. See Table 6.

#### **Demographic Variables and QOL, Frequency, Number, & Meaning of Recreational Activity Participation**

A cross tabulation analysis was conducted to determine relationships between demographic information and QOL/frequency/number/meaning of activity participation. Demographic information with a variety of responses were recoded into two or three response categories. Employment and assistance at home were recoded as a "yes" or "no" response. Income level was recoded as "lower than \$35,000" and "above \$35,000". Education was

recoded as “Some college or less” or “2 year degree or more”. Visual Acuity was coded as “partially sighted” and “totally blind”. Time with vision impairment was recoded as “less than ten years”, “ten to twenty years”, and “twenty or more years”.

Significant relationships included: income and frequency of outdoor activity participation  $\chi^2(4, N = 31) = 10.363, p = .035$ , accessible transportation and number of activities  $\chi^2(6, N = 29) = 16.763, p = .010$ , secondary conditions and number of activities  $\chi^2(6, N = 29) = 15.217, p = .019$ , and time with visual impairment and frequency of cultural activity participation  $\chi^2(8, N = 33) = 16.908, p = .031$ . No other variables reflected a significant relationship.

See Tables 7 and 8.

## **Discussion**

The results of the study lead to several implications for services, support systems, and policies related to adults with visual impairments. While the results are limited to the 35 respondents in this study, they may have broader implications for all persons with visual impairments.

### **Impact of Social Activities on QOL**

Similar to the findings of Horowitz, Reinhardt, Boerner, and Travis (2003) and Stevens-Ratchford and Krauss (2004), there was a positive relationship between participation in social activities and participation in sports activities, outdoor activities, and cultural events. Social events typically nurture positive bonds and relationships between two or more individuals. Sports activities (spectator sports or participation in sports), outdoor activities (hiking, fishing), and cultural events (plays, concerts, museum visits) are more often social in nature and done within a group setting (two or more persons). There may be merit in providing individuals with vision impairments social opportunities with others without visual impairments. Such

relationships between those with visual impairments and other individuals, sighted or with visual impairments may have a positive impact on overall QOL.

Suggestions to enhance social opportunities include increasing face-to-face social contact, social media, or other technological advances. Opportunities to interact with others outside of a person's home environment can be a rare opportunity for individuals where transportation is not easily available. Several communities in North Carolina offer support groups for individuals with visual impairments (NC Division of Services for the Blind, 2013; NC Federation of the Blind, 2013). In addition, support groups are offered through local Division of Services for the Blind (through Department of Health and Human Services), North Carolina Federation for the Blind, and other related advocacy organizations. Groups such as these play an important role in creating new opportunities for social relationships with individuals in similar situations across the community (Larner, 2005). Providing opportunities to gain access through transportation and other support mechanisms will continue to be a challenge for service providers. Promoting activities that facilitate social relationships (e.g., beepball or social outings) between sighted and visually impaired individuals may offer options for addressing both transportation and social activity participation.

Depending on the size of the community in which a person lives and the availability of support groups, it may be easier for a person to engage socially through social media or other technology. Since Facebook, Twitter, and other social media options have been created, multiple opportunities for individuals to engage in social activities exist. Visually impaired computer users are able to utilize JAWS software, Braille readers, or screen enlargement programs to facilitate the use of the Internet and other technologies. Cell phones provide access to options

enabling users to navigate through phone calls, text messages, email, applications, or most other tasks via voice commands.

### **Frequency of Activity Participation and Number of Activities**

There was a relationship between the frequency of activity participation and the number of activities engaged and the perceived quality of life for the respondents. Similar results were found by Lustyk, Widman, Paschane, & Olson (2004) as related to engagement in physical activities. In the case of this study, quality of life was related to both the number of activities (different types) and the frequency of participation in these activities.

From a programmatic perspective, there is a need for service providers to offer a broad variety of activity options for individuals with visual impairments as well as more opportunities for more frequent engagement. Challenges may arise including the need to expand offerings for individuals with visual impairments as separate programs or services, as well as providing inclusive services. By responding on both fronts, more opportunity for engagement is promoted and a greater variety of activity options would be made available to the consumer with a visual impairment.

### **Inclusive Recreation Opportunities**

Before offering adaptive or inclusive recreation opportunities, programming professionals in management must ensure that the front-line staff are trained adequately to best serve the participants. Staff training should include: general information about vision loss, how to modify activities, ADA guidelines for facilities, and in general communications (e.g., how to be descriptive, methods of information delivery (large print, email, audio cassette, or Braille)), use of service animals, and the process for making facilities more accessible to those with visual



impairments. Once staff are trained to work with individuals with visual impairments, it is important to survey the layout and arrangement of the facility or building.

Most individuals with vision impairments use a mobility aid, which could be a cane or guide dog. While guide dogs are trained to keep their handler as safe as possible, patrons who use white canes are at greater risk of injury when in a new location. The arrangement of furniture and equipment within a facility can be important to encouraging participation in recreation opportunities (Rimmer, Riley, Wang, Rauworth, & Jurkowski, 2004). If arrangements are difficult for persons with visual impairments to follow or if objects create obstructions, safety hazards may exist for those with visual impairment.

Providing recreational opportunities to individuals with vision impairments does not have to require a total program overhaul. While it may or may not be feasible to offer programs for a specific set or group of people to ensure all programming is age-appropriate and functionally suitable, adaptations can be made to current standing programs. A trend in local recreation agencies is inclusive recreation programming. With an inclusive program, instructors or coaches are trained and provided information about what to expect with an individual who has a particular impairment, as well as information of how to make modifications to best help the participant. There is usually an Inclusion Specialist who is assigned to individuals with disabilities to provide support them to be successful within that program. Not all programs or activities will require an Inclusion Specialist. Some adaptations can be made to make regular programming inclusive include: delivery of information (Braille, audio, email, or large print documents), hands-on or tactile demonstrations, and audio description of videos or movies.

## **Accessibility of Transportation and Impact on QOL**

Transportation was an issue for 40% of the respondents in this study. This may be higher or lower depending on where the respondents live. For those who said transportation was not easily accessible, it may be that they live in a city where transportation is not as easily scheduled or non-existent. The lack of accessibility to public transportation for persons with visual impairments is one of many factors that can lead to increased social isolation (Rubinstein, Lubben, & Mintzer, 1994). Based on research (Ibrahim, Abolfathi Momtaz, & Hamid, 2012; Rubinstein, Lubben, & Mintzer, 1994), social isolation can be detrimental to all dimensions of a person's vision-related QOL.

To participate in community-based activities, transportation must be available and easily scheduled, or individuals have a social support system that can transport them to and from activities. Within Raleigh and other major cities in North Carolina, transportation assistance is available at a nominal fee. It is typical for individuals to schedule trips a minimum of one day in advance. While this makes getting to work and regularly scheduled appointments easy, it is not the same for recreation and leisure opportunities that may come up on short notice.

For participants of the City of Raleigh's Visually Impaired Program, transportation is available to the majority of program participants for a fee. This allows persons who may not qualify for public assistance for transportation to participate in programs, as long as they reside within Raleigh city limits. Offering transportation options for programs will be easier in cities that have established systems. A program similar to this may be possible in rural areas, if small communities shared their resources to be more accessible for individuals with vision impairments (Rimmer, Riley, Wang, Rauworth, & Jurkowski, 2004).

For instance, the data indicated that access transportation, private or public affects an individual's participation in recreation activities. Local government entities may consider offering assistance to city and county residents in accessing transportation as a means to increase access and engagement in a range of community activities and thus improve perceived quality of life. Partnerships among rural communities may be required to facilitate recreation engagement for person with visual impairments. The key is the provision of personnel, services and programs, and policies that promote what the ICF reflects as participation in the life of the community.

### **Relationship of Demographic Variables, VisQOL, and Activity Participation**

When examining the relationship of demographic information and frequency, number, meaning of recreation activity participation, and VisQOL scores, significant relationship were found with several variables, (e.g., income and frequency of outdoor activity participation, accessible transportation and number of activities, secondary conditions and number of activities, and time with visual impairment and frequency of cultural activity participation).

**Income and Frequency of Outdoor Activity Participation.** Individuals who made less than \$35,000 per year ( $n = 18$ ) were more likely to participation in outdoor activities. One explanation could be that outdoor activities are typically low cost activities (e.g., camping, fishing). For those with less economic support, a Certified Therapeutic Recreation Specialist (CTRS) could help them explore free or low-cost activity options in the other activity categories in their local community. For activities that may not be affordable, a financial assistance program may provide the needed support to expand activity options. In addition, organizations are able to access organizations that offer grants or price discounts to individuals with visual impairments to encourage participation in particular types of activities may be warranted.

**Accessible Transportation and Number of Activity Types.** Individuals who reported to have transportation easily accessible to them (n = 18) were more than likely to participate in a larger number of activity types. The majority of this group participated in four to six of the activity categories. As noted in the results section, an increase in participation in number of activity types indicated a higher perceived QOL. Being able to easily access transportation is important to a person's participation in recreation activities. Increased attention to transportation to persons with visual impairment may further influence activity participation and, thus, quality of life.

**Secondary Conditions and Number of Activity Types.** Individuals who reported no having a secondary condition (i.e., health) that limited their activity engagement (n = 24) were more than likely to participate in a wider variety of activity types. The majority of those individuals who did not report a secondary condition participated in four to six of the activity categories. Secondary or co-existing conditions that limited activity participation may decrease an individual's perceived ability to participate in a particular activity type. For instance, someone who participates in beepball who acquires a hearing impairment may choose not to engage in beepball depending on the level of real or perceived impairment. In this example, hearing is essential for participation in the sport.

Similarly, other health conditions may impact an individual's functional performance and therefore, limit their engagement. The qualified CTRS professional may need to further modify activities or engage the individuals in treatment oriented activities that improve functional performance in order to compensate for the impact of the secondary condition.

**Time with Visual Impairment and Frequency of Cultural Activity Participation.** Individuals who had a visual impairment of 20 years or more (n = 29) were more than likely to

participate in cultural activities. Since these participants had been visually impaired for 20 or more years, the majority of the respondents were in the 50-65 year old category. There was an insufficient number of respondents (n=4) with a visual impairment of less than 20 years. It may be beneficial, however, to ensure that individuals with more newly acquired visual impairment be exposed to a full range of activity options. Therefore, programmers may consider the number of activity options available across the entire population of individuals with visual impairments.

### **Summary**

Certified Therapeutic Recreation Specialists (CTRS) in a community-based or clinical setting and recreation service providers may use the information from this study to better plan programs and services for adults with visual impairments. The access and engagement in quality community-based services does impact an individual's overall perceived quality of life.

The number of recreation and leisure offerings also seems to have an impact on the perceived quality of life of the study participants. While the research sample for this was small, the results may apply to the larger population of persons with visual impairments.

Since the sample size in this study was small, the demographic information may not be completely representative of the population. Further research with a larger sample size is necessary to establish a more confident understanding of the quality of life needs of this population. In addition, this study did not include a means to compare responses of urban versus rural dwellers with visual impairments. The challenges of rural dwellers may be significantly different or of different magnitude than urban dwellers. Access to public transportation alone impacts social networks, access to program offerings, and engagement with the local community.

In general, the results of this study confirmed outcomes of prior studies (Horowitz, et al., 2003; Rimmer, et al., 2004; Stevens-Ratchford & Krauss, 2004). Access to and engagement in a

number of community activities has an impact on the physical, social, and emotional well-being of individuals with visual impairments.

Local governments can use the data on accessible transportation and its impact on a person's quality of life to lobby for grants and services. This would allow individuals with vision impairments, and even other physical disabilities, the chance to become more independently engaged within their community.

The challenges confronting individuals with visual impairments are significant. Through well planned programs and services and appropriate modifications, the person with a visual impairment can engage in the life of the community. Active engagement is one means in which an individual's quality of life can be impacted in a positive manner.

## Discussion References

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Table 1

*Demographic Information of 35 Respondents with Visual Impairments*

Questions	Frequency	Percent
<b>What is your gender?</b>		
Male	20	57.1
Female	15	42.9
<b>What is your age?</b>		
18 to 34	9	25.7
35 to 49	4	11.4
50 to 65	22	62.9
<b>How long have you been visually impaired?</b>		
More than 1 year, but less than 5	1	2.9
More than 5 years, but less than 10	2	5.7
More than 15 years, but less than 20	2	5.7
More than 20 years	10	28.6
Since birth	20	57.1
<b>Which best describes your visual acuity?</b>		
20/200 to 20/400	9	25.7
20/500 to 20/1000	5	14.3
20/1000 or less	6	17.1
No light perception/ total visual impairment	15	42.9
<b>What is the highest level of education you have completed?</b>		
Completed High School	4	11.4
Some College	5	14.3
Completed a 2 Year Degree	3	8.6
Completed a 4 Year Degree	14	40
Completed a Graduate/ Professional Degree	7	20
Doctorate Degree	2	5.7
<b>Are you employed?</b>		
Full-time	14	40
Part-time	5	14.3
Retired	4	11.4
Unemployed, but seeking work	7	20
Unemployed	5	14.3
<b>What is your household income level?</b>		
Under \$10,000	7	20
\$10,000 to \$14,999	4	11.4
\$15,000 to \$24,999	6	17.1
\$25,000 to \$34,999	3	8.6
\$35,000 to \$49,999	9	25.7
\$50,000 to \$74,999	2	5.7
\$75,000 to \$99,999	3	8.6
<b>Do you feel transportation is easily accessible to you?</b>		
Yes	21	60
No	14	40
<b>How often do you require assistance at home?</b>		
Daily	3	8.6
1 to 2 times per week	6	17.1
1 to 2 times per month	9	25.7
Never	17	48.6
<b>Do you have other disabilities or conditions that limit your physical activity?</b>		
Yes	8	22.9
No	27	77.1



Table 2

*Summary of Answer Selections of the Vision Quality of Life Index of 35 Respondents with Visual Impairments Ages 18 to 65*

VisQOL Dimension	Lesser Impact				Greater Impact			MEAN
	1	2	3	4	5	6	7	
Physical Well-Being	16	18	1	0	0	NA	NA	1.57
Social Well-Being	4	6	16	8	1	0	NA	2.89
Emotional Well-Being	0	21	12	1	1	0	0	2.49
Planning & Organization	12	15	6	1	0	0	NA	1.83
Self-Actualization	6	4	15	7	2	1	NA	2.94
Independence	1	18	11	3	2	0	NA	2.63
Mean Sum Score								<b>14.35</b>

Note: Scores on the VisQOL result from the individual's perceived impact of vision on each of the six dimensions of QOL. Scores must be used as a summative score, as individual question scores are meaningless on their own. The mean score was a 14.35, indicating a major impairment on life (Misajon et al., 2005). The numbers within the table indicate the number of times each answer was selected. NA indicates that the option was not available.

Table 3

*Correlation of VisQOL Score and Frequency of Recreation Activity Participation of 35 Respondents (Pearson Correlation; 2-Tailed)*

	VisQOL Sum	Social Activities	Mass Media	Sports Activities	Outdoor Activities	Cultural Events	Hobbies
VisQOL Sum	1.000	-.589**	-.015	-.459**	-.558**	-.415**	-.199

Note: VisQOL values were negatively correlated due to a lower QOL score meaning a higher perceived QOL. A negative correlation is to be expected.

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

Table 4

*Correlation between Number of Categories of Recreational Activities Participated and Perceived QOL (Pearson Correlation; 2-Tailed)*

	Number of Activities	VisQOL Score
Number of Activities	1.000	-.478**
VisQOL Score		1.000

Note: VisQOL values were negatively correlated due to a lower QOL score indicating a higher perceived QOL. A negative correlation is to be expected.

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

Table 5

*Correlation of VisQOL Score vs. Meaning of Participation in Six Categories of Recreation Activity Participation Types (Pearson Correlation; 2-Tailed)*

	Social Activities	Mass Media	Sports Activities	Outdoor Activities	Cultural Events	Hobbies
VisQOL	-.476**	-.033	-.139	-.245	-.317	-.163
Sum						

Note: VisQOL values were negatively correlated due to a lower QOL score indicating a higher perceived QOL. A negative correlation is to be expected.

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

Table 6

*Correlation of Frequency and Meaning of Recreation Participation among Six Categories of Activities (Pearson Correlation; 2-Tailed)*

		Meaning						
		Examples	Social Activities	Mass Media	Sports Activities	Outdoor Activities	Cultural Events	Hobbies
Frequency	Social Activities	Being with others	.781**					
	Mass Media	TV Time or News		.404*				
	Sports Activities	Spectator or Playing Sports			.723**			
	Outdoor Activities	Hiking or Fishing				.551**		
	Cultural Events	Concerts, Theater, or Opera					.656**	
	Hobbies	Sewing or Pottery						.921**

Note: Responses to frequency of participation was indicated as follows: “1 – Never”, “2 – Seldom”, “3 – Some of the time”, “4 – Often”, and “5 – Very often”. Responses to meaning of participation were indicated as follows: “1 – Not Meaningful”, “2 – Somewhat Meaningful”, “3 – Neutral”, “4 – Meaningful”, and “5 – Very Meaningful”.

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

Table 7

*Cross Tabulation Analysis of Demographic Information and Frequency of Recreation Activity Participation with Significant Relationships*

		Never	Seldom	Some of the Time	Often	Very Often	Total
Time With Visual Impairment and Cultural Activities	Less than 10 Years	0	1	1	0	0	2
	10 to 20 Years	2	0	0	0	0	2
	More than 20 Years	3	11	2	11	2	29
	Total	5	12	3	11	2	33
Income Level and Outdoor Activities	Less than \$35,000	0	9	5	3	1	18
	More than \$35,000	3	1	3	3	3	13
	Total	3	10	8	6	4	31

Table 8

*Cross Tabulation Analysis of Demographic Information and Number of Recreation Activities with Significant Relationships*

Number of Activities		0	1	2	3	4	5	6	Total
Accessible Transportation	Yes	0	2	0	3	4	8	1	18
	No	1	1	5	0	3	0	1	11
	Total	1	3	5	3	7	8	2	29
Secondary Conditions	Yes	1	0	1	2	0	0	1	5
	No	0	3	4	1	7	8	1	24
	Total	1	3	5	3	7	8	2	29

Appendix C  
Survey Instrument



**Please answer the following questions.****Q1.**

Your participation is requested to participate in a research study titled "The Relationship Between Recreational Activity Participation and Vision-Related Quality of Life Among Adults with Visual Impairments" being conducted by Betsy Cuthrell, a graduate student at East Carolina University in the Recreation and Leisure Studies department. The goal is to survey 150-300 residents of North Carolina, ages 18 to 65 with visual impairment. The survey should take approximately 15-20 minutes to complete. The survey contains questions on demographic information, vision-related quality of life, and recreational activity participation. It is hoped that this information will assist us to better understand the impact of participation in recreational activities on a person's vision-related quality of life. The survey is anonymous, so please answer questions as honestly as possible. Your participation in the research is voluntary. You may choose not to answer any or all questions, and you may stop at any time. There is no penalty for not taking part in this research study. Please call Betsy Cuthrell at 252-766-1429 or Dr. Thomas Skalko at 252-328-0018 for any research related questions or the Office for Human Research Integrity (OHRI) at 252-744-2914 for questions about your rights as a research participant.

By choosing "yes", you agree to participate in this study. Please note that all responses are anonymous. If you choose to decline to participate, please close this window.

- Yes, I agree
- No, I do not agree

**Q2. What is your gender?**

- Male
- Female

**Q3. How long have you been visually impaired?**

- Less than 1 Year
- More than 1, but less than 5
- More than 5, but Less than 10
- More than 10, but Less than 15
- More than 15, but Less than 20
- More than 20
- Since Birth
- I do not have any visual impairment.

Q4. Are you employed?

---

- Full-time
- Part-time
- Homemaker
- Retired
- Unemployed, but seeking work
- Unemployed

Q5. What is your household income level?

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- Under \$10,000
- \$10,000 to \$14,999
- \$15,000 to \$24,999
- \$25,000 to \$34,999
- \$35,000 to \$49,999
- \$50,000 to \$74,999
- \$75,000 to \$99,999
- \$100,000 and \$149,999
- \$150,000 to \$199,999
- \$200,000 or more

Q6. What is your age?

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Q7. What is the highest level of education you have completed?

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- Less Than High School
- Completed High School
- Some College
- Completed a 2 Year Degree
- Completed a 4 Year Degree
- Completed a Graduate Degree/ Professional Degree
- Doctorate Degree

Q8. Do you feel transportation is easily accessible to you?

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- Yes  
 No

Q9. If you answered "no" to the previous question about accessible transportation, why do you feel that way?

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Q10. How often do you require assistance at home?

- Daily  
 1 to 2 times per week  
 1 to 2 times per month  
 Never

Q11. Do you have other disabilities or conditions that limit your physical activity?

- Yes  
 No

Q12.

If you answered yes, to the question about other disabilities/ conditions that may limit your physical activity, please explain.

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Q13. Which best describes your visual acuity?

- 20/20 to 20/60  
 20/70 to 20/160  
 20/200 to 20/400  
 20/500 to 20/1000  
 20/1000 or less  
 No light perception/ total visual impairment

Q14. Does your vision make it likely you will injure yourself (i.e. when moving around the house, yard, neighborhood, or workplace)?

<input type="radio"/>	Most Unlikely	<input type="radio"/>	Small Chance	<input type="radio"/>	Good Chance	<input type="radio"/>	Very Likely	<input type="radio"/>	Almost Certain
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Likelihood of injury due to vision loss...

**Q15. Does your vision make it difficult to cope with the demands in your life?**

	No affect	Not Difficult	A Little Difficult	Moderately Difficult	Very Difficult	Unable to Cope
Ability to cope with demands of life due to vision loss...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q16. Does your vision affect your ability to have friendships?**

	Friendships are Easier	No Effect	More Difficult	A Lot More Difficult	Extremely Difficult	Unable to Have Friendships	I have no Friends
Ability to have friendships due to vision loss...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q17. Do you have difficulty organizing any assistance you may need?**

	No Difficulty	A Little Difficulty	Moderate Difficulty	A Lot of Difficulty	Unable to Organize	No Need to Organize Assistance
Organization of assistance due to vision loss...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q18. Does your vision make it difficult to fulfil the roles you would like to fulfil in life (e.g., family roles, work roles, community roles)?**

	No Effect	No Difficulty	A Little Difficult	Moderately Difficult	Very Difficult	Unable to Fulfill
Fulfillment of roles in life due to vision loss...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q19. Does your vision affect your confidence to join in everyday activities?**

	More Confident	No Effect on Confidence	A Little Less Confident	Moderately Less Confident	A Lot Less Confident	Not Confident
Confidence in joining everyday activities due to vision loss...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q20. Do you participate in the following types of activities? Some examples include: visiting friends, entertaining friends, dating, attending parties, social dancing or other social activities. Please select the column that best describes your participation level within the past 12 months. Also, please rate**

how meaningful this type of activity is to you.

	How often do you participate					How meaningful is this activity?				
	Never	Seldom	Some of the Time	Often	Very Often	Not Meaningful	Somewhat Meaningful	Neutral	Meaningful	Very Meaningful
Social Activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q21. Do you participate in the following types of activities? Some examples include: watching TV, reading newspapers or magazines, going to movies, etc. Please select the column that best describes your participation level within the past 12 months. Also, please rate how meaningful this type of activity is to you.

	How often do you participate					How meaningful is this activity?				
	Never	Seldom	Some of the Time	Often	Very Often	Not Meaningful	Somewhat Meaningful	Neutral	Meaningful	Very Meaningful
Mass Media	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q22. Do you participate in the following types of activities? Some examples include: spectating at sports events, fitness activities, team sports, individual sports, dual sports, etc. Please select the column that best describes your participation level within the past 12 months. Also, please rate how meaningful this type of activity is to you.

	How often do you participate					How meaningful is this activity?				
	Never	Seldom	Some of the Time	Often	Very Often	Not Meaningful	Somewhat Meaningful	Neutral	Meaningful	Very Meaningful
Sports Activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q23. Do you participate in the following types of activities? Some examples include: picnicking, fishing, gardening, day outings (zoo, museum), hiking, boating, camping, etc. Please select the column that best describes your participation level within the past 12 months. Also, please rate how meaningful this type of activity is to you.

	How often do you participate					How meaningful is this activity?				
	Never	Seldom	Some of the Time	Often	Very Often	Not Meaningful	Somewhat Meaningful	Neutral	Meaningful	Very Meaningful
Outdoor Activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q24. Do you participate in the following types of activities? Some examples include: attending concerts, ballet, opera, visiting art museums, folk or square dancing, attending theater, etc. Please select the column that best describes your participation level within the past 12 months. Also, please rate how meaningful this type of activity is to you.

	How often do you participate					How meaningful is this activity?				
	Never	Seldom	Some of the Time	Often	Very Often	Not Meaningful	Somewhat Meaningful	Neutral	Meaningful	Very Meaningful
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	How often do you participate					How meaningful is this activity?				
	Never	Seldom	Some of the Time	Often	Very Often	Not Meaningful	Somewhat Meaningful	Neutral	Meaningful	Very Meaningful
Cultural Events	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q25. Do you participate in the following types of activities? Some examples include: painting, drawing, sketching, woodwork, collecting stamps or coins, needlework, sewing, knitting, plant care, pottery, etc. Please select the column that best describes your participation level within the past 12 months. Also, please rate how meaningful this type of activity is to you.

	How often do you participate					How meaningful is this activity?				
	Never	Seldom	Some of the Time	Often	Very Often	Not Meaningful	Somewhat Meaningful	Neutral	Meaningful	Very Meaningful
Hobbies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix D  
IRB Approval



**EAST CAROLINA UNIVERSITY**

**University & Medical Center Institutional Review Board Office**

4N-70 Brody Medical Sciences Building · Mail Stop 682

600 Moye Boulevard · Greenville, NC 27834

Office 252-744-2914 · Fax 252-744-2284 · [www.ecu.edu/irb](http://www.ecu.edu/irb)

Notification of Exempt Certification

From: Social/Behavioral IRB  
To: [Betsy Cuthrell](#)  
CC: [Thomas Skalko](#)  
Date: 2/28/2013  
Re: [UMCIRB 13-000262](#)  
Activity Participation & Quality of Life among Adults with Visual Impairments

I am pleased to inform you that your research submission has been certified as exempt on 2/28/2013.

This study is eligible for Exempt Certification under category #2.

It is your responsibility to ensure that this research is conducted in the manner reported in your application and/or protocol, as well as being consistent with the ethical principles of the Belmont Report and your profession.

This research study does not require any additional interaction with the UMCIRB unless there are proposed changes to this study. Any change, prior to implementing that change, must be submitted to the UMCIRB for review and approval. The UMCIRB will determine if the change impacts the eligibility of the research for exempt status. If more substantive review is required, you will be notified within five business days.

The UMCIRB office will hold your exemption application for a period of five years from the date of this letter. If you wish to continue this protocol beyond this period, you will need to submit an Exemption Certification request at least 30 days before the end of the five year period.

The Chairperson (or designee) does not have a potential for conflict of interest on this study.

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IRB00000705	East	Carolina	U	IRB	#1	(Biomedical)	IORG0000418
IRB00003781	East	Carolina	U	IRB	#2	(Behavioral/SS)	IORG0000418 IRB00004973

Study.PI Name: Betsy Cuthrell

Study.Co-Investigators: Dr. Thomas K. Skalko, PhD