The association between two quality of life measures for first time low vision device users

by

Rana Taji

A thesis
presented to the University of Waterloo
in fulfillment of the
thesis requirement for the degree of
Master of Science
in
Vision Science

Waterloo, Ontario, Canada, 2006

Author’s Declaration

I hereby declare that I am the sole author of this thesis.
I authorize the University of Waterloo to lend this thesis to other institutions or individuals for the purpose of scholarly research.

Signature

Abstract

Many individuals with impaired vision experience a decrease3d quality of life. Quality of life is defined as “the degree to which an individual enjoys the important possibilities of their life.” Vision rehabilitation outcomes primarily focus on the functional impacts of interventions, with less attention being paid to any associated psychosocial impacts. This study examines the relationship between measures of visual function status and psychosocial status in individuals acquiring low vision assistive devices for the first time. One hundred and twenty subjects were evaluated after purchasing their first low vision device from a University-based low vision clinic. The measures used were the National Eye Institute Visual Function Questionnaire (NEI-VFQ 25) and the Psychosocial Impact of Assistive Devices Scales (PIADS). The NEI-VFQ 25 measures the status of visual function, while PIADS is a device impact measure, which explores the psychosocial impact of devices on three domains: competence, adaptability, and self-esteem. This study determines the strength of association between these two measures at initial and follow-up administrations, and between each subsequent measure as a result of the time interval between administrations, in addition to assessing whether or not a change in stability for the measures occurred over time. Modest strengths of associations were anticipated and the short time interval was not expected to be a factor in change in stability of the measures. The expectation was that subjective reports of functional changes should have a moderate correlation with psychosocial impact.

Acknowledgements

I would first like to acknowledge my supervisors, Dr. Graham Strong for all your help, support, and guidance; Dr. Jeffrey Jutai, for your vast knowledge and wonderful feedback every step of the way; Dr. Ann Plotkin, for your great input, encouragement, and vast clinical expertise. I would like to also thank the Low Vision Clinic staff for all their encouragement and support, my statistician Erin Harvey for helping me understand statistics and Erin Bloch for her help in setting up the databases. Lastly, I would like to thank all my family and friends for their support and encouragement during the best and worst of times when I thought I would never be done! Thank you all!

Dedication

I would like to dedicate this thesis to my family, my mom, dad, brother and sister, who believed in me every step of the way and had faith that I could achieve anything I wanted. I will never forget all the love and support you gave me! Thank you!

Table of Contents

List of Tables

List of Figures

Chapter 1

Introduction

1.1 Low Vision

Low vision describes any condition of functional vision loss that cannot be corrected by spectacles, contact lenses, or medical interventions such as surgery[1-3]. The International Classification of Functioning, Disability and Health (ICF), a classification of health and health related domains that describe body functions and structures, is published by the World Health Organization, which provides a useful context for understanding health outcomes. According to ICF, disorders of the eye and other organs of the visual system result in impairments in "seeing functions", which are sub classified as visual acuity function, visual field functions, and quality of vision functions[4]. Low vision may result from many different ocular and neurological disorders. Visual impairments affect about 10% of people aged 65-75, and 20% of those aged 75 or older[1]. Disorders of the visual system include any diseases, injuries, or abnormal development affecting the eyes or their neural connections. The ensuing visual impairments may interfere with an individual's ability to perform work and their ability to participate in activities of daily living and leisure activities[1]. This deficit vision performance is described as a visual impairment [5]. The prevalence of low vision in North America is increasing dramatically as the baby boomer population ages and becomes more vulnerable to sight-limiting conditions associated with aging. In Canada, the number people over the age of 65 are expected to increase from about 5 million people by 2021, increasing the number of visually impaired individuals[1]. The most common causes of blindness in North America are age-related macular degeneration (AMD), glaucoma, and cataracts [1, 2]. Many individuals with impaired vision fail to obtain vision rehabilitation services because they are unaware of the potential benefits or because they have difficulty locating the services they need[1, 6].

Vision loss is not dichotomous, but occurs as a continuum that ranges from modest low vision to total blindness [1]. While the functional consequences (disabilities) of vision loss are generally dependant on the severity of the impairment, this is not always the case [7]. Assistive devices are available to provide functional solutions for these seeing problems.

There is a broad range of definitions for "quality of life" in the professional literature, making it a highly variable and unstable construct that is difficult to measure[14]. Quality of life has been defined as the 'degree to which an individual enjoys the important possibilities of their life' [12, 13]. It is assumed to be a complex and multidimensional construct. It is dynamic and changes over time and over a person's life. It arises from a person's interaction with their environment and is experienced differently from person to person, but has the same components for everyone [12, 15].

The primary role of vision rehabilitation is to help people maximize functional independence, maintain quality of life, and adapt to the psychosocial aspects of their vision loss [1, 2]. Low vision rehabilitation allows people with visual impairments to use their limited residual vision as optimally as possible, with the use of assistive devices and technologies, and to make adaptations to activities of daily living in order to maintain functionality and independence[1, 8]. The intention is to restore lost function and to limit or minimize any related disabilities [5, 9]. The level of difficulty of any desired seeing task is determined by the individual's functional reserve, which is the difference between the person's seeing abilities and the seeing requirements of the seeing task [9]. Successful low vision rehabilitation alters the impact of visual impairments on functional performance, thereby reducing the level of disability [10]. Rehabilitation services are intended to achieve positive outcomes in one or more of the following domains: cognition, communication, functional independence, mobility, occupational performance, perception, physical function, psychological well being, quality of life, social skills and socialization [11]. Vision rehabilitation can be very successful at reducing costs and prolonging an individual's independent activity and contribution to society despite the visual impairment [1].

Low vision rehabilitation is a very reliable and successful intervention for many young patients [8]. However, the majority of people with low vision are elderly. It may be more difficult to counsel and rehabilitate older people because they may be more set in their ways. Many older people become fixated on finding a cure for their vision problems, and defer seeking rehabilitation solutions. There is a higher prevalence of depression in older people with age related vision loss [16]. In these instances, rehabilitation must include counselor support that helps people accept and adapt to their vision loss. Successful low vision rehabilitation is often subjective and its success may be determined by whether the individual feels their assistive device has helped or not [8]. Rehabilitation should be ongoing rather than short term since generally with the progression of a condition or disease, an individual's general health and mental status may tend to also deteriorate[8]. Repeated outcome administrations are necessary to help track such changes.

Low vision rehabilitation can only be successful if it is accessible to low vision patients. The WHO estimates that there are 140 million people worldwide with low vision, with the leading cause being Cataracts followed by Age-Related Macular Degeneration, 35 million of which require services because their vision loss is untreatable [17]. Some of the issues that individuals face when attempting to access services are: lack of awareness of services, transportation, ineffective communication between patient and eye care practitioners, money, and stigma of low vision services[17].

1.2 Hypotheses

The rationale for obtaining low vision devices is to restore an individual's capability to perform desired seeing tasks that are difficult or impossible due to the presence of a low vision condition. It is generally assumed that restoring an individual's lost ability to perform seeing activities of importance, such as the ability to read or watch television, will translate into a verifiable improvement in the individual's quality of life. Outcome measures have primarily focused on functional impacts of assistive technology [18]. Research has focused less on the psychosocial impacts of these interventions. Assuming that the measures represent different aspects of quality of life, we predict that measures using both types will be moderately correlated. We further predict that the two measures are not redundant and will collectively provide broader insights than might otherwise be captured using a single outcomes administration tool. Such outcomes research is generally concerned with verifying that interventions are causally responsible for observed changes in targeted individuals or populations and developing an improved understanding of such causal relationships[19]. Two administration tools were used in an attempt to unravel a moderate strength of association. The administration tools were the PIADS (Psychosocial Impact of Assistive Devices Scale) and the NEI-VFQ 25 (National Eye Institute Visual Function Questionnaire), which will described later in this review. NEI-VFQ 25 is a functional status measure in this study, whereas PIADS is measuring the change in impact.

The study aimed to answer the following questions:

1. How do each of the PIADS and NEI-VFQ 25 correlate with clinical measures (Visual acuity and contrast sensitivity)?

2. What are the strength of association between the PIADS measure at initial (post-adoption of device) and follow up administrations, and the NEI-VFQ 25 at initial (post-adoption of device) and follow up?
3. What is the strength of association between the PIADS and NEI-VFQ 25 at initial administration, and then at follow up? In other words, how does a generic impact measure like the PIADS compare with a vision-specific measure in sensitivity to self-reported functional vision?
4. Given the time interval (2 weeks) between initial and follow up administrations, do we expect the relationship to change over time or remain stable for the NEI-VFQ 25 and PIADS?

The goal of this project was to develop a conceptual framework for relating PIADS (impact) and NEI-VFQ 25 (functional status). The aim was to attempt to relate a functional measurement to a subjective one. NEI-VFQ 25 provided a functional outcome while PIADS rendered a subjective experience. The following has been hypothesized:

1. The NEI-VFQ 25 will exhibit a stronger correlation to clinical measures than the PIADS will. (i.e. correlating to VA and CS)
2. A modest correlation will exist between the PIADS measure at initial and follow up administration and for the NEI-VFQ 25 as well.
3. A modest correlation will exist between the NEI-VFQ 25 and PIADS measure at initial administration, and at follow up.

Finally, as part of a secondary hypothesis, we expected that these relationships will not change over time but rather remain stable given the short interval in which the measures are being repeated.

1.3 Outcomes Research

Outcomes research deals with the questions about which services work best, under which particular conditions, and for which kinds of service recipients[22]. Evaluation of measures has become increasingly important as a tool to aid decision makers concerning allocating resources within health care [21]. There is a growing interest in using outcome measures to demonstrate the effectiveness and quality of rehabilitation interventions[23], to investigate the association between age and vision loss, and to establish the demand for low vision rehabilitative services [24]. The effectiveness of low vision rehabilitation is determined by the usefulness of the services rendered to service consumers with impaired vision. When the service is effective at restoring functional capability and improving quality of life, then the outcome is positive. However, it is important to recognize that improvements in functional capability do not necessarily translate to an improved quality of life. Hence, outcomes investigations cannot be restricted exclusively to functional and clinical status administrations. They also must contemplate factors such as consumer satisfaction, value, quality, or cost [14]. It is difficult to identify all of the interventions that legitimately contribute to a positive rehabilitation outcome. Even if all of these critical components could be identified, one would still need to quantify them in some way and then establish how they are integrated. This would depend on suitable measurement protocols and each intervention presents its own measurement challenges [25]. Nevertheless, using benchmarks and guidelines for predicting successful outcomes is usually the best method for assessing low vision outcomes. Measures of patient satisfaction, vision functioning in various activities of daily living, impacts on individual's well being, and levels of understanding about the causal eye condition are some of the strategies that are used to quantify successful outcomes [26]. Patient outcome criteria should also include improved understanding of emotional and psychological adjustments to vision loss, improved ability to complete independently activities of daily living, and improved knowledge about relevant resources and assistive devices [1].

The following eight criteria have been suggested [27, 28] for evaluating instruments that are used to assess patient based outcome measures:

Appropriateness: Investigators consider match of an instrument to the specific purpose and question of a trial.
Reliability: Instrument is reproducible and internally consistent, degree to which a measure is free from random error.
Validity: Judging whether an instrument measures what it purports to measure.
Responsiveness: Addresses whether an instrument is sensitive to change of importance of patients.
Precision: Concerned with number and accuracy of distinctions made by an instrument.
Interpretability: How meaningful are the scores from the instrument.
Acceptability: How acceptable an instrument is for respondents to complete.
Feasibility: Extent of effort, burden and disruption to staff and clinical care arising from use of instrument.

Assessing such psychometric factors such as reliability and internal scale consistency should be taken into account for every measure. Cronbach's alpha

$$\alpha = \frac{N \cdot \bar{r}}{1 + (N-1) \cdot \bar{r}}$$ [29],

where N is the number of items and r-bar is the average inter-item correlation among the items should be used for assessing reliability of a subscale's internal consistency, where the acceptable minimum value should be >0.70, the minimum >0.6, and a poor internal consistency would be alpha <0.6 [30]. Many of the times these factors are not reported on and the rationale for the use of outcomes measures is not explicitly stated [18].

Using a standard taxonomy of interventions and treatments is important to provide clarity and proper standardization of methods to serve as a basis for measuring interventions that are used in conjunction with outcomes [25]. Taxonomy is a typology that brings order and rigor to the description of myriad rehabilitation interventions [25]. The purpose of a rehabilitation intervention taxonomy is to characterize systematically the many treatments, procedures, and interventions that are used in rehabilitation, taking into account their multidimensionality with respect to content, purpose, intensity, duration, sequence, frequency, and other characteristics[25]. Taxonomies may help to standardize collection on treatment intervention that will elicit a comparison of results across studies and across sites, such that standardization on the input side will greatly strengthen ability to make comparisons across an even wider range of interventions and outcomes [25]. Thus, the need for integrated systems is crucial in outcomes research.

When describing outcomes research, authors should define their measurement constructs and domains to reflect a thorough understanding of how well their conceptual model is covered [20]. Measures in outcomes research that include data from both general and impaired subgroups are useful for comparison reasons. This ensures that there are benchmark standards to facilitate interpretations of scale normality, specificity, and deviance. Researchers should only use measures that are known to produce data with acceptable reliability and validity. These measures should have evidence of content, criterion, and/or construct validity [31]. Measures should at least satisfy the minimum standards and provide information on the above items. Deciding on the measures to use is one of the problematic aspects in planning an outcomes study of most assistive technologies [22]. Without standardization of measures, clinical programming would be unorganized, unclear [28] and future researchers would find difficulty in tracking back records and reproducing results.

Some surveys used in outcomes research may be insensitive to differences between people [20] due to either a floor or ceiling effect. The data may be skewed by grouping individuals at the minimum or maximum extremes. Floor or ceiling effects are present when 15% or more of a group of scores are present at either extreme [20]. Health-related quality of life measures should not be affected by such factors as culture, social circumstance, or impairment type, unless the instrument is designed to detect differences in such measures. The measures utilized in this study, which will be described later, are unaffected by these domains. The sample population includes a variety of cultures, socio-economic backgrounds and visual impairments which may present a bias if the measures were sensitive to such factors. It is interesting to note that one study actually found that such factors influence one of the measures used in this study[32]. Bias is systematic variation resulting in high or low results, and both random unreliability and systematic biases need to be investigated during the development of measures and considered when being applied [28]. When selecting outcome measures, investigators should understand the general purpose of measures, the population that is being evaluated, the likely consequences of the administration, and any procedures that are required to improve validity and decrease error or bias [28].

Outcome measures are used in clinical settings when the benefits to the client outweigh the cost of using the measure [33]. They may assist clinicians in determining client goals for rehabilitation which allows them to map out a more appropriate individual rehabilitation program than might otherwise be possible [33]. Also, knowing the goals also assists the clinician and client to select an appropriate device, including making the decision about whether to progress to a more sophisticated device [33]. Moreover, it is important to have some sort of mechanism for evaluating the success of such interventions at the conclusion of the service contact.[33]. Clinicians must be aware of how to evaluate meaningful changes in quality of life, which may be accomplished by considering the characteristics of the population, psychometric properties of the quality of life questionnaire, the adequacy of administrations, power, and so forth [34]. This will ensure an effective strategy in obtaining the most clinically relevant and useful information. Many clinicians use evidence-based information to provide additional information about clinically relevant research [35].

The order in which instruments are administered may have an effect on the quality of responses obtained. However one study looking at the effect of order of administration of health related quality of life interview instruments on responses found that the overall order did not have a large effect on the responses[36]. Nonetheless, the order should be kept the same for all respondents to avoid introducing a bias in response into the study. The study looked at two generic health-related instruments and one vision targeted instrument. It was assumed that administering the generic instrument followed by the vision targeted instrument was logical and appropriate. Others have reported that respondents scored lower on mental health subscales when they are asked after responding to questions about their vision loss [36]. Consequently, the order of surveys should be determined by the goals of the study and should remain consistent for the duration of the study.

An uncommon method used in the administration of quality of life has been co-morbidity scores. Co-morbidity is total burden of illness unrelated to a patient's principal diagnosis and has been shown to be important in assessing severity of disease and the risk of mortality[37]. Un-weighted and weighted co-morbidity indexes were created for assessing co-morbidity and visual function of the LALES (Los Angeles Latino Eye Study), in order to model the low physical function with self-reported systemic co-morbidities, and illustrate the usefulness of these scores in the analysis of quality of life in certain diseases [37].

Babcock et al looked at two rehabilitation outcomes measures to examine their compatibility. FAST (Functional Assessment of Self-Reliance Tasks) is a clinical rating instrument and VA-13 is a self reporting instrument[38]. The VA-13 purports to measure functional independence while FAST measures functional ability [38]. FAST serves as a clinical screen, providing clinicians with the administration information required to develop both treatment and discharge plans. The study hypothesized that respondent's ratings should not be completely unrelated or different, and any inconsistencies would be explained by differences in the measurements [38]. Although both scales functioned consistently, they were found to be incompatible.

Another study utilized the NEI-VFQ 25 and the SF-12. This latter instrument is a generic quality of life measure derived from the SF-36, contains one or more questions to measure each of the eight health concepts on the original SF-36 measures: physical functioning, role limitations due to physical health, bodily pain, general health perceptions, vitality, social functioning, role, role limitations due to emotional problems and mental health [39]. The study showed that patients with worse vision had more difficulties in performing most vision dependent daily activities and had worse subscale scores than patients with less severe vision loss or those without eye diseases[39]. The SF-12/36 measure illustrates relatively little change and appears to be a relatively limited instrument for assessing visual function [40].

Other measures have been developed to specifically look at self-reports of visual function. The Functional Assessment Questionnaire (FAQ) was developed as a self-report of visual function and overall well being, and the Functional Vision Performance Test (FVPT) was designed as an observer rated administration of visual performance [41]. FAQ evaluated specific visual function and functional independence as perceived by patients, while the FVPT allocates an observer to measure an individual's visual performance in standardized tasks [41]. The study demonstrated that the involvement of various services in vision rehabilitation would maximize the participant's level of function. An overview of low vision rehabilitation notes that several factors play a role in a successful rehabilitation service, such as low vision team, rehabilitative approach, rehabilitation, activities of daily living, travel and social or recreational activities [42]. Other studies have also shown the importance of proactively utilizing all vision rehabilitation services in an attempt to maximize an individual's experience at providing the best ways in which to increase function.

One final study looked at the Low Vision Quality of Life Questionnaire (LVQOL) and demonstrated it to be a reliable and valid method for assessing vision specific quality of life [43]. It was deemed acceptable for use in a clinical setting and for effectively determining the impact of low vision rehabilitation. A distinguishable feature of this questionnaire is that it is specifically designed for low vision, which may be more suitable in assessing outcomes of low vision rehabilitation than other measures. It was also shown to be related to functional measures of vision, such as distance acuity and contrast sensitivity [43]. While the NEI-VFQ 25, which will be discussed next, is successful at detecting such changes, it may be interesting to compare it to the LVQOL in future research to determine which measure is more attune to low vision outcomes.

1.4 NEI-VFQ (National Eye Institute Visual Function Questionnaire)

The NEI-VFQ 25 was created by RAND with funding support from the National Eye Institute (NEI) in order to develop a domain that would allow individuals to report on their professed visual health[44-47]. The NEI-VFQ 25 measures quality of life based on visual disability and how the disability affects well being and emotional responses. It is a measure of vision targeted health-related quality of life and generates a single overall visual function score that reports an individual's perception of their visual functioning[30, 48]. The NEI-VFQ 25 consist of twenty-five items, which generates the following twelve visual subscales: overall health, overall vision, difficulty with near vision and distance activities, ocular pain, driving difficulties, limitations and peripheral vision and color vision; social functioning, role limitations, dependency and mental health symptoms related to vision[44, 45, 46, 47, 49, 50]. Eleven subscales constitute independent function specific measures of visual functioning, related specific aspects of visual function [30]. The twelfth subscale is a single general health rating scale, which is shown to be a very robust predictor of future health and mortality in population based studies[44, 48]. The NEI-VFQ-25 is a short form version of the 51-item National Eye Institute Visual Function Questionnaire (NEI-VFQ), a vision specific HRQOL instrument derived from a multi-condition focus group process [49, 51], which has been shown to retain much of the original content of the longer questionnaire [44]. The reliability and validity of the NEI-VFQ-25 has been compared to the NEI-VFQ-51, and has been shown to maintain the same multi-dimensional content, reliability, and validity of the full length survey [44, 49, 51]. The shorter version was created in response to a need that would be appropriate for research and clinical settings. Studies are ongoing to assess the reliability and validity of the 25-item scale in comparison to both the 51-item and previous 96-item questionnaire [44].The NEI-VFQ-25 contains twelve subscales and requires approximately ten minutes to complete an interview-administered format. Topics covered include difficulties reading a newspaper, performing activities up close, or feeling like he/she accomplishes less than he/she would like to because of the vision loss. The NEI-VFQ 25 has been shown to be sensitive to any low vision cause, and thus is a clinically valid measure [44, 46, 50]. The measure also exhibits internal consistency and reliability which has been assessed using Cronbach's alpha [30, 52]. Item internal consistency and item discriminate validity could not be calculated for Peripheral Vision, Color Vision, General Vision, and General Health because these subscales have only one item [30], but overall evidence for validity has been examined [44]. The 25 item questionnaire was chosen in recognition that survey length plays an important role in data quality and costs. The NEI-VFQ 25 has been used in numerous studies, and is proven to be a valid and reliable questionnaire for participants with various eye conditions, and is appropriate for a broad range of individuals[32, 36, 37, 39, 40, 46, 47, 48, 49, 51, 52, 53, 53, 54, 54, 55, 55-74]. The NEI-VFQ 25 has been deemed acceptable for use in other languages[30, 60, 66, 70, 75], such as French, Spanish, Italian, Japanese, and Turkish. Moreover, the NEI-VFQ 25 is a responsive and evaluative measure that is able to detect meaningful changes in populations over time and across any eye condition, changes in visual acuity, in addition to changes associated with low vision rehabilitation services[44, 46, 47, 50, 72, 75]. NEI-VFQ 25 is a useful tool in assessing whether or not improved functional performance occurs as a result of an intervention in a study, as may be noted in the studies acknowledged previously.

In previous studies, the NEI-VFQ 25 was administered pre and post intervention when horizontal rectus tenotomy was performed on patients with congenital nystagmus[48]. The following study demonstrates how NEI-VFQ 25 can be used to monitor impact of intervention on a low vision population. The following data were reported:

Table 1: NEI-VFQ 25 Subscale Scores Pre and Post Intervention[48]

Table 3. Secondary Outcome Measure: NEI-VFQ* Change

Patient No.	Age (yrs)	PRE-VFQ	POST-VFQ
1	39	48†	64†
2	30	63†	83†
3	39	83†	85†
4‡	49	77†	79†
5‡	39	79†	95†
6	28	77†	88†
7‡	39	62†	74†
8	20	78	71
9‡	55	78†	82†
10‡	34	81†	93†

*National Eye Institute Visual Function Questionnaire test score before tenotomy (PRE-VFQ) and 52 weeks after tenotomy (POST-VFQ).
†Patients who reported increased visual functioning.
‡Congenital nystagmus plus asymmetric (a)periodic alternating nystagmus.

This illustrates that following an intervention, if the improvement is favorable, then the NEI-VFQ 25 is sensitive to the difference in change and is able to pick this up. The NEI-VFQ 25 also has been shown to be sensitive to changes in functional status and quality of life related to the provision of low vision services [76], and scores have also been shown to change after vision rehabilitation training [24, 65, 76].

The NEI-VFQ 25 also has been used to assess depression in older adults with visual impairments [62]. Any individual who experiences an impairment resulting in a disability is likely to experience some level of depression. Scores were reported to be lower for depressed individuals than for those who were not, indicating that those who reported lower scores seemed to have more depressive symptoms than those who scores higher [62]. Depression was associated with the specific NEI-VFQ 25 subscales that are more psychosocially oriented such as role difficulties, mental health, and dependency [62]. Based on studies reported in the literature, the NEI-VFQ 25 appears to be a valid and reliable tool for assessing health related quality of life.

1.5 PIADS (Psychosocial Impact of Assistive Devices Scale)

Quality of life is a subjective concept and should be based on a user's perception of his/her own well being, whether or not they have full or partial functional capability. The Psychosocial Impact of Assistive Devices Scale (PIADS) emerged through the development of several quality of life scales. The PIADS evolved from empirical explorations with a pleasure-arousal dominance scale, users' responses concerning how they expected devices to impact their quality of life, and the literature on personality research (which suggested the inclusion of constructs associated with perceived self-efficacy and personal control) [15, 77]. Day and Jutai developed PIADS as a measure that was specifically designed to assess the psychosocial impact of assistive technology, and assess the effects of a device on functional independence, well being, and quality of life[77, 78]. The goal was to create a scale that would reliably measure perceived device impact and discriminate among device categories and user conditions in a clinically sensible way [15]. The term 'psychosocial' refers to both factors within the person and factors attributable to the environment that affect the psychological adjustment of individuals who have a disability [77]. It is assumed that assistive technology should have some measurable impact on subjective perceptions of psychosocial well being and quality of life [3, 78].

PIADS is a more sensitive of a scale than other measures, and is responsive to detecting clinically important change over time, sensitive to important variables such as the user's clinical condition, device stigma, and functional feature of the device[12, 13, 15, 77, 79]. The instrument has good internal consistency, test-retest reliability, and construct validity [77]. PIADS was developed due to a need for a measure that would properly assess impact of an assistive device, since much health related quality of life measures were too medically oriented and focused more on the change in health status, rather than the impact attributable to any particular form of intervention. The scale is based on 26 items, measuring a user's perceptions on three different sub-scales: Competence, Adaptability, and Self-esteem. Competence (12 items) refers to an individual's perceived functional capability, independence, and performance[3, 15, 77, 79-81]. Example determinants within the Competence subscale would be adequacy, efficiency, and skillfulness. Adaptability (6 items) refers to inclination or motivation to participate socially and take risks[3, 15, 77, 79-81]. Example determinants within this subscale would be ability to participate, willingness to take chances, and ability to take advantage of opportunities. Finally, self-esteem (8 items) reflects on self confidence, self-esteem and emotional well being[3, 15, 77, 79-81]. Example determinants within this subscale would be sense of power, happiness, and frustration. An individual can score themselves within a range of -3 to +3. A score of +1 to +3 indicates a positive impact; a score of -1 to -3 indicates a negative impact, while a score of

0 indicates no perceived impact or simply neutrality. PIADS has been used in several studies that investigate quality of life for various assistive devices, without being specifically limited to vision loss[3, 12, 22, 77-86], and has been proven as a reliable, sensible, valid, and responsive tool, with good clinical utility for testing psychosocial impact of assistive technology[3, 15, 22, 81, 84]. The PIADS scale has been proven to be internally consistent using Cronbach's alpha, that items are homogenous but not redundant, and demonstrate excellent psychometric properties[22, 79, 81], in both English and other languages[86].

The PIADS was used to investigate changes in quality of life following small fenestra stapedotomy, a surgical procedure to improve severe conductive hearing loss. Overall, patients experienced a positive impact following device intervention. The results of this study compared favorably with other studies in which PIADS was used to validate the use of contact lenses and eyeglasses [80]. The study suggested the possibility that impact of the assistive device may in fact diminish with time [82]. This is generally the case for any assistive device, and not just specific to hearing devices, that the effectiveness is not as dramatic as when the device is first adopted. It was also found that the psychosocial impact on users was stable over time in a study with electronic aids for daily living, and it was suggested that the reported impacts may be a blend of perceptions relating to the device and services rendered with it[84]. Conversely, an article on psychosocial impact of assistive technology devices in stroke rehabilitation illustrated a change in impact over time, rather than at first[83], suggesting in fact the possibility that depending on device and condition, impact and perceived effectiveness may not be apparent until captured with a repeated measure. This was also consistent with a study on hearing aids, implying that users are more likely to experience the expected benefit after a certain period of time of using the device [79].

The research and development of the PIADS has proceeded in the best tradition of rehabilitation outcome measures, by first developing a measure that was sensitive and responsive to clinically important variations. The ability of the scale to predict abandonment and retention of assistive devices has prompted for further research in this field [15]. PIADS provides clinicians with a reliable and economical method for assessing the role of psychosocial factors in retention or abandonment of an assistive device [82]. It also may provide researchers with information that will help create better technologies and improved matches with the needs of users. It also may help predict how new assistive technologies and prototype devices will be accepted or abandoned by their users and used effectively in both short and long terms [11, 12]. PIADS is not a measure of quality of life, but a measure of the impact of an assistive device on quality of life, and is able to predict continuation or discontinuation of a device based on impact [85]. It is a reliable measure that provides best results when used in conjunction with another measure [12], such as the NEI-VFQ 25.

1.6 Assistive Technology Devices (ATD's)

An assistive device is any item, piece of equipment, or product system that is used to increase, maintain, or improve the functional capabilities of individuals with disabilities [85]. It is any device that would help an individual accomplish a task that they otherwise would not be able to. Assistive devices (ATD's) are considered essential for the health and well being of many people with sensory or physical disabilities [81]. They are among the most widely prescribed and recommended therapies for these individuals and they constitute a significant proportion of health and rehabilitation costs [15]. In reference to the significant cost and benefits associated, assistive technology research is now gaining more attention [87]. The demand for assistive devices is significant and is expected to continue to grow [14]. Vision devices range from basic eyeglasses, magnifiers, binoculars, and telescopes to sophisticated electro optical devices such as closed circuit television (CCTV) systems. The purpose of an assistive device is to improve function and quality of life [13, 19, 82]. Jutai defines the role of an assistive device as one that will promote good quality of life for the user to the extent to which it makes the user feel competent, confident and inclined (or motivated) to exploit life's possibilities [12, 15, 78, 82]. Reported problems adapting or using assistive devices are generally attributed to a high degree of dissatisfaction with assistive devices[81, 82]. The increased involvement of clients in the rehabilitation process increases the likelihood of a good outcome [33]. A significant proportion of low vision devices are abandoned within four months of adoption [2]. These cases may indicate a failure to fit the device to the individual with some expectation that the individual will eventually adapt to the device [15]. When the opinion of the individual is incorporated into the selection of a device, the likelihood that they will abandon that device is decreased [81]. Some major problems reported with assistive devices are inadequate performance, failure to achieve improved function, difficulty in operating device, and the high cost and maintenance of the device [12, 82, 85]. Overall, success is achieved with a device when an individual finds it to be beneficial and uses it to solve one or more visual problems [88].

Assistive technology outcomes research is a systemic study of the impact of assistive technology devices on the lives of users[19]. Assistive technology outcomes encompass a variety of factors: facilitation of activities of daily living, changes in functional independence, user satisfaction, societal and individual gains, and effect on participation, employment, and societal roles [87]. Psychosocial factors, such as attitudes, perceptions, and behaviors, appear to play critical roles in determination of assistive technology device outcomes [85]. Psychosocial impact describes the extent to which assistive devices affect the individual's subjective perceptions of psychological well being and quality of life [85]. It is important to use standardized instruments to properly evaluate those outcomes. This requires the use of instruments that will produce data of quality, and with verified reliability, validity, and responsiveness. Both the PIADS and NEI-VFQ 25 meet these standards.

The use of PIADS reflects an assumption that the adoption of a device will lead to an improved quality of life, which may include improvement in health, happiness and advancement of society [81]. Assistive technology may have an impact on psychosocial status that is somewhat independent from the impact on vision function. It is useful in determining whether or not this is indeed the case, and if the opposite is true where users are dissatisfied and have abandoned their devices [81].

Quality of life and its component feelings of competence, self efficacy, self confidence, self esteem are all considered to be important goals of rehabilitation. One would expect that the likelihood of assistive device abandonment would increase if the device failed to enhance these feelings [89]. Accordingly, outcomes research provides a useful mechanism for identifying different ways to improve the provision of rehabilitation services and devices to individuals with low vision [14].

Some health related quality of life measures appear to be too medically oriented to focus properly on the importance of assistive technologies, which is not to promote good health and healing, but to restore functional capabilities [13]. In these instances, the goal is to assess the impact of the device or intervention rather than just a change in health status. The PIADS is expressly designed to assess the perceived impact of an assistive device on psychosocial wellbeing, with its three subscales, Competence, Adaptability, and Self-esteem.

1.7 PIADS and NEI-VFQ 25: A comparison

The PIADS and the NEI-VFQ 25 are two measures that can be used to evaluate the impact of using an assistive device on an individual's quality of life. In this study, the NEI-VFQ 25 will look at functional status, and PIADS will explore the impact. Quality of life is defined in the NEI-VFQ 25 based on an individual's functional capabilities whereas in the PIADS it is related to the perceived impact of an assistive device, and thus the PIADS is better equipped to measure the psychosocial impact of an assistive device. NEI-VFQ 25 is specifically geared to visual loss, whereas the PIADS may be used for any device. Research has shown that PIADS is sensitive to the use of an assistive device across various populations and that the impact is unaffected by illness and disability [103, 54, 90, 55]. NEI-VFQ 25 scores are generally higher for individuals with less visual disability than for individuals with greater levels of vision loss [44, 46, 50]. Both measures are sensitive in their own manner, but PIADS will likely be shown to be more sensitive. In general, quality of life should be consistent no matter how it is measured. However, it seems likely that it cannot be measured accurately with a single test instrument. It will be significant to examine whether or not the measures in question exhibit a modest correlation since they are both assessing different aspects quality of life. It is expected that these measures will be correlated, and some aspects of PIADS and NEI-VFQ 25 will be more correlated that others. Even though they do measure different aspects of quality of life, one can still say that they should be related.

It is important to establish a conceptual framework that explains how assistive technology impacts on quality of life and how it relates to the measures being considered. A framework also can provide a template for other models. It provides a useful perspective for all stakeholders (consumers, funders, and service providers) [90]. Models also help us understand the functional problems upon which the device type is intended to impact, critical features of the device type that are putatively responsible for those impacts, characteristics of individuals that are affected by the model, elements and contingencies in the causal chain connecting procurement of the device type with likely outcomes, and expected changes in user's status and in their environment that constitute those outcomes [90].

The International Classification of Functioning, Disability and Health (ICF) described two conceptual models for disability:

- A medical model views disability as a feature of the person that is directly caused by the disease or health condition, and
- A social model views disability as a socially created problem and not at all an attribute of the individual [91].

Both models can be incorporated to provide completion, since neither one seems adequate on its own. Below is ICF's representation of the model of disability:

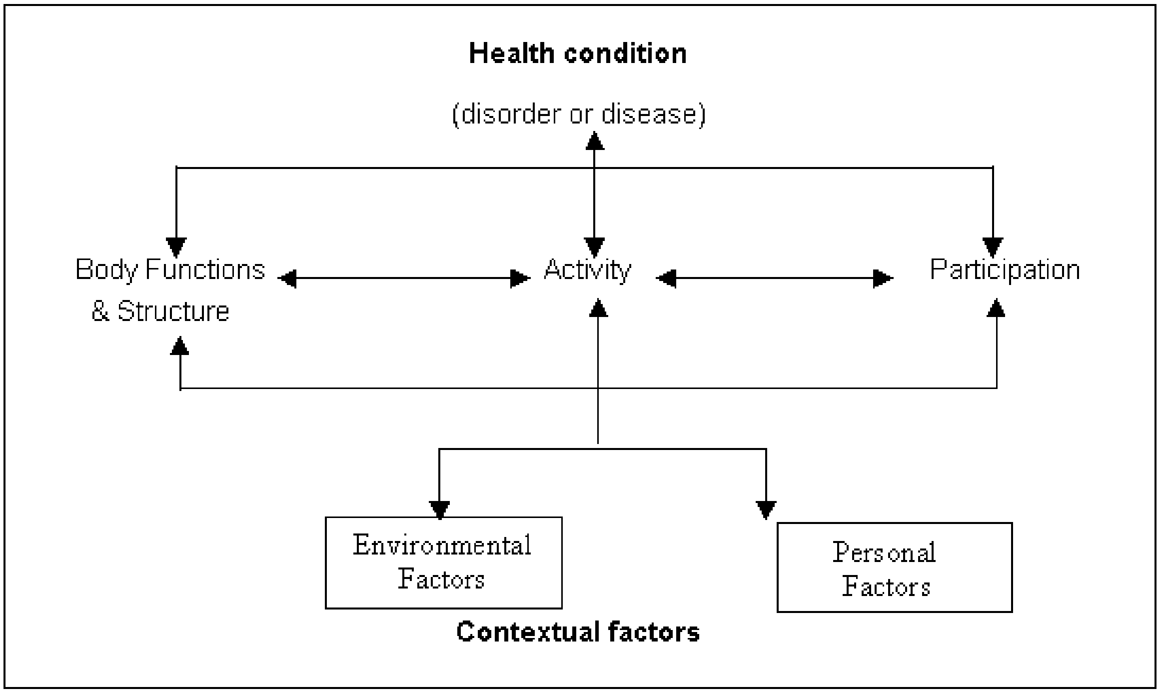


Figure 1-1 ICF Disability Model [91]

Health condition influences several domains, body functions and structure, activity, participation, which are all intertwined and affected by environmental and personal factors.

Disability and functioning are portrayed as outcomes of the interactions between health conditions and contextual factors, and functioning is identified at the level of the body, the whole person, or the whole person in a social context [91]. This framework can be used to encourage research that promotes a common understanding among those with an interest on various perspectives in considering assistive technology device outcomes [90]. CATOR assigned priority to outcomes in five areas: effectiveness, social significance, device satisfaction, psychological functioning, and subjective well being [19]. The user's perspective must be accounted for and the framework should facilitate administrations of the effect of assistive technology devices on users. Below is a conceptual framework that is proposed for the current study.

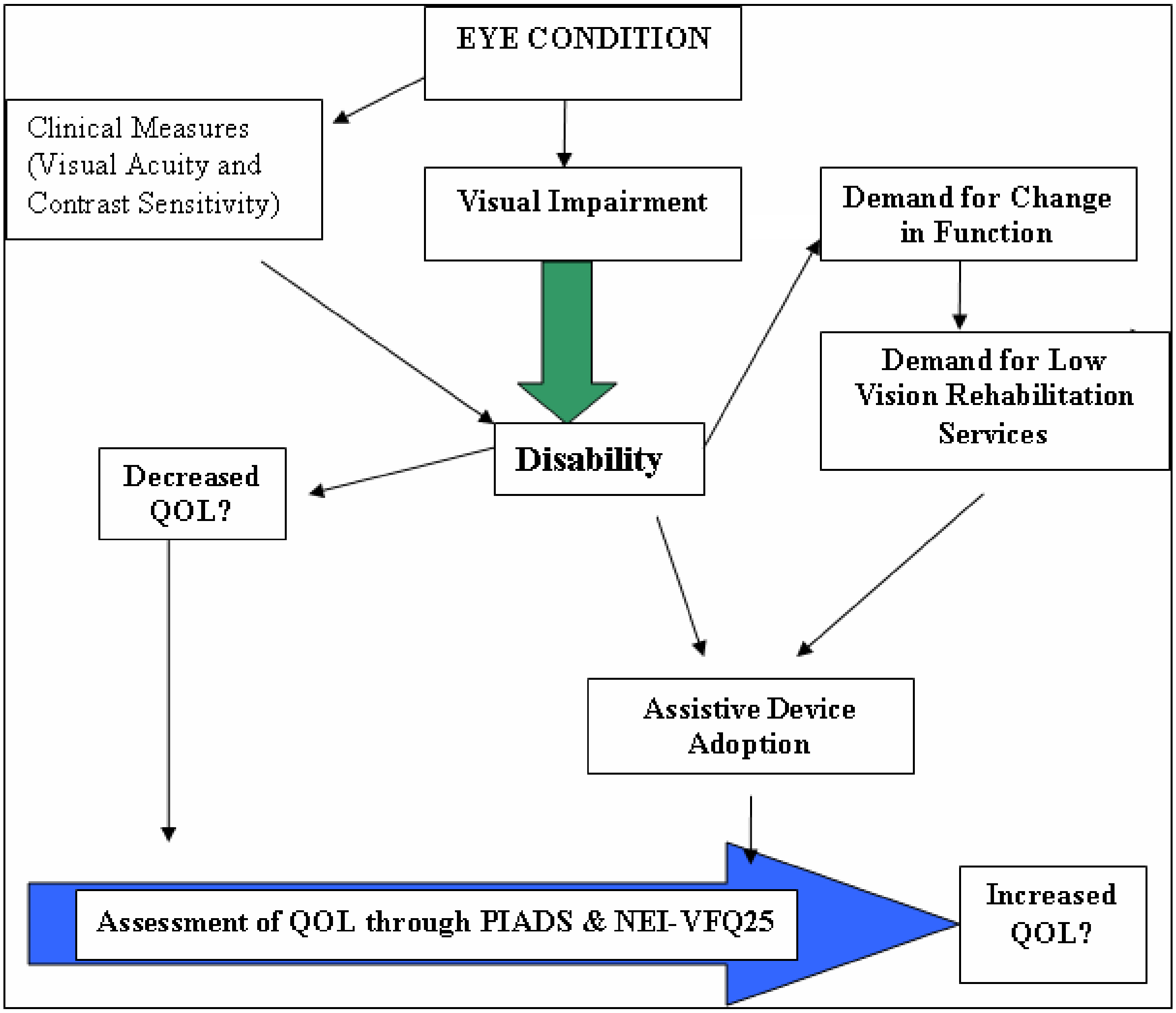


Figure 1-2 Proposed Conceptual Model Linking Vision Impairment, Device Demand, and Quality of life

A change in eye condition leads to visual impairment, causing a disability, initiating a demand for services (i.e. Assistive Device Adoption), which will aid in restoring some functional capability, leading to a verifiable improvement in quality of life.

The above model suggests that a change in eye condition, as measured by clinical measures, will likely lead to a visual impairment, thus eliciting a demand for change in function. In turn, a demand for change in function should therefore bring forth the adoption of a device to aid in restoring function, thus translating into a verifiable improvement in quality of life, which should then translate into a perceived increased in psychosocial impact. The purpose of the model is to show that although one may not necessarily be able to restore lost visual function, but by adopting a device, quality of life can be improve through restoring some functional status.

1.8 Research Gaps

There are some obvious gaps in the research literature. No large scale randomized control trial needs have been conducted to describe quality of life in all of its significant constructs: visual function, clinical measures, physical function, psychosocial function, and so forth. As well, more and better research is needed to look at the perspective of the patient and to evaluate the most effective tools to meet their rehabilitation demands. Further outcomes research is warranted as the visually impaired aging population is constantly increasing.

1.9 Significance of Study

Although it may be desirable to find a single instrument for measuring quality of life changes associated with low vision rehabilitation, the quality of life concept is much too complicated for this to be viable. This study investigated how a vision-specific measure compares with a more generic measure of quality of life. On the surface, vision-specific measures would seem to enjoy a validity advantage. Measures like the NEI-VFQ 25 appear to address the issues most relevant to successful use of low vision aids such as closed-circuit television systems (CCTV). However, the effectiveness of these devices at restoring lost functional capabilities may be poorly correlated with how well they improve psychosocial well-being. For example, an individual with more severe vision loss may derive significant functional benefit from a CCTV system that allows him/her to read independently, but the presumed impact on quality of life may be offset by less frequent visits by friends or relatives who used to drop by to read to. No single measure can successfully engage all of the issues inherent in this complex problem. Rather, each measure may have a different clinical application.

Chapter 2
Methods

2.1 Participants

One hundred and twenty adult subjects (≥18yrs) were recruited after obtaining their first ever prescribed low vision device through the Low Vision Clinic at the University of Waterloo, School of Optometry. This recruitment is related to a parent research project being funded by the Canadian Institutes of Health Research (CIHR). Recruitment was conducted sequentially from consecutive appointments at the Low Vision Clinic and therefore was not selected randomly. First, their eligibility for the study was determined. The inclusion criteria required them to be over the age of 18, a new patient to the clinic, and someone who had little or no experience with low vision aids. All other patients were considered ineligible. The age criterion was selected to ensure subjects were competent and able to give personal consent with respect to the significant time commitment required to participate in the host CIHR study. This group was selected order to track changes that occur following the first adoption of a device.

2.2 Procedures

Prospective subjects were approached on the day of their low vision administration. They were given a large print information letter that described the study being conducted, as well to receiving the information verbally. They were invited to ask questions to obtain any additional information they required. If they agreed to participate, they were asked to sign a consent form confirming their agreement. For those patients who refused to take part, their reasons were noted and recorded in a database.

After a person completed their low vision clinical administration, their file was reviewed and data collected from forms that were completed during the administration. These data include eye condition, living support, visual acuities (distance VA's, Pelli-Robson Contrast Sensitivity tests), primary and secondary chief complaints, diagnosis, and any other limitations.

Subjects were contacted approximately two weeks after their low vision appointment. The initial administration was conducted after verifying that subjects had received their low vision device and had commenced using it. If they had not yet received their low vision devices, a subsequent contact time was arranged to ensure they were utilizing their new device before taking part in the first administration. Those who decided not to obtain a device were excluded from the study. Data collection was administered by telephone interview for both the PIADS and the NEI-VFQ 25. For the NEI-VFQ 25, standard instructions were followed and respondents were asked to answer all questions, taking into account their use of the assistive device. It has been shown that there is no statistically significant difference in results obtained from face to face and telephone interviews[89]. Subjects were contacted for follow-up administration two weeks after their initial administration. The parent CIHR study continued with the follow up administrations at bi-weekly intervals for six months, followed by monthly interviews over the next six months.

The primary administration instruments were PIADS and NEI-VFQ 25. These data were recorded on data report sheets and then transferred into an SPSS database for analysis.

2.3 Instruments

The measures used were the National Eye Institute Visual Function Questionnaire (NEI-VFQ 25) and the Psychosocial Impact of Assistive Devices Scales (PIADS). Table 2 provides examples of items that are included in the 26-item PIADS measure. A copy of a complete PIADS questionnaire is included in Appendix A:

Table 2 Example of PIADS Items [81]

	Decreases			No Change	Increases		
	-3	-2	-1	0	1	2	3
Embarrassment	☐	☐	☐	☐	☐	☐	☐
Self-Confidence	☐	☐	☐	☐	☐	☐	☐
Ability to Adapt to Activities of Daily Living	☐	☐	☐	☐	☐	☐	☐

Participants were asked to score the impact that their device has had on each item; for example if using the device has increased, decreased, or made no change in their competence. The scoring of three of the PIADS items are reversed (confusion, frustration and embarrassment). The score for each subscale is not the total score for that subscale. Instead, the subscale score is based on the mean for all the items on that subscale. This ensures that each subscale will always have a score between -3 and +3, thereby facilitating interpretation and comparison.

The NEI-VFQ 25 was scored according to the scoring algorithm [45]. Please see Appendix B for the complete questionnaire of the NEI-VFQ 25. NEI-VFQ-25 subscales are scored on a scale from 0 to 100, with 100 indicating the highest level of function. As specified by Mangione et al, the VFQ-25 composite score is calculated as the un-weighted average of all items excluding the general health subscale [45]. All items are scored so that a high score represents better functioning. Item responses were adjusted for directionality (high values reflect participants with good vision or health) and were transformed to a scale of 0 to 100. Adjusted items belonging to a scale were averaged together to create a single scale score [67]. The overall (composite) score is the mean of all responses to all 11 domains (excluding general health) and represents a global estimate of a patient's visual function [48]. For those individuals who do not drive it was coded as missing and they did not have the driving subscale included in their composite score. Participants were excluded from the analysis if they had stopped doing the activity for reasons other than poor eyesight.

The overall composite score of the NEI-VFQ was tabulated, in addition to an overall PIADS score of the three subscales. The composite score is best used in situations where an overall measure of vision targeted health-related quality of life is desired [48]. The NEI-VFQ-25 composite (overall) score is calculated as the un-weighted average of all items, excluding the general health subscale. The two measures were not directly comparable, since the PIADS questionnaire contains 26 items, grouped into three-subscales, and the NEI-VFQ contains 25 items, grouped into 12 subscales.

2.4 Data Analysis

Data analysis was performed using SPSS version 13.00. The sample size population was chosen at 120 subjects, and α (alpha) was set to 0.05. ß will equal 1-power. With 80% power, ß will equal 0.2. Failure to reject the null hypothesis will yield a type I error where the probability of error is likely in 5% of all studies. The Null Hypothesis in this case is that the means of the data sets will be equal and no significant correlation would exist. The alternative hypothesis would state that they are not equal and that a difference does exist, thus a significant correlation is present. In a paired t-test, if the 95% confidence interval does not include the null hypothesis, then we can safely reject. If $p < \alpha$ then we would have sufficient evidence to reject the null hypothesis. If $p > \alpha$ then we would fail to reject the null hypothesis. The degrees of freedom would be 119 (# of pairs-1). We made the assumption that a normal distribution existed for the population. The assumption was also made that the populations have the same variance and the samples will be independent of one another. Each subject was assessed individually and unaware of the answers of other subjects. The above applied to both the PIADS and NEI-VFQ 25.

Clinical data were collected for analysis. Distance visual acuity was recorded, because it is a common reference for visual function [92]. It is tested by clinicians by using standardized wall charts with black letters on a white background under high light levels. The visual acuity measure was converted from a decimal acuity to its log MAR equivalent. (Log minimum angle of resolution) VA = 1/MAR and Log MAR= log (1/VA). Contrast sensitivity was recorded from Pelli Robson data in clinic records.

Descriptive data for the PIADS and NEI-VFQ 25 at initial and follow up administrations are presented as medians, floor and ceiling effects, and means ± standard deviation. Floor or ceiling effects are identified when 15% or more of scores occur at either extreme. Graphical representations of these distributions are presented.

2.4.1 Psychometric Properties of the Instruments

Psychometric properties of the PIADS and the NEI-VFQ 25 have been verified and validated in the literature. The psychometrics were examined for the sample population of this study. Internal consistency of both measures was calculated using Cronbach's alpha [29]. Both measures at both time instances had a Cronbach's alpha > 0.70, except the NEI-VFQ 25 at initial administration whose alpha value was 0.695, which is still deemed to be acceptable. Test-retest reliability analysis was done by calculating the inter item correlation coefficient (ICC). Responsiveness was tested by determining the effect size and conducting t-tests to see if there was a change between the two instances. When the sample size is reasonable and the t-value is greater than 1.96, the null hypothesis is rejected and one can conclude that a statistically significant change in the measure occurred over time, making the measure responsive [93]. A significant change in score would be evidence of responsiveness, where effect size (ES) was calculated as the mean change in scores between first and second administration, divided by the standard deviation of the scale at the first administration [46]. A large effect size indicates greater likelihood that the instrument as a whole or the various subscales will detect progression; an effect size of 0.2 to 0.49 represents a small change, 0.5 to 0.79 a medium change, and an effect size > 0.8 indicates that the scale on average changed by 0.8 SDs, suggesting that the scale or domain is responsive[46].

Please refer to Appendices C and F for ICC matrix, reliability and effect size calculations.

Looking at the literature for the NEI-VFQ 25, an 80% power is attained when α= 0.05 and is two-tailed. ß will be equal to 0.2, which would mean that a type II error would occur in 20% of the studies. A two-tailed is a test that will be interpreted if the criterion for significance (alpha) falls in either direction. The following table provides us with an estimate of the sample sizes needed:

Table 3 Statistical Values for NEI-VFQ 25 in estimations of power taken from NEI VFQ-25 Scoring Algorithm [44, 45]

Sample sizes needed per <u>group</u> to detect differences between two experimental groups for the VFQ-25, *post-intervention measures only*.

		Number of Points Difference			
Scale Name	SD	2	5	10	20
VFQ-25:					
General Health	26.00	2650	424	106	26
General Vision	21.00	1729	277	69	17
Ocular Pain	17.00	1133	181	45	11
Near Activities	29.00	3297	527	132	33
Distance Activities	29.00	3297	527	132	33
Social Functioning	27.00	2858	457	114	29
Mental Health	27.00	2858	457	114	29
Role Difficulties	29.00	3297	527	132	33
Dependency	28.00	3073	492	123	31
Driving	35.00	4802	768	192	48
Color Vision	23.00	2074	332	83	21
Peripheral Vision	27.00	2858	457	114	29
VFQ-25 Composite	20.00	1568	251	63	16

It is interesting to note the "number of points difference" in Table 3, which is taken from the NEI-VFQ 25 scoring manual[45]. This refers to the anticipated differences in scores between groups. There is a relative difference between sample sizes need for 5 points difference and 10. In agreement with the sample size chosen, we will approximate number of points difference to be 10. This method is used when one needs to estimate statistical power in situations like this study when randomization is not possible [44].

A MANOVA (multivariate analysis of variance) test was conducted to assess whether or not the PIADS and NEI-VFQ 25 subscales were influenced by the type of device participants had adopted.

The NEI-VFQ 25 data collected was also compared to a reference group of subjects who were eye disease-free. This reference group was obtained from prior published NEI-VFQ 25 data (NEI-VFQ 25 scoring algorithm). Participants in this reference group had no evidence of underlying eye disease except for corrected refractive error to at least 20/25 [44, 49, 50]. T-tests conducted allowed for a comparison of means.

A Pearson Product Moment Correlation result was used to examine the association between the clinical measurements (visual acuity and contrast sensitivity) to the measures administered (PIADS and NEI-VFQ 25), and scatter plots were constructed for visual representation. The Pearson Product Moment Correlation test was chosen because data appeared to be normally distributed. To examine the relationship between the same measures at the different time points, a Spearman Rank Correlation was used to test whether a linear relationship existed. The correlations between measures were summarized by the Spearman correlation coefficient, because many of the measures were highly skewed and/or ordinal. For the secondary hypothesis, using the paired t-test, a comparison of means was used to determine if the relationship changed or remained stable over the short interval stated.

The sample population of 120 was filtered to consider only the participants with Age Related Macular Degeneration (ARMD), and where applicable, the above analyses were repeated. This was done in an attempt to eliminate the variable of eye condition by limiting the sample to only subjects with ARMD, with the possibility that eye condition may have some influence on test scores. The mean scores of PIADS and NEI-VFQ 25 for this ARMD subpopulation fell within the 95% confidence interval of the mean scores for the overall sample population, which indicates that eye condition was not a significant complicating factor.

Chapter 3
Results

3.1 Overall Sample Population

3.1.1 Demographics

Subjects were 66% female with a mean age of 76 years ***(Fig3-2)*** and 71% had ARMD ***(Fig 3-1)*** as the primary diagnosis. The majority of participants were female between the ages of 76-85 ***(Fig 3-3)***. Devices obtained from the low vision clinic included: CCTV System (37.5%), Hand/stand magnifiers (25%), Rx Spectacle (20%), Telescope/Binoculars (7.5%), Field Enhancement Device (3.3%), Adaptive Computer Equipment (5%), and Non-Optical Device (1.7%). Refer to ***Fig 3-4*** for device distribution.

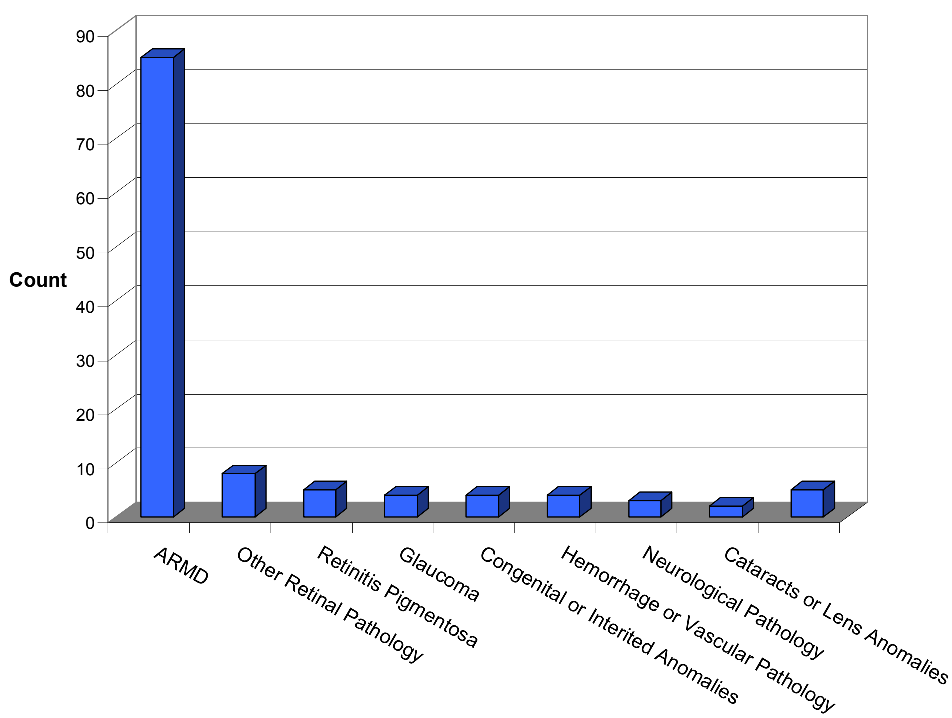


Figure 3-1 Distribution of Eye Conditions for 120 Subjects

The majority of subjects had ARMD, followed by retinal pathologies.

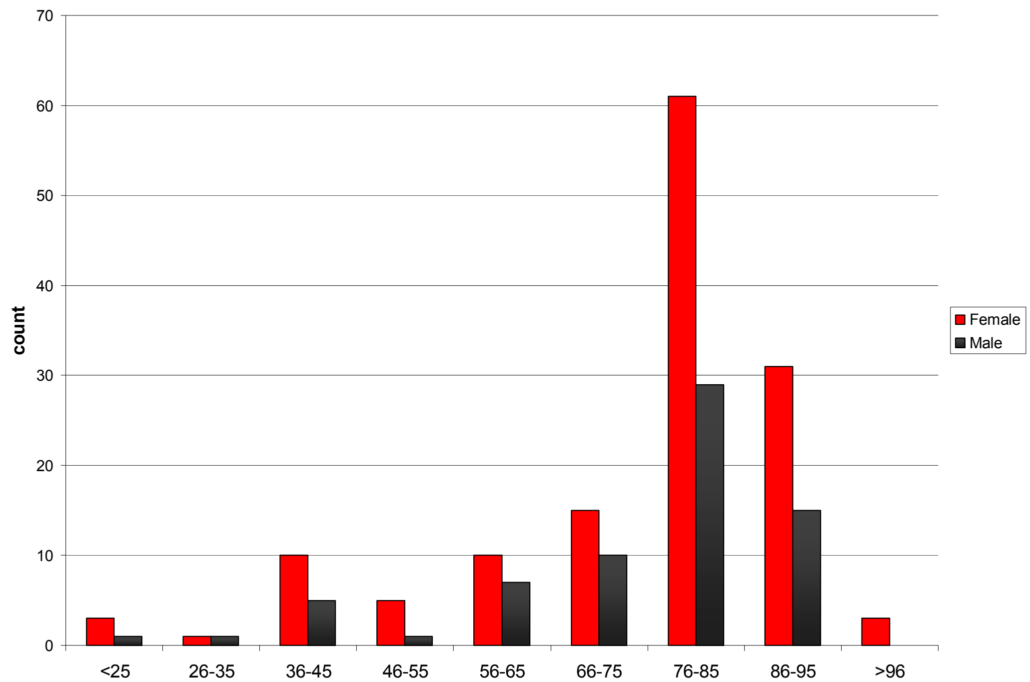


Figure 3-2 Age and Gender Distribution for 120 Subjects

Majority of Subjects were female and between the ages of 76-85 years of age.

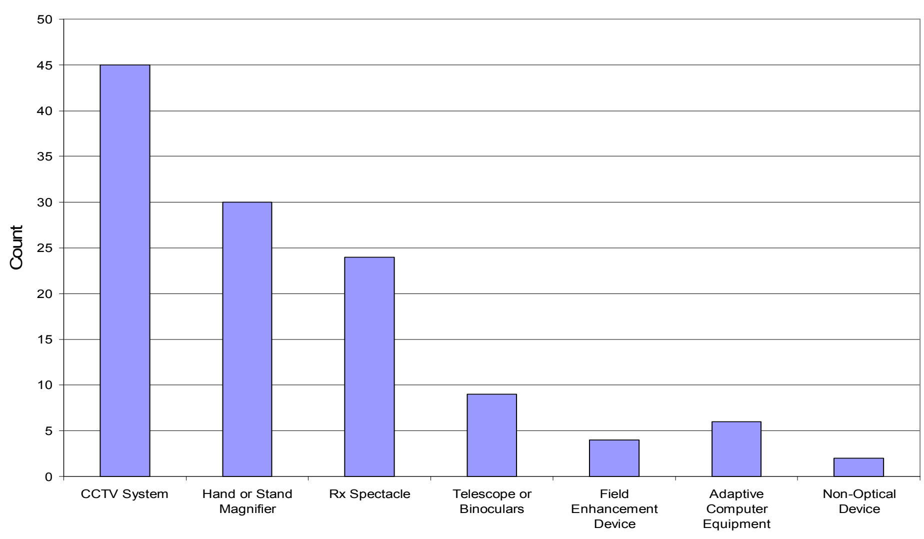


Figure 3-3 Device Distribution for 120 Subjects

CCTV Systems were the most common adopted assistive technology device, followed by Hand/Stand Magnifiers and Rx Spectacles.

The average best corrected visual acuity was 0.78 ± 0.32 logMAR (log minimum angle of resolution), and contrast sensitivity was 1.15 log CS (log contrast sensitivity) **(Table 4)**. On the logMAR scale, 0 coincides with 6/6 acuity, while 1.0 coincides with 6/60 acuity. In other words, the lower the logMAR score, the better the acuity performance. Conversely, the higher the Pell Robson score, the greater contrast sensitivity is. Both clinical measures exhibited normal distribution ***(Fig 3-5 and 3-6).***

Table 4 Clinical Statistics for Best Corrected Visual Acuity and Contrast Sensitivity. Log Mar Scale Used.

		DISTANCE VA	PELLI ROBSON OU
N		119	116
Mean		.778872	1.1509
Median		.802000	1.1500
Std. Deviation		.3206126	.30737
Variance		.103	.094
Skewness		-.496	-.230
Std. Error of Skewness		.222	.225
Minimum		.0000	.30
Maximum		1.5600	1.95
Percentiles	25	.602000	1.0000
	50	.802000	1.1500
	75	1.000000	1.3500

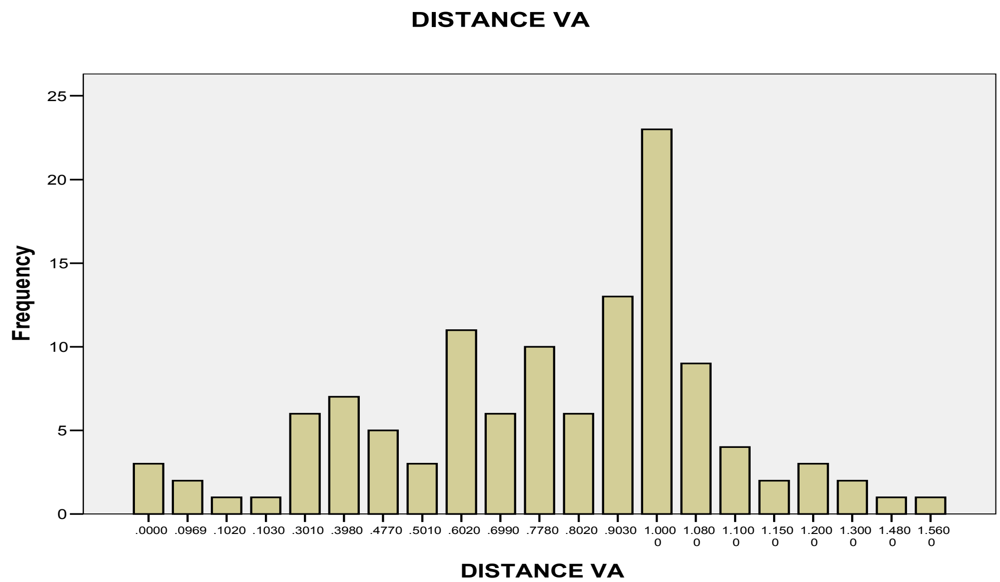


Figure 3-4 Distribution of Distance Visual Acuity Data for 120 Subjects

Normal Distribution exhibited for Distance Visual Acuity data, with most common VA on Log Mar scale being 1.00

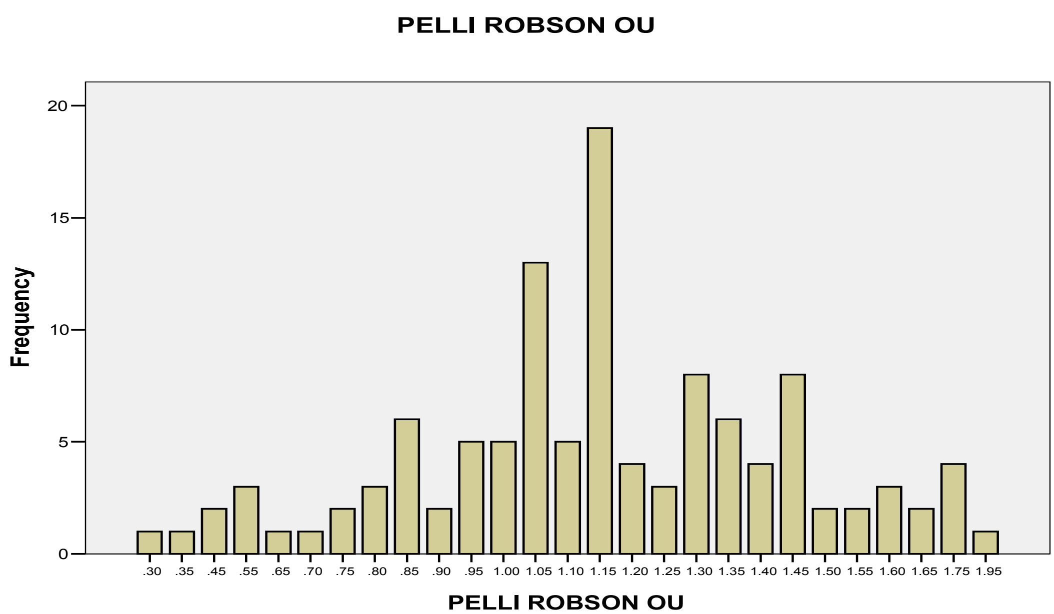


Figure 3-5 Distribution of Contrast Sensitivity Data for 120 Subjects

Normal Distribution exhibited for Pelli Robson Binocular Data, with most common being 1.15

3.1.2 PIADS Distributions

The distributions for PIADS and its subscales are presented in **Tables 5 and 6** for both initial and follow up administrations. No significant floor or ceiling effects were noted. Competence exhibited the highest subscale mean (1.16 ± 0.77 at initial and 1.35 ±0.71 at follow up). In every instance, there appeared to be a positive shift between initial and follow up for each subsequent subscale and the overall scores ***(Figs 3-7,3-8,3-9,3-10,3-11,3-12,3-13,3-14)***. The shift to the right indicates user response has improved at the follow-up administration.

Table 5 26-Item PIADS Frequency Distributions for 1st Administration for 120 Subjects

Scale	N	Mean ± Standard Deviation	Median	Floor n (%)	Ceiling n (%)
Competence	120	1.16 ± 0.77	1.25	6(4.8%)	6(4.8%)
Adaptability	120	0.97 ±0.74	1.00	6(4.8%)	5(4%)
Self-Esteem	120	0.81 ±0.66	0.81	9(7.2%)	2(1.6%)
Overall PIADS	120	0.98 ±0.66	0.94	6(4.8%)	3(2.4%)

Note: Floor effects were calculated for those individuals with scores less than 0, while ceiling effects were calculated for those with scores higher than 2.5

Table 6 26-Item PIADS Frequency Distributions for 2nd Administration for 120 Subjects

Scale	N	Mean ± Standard Deviation	Median	Floor n (%)	Ceiling n(%)
Competence	120	1.35 ±0.71	1.25	2(1.6%)	8(6.4%)
Adaptability	120	1.10 ±0.67	1.00	2(1.6%)	7(5.6%)
Self-Esteem	120	1.03 ±0.63	0.87	1(0.8%)	2 (1.6)
Overall PIADS	120	1.16 ±0.60	1.12	0 (0.0%)	1(0.8%)

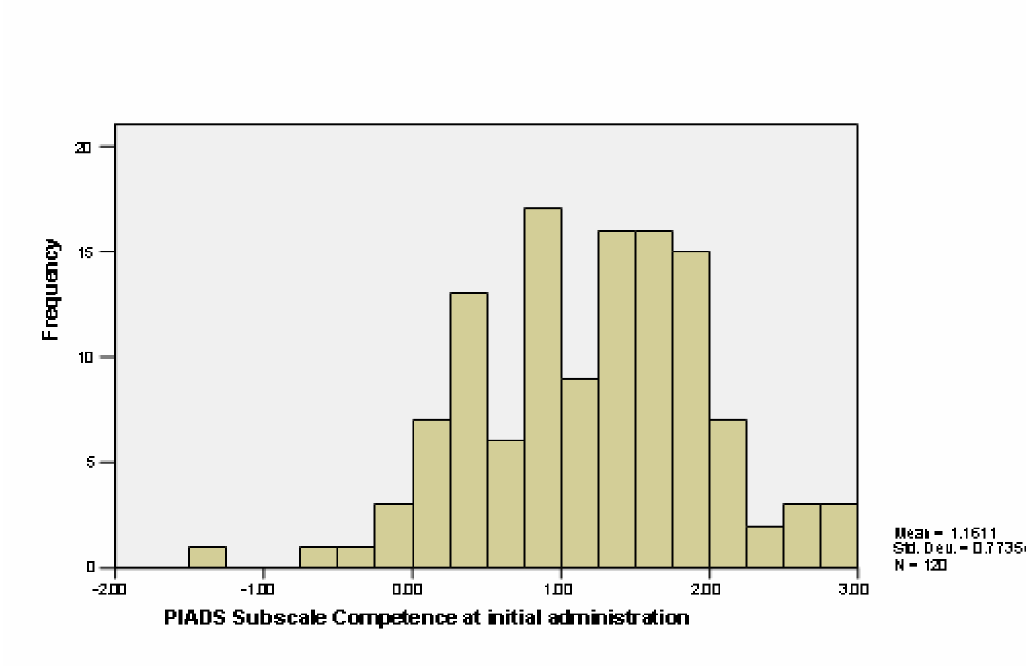


Figure 3-6 PIADS Distribution at initial administration for Competence for 120 subjects

Data exhibited normal distribution with majority of scores being positive.

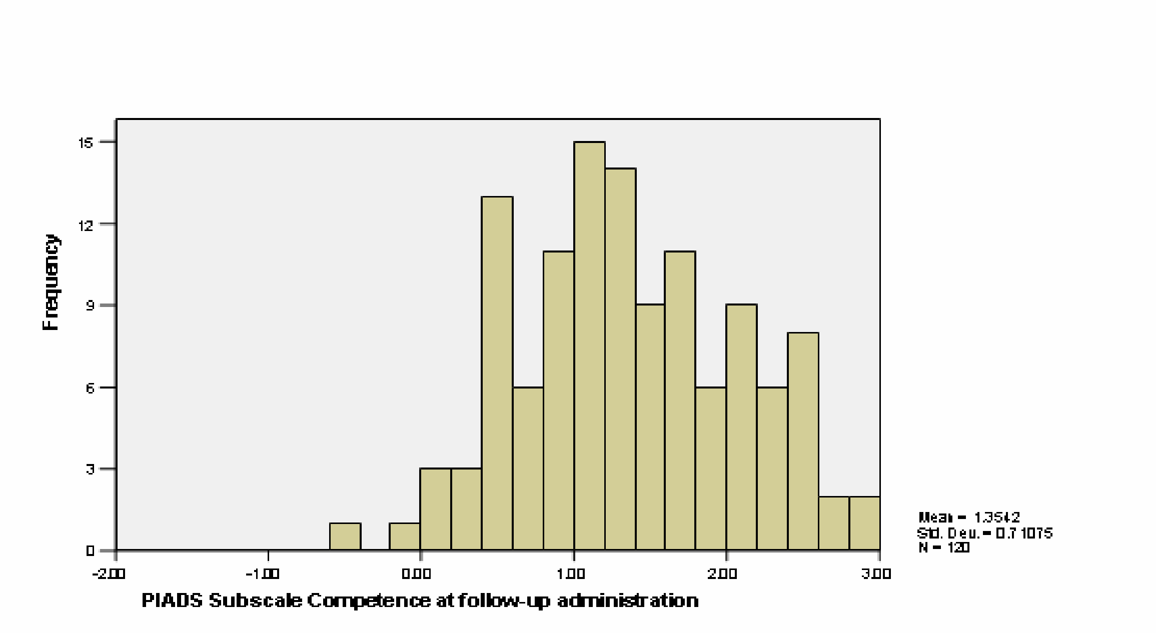


Figure 3-7 PIADS Distribution at follow up administration for Competence for 120 subjects

Data exhibited normal distribution with majority of scores being positive

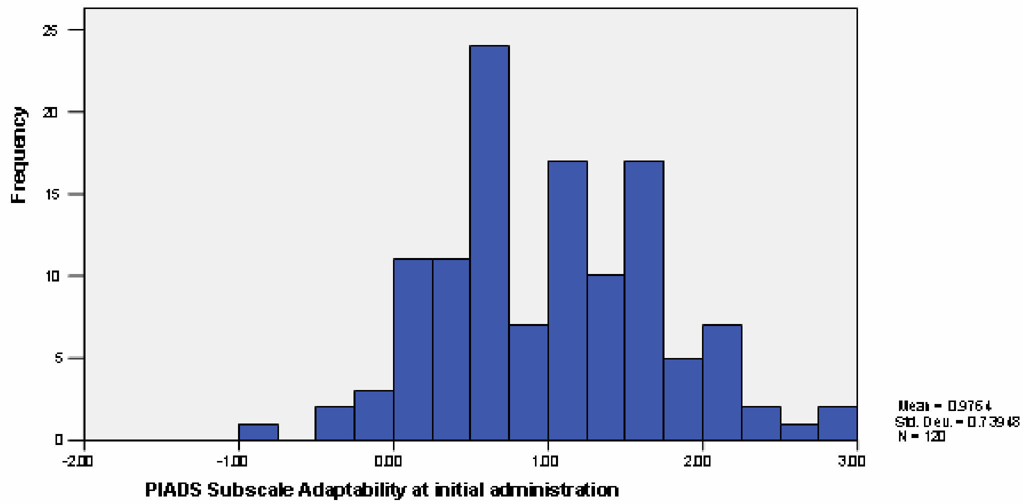


Figure 3-8 PIADS Distribution at initial administration for Adaptability for 120 Subjects

Data exhibited normal distribution with majority of scores being positive

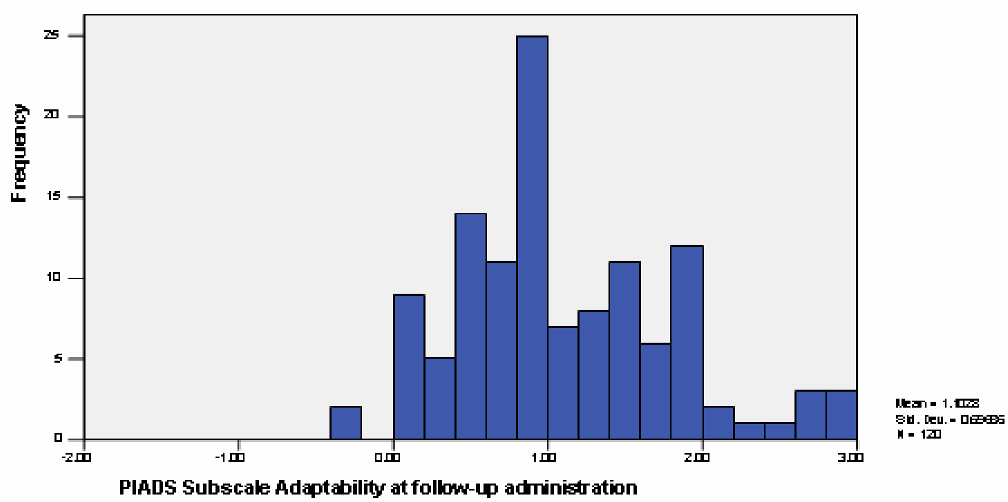


Figure 3-9 PIADS Distribution at follow up administration for Adaptability for 120 subjects

Data exhibited normal distribution with majority of scores being positive

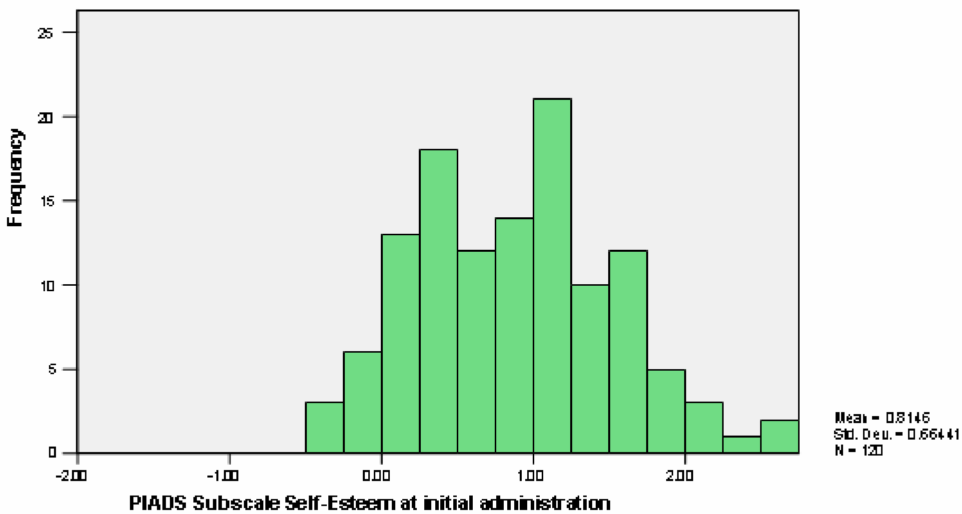


Figure 3-10 PIADS Distribution at initial administration for Self-esteem for 120 Subjects

Data exhibited normal distribution with majority of scores being positive

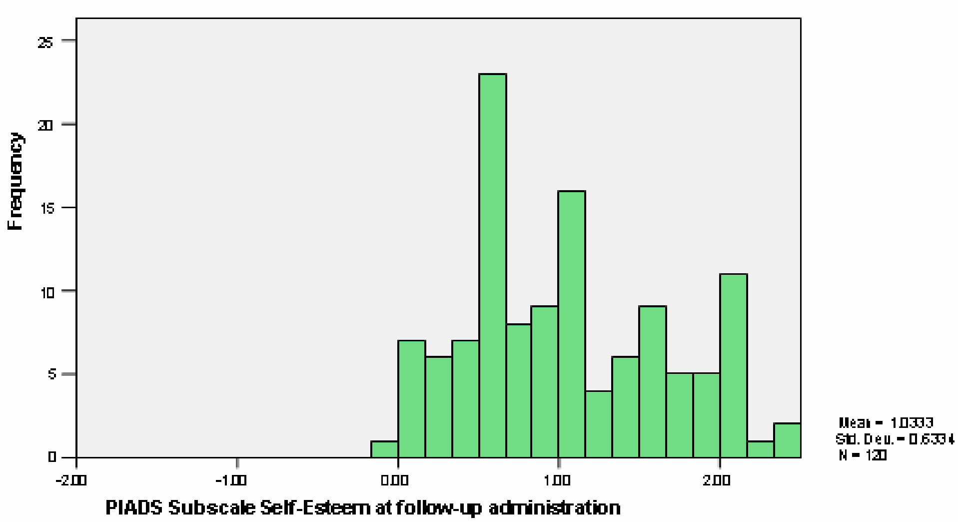


Figure 3-11 PIADS Distribution at follow up administration for Self-esteem for 120 Subjects

Data exhibited normal distribution with majority of scores being positive

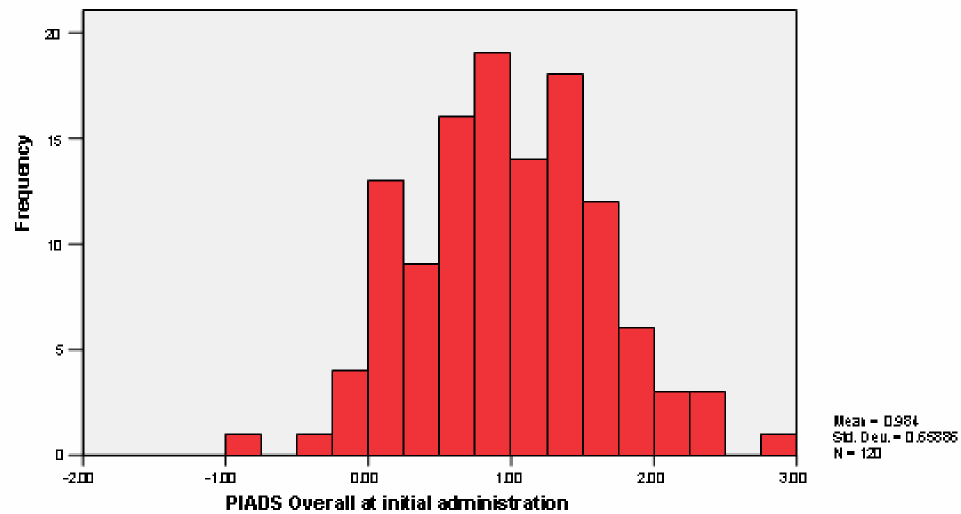


Figure 3-12 PIADS Distribution at initial administration for overall score for 120 Subjects

Data exhibited normal distribution with majority of scores being positive

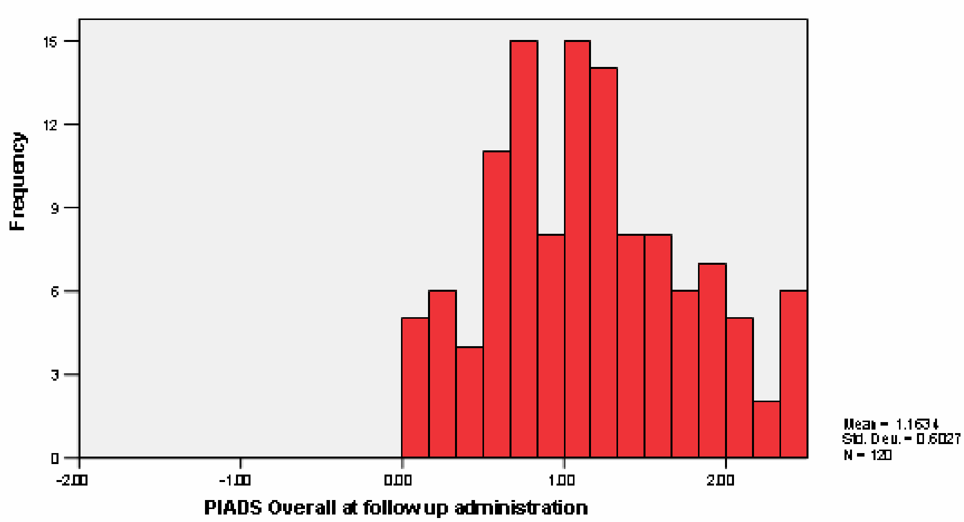


Figure 3-13 PIADS Distribution at follow up administration for overall score for 120 subjects

Data exhibited normal distribution with majority of scores being positive

3.1.3 Responsiveness of the PIADS

The paired t-test was used to determine which subscales are most responsive. The overall PIADS score was responsive(able to detect change) ($t=-3.42$, $p=0.001$) with respect to device usage. The subscales of the PIADS that were most responsive to device usage were "Competence" ($t=-3.12$, $p=0.002$) and "Self-esteem" ($t=-4.06$, $p<0.001$). Using the effect size measure, the difference detected with the PIADS overall score indicated a significant increase between initial and follow up administrations following device usage (ES=0.79). The PIADS subscales also showed a moderate to large increase in scores as a result of device usage: Competence (ES=0.79), Adaptability (0.74), Self esteem (0.72). Responsiveness statistics for the PIADS can be seen in **Table 7**.

Table 7 Responsiveness Statistics of the PIADS as a Result of Device Adoption for 120 Subjects

PIADS Subscales	Mean ± Standard Deviation at t_1	Mean ± Standard Deviation at t_2	Observed t-value:	Effect Size (ES)
Competence	1.16 ± 0.77	1.35 ±0.71	-3.12, p=0.002	0.785
Adaptability	0.97 ±0.74	1.10 ±0.67	-1.92, p=0.06	0.738
Self-Esteem	0.81 ±0.66	1.03 ±0.63	-4.06, p<0.001	0.720
PIADS Overall	0.98 ±0.66	1.16 ±0.60	-3.42, p=0.001	0.786

3.1.4 NEI-VFQ 25 Distributions

The distributions for NEI-VFQ 25 and its subscales are presented in **Tables 8 and 9** for both initial and follow up administrations. Significant floor effects are present for the driving subscale in both instances (89.4% at initial and 88.5% at follow up) because most participants are ineligible for a driver's license in Ontario due to their visual impairment. General Health (19.2% t_1, 20.8% t_2), Ocular Pain (58.3% t_1, 50.8% t_2), Color Vision (52.9% t_1, 52.5% t_2), and Peripheral Vision (51.7% t_1, 48.3% t_2) NEI-VFQ 25 subscales all demonstrate ceiling effects for both the initial and follow up administrations. Comparing ***Fig 3-15 and Fig 3-16***, it can be seen there is no significant change for the t-tests between scores for the NEI-VFQ 25 overall composite scores between initial and follow up administrations.

Many individuals reported their general health as "Good" ***(Fig 3-17)***. The majority also reported their perceived visual health as either "fair" or "poor" ***(Fig 3-18)***. The Near Activities subscale scores were mostly reported to be either "extreme" or "moderate" difficulty accomplishing tasks associated with being up close ***(Fig 3-19)***. The Distance Activities subscale shows neither floor nor ceiling effects, with responses ranging from “no difficulty” to “stopped doing” ***(Fig 3-20)***. Peripheral vision does not appear to be a problem for the majority of the participants in the study, as can be seen in ***Fig 3-21***. The subscale scores for Role Difficulties, Driving, and General Vision are the lowest while Ocular Pain, Color Vision, and Peripheral Vision are the highest. High scores indicated least difficulty while low scores indicate the most difficulty.

Table 8 NEI-VFQ 25 Frequency Distribution for 1ST Administration for 120 Subjects

Scale	N	Mean ± Standard Deviation	Median	Floor n (%)	Ceiling n (%)
General Health	120	56.67 ± 28.76	50.00	4(3.3%)	23 (19.2%)
General Vision	120	45 ± 20.46	40.00	1 (0.8%)	2 (1.7%)
Ocular Pain	120	84.85 ± 22.69	100.00	2 (1.7%)	70(58.3%)
Near Activities	120	49.97 ±23.37	50.00	3 (2.5%)	2 (1.7%)
Distance Activities	120	49.34 ± 22.81	50.00	2 (1.7%)	3 (2.5%)
Social Functioning	120	63.23 ± 23.61	62.5	6 (5.0%)	18 (14.4%)
Mental Health	120	54.43 ±23.36	56.25	3 (2.5%)	4 (3.3%)
Role Difficulties	120	39.90 ±28.13	37.5	19 (15.8%)	2 (1.7%)
Dependency	120	58.75 ± 29.78	58.33	6 (5.0%)	19 (15.8%)
Driving	85	5.25 ± 17.31	0.00	76 (89.4%)	1 (1.2%)
Color Vision	120	75.63 ± 32.46	100.00	8 (6.7%)	63 (52.9%)
Peripheral Vision	120	75.21 ± 31.34	100.00	6 (5.0%)	62 (51.7%)
NEI-VFQ Composite	120	56.05 ± 14.25	56.08	0 (0.00%)	0 (0.00%)

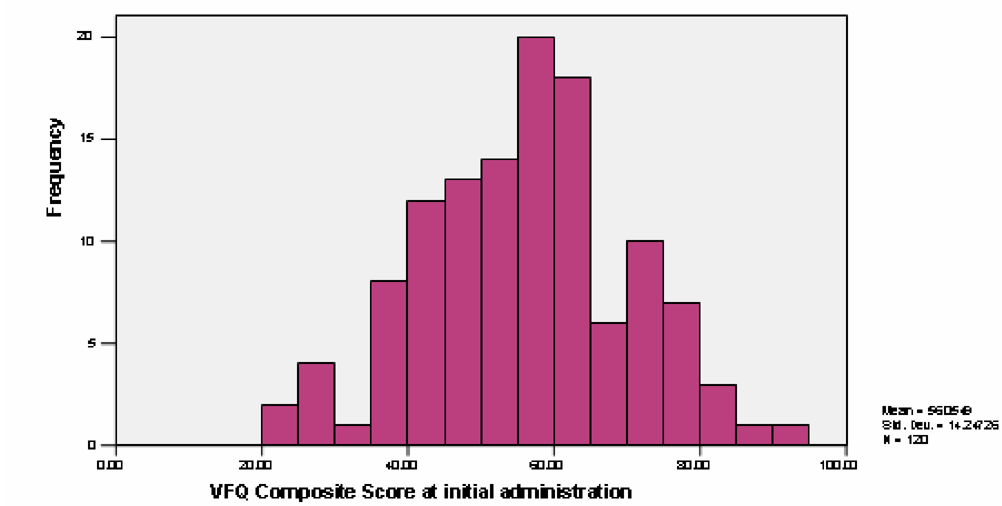


Figure 3-14 Distribution of NEI-VFQ 25 results for overall composite score at initial administration for 120 subjects

Data exhibited normal distribution with majority of scores being positive

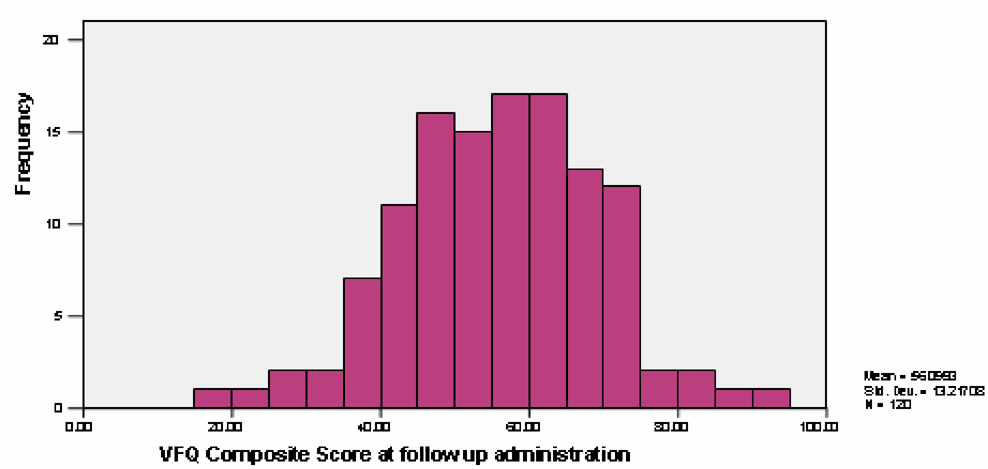


Figure 3-15 Distribution of NEI-VFQ 25 results for overall composite score at follow up administration for 120 subjects

Data exhibited normal distribution with majority of scores being positive

Table 9 25-Item NEI-VFQ 25 Frequency Distributions for 2ND ADMINISTRATION FOR 120 SUBJECTS

Scale	N	Mean ± Standard Deviation	Median	Floor n (%)	Ceiling n(%)
General Health	120	58.96 ± 27.84	50.00	6 (5.0%)	25 (20.8%)
General Vision	120	47.67 ± 17.43	40.00	0 (0.00%)	0 (0.00%)
Ocular Pain	120	82.81 ± 22.69	100.00	0 (0.00%)	61 (50.8%)
Near Activities	120	53.30 ± 23.13	50.00	1 (0.8%)	3 (2.5%)
Distance Activities	120	49.41 ± 21.79	50.00	3 (2.5%)	3 (2.5%)
Social Functioning	120	60.00 ± 24.61	62.50	0 (0.00%)	16 (13.3%)
Mental Health	120	55.47 ± 23.15	56.25	1 (0.8%)	3 (2.5%)
Role Difficulties	120	40.10 ± 28.11	37.50	18 (15.0 %)	4 (3.3%)
Dependency	120	56.88 ± 29.04	58.33	6 (5.0%)	12 (10.0%)
Driving	87	6.13 ± 18.95	0.00	77 (88.5%)	1 (1.1%)
Color Vision	120	76.91 ± 30.17	100.00	5 (4.2%)	62 (52.5%)
Peripheral Vision	120	75.21 ± 30.14	75.00	4 (3.3%)	58 (48.3%)
NEI-VFQ Composite	120	56.10 ± 13.22	56.06	0 (0.00%)	0 (0.00%)

Note: Floor effects are calculated for those individuals whose score is 0, while ceiling effects are for those individuals who scored 100.

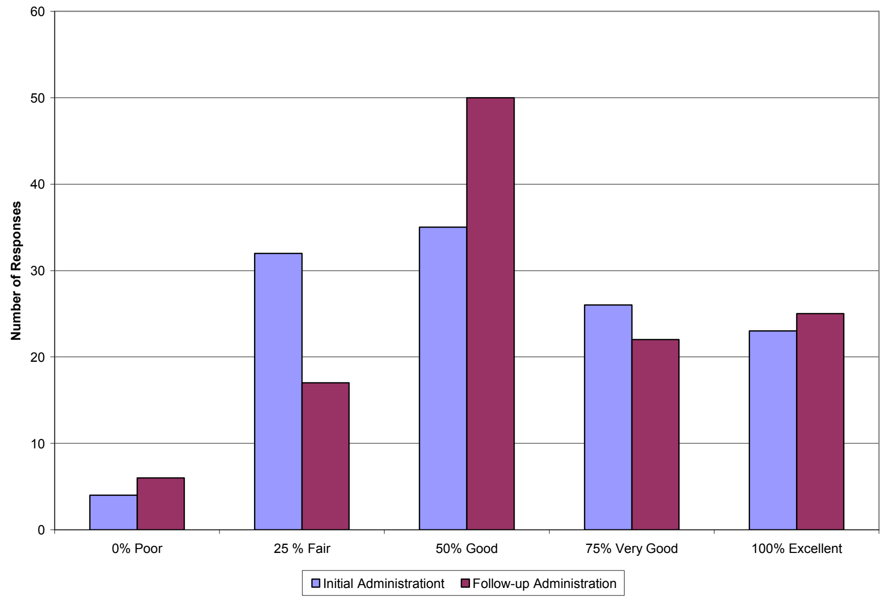


Figure 3-16 Distribution of NEI-VFQ 25 results for Overall Health at initial and follow up administrations for 120 subjects

Majority of subjects reported their professed health as "Good" at both initial and follow up administrations.

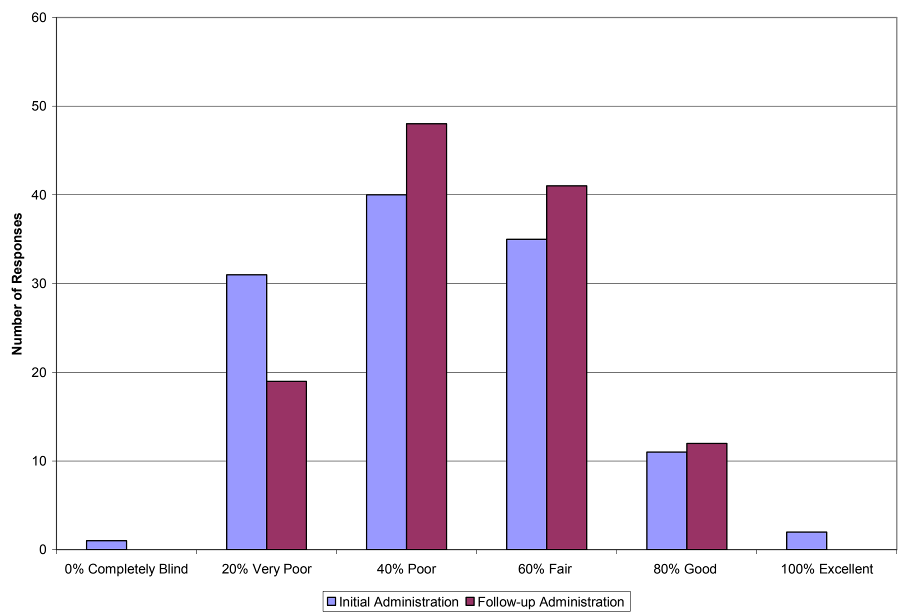


Figure 3-17 Distribution of NEI-VFQ 25 results for Overall Vision at initial and follow up administration for 120 subjects

At both initial and follow up administrations, majority of subjects reported their vision as being "fair" or "poor"

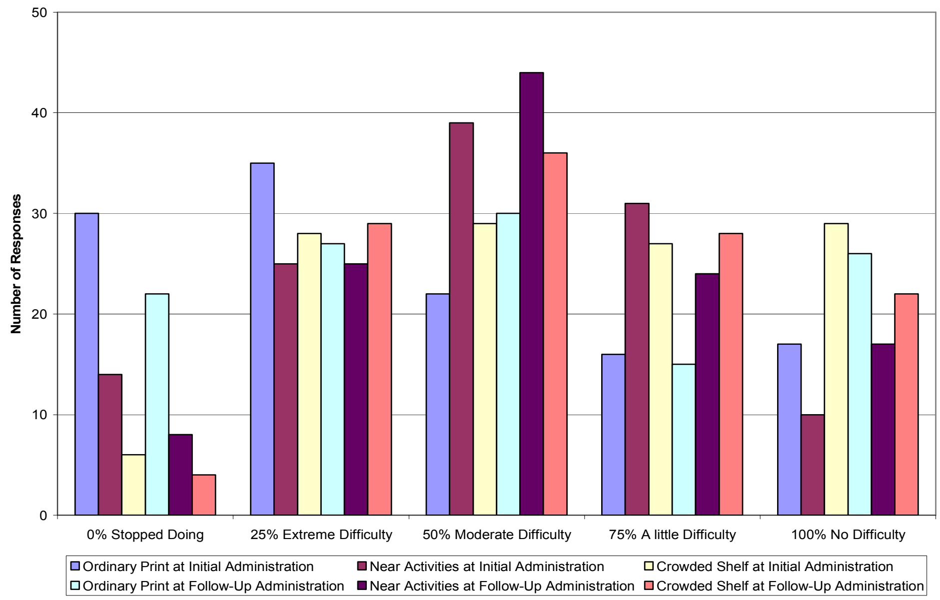


Figure 3-18 Distribution of NEI-VFQ 25 results for Near Activities at initial and follow up administration for 120 subjects

Results were distributed across but majority reported as having moderate to extreme difficulty in completing near activities

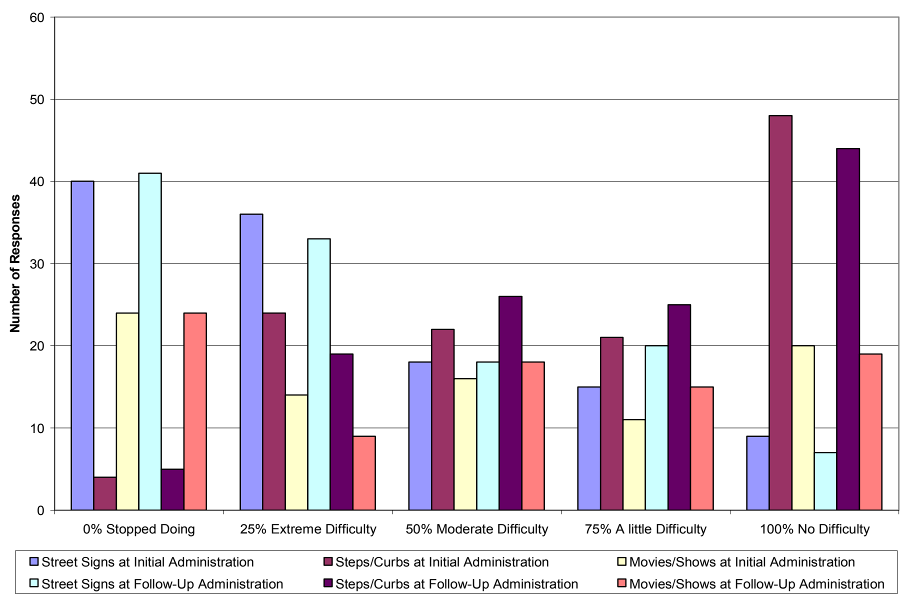


Figure 3-19 Distribution of NEI-VFQ 25 results for Distance Activities at initial and follow up administration for 120 subjects

Responses were distributed over the subscale, from “stopped doing activity” to “having no difficulty”

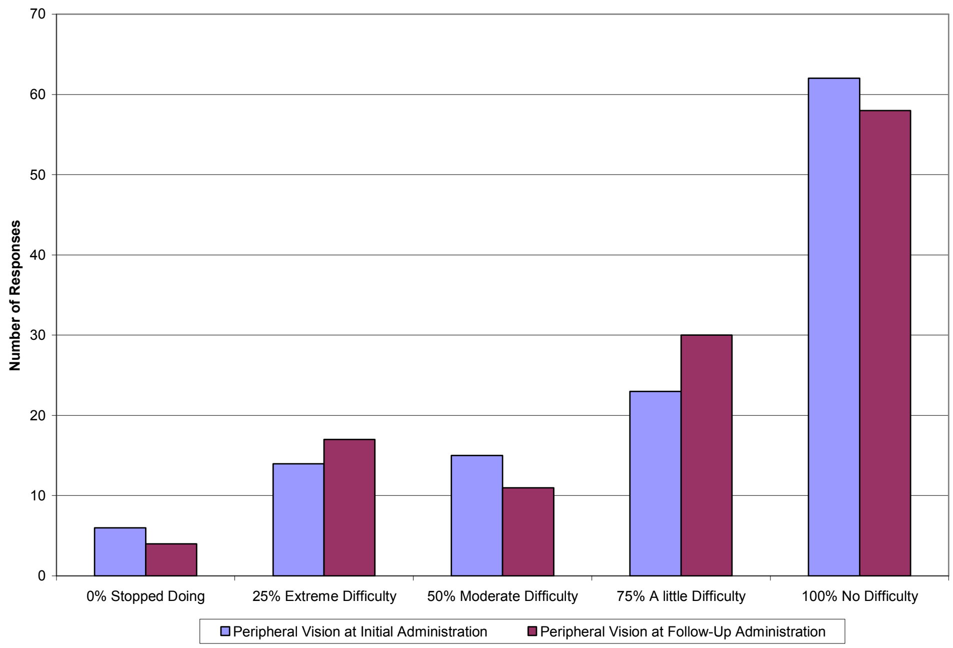


Figure 3-20 Distribution of NEI-VFQ 25 results for Peripheral Vision at initial and follow up administration for 120 subjects

Majority of subjects had no difficulty with activities associated with Peripheral Vision

Note: All other graphical representations for remaining subscales are located in Appendix E

3.1.5 Responsiveness of the NEI-VFQ 25

The responsiveness of the NEI-VFQ 25 was first calculated using the paired t-test. Using this method, none of the subscales or the composite score exhibited responsiveness. When using the effect size measure, all the subscales except driving, and the overall composite score showed a moderate to large effect size. They were: General Health (ES=0.84), General Vision (ES= 0.88), Ocular Pain (ES= 0.94), Near Activities (ES= 0.85), Distance Activities (ES= 0.84), Social Functioning (ES= 0.88), Mental Health (ES= 0.86), Role Difficulties (ES= 0.72), Dependency (ES=0.82), Color Vision (ES= 0.87), Peripheral Vision (ES= 0.87), and the composite score (ES= 0.95). Although effect size deems the NEI-VFQ 25 responsive for the sample population, the paired t-test indicates otherwise. **Table 10** displays all the responsiveness statistics for the NEI-VFQ 25

Table 10 Responsiveness Statistic of the NEI-VFQ 25 as a Result of Device Adoption for120 Subjects

NEI-VFQ 25 Subscales	Mean ± Standard Deviation at t_1	Mean ± Standard Deviation at t_2	Observed t-value	Effect Size (ES)
General Health	56.67 ± 28.76	58.96 ± 27.84	-1.06, p=0.289	0.836
General Vision	45 ± 20.46	47.67 ± 17.43	-1.78, p=0.077	0.880
Ocular Pain	84.85 ± 22.69	82.81 ± 22.69	1.47, p=0.144	0.939
Near Activities	49.97 ±23.37	53.30 ± 23.13	-2.13, p= 0.035	0.852
Distance Activities	49.34 ± 22.81	49.41 ± 21.79	-0.06, p=0.953	0.844
Social Functioning	63.23 ± 23.61	60.00 ± 24.61	1.23, p=0.222	0.879
Mental Health	54.43 ±23.36	55.47 ± 23.15	-0.65 , p=0.518	0.856
Role Difficulties	39.90 ±28.13	40.10 ± 28.11	-0.09, p=0.928	0.719
Dependency	58.75 ± 29.78	56.88 ± 29.04	1.04, p=0.302	0.815
Driving	5.25 ± 17.31	6.13 ± 18.95	0.17, p=0.868	0.098
Color Vision	75.63 ± 32.46	76.91 ± 30.17	-0.78 , p=0.439	0.870
Peripheral Vision	75.21 ± 31.34	75.21 ± 30.14	0.00, p=1.00	0.871
NEI-VFQ Composite	56.05 ± 14.25	56.10 ± 13.22	-0.07, p=0.947	0.947

3.1.6 PIADS and NEI-VFQ 25 as a Function of Device

A multivariate analysis of variance (MANOVA) revealed no differences between device choices for PIADS or NEI-VFQ 25, or for any of their respective subscales. Alpha was calculated at 0.001, since 34 analysis of variance tests were run to determine if there were any differences based on device choice, and these were adjusted by Bonferroni's method. (See Appendix G for results of MANOVA calculations).

3.1.7 NEI-VFQ 25 Comparison to a Published Reference Group

NEI-VFQ 25 subscale and overall scores were compared with those for a published reference group. Significant differences were found for most subscales at initial and follow up administrations, where the reference group was higher in most subscales **(Tables 11 and 12)**. Bonferonni's method was also used here to adjust for multiple comparisons. With alpha set at 0.004, differences were found in every subscale except for Ocular Pain at both initial and follow up administration (t=2.06878, p= 0.039 at initial, t=1.61992, p = 0.106 at follow up).

Table 11 Comparison of NEI-VFQ 25 Scores for Low Vision Cohort (N=120) Versus Published Reference Group of Eye Disease-free Patients (N=118) for 1ST Administration

NEI-VFQ-25 Scale	LV Cohort (mean ± SD)	Reference Group (mean ± SD)[44, 63]	LV vs. Reference (two tailed t-test)
General Health	56.67 ± 28.76	69 ± 24	T= 3.59, p = 0.000402
General Vision	45 ± 20.46	83 ± 14	T=16.7457, p<0.0001
Ocular Pain	84.85 ± 22.69	90 ± 15	T=2.06878, p= 0.039656
Near Activities	49.97 ±23.37	92 ± 12	T=17.4948, p<0.0001
Distance Activities	49.34 ± 22.81	94 ± 11	T=19.274, p<0.0001
Social Functioning	63.23 ± 23.61	99 ± 4	T=16.3593, p<0.0001
Mental Health	54.43 ±23.36	92 ± 12	T=16.1874, p<0.0001
Role Difficulties	39.90 ±28.13	93 ± 13	t=18.7429, p<0.0001
Dependency	58.75 ± 29.78	99 ± 4	t=14.6718, p<0.0001
Driving	5.25 ± 17.31	87 ± 16	t=37.8437, p<0.0001
Color Vision	75.63 ± 32.46	98 ± 8	t=7.32644, p<0.0001
Peripheral Vision	75.21 ± 31.34	97 ± 10	t=7.25029, p<0.0001
NEI-VFQ Composite	56.05 ± 14.25	92 ± 7	t=24.764, p<0.0001

Table 12 Comparison of NEI-VFQ 25 Scores for Low Vision Cohort (N=120) Versus Published Reference Group of Eye Disease-free Patients (N=118) for 2nd Administration

NEI-VFQ-25 Scale	LV Cohort (mean ± SD)	Reference Group (mean ± SD) [44, 63]	LV versus Reference (two tailed t-test)

General Health	58.96 ± 27.84	69 ± 24	t=2.98142, p=0.00317
General Vision	47.67 ± 17.43	83 ± 14	t=17.2542, p<0.0001
Ocular Pain	82.81 ± 22.69	90 ± 15	t=1.61992, p = 0.10658
Near Activities	53.30 ± 23.13	92 ± 12	t=16.2401, p<0.0001
Distance Activities	49.41 ± 21.79	94 ± 11	t=19.977, p<0.0001
Social Functioning	60.00 ± 24.61	99 ± 4	t=17.1312, p<0.0001
Mental Health	55.47 ± 23.15	92 ± 12	t=15.3191, p<0.0001
Role Difficulties	40.10 ± 28.11	93 ± 13	t=18.6832, p<0.0001
Dependency	56.88 ± 29.04	99 ± 4	t=15.7374, p<0.0001
Driving	6.13 ± 18.95	87 ± 16	t=35.5941, p<0.0001
Color Vision	76.91 ± 30.17	98 ± 8	t=7.39767, p<0.0001
Peripheral Vision	75.21 ± 30.14	97 ± 10	t=7.51039, p<0.0001
NEI-VFQ Composite	56.10 ± 13.22	92 ± 7	t=26.2411, p<0.0001

3.1.8 PIADS Correlations with Clinical Measures: Visual Acuity and Contrast Sensitivity

Table 13 presents the correlations between PIADS and visual acuity. No significant correlations existed and visual acuity did not play a role in PIADS scores. ***Figs 3-22 and 3-23*** present a graphical representation of visual acuity versus overall PIADS score at t_1 & t_2. The same was the case for PIADS correlations with contrast sensitivity **(Table 14)**; with ***Figs 3-24 and 3-25*** as graphical representations for contrast sensitivity versus PIADS. Graphical representations of all the visual acuity and contrast sensitivity versus PIADS subscales can be found in Appendix H.

Table 13 Correlations Between PIADS Subscale and Overall Items for Initial (t_1) and Follow up Administrations (t2) with Best Corrected Visual Acuity Score N=116

PIADS Subscale Items with Visual Acuity scores	Correlation Coefficient*	P-value
PIADS Competence t_1	0.196	0.033
PIADS Competence t_2	0.067	0.467

PIADS Adaptability t_1	0.187	0.041
PIADS Adaptability t_2	0.032	0.730
PIADS Self-Esteem t_1	0.152	0.098
PIADS Self Esteem t_2	0.196	0.033
PIADS Overall t_1	0.198	0.031
PIADS Overall t_2	0.107	0.245

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

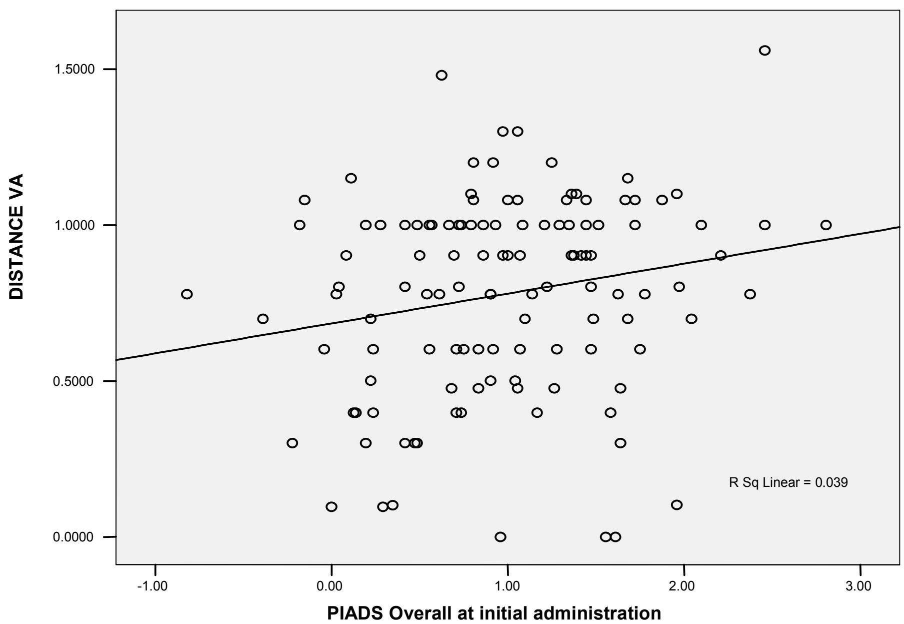


Figure 3-21 Correlation between visual Acuity and overall PIADS score at initial administration. Scatter plot indicates very little correlation between PIADS and VA, n=116

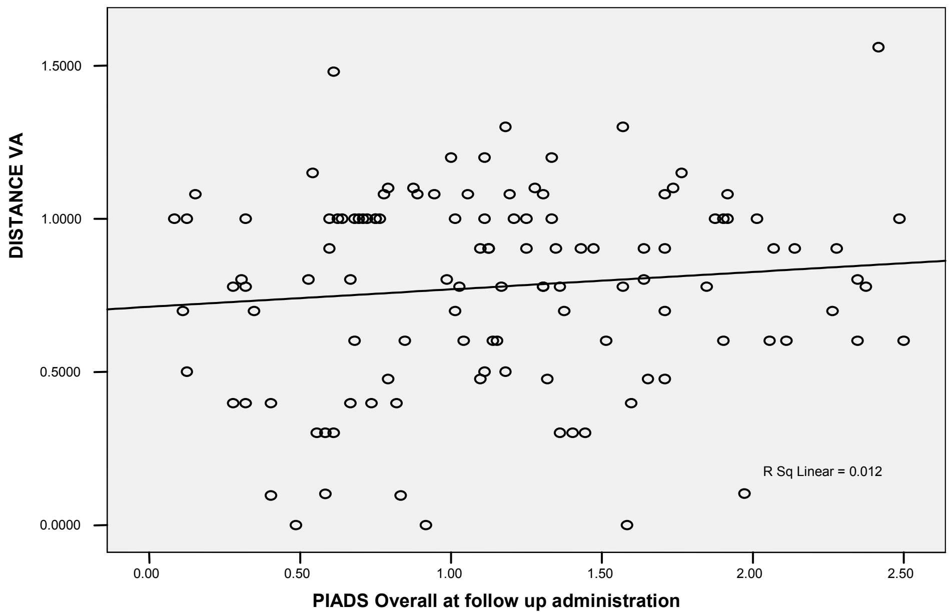


Figure 3-22 Correlation between Visual Acuity and overall PIADS score at follow up administration. Scatter plot indicates very little correlation between PIADS and VA, n=116

Table 14 Correlations between PIADS Subscale Items for Initial (t_1) and Follow up (t_2) Administrations with Pelli-Robson Contrast Sensitivity Test, n=119

PIADS Items with Pelli-Robson scores	Correlation Coefficient	P-value
PIADS Competence t_1	-0.059	0.527
PIADS Competence t_2	-0.025	0.794
PIADS Adaptability t_1	0.023	0.810
PIADS Adaptability t_2	0.008	0.928
PIADS Self-Esteem t_1	-0.042	0.654
PIADS Self Esteem t_2	-0.026	0.779
PIADS Overall t_1	-0.029	0.759
PIADS Overall t_2	-0.016	0.867

*Correlation is significant at the 0.05 level (2-tailed), and correlation coefficient is ≥0.20.

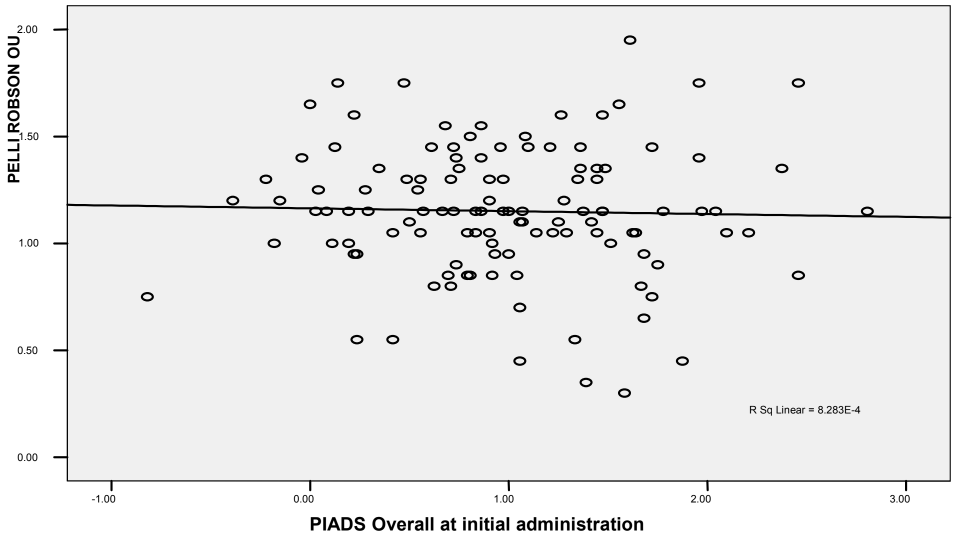


Figure 3-23 Correlation between Contrast Sensitivity and overall PIADS score at initial administration. Scatter plot indicates very little correlation between PIADS and CS, n=116

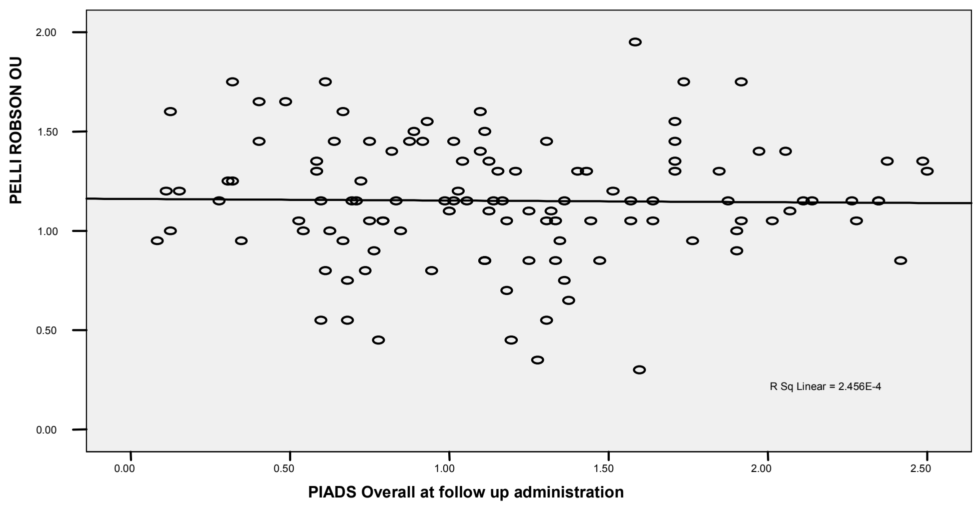


FIGURE 3-24 Correlation between Contrast Sensitivity and overall PIADS score at follow up administration. Scatter plot indicates very little correlation between PIADS and CS, n=116

3.1.9 Correlations between NEI-VFQ 25 and Clinical Measures of Visual Acuity and Contrast Sensitivity

The NEI-VFQ 25 appears to correlate somewhat better than the PIADS with the clinical measures. **Table 15** shows that NEI-VFQ 25 subscales all show modest correlations in the areas of General Vision at t_1 (-0.218, p=0.017), Driving at t_1 (-0.292, p=0.007), Peripheral Vision at t_1 (0.240, p= 0.009), Driving at t_2 (-0.266, p=0.013), and Peripheral Vision at t_2 (0.221, p= 0.015). ***Figs 3-26 and 3-27*** present a graphical representation for visual acuity versus overall NEI-VFQ 25 composite scores at t_1 & t_2. For contrast sensitivity **(Table 16)**, there are several more correlations, but these are also modest at best: Near Activities at t_1 (0.279, p= 0.002), Distance Activities at t_1 (0.250, p=0.007), Driving at t_1 (0.258, p= 0.019), Color Vision at t_1 (0.297, p=0.001), NEI-VFQ 25 composite score at t_1 (0.270, p=0.003), Distance Activities at t_2 (0.260, p=0.005), Driving at t_2 (0.319, p=0.003), Color Vision at t_2 (0.277, p=0.003), and NEI-VFQ 25 composite score at t_2 (0.284, p=0.002). ***Figs 3-28 and 3-29*** also present a graphical representation for contrast sensitivity versus overall NEI-VFQ 25 composite scores at t_1 & t_2. See Appendix H for graphical representations of all the visual acuity and contrast sensitivity versus NEI-VFQ 25 subscales.

Table 15 Correlations between NEI-VFQ 25 Subscale and Overall Items for Initial (t_1) and Follow up (t_2) with Best Corrected Visual Acuity Score, n=116

NEI-VFQ 25 Items with Visual Acuity scores	Correlation Coefficient	P-value
General Health t_1	-0.136	0.140
General Vision t_1	**-0.218***	0.017
Ocular Pain t_1	0.054	0.558
Near Activities t_1	-0.040	0.667
Distance Activities t_1	-0.022	0.813
Social Functioning t_1	0.009	0.926
Mental Health t_1	0.050	0.586
Role Difficulties t_1	0.084	0.364
Dependency t_1	-0.054	0.563
Driving t_1	**-0.292***	0.007
Color Vision t_1	-0.110	0.237
Peripheral Vision t_1	**0.240***	0.009
NEI-VFQ Composite t_1	0.009	0.924
General Health t_2	0.010	0.916

General Vision t_2	-0.171	0.063
Ocular Pain t_2	0.077	0.408
Near Activities t_2	0.025	0.786
Distance Activities t_2	-0.055	0.554
Social Functioning t_2	-0.131	0.154
Mental Health t_2	0.105	0.255
Role Difficulties t_2	-0.087	0.346
Dependency t_2	-0.035	0.707
Driving t_2	**-0.266***	0.013
Color Vision t_2	-0.134	0.150
Peripheral Vision t_2	**0.221***	0.015
NEI-VFQ Composite t_2	-0.044	0.631

*Correlation is significant at the 0.05 level (2-tailed), and correlation coefficient is ≥0.20.

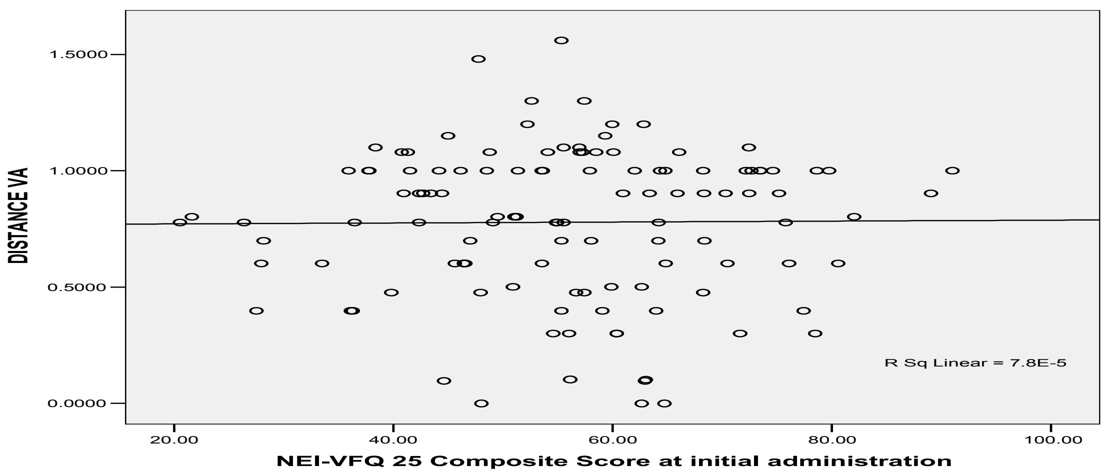


Figure 3-25 Correlation between Visual Acuity and overall NEI-VFQ 25 score at initial administration. Scatter plot indicates some but little correlation between NEI-VFQ 25 a nd VA, n=116

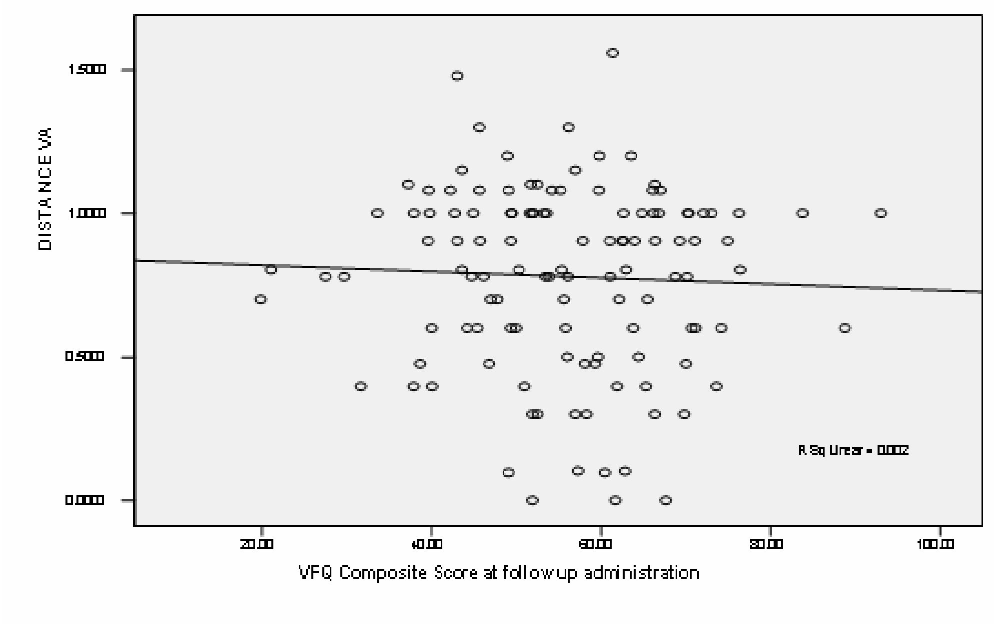


Figure 3-26 Correlation between Visual Acuity and overall NEI-VFQ 25 score at follow up administration. Scatter plot indicates some but little correlation between NEI-VFQ 25 and VA, n=116

Table 16 Correlations between NEI-VFQ 25 Subscale and Overall Items for Initial (t_1) and Follow up (t_2) Administrations with Pelli-Robson Contrast Sensitivity n =119

NEI –VFQ 25 Items with Pelli-Robson scores	Correlation Coefficient	P-value
General Health t_1	0.040	0.672
General Vision t_1	0.141	0.132
Ocular Pain t_1	0.102	0.275
Near Activities t_1	**0.279***	0.002
Distance Activities t_1	**0.250***	0.007
Social Functioning t_1	0.098	0.295
Mental Health t_1	-0.025	0.789
Role Difficulties t_1	0.052	0.579
Dependency t_1	0.181	0.051
Driving t_1	**0.258***	0.019
Color Vision t_1	**0.297***	0.001
Peripheral Vision t_1	0.022	0.811
NEI-VFQ Composite t_1	**0.270***	0.003

General Health t_2	-0.002	0.981
General Vision t_2	0.167	0.074
Ocular Pain t_2	0.098	0.295
Near Activities t_2	0.170	0.068
Distance Activities t_2	**0.260***	0.005
Social Functioning t_2	0.167	0.073
Mental Health t_2	-0.046	0.625
Role Difficulties t_2	0.141	0.131
Dependency t_2	0.168	0.072
Driving t_2	**0.319***	0.003
Color Vision t_2	**0.277***	0.003
Peripheral Vision t_2	0.033	0.728
NEI-VFQ Composite t_2	**0.284***	0.002

*Correlation is significant at the 0.05 level (2-tailed), and correlation coefficient is ≥0.20.

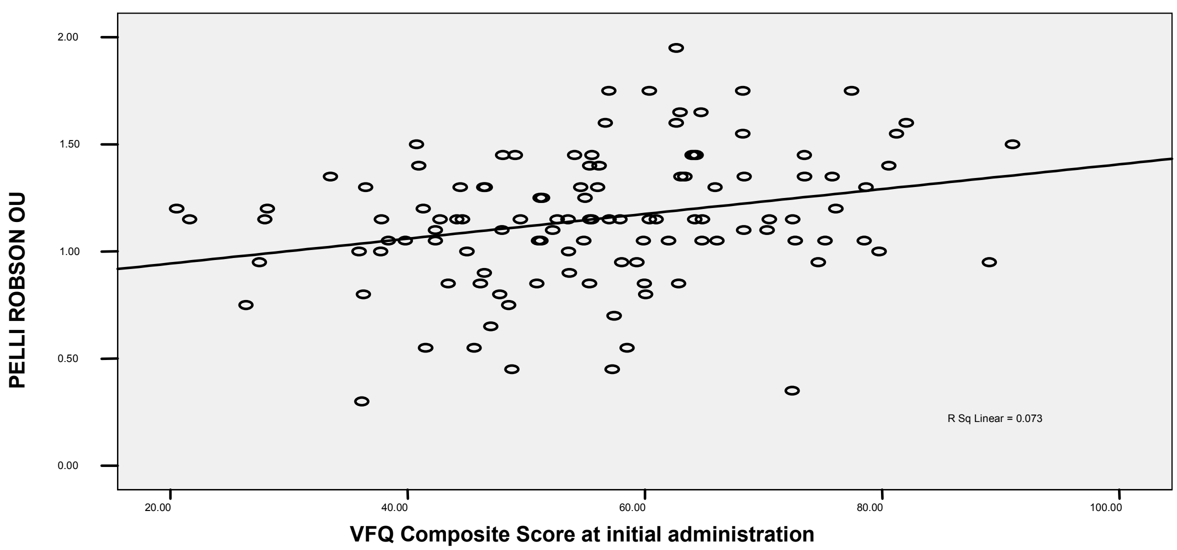


Figure 3-27 Correlation between Contrast Sensitivity and overall NEI-VFQ 25 score at initial administration. Scatter plot indicates modest correlation between NEI-VFQ 25 and CS, n=116

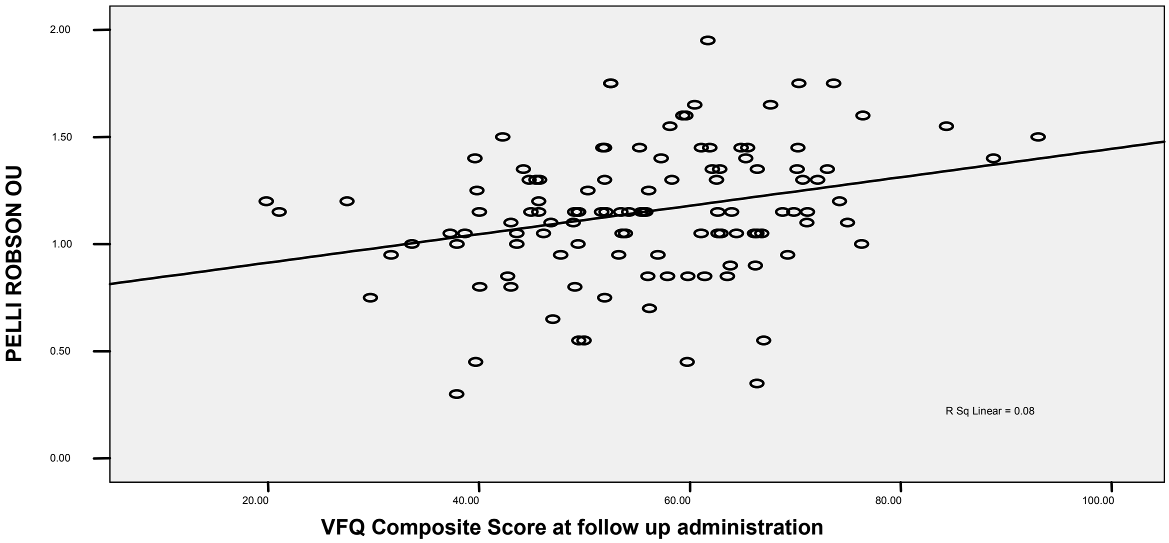


Figure 3-28 Correlation between Contrast Sensitivity and overall NEI-VFQ 25 score at follow up administration. Scatter plot indicates modest correlation between NEI-VFQ 25 and VA, n=116

3.1.10 PIADS & NEI-VFQ 25 Within Measure Correlations at Initial and Follow Up Administrations

Table 17 illustrates the correlations between PIADS subscales and overall scores at initial and follow-up administrations. Moderate to high correlations are evident for all scores, thus helping to validate the stability of the relationship within the measures. A graphical representation of the overall PIADS scores at t_1 and t_2 is presented ***(Fig 3-30).*** In addition, the NEI-VFQ 25 subscales and composite scores also exhibit moderate to high correlations **(Table 18)**, over the test/retest interval, which demonstrates a stable relationship within the measure. Graphical representation of composite scores between t_1 & t_2 can been seen in ***Fig 3-31***.

Table 17 Correlation between PIADS Subscale Items at Initial and Follow up Administrations (i.e. t_1=Initial t_2=Follow up, t_2-t_1=2 Weeks). N=120.

PIADS Subscale Items	Correlation Coefficient*	P-value

PIADS Competence t_1 with Competence t_2	0.593	<0.001
PIADS Adaptability t_1 with Adaptability t_2	0.528	<0.001
PIADS Self-Esteem t_1 with Self Esteem t_2	0.613	<0.001
PIADS Overall t_1 with t_2	0.609	<0.001

*Correlation is significant at the 0.05 level (2-tailed), and correlation coefficient is ≥0.20.

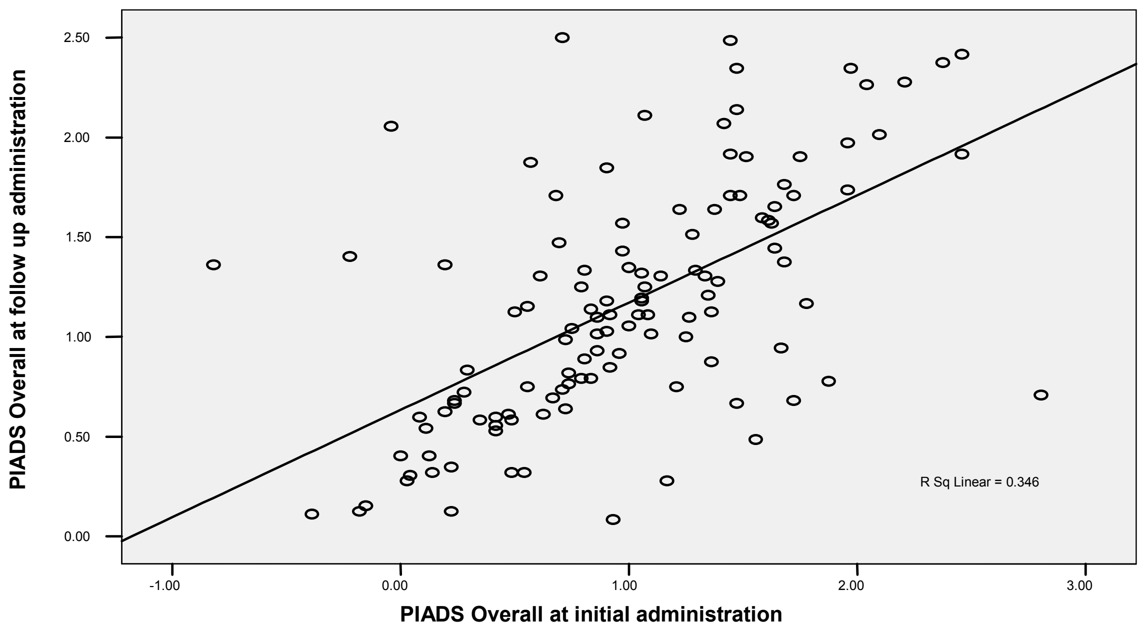


Figure 3-29 Correlations of PIADS overall scores for initial and follow up administrations for 120 subjects. Moderate correlations are present for PIADS between administrations during given time period (2 weeks)

Table 18 Correlation between NEI-VFQ 25 Subscale Items at Initial and Follow up Administrations (i.e. t_1=Initial, t_2=Follow up, t_2-t_1=2 weeks) n=120.

NEI-VFQ-25 Subscale Items	Correlation Coefficient	P-value
General Health t_1 with t_2	0.670	<0.001
General Vision t_1 with t_2	0.665	<0.001
Ocular Pain t_1 with t_2	0.745	<0.001

Near Activities t_1 with t_2	0.737	<0.001
Distance Activities t_1 with t_2	0.827	<0.001
Social Functioning t_1 with t_2	0.482	<0.001
Mental Health t_1 with t_2	0.740	<0.001
Role Difficulties t_1 with t_2	0.591	<0.001
Dependency t_1 with t_2	0.764	<0.001
Driving t_1 with t_2	0.998	<0.001
Color Vision t_1 with t_2	0.806	<0.001
Peripheral Vision t_1 with t_2	0.783	<0.001
NEI-VFQ Composite t_1 with t_2	0.841	<0.001

*Correlation is significant at the 0.05 level (2-tailed), and correlation coefficient is ≥0.20.

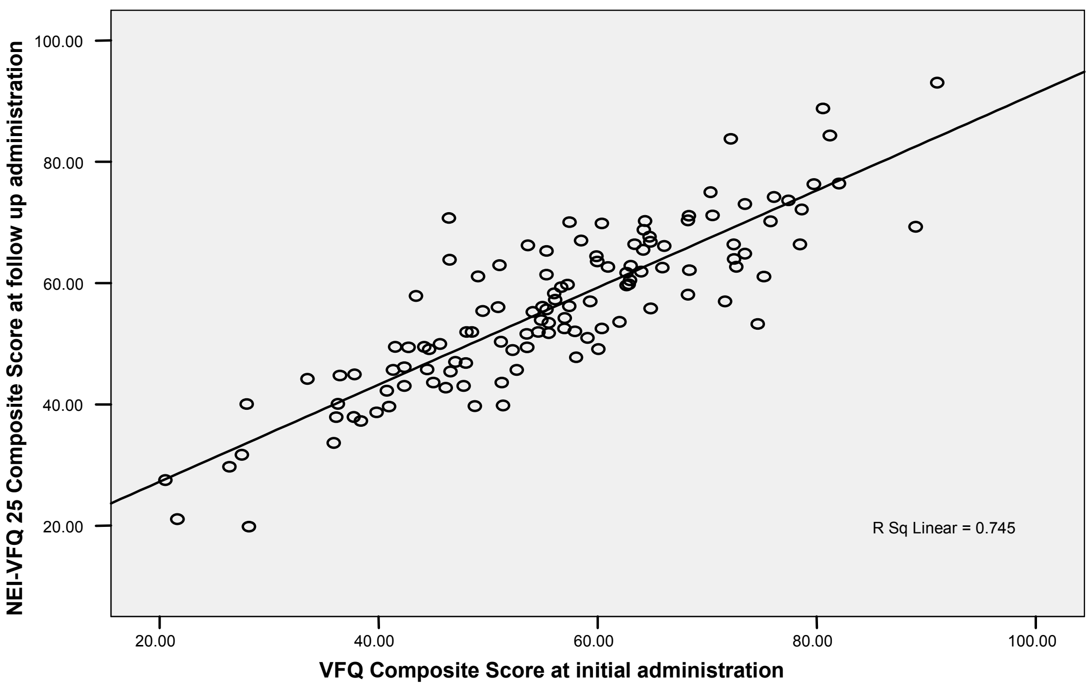


Figure 3-30 Correlations of NEI-VFQ 25 composite scores for initial and follow up administrations for 120 subjects. Moderate correlations are present for NEI-VFQ25 between administrations during given time period (2 weeks)

3.1.11 PIADS and NEI-VFQ between Measures Correlations at Initial and Follow Up Administrations

The correlations between PIADS and NEI-VFQ 25 were summarized for time periods, t_1 and t_2. A Spearman correlation coefficient was used because the measures were highly skewed and or/ordinal. The correlations were significant at $\alpha = 0.05$, and where the correlation coefficient was ≥0.20. The bolded items in **Tables 19 and 20** represent those that are statistically significant. Although they are significant statistically, the value of the correlation coefficients is moderate at best. Several weak but significant correlations were found between subscale items for PIADS and NEI-VFQ 25 at initial administration:

- Vision function status in the areas of near activities (r= 0.290, p=0.001), social functioning (r= 0.211, p=0.022), overall composite score (r= 0.215, p=0.018) (as revealed by NEI-VFQ 25) and psychosocial impact on competence (as revealed by PIADS).
- Vision function status in the areas of near activities (r= 0.353, p<0.001), mental health (r= 0.240, p=0.008), overall composite score (r= 0.233, p=0.01) (as revealed by NEI-VFQ 25) are correlated with adaptability (as revealed by PIADS).
- Vision function status in the areas of near activities (r= 0.208, p=0.023) (as revealed by NEI-VFQ 25) with self-esteem (as revealed by PIADS)
- The PIADS overall score correlated positively with near activities (r= 0.321, p<0.001), mental health (r= 0.200, p=0.028), role difficulties (r= 0.201, p= 0.027), and the NEI-VFQ 25 composite score (r= 0.226, p=0.013).

Fig 3-32 is a plot of PIADS overall score with the NEI-VFQ 25 composite score at initial administration. For all other significant correlations, please refer to Appendix I

Table 19 Correlations between NEI-VFQ 25 Subscale Items and PIADS Subscale Items at Initial Administration (i.e. t_1=Initial) N=120. Bolded Items indicate a correlations coefficient ≥ 0.20

	PIADS Subscales							
NEI-VFQ-25 Subscale Items	Competence		Adaptability		Self-Esteem		PIADS Composite	
	Correlation Coefficient	p-value	Correlation Coefficient	p-value	Correlation Coefficient	p-value	Correlation Coefficient	p-value
General Health	0.092	0.319	0.050	0.586	0.009	0.920	0.039	0.671
General Vision	0.057	0.539	0.143	0.119	0.165	0.072	0.138	0.132
Ocular Pain	-0.076	0.410	-0.035	0.704	-0.072	0.437	-.060	0.517
Near Activities	**0.290***	0.001	**0.353***	<0.001	**0.208***	0.023	**0.321***	<0.001
Distance Activities	0.132	0.152	0.163	0.075	0.014	0.882	0.118	0.198

Social Functioning	**0.211***	0.022	0.147	0.109	0.061	0.507	0.168	0.067
Mental Health	0.101	0.272	**0.240***	0.008	0.154	0.094	**0.200***	0.028
Role Difficulties	0.192	0.036	0.149	0.105	0.166	0.070	**0.201***	0.027
Dependency	0.055	0.548	0.081	0.377	0.020	0.833	0.076	0.407
Driving	0.017	0.881	-0.051	0.641	-0.063	0.569	-0.035	0.750
Color Vision	0.118	0.175	-0.018	0.843	-0.081	0.384	0.011	0.903
Peripheral Vision	0.131	0.153	0.199	0.290	0.135	0.142	0.167	0.069
NEI-VFQ Composite	**0.215***	0.018	**0.233***	0.01	0.117	0.204	**0.226***	0.013

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

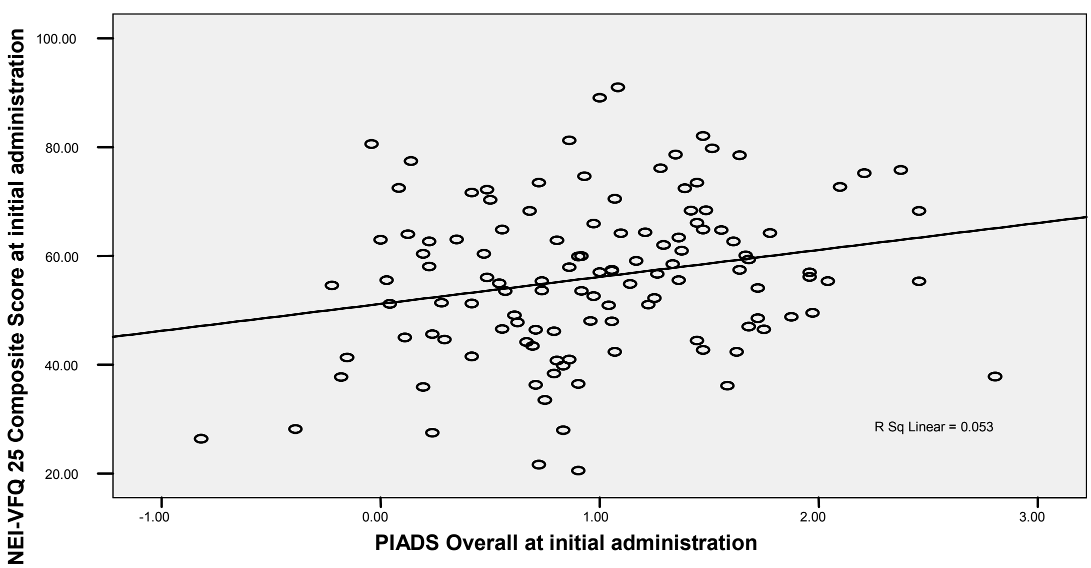


Figure 3-31 Correlations of overall scores between PIADS and NEI-VFQ 25 at initial administration for 120 subjects. Several modest correlations are present between PIADS subscales and NEI-VFQ 25 subscales and overall scores.

- Several weak but significant correlations were found between subscale items for PIADS and NEI-VFQ 25 at follow-up administration:

- Vision function status in the areas of general health (r= 0.203, p=0.026), role difficulties (r= 0.261, p=0.004), dependency (r= 0.212, p=0.020), overall composite score (r= 0.274, p=0.002) (as revealed by NEI-VFQ 25) and psychosocial impact on competence (as revealed by PIADS).
- Vision function status in the areas of general health (r= 0.292, p=0.001), near activities (r= 0.244, p=0.007), distance activities (r= 0.259, p=0.004), mental health (r= 0.212, p=0.020), overall composite score (r= 0.271, p=0.003) (as revealed by NEI-VFQ 25) are correlated with adaptability (as revealed by PIADS).
- Vision function status in the areas of general health (r= 0.237, p=0.009) (as revealed by NEI-VFQ 25) with self-esteem (as revealed by PIADS)
- The PIADS overall score correlated positively with general health (r= 0.271, p=0.003), distance activities (r= 0.210, p=0.021), mental health (r= 0.215, p=0.018), role difficulties (r= 0.203, p=0.026), dependency (r= 0.218, p=0.017), and the NEI-VFQ 25 composite score (r= 0.281, p=0.002).

Fig 3-33 is a plot of PIADS overall score with the NEI-VFQ 25 composite score at follow up administration. For all other significant correlations, please refer to Appendix I.

Table 20 Correlations between NEI-VFQ 25 Subscale Items and PIADS Subscale Items at Follow Up Administration (i.e. t_2= Follow up) n=120. Bolded Items indicate a correlation coefficient ≥ 0.20

	PIADS Subscales							
NEI-VFQ-25 Subscale Items	Competence		Adaptability		Self-Esteem		PIADS Composite	
	Correlation Coefficient	p-value	Correlation Coefficient	p-value	Correlation Coefficient	p-value	Correlation Coefficient	p-value
General Health	**0.203***	0.026	**0.292***	0.001	**0.237***	0.009	**0.271***	0.003
General Vision	0.153	0.096	0.164	0.073	0.179	0.051	0.183	0.045
Ocular Pain	0.018	0.848	0.045	0.629	-0.063	0.493	0.000	0.98
Near Activities	0.128	0.165	**0.244***	0.007	0.078	0.400	0.179	0.051
Distance Activities	0.151	0.100	**0.259***	0.004	0.108	0.242	**0.210***	0.021
Social Functioning	0.017	0.851	0.023	.799	-0.001	0.992	0.020	0.826
Mental Health	0.187	0.041	**0.212***	0.020	0.129	0.160	**0.215***	0.018
Role Difficulties	**0.261***	0.004	0.161	0.079	0.081	0.381	**0.203***	0.026
Dependency	**0.212***	0.020	0.150	0.102	0.190	0.038	**0.218***	0.017
Driving	0.078	0.473	0.086	0.430	0.031	0.778	0.071	0.515
Color Vision	0.081	0.385	0.057	0.537	0.060	0.517	0.082	0.379
Peripheral Vision	0.087	0.344	0.074	0.422	0.005	0.959	0.076	0.408

NEI-VFQ Composite	**0.274***	0.002	**0.271***	0.003	0.152	0.098	**0.281****	0.002

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

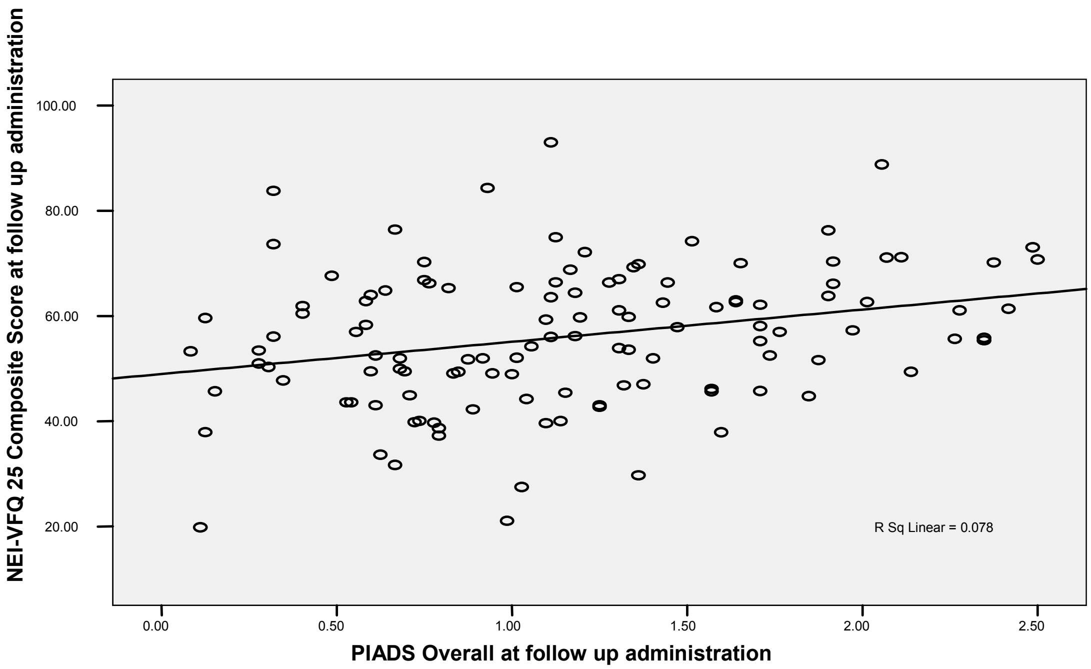


Figure 3-32 Correlations of overall scores between PIADS and NEI-VFQ 25 at initial administration for 120 subjects. Several modest correlations are present between PIADS subscales and NEI-VFQ 25 subscales and overall scores.

3.1.12 Relationship Changes Over Time for PIADS and NEI-VFQ 25

Table 21 shows that a significant change occurs between times t_1 and t_2 for the PIADS subscales Competence (t=-3.121, p=0.002), Self-esteem (t= -4.059, p<0.001), and PIADS overall (t= -3.430 p= 0.001). In each instance, t_2 had a significant higher score, thus indicating that there is a positive change at the follow up administration. No Significant change was present for the Adaptability subscale of PIADS. It is interesting to note that there is a slight positive change for the NEI-VFQ 25 composite score, but it is negligible (no significant status change).

Table 21 Paired Samples Test assessing whether or Not the Relationship between PIADS and NEI-VFQ 25 Measures change between t_1 and t_2. Bolded values indicated scores for t_2 are of significantly higher value. In this case, α= 0.05/17 = 0.003, Known as the Bonferroni Correction, since 17 pairs of tests are run.

	Paired Differences							
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
				Lower	Upper			
PIADS Subscale Competence1 - PIADS Subscale Competence2	**-0.19306**	**0.67769**	**.06186**	**-.31555**	**-.07056**	**-3.121**	**119**	**.002**
PIADS Subscale Self-Esteem1 - PIADS Subscale Self-Esteem2	**-0.21875**	**0.59037**	**0.05389**	**-.32546**	**-0.11204**	**-4.059**	**119**	**.000**
PIADS Adaptability 1-PIADS Adaptability 2	-0.12639	0.71759	0.06551	-0.25610	0.0032	-1.929	119	0.056
PIADSOverall1 - PIADSOverall2	**-.17940**	**0.57467**	**.05246**	**-.28327**	**-.07552**	**-3.420**	**119**	**.001**
VFQ Composite Score1 - VFQ Composite Score2	-.04439	7.24759	.66161	-1.35444	1.26567	-.067	119	.947

Note: Appendix J includes all paired t-test conducted

3.2 Age-related Macular Degeneration Population (ARMD)

3.2.1 Clinical Measures: Visual Acuity and Contrast Sensitivity

The ARMD sample subgroup was taken from the cohort of 120 participants of the overall sample. 71% of participants had ARMD as their reported eye condition. The average best corrected visual acuity for the ARMD sample was 0.83 ± 0.28 logMAR (compared to 0.78 ± 0.32 logMAR for overall sample), and log contrast sensitivity was 1.11 (compared to 1.15 for overall sample) **(See Table 22)**. Each clinical measure (VA and CS) also exhibited normal distribution for the ARMD sample ***(Figs 3-34& 3-35)***.

Table 22 Clinical Statistics for ARMD Population for Best Corrected Visual Acuity and Contrast Sensitivity. Log Mar Scale Used.

		DISTANCE VA	PELLI ROBSON OU
N		84	82
Mean		.827082	1.1116
Median		.903000	1.1500
Std. Deviation		.2826708	.26878
Variance		.080	.072
Skewness		-.217	-.589
Std. Error of Skewness		.263	.266
Percentiles	25	.602000	1.0000
	50	.903000	1.1500
	75	1.000000	1.3000

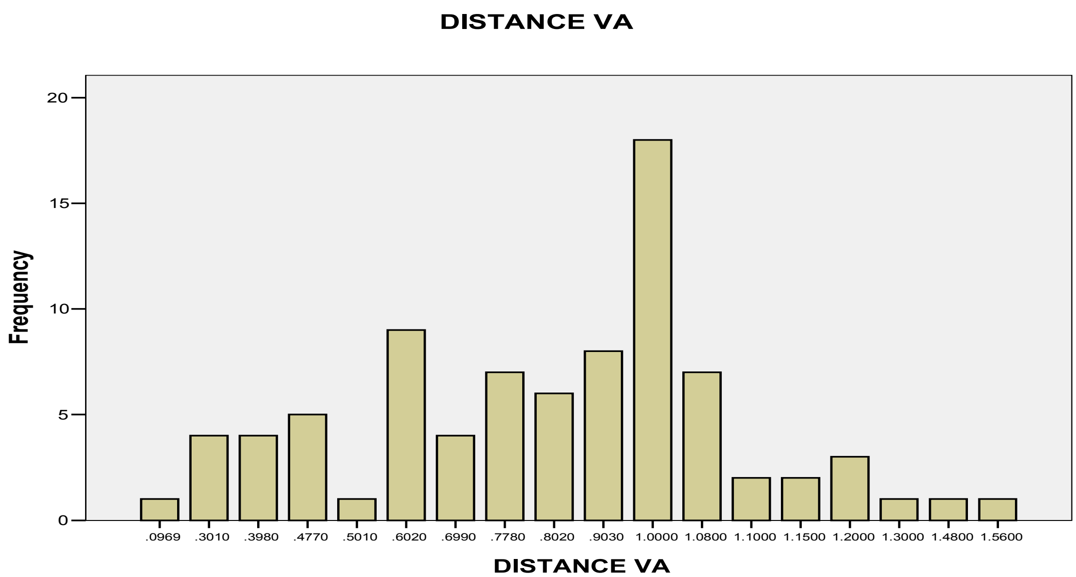


Figure 3-33 Distribution of Distance Visual Acuity Data for ARMD Population

Normal Distribution exhibited for Distance Visual Acuity data, with most common VA on Log Mar scale being 1.00

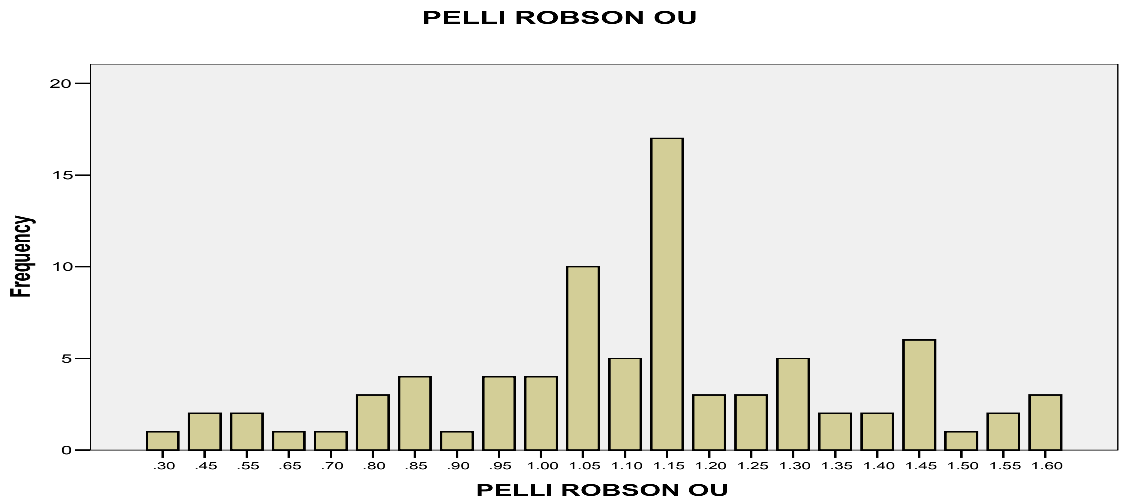


Figure 3-34 Distribution of Contrast Sensitivity Data for ARMD Population

Normal Distribution exhibited for Pelli Robson Binocular Data, with most common being 1.15

3.2.2 PIADS Distributions

The distributions for PIADS and its subscales are presented in **Tables 23 and 24**for both initial and follow up administrations for the ARMD sample. No significant floor or ceiling effects were noted. Competence also exhibited the highest subscale mean (1.11 ± 0.72 at initial and 1.34 ±0.71 at follow up) for the ARMD sample as well. The same improvement in responses on the PIADS subscales and overall scores was noted at follow up administration. Every subscale had a positive shift between initial and follow up for each subsequent subscale and the overall scores ***(Figs 3-36,3-37,3-38,3-39,3-40,3-41,3-42,3-43)***. The shift to the right indicates user response has improved at the follow-up administration. No significant differences were noted in improvement between overall sample and the ARMD population.

Table 23 26-Item PIADS Frequency Distributions for 1ST Administration for ARMD Population

Scale	N	Mean ± Standard Deviation	Median	Floor n (%)	Ceiling n (%)
Competence	85	1.11 ± 0.72	1.08	4(4.8%)	2(2.4%)
Adaptability	85	0.98 ±0.74	1.00	5(5.8%)	3(3.6%)
Self-Esteem	85	0.81 ±0.64	0.88	6(7.2%)	0(0%)
Overall PIADS	85	0.97 ±0.63	0.92	4(4.8%)	1(1.2%)

Note: Floor effects were calculated for those individuals with scores less than 0, while ceiling effects were calculated for those with scores higher than 2.5

Table 24 26-Item PIADS Frequency Distributions for 2ND Administration for ARMD Population

Scale	N	Mean ± Standard Deviation	Median	Floor n (%)	Ceiling n(%)
Competence	85	1.34 ±0.71	1.25	1(1.2%)	3(3.6%)
Adaptability	85	1.08 ±0.68	0.83	1(1.2%)	4(4.8%)
Self-Esteem	85	1.04 ±0.62	1.00	6(7.2%)	0(0%)
Overall PIADS	85	1.15 ±0.60	1.11	0 (0.0%)	0(0%)

Note: Appendix K includes more detailed distributions.

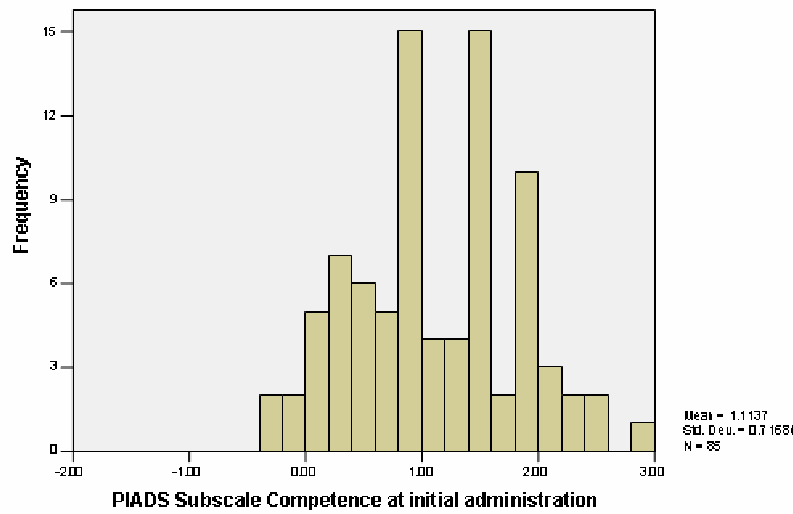


Figure 3-35 PIADS Distribution at initial administration for Competence for ARMD Population

Data exhibited normal distribution with majority of scores being positive

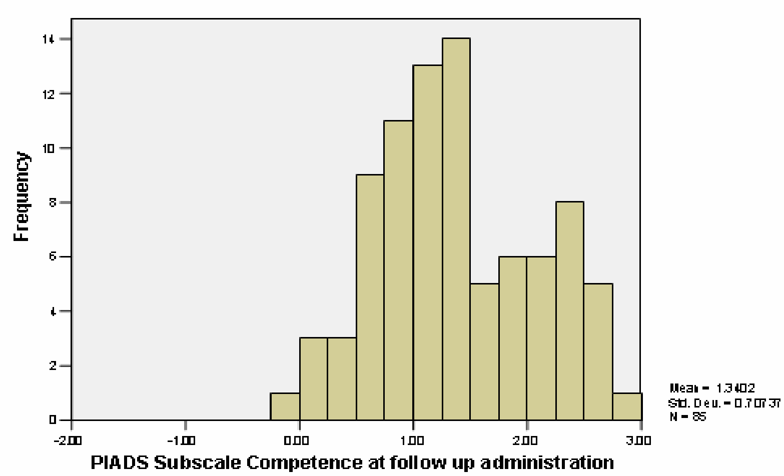


Figure 3-36 PIADS Distribution at follow up administration for Competence for ARMD population

Data exhibited normal distribution with majority of scores being positive

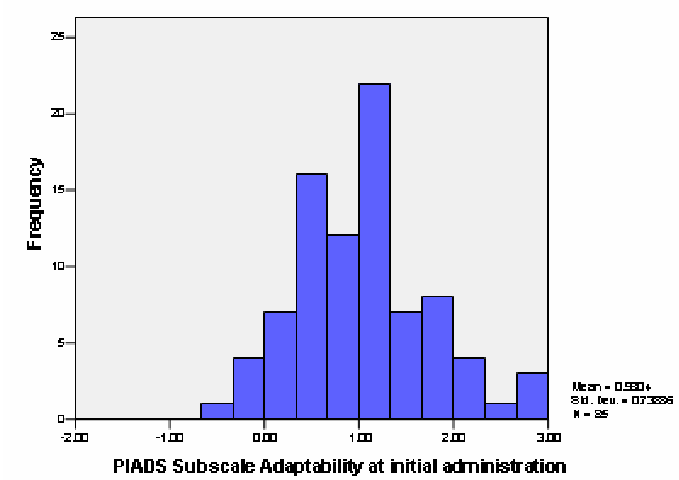


Figure 3-37 PIADS Distribution at initial administration for Adaptability for ARMD population

Data exhibited normal distribution with majority of scores being positive

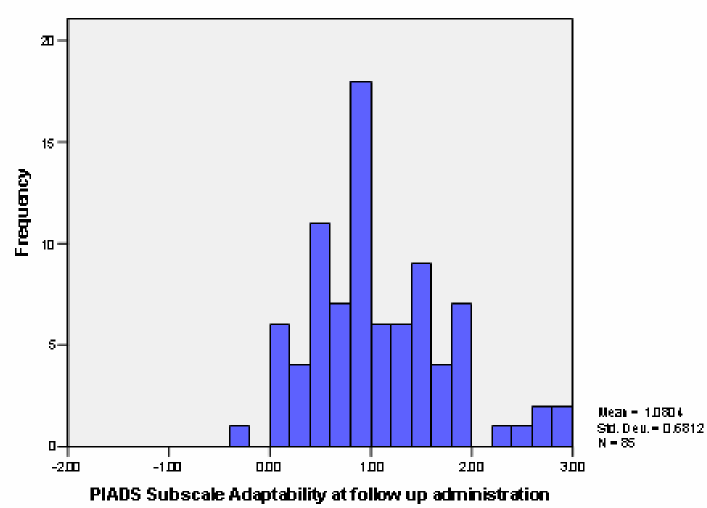


Figure 3-38 PIADS Distribution at follow up administration for Adaptability for ARMD population

Data exhibited normal distribution with majority of scores being positive

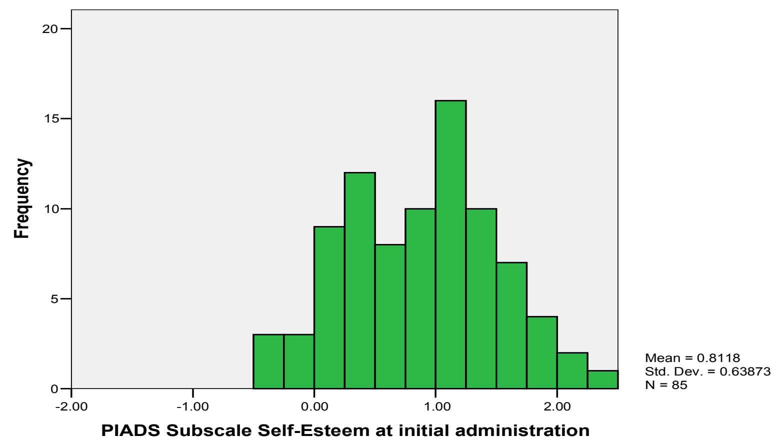


Figure 3-39 PIADS Distribution at initial administration for Self-esteem for ARMD population

Data exhibited normal distribution with majority of scores being positive

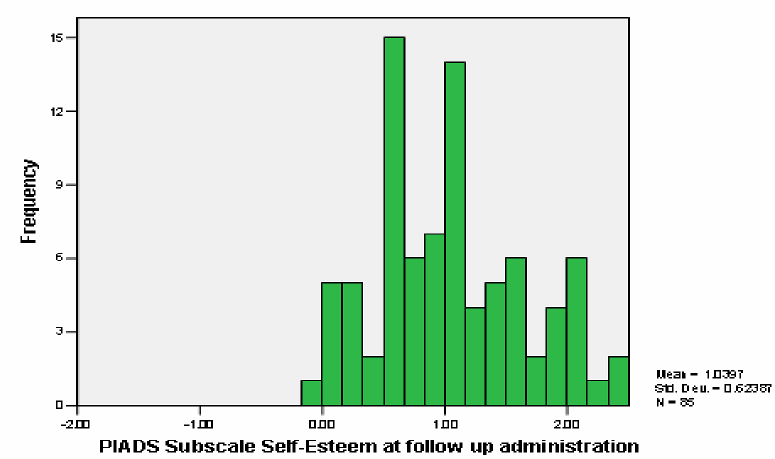


Figure 3-40 PIADS Distribution at follow up administration for Self-esteem for ARMD population

Data exhibited normal distribution with majority of scores being positive

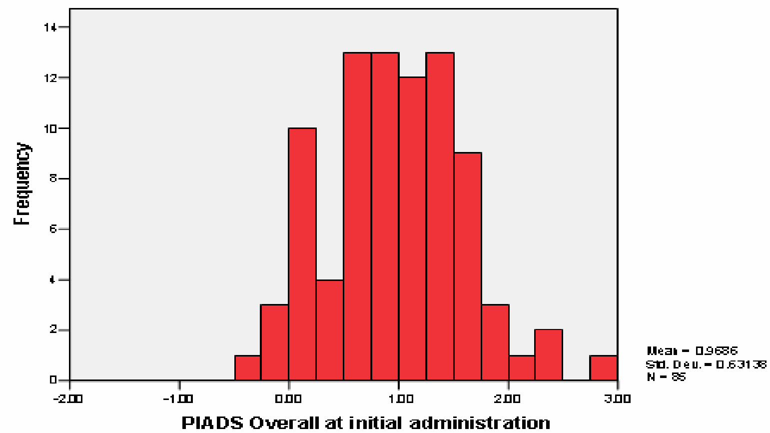


Figure 3-41 PIADS Distribution at initial administration for Overall score for ARMD population

Data exhibited normal distribution with majority of scores being positive

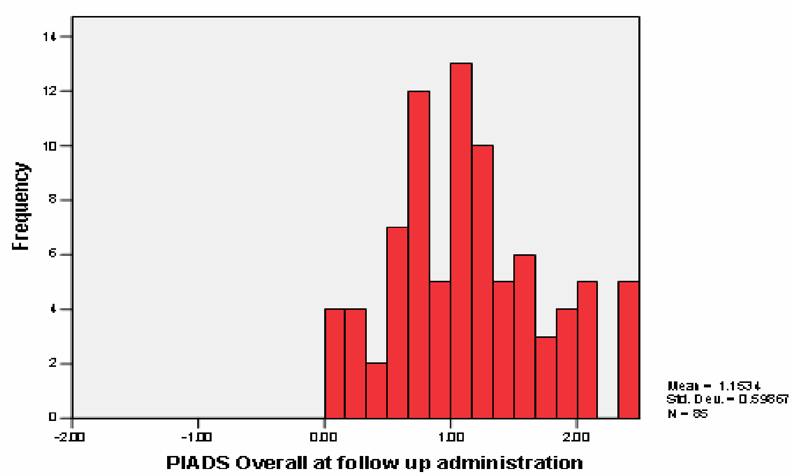


Figure 3-42 PIADS Distribution at follow up administration for Overall score for ARMD population

Data exhibited normal distribution with majority of scores being positive

3.2.3 NEI-VFQ 25 Distributions

The distributions for NEI-VFQ and its subscales are presented in **Tables 25 and 26** for both initial and follow up administrations for the ARMD subgroup. For the initial and follow up administrations, significant floor effects were noted for the Driving subscale (91.5% at initial and 90.2% at follow up). The percentages were slightly higher than the overall population but this is also due to the fact most participants are ineligible to drive in Ontario based on their visual impairment. Ocular pain (63.5% t_1, 54.1% t_2), Color Vision (48.8% t_1, 47.6% t_2), and Peripheral Vision (60.0% t_1, 54.1% t_2) subscales all demonstrate ceiling effects for both the initial and follow up administrations. General Health is the only subscale that does not demonstrate ceiling effects, as is the case in the overall sample population. The subscale scores for Role Difficulties, Driving, and General Vision are the lowest while Ocular Pain, Color Vision, and Peripheral Vision are the highest, as is the case for the overall sample population as well. Comparing ***Figs 3-44 and 3-45***, it can be seen there is no significant change between scores for the NEI-VFQ 25 overall composite scores between initial and follow up administrations.

Table 25 25-Item NEI-VFQ 25 Frequency Distributions for 1ST Administration for ARMD Population

Scale	N	Mean ± Standard Deviation	Median	Floor n (%)	Ceiling n(%)
General Health	85	52.06 ± 28.41	50.00	4(4.7%)	12(14.1%)
General Vision	85	44 ± 19.23	40.00	0(0%)	1 (1.2%)
Ocular Pain	85	86.23 ± 22.1	100.00	0 (0%)	54(63.5%)
Near Activities	85	49.07 ±22.81	50.00	1 (1.2%)	2 (2.4%)
Distance Activities	85	47.89 ± 23.35	50.00	2 (2.4%)	2 (2.4%)
Social Functioning	85	63.53 ± 32.52	62.5	6 (5.0%)	13 (15.3%)
Mental Health	85	54.48 ±25.71	56.25	2 (2.4%)	3 (3.5%)
Role Difficulties	85	39.11 ±27.47	37.5	13 (15.3%)	1 (1.2%)
Dependency	85	58.82 ± 31.03	58.33	5 (5.9%)	15 (17.6%)
Driving	59	4.16 ± 16.21	0.00	54 (91.5%)	1 (1.7%)
Color Vision	85	72.32 ± 33.39	75.00	5 (6.0%)	41 (48.8%)
Peripheral Vision	85	80.88 ± 28.78	100.00	3 (3.5%)	51 (60%)
NEI-VFQ Composite	85	56.058± 14.98	56.67	0 (0.00%)	0 (0.00%)

Table 26 25-Item NEI-VFQ 25 Frequency Distributions for 2ND Administration for ARMD Population

Scale	N	Mean ± Standard Deviation	Median	Floor n (%)	Ceiling n(%)
General Health	85	55.88 ± 27.72	50.00	5(5.9%)	14 (16.5%)
General Vision	85	47.06 ± 16.53	40.00	0 (0.00%)	0 (0.00%)
Ocular Pain	85	85.00 ± 21.72	100.00	0 (0.00%)	46 (54.1%)
Near Activities	85	52.11 ± 23.51	50.00	1 (1.2%)	2 (2.4%)
Distance Activities	85	47.35 ± 22.13	50.00	3 (3.5%)	2 (2.4%)
Social Functioning	85	56.03 ± 23.75	62.50	0 (0.00%)	9 (10.6%)
Mental Health	85	55.66 ± 23.58	56.25	1 (01.2%)	9 (10.6%)
Role Difficulties	85	37.06 ± 28.96	37.50	16 (18.8 %)	4 (4.7%)
Dependency	85	56.08 ± 28.89	50.00	5 (5.9%)	10 (11.8%)
Driving	61	5.33 ± 18.00	0.00	55 (90.2%)	1 (1.6%)
Color Vision	85	75.30 ± 29.43	75.00	2 (2.4%)	40 (47.6%)
Peripheral Vision	85	79.71 ± 27.68	100.00	2 (2.4%)	46 (54.1%)
NEI-VFQ Composite	85	55.50 ± 13.99	55.23	0 (0.00%)	0 (0.00%)

Note: Floor effects are calculated for those individuals whose score is 0, while ceiling effects are for those individuals who scored 100. Refer to Appendix L for more detailed distributions

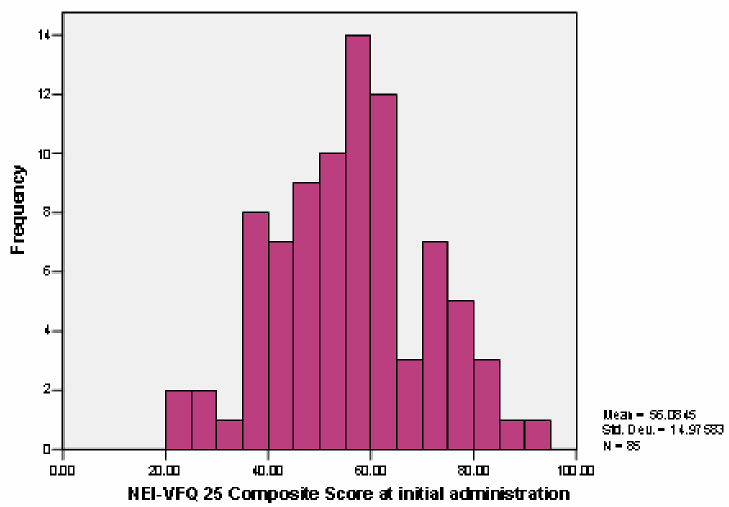


Figure 3-43 Distribution of NEI-VFQ 25 results for Overall Composite score at initial administration for ARMD population

Data exhibited normal distribution with majority of scores being positive

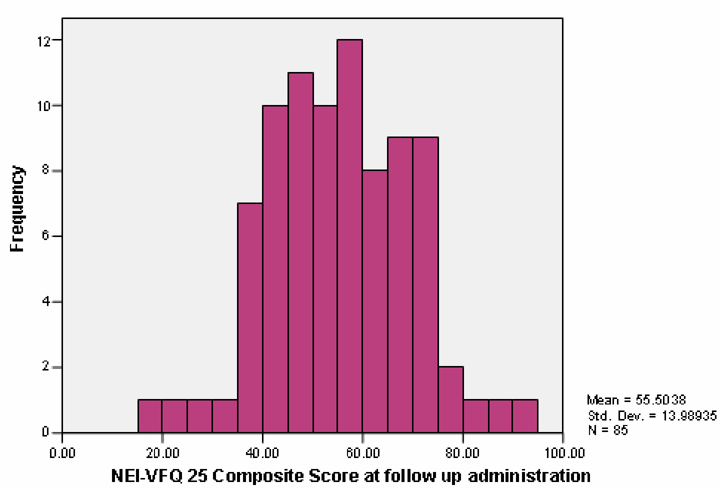


Figure 3-44 Distribution of NEI-VFQ 25 results for Overall Composite score at follow up administration for ARMD population

Data exhibited normal distribution with majority of scores being positive

3.2.4 PIADS Correlations with Clinical Measures: Visual Acuity and Contrast Sensitivity

Table 27 presents the correlations between PIADS and visual acuity for the ARMD sample. Unlike the overall population, there are several weak but significant correlations and visual acuity appears to play a slight role in PIADS scores. Looking at **Table 27**, competence at t_1 (0.262, p=0.016), self esteem at t_1 (0.258, p=0.018), and PIADS overall at t_1 (0.263, p= 0.016) all presented weak but modest correlations. ***Figs 3-46 and 3-47*** present a graphical representation of visual acuity versus overall PIADS score at t_1 & t_2.

Only one PIADS subscale correlated with contrast sensitivity **(Table 28)**, Competence at t_1 (-0.229, p=0.038). No valid conclusions can be drawn about PIADS and contrast sensitivity for the ARMD sample since only one correlation existed, it was negative and modest at best. ***Figs 3-48 and 3-49*** are presented as graphical representations for contrast sensitivity versus PIADS. Refer to Appendix M for statistical tests of all correlations.

Table 27 Correlations between PIADS Subscale Items for Initial (t_1) and Follow up (t_2) Administrations with Best Corrected Visual Acuity Score, n=82 for ARMD Population

PIADS Subscale Items with Visual Acuity scores	Correlation Coefficient	P-value
PIADS Competence t_1	**0.262***	0.016
PIADS Competence t_2	0.024	0.829
PIADS Adaptability t_1	0.197	0.072
PIADS Adaptability t_2	-0.103	0.350
PIADS Self-Esteem t_1	**0.258***	0.018
PIADS Self Esteem t_2	0.164	0.135
PIADS Overall t_1	**0.263***	0.016
PIADS Overall t_2	0.027	0.804

*Correlation is significant at the 0.05 level (2-tailed), and correlation coefficient is ≥0.20.

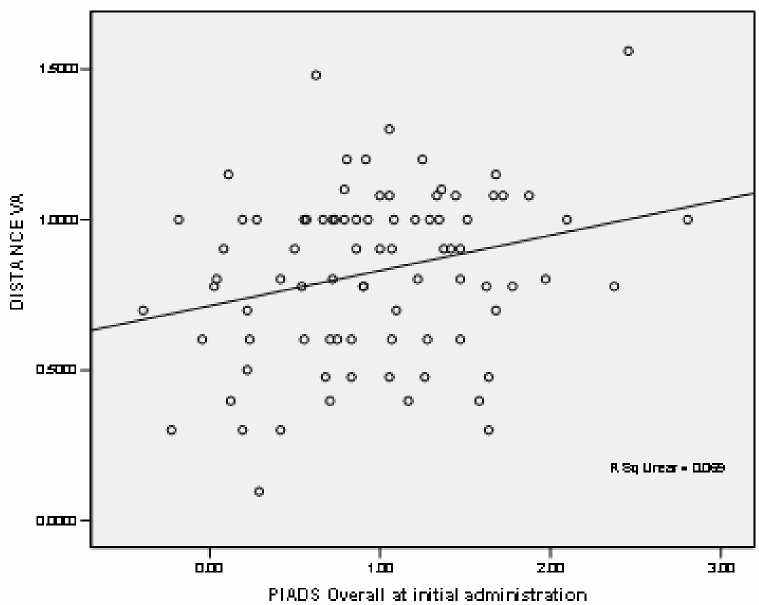


Figure 3-45 Correlation between Visual Acuity and overall PIADS score at initial administration for ARMD population. Scatter plot indicates some weak correlation between PIADS and VA, n=116

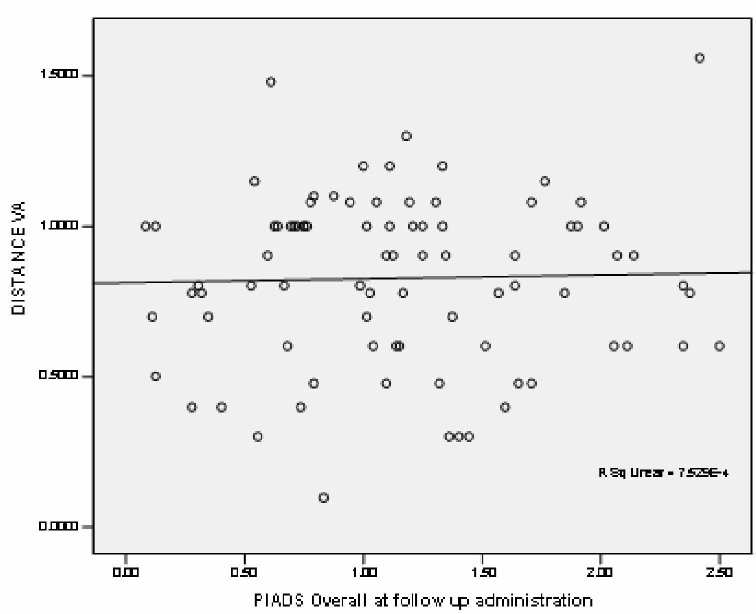


Figure 3-46 Correlation between Visual Acuity and overall PIADS score at follow up administration for ARMD population. Scatter plot indicates some weak correlation between PIADS and VA, n=116

Table 28 Correlations between PIADS Subscale Items for Initial (t_1) and Follow up (t_2) Administrations with Pelli-Robson Score, n=84 for ARMD Population

PIADS Items with Pelli-Robson scores	Correlation Coefficient	P-value
PIADS Competence t_1	**-0.229***	0.038
PIADS Competence t_2	-0.041	0.712
PIADS Adaptability t_1	-0.005	0.965
PIADS Adaptability t_2	0.061	0.584
PIADS Self-Esteem t_1	-0.193	0.083
PIADS Self Esteem t_2	-0.074	0.510
PIADS Overall t_1	-0.153	0.171
PIADS Overall t_2	-0.019	0.868

*Correlation is significant at the 0.05 level (2-tailed), and correlation coefficient is ≥0.20.

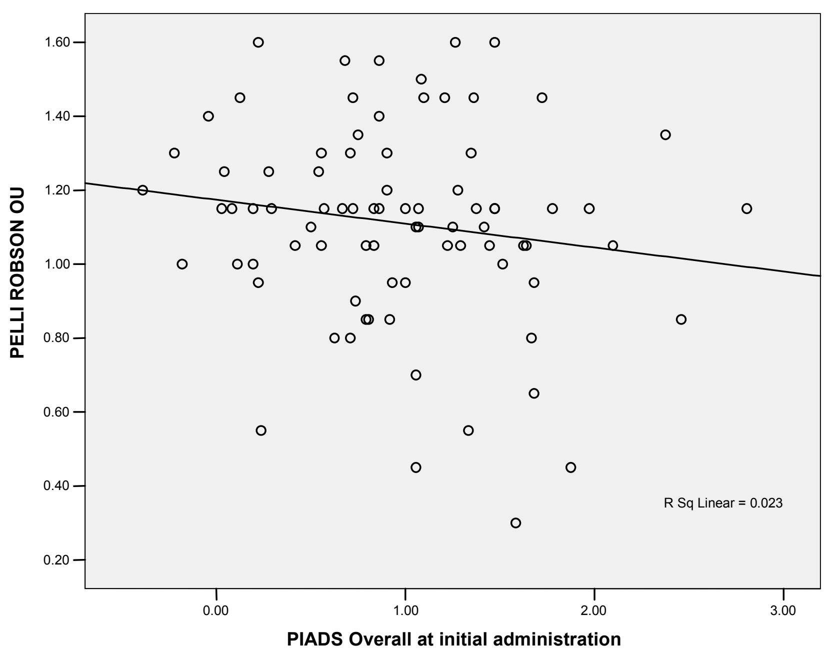


Figure 3-47 Correlation between Contrast Sensitivity and overall PIADS score at initial administration for ARMD population. Scatter plot indicates very little correlation between PIADS and CS, n=116

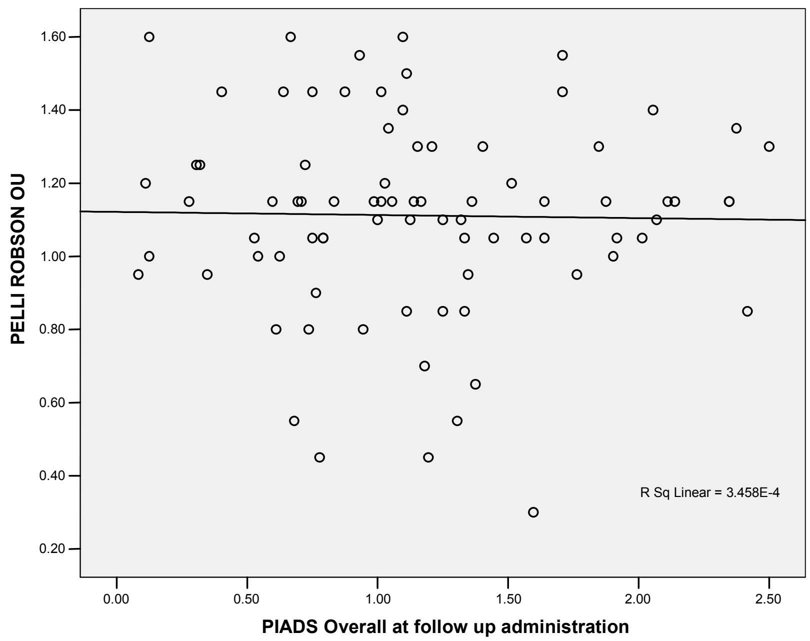


Figure 3-48 Correlation between Contrast Sensitivity and overall PIADS score at follow up administration for ARMD population. Scatter plot indicates very little correlation between PIADS and CS, n=116

3.2.5 NEI-VFQ 25 Correlations with Clinical Measures: Visual Acuity and Contrast Sensitivity

The overall sample for the NEI-VFQ 25 appeared to have more correlations than the ARMD sample for visual acuity. Looking at T**able 29**, General Health at t_1 (-0.262, p=0.016) and General Vision at t_1 (-0.248, p=0.023) are the only two subscales that are correlated (albeit a modest correlation). ***Figs 3-50 and 3-51*** present a graphical representation for visual acuity versus overall NEI-VFQ 25 composite scores at t_1 & t_2. Correlations with contrast sensitivity **(Table 30)** were as follows: General Vision at t_1 (0.238, p=0.031), Ocular Pain at t_1 (0.334, 0.002), Near Activities at t_1 (0.331, p= 0.004), Distance Activities at t_1 (0.234, p=0.034), NEI-VFQ 25 composite score at t_1 (0.242, p=0.028), General Vision at t_2 (0.227, p=0.040), Ocular pain at t_2 (0.360, p=0.001), Near Activities at t_2 (0.260, p=0.019), Distance Activities at t_2 (0.305, p=0.005), Driving at t_2 (0.298, p=0.022), and NEI-VFQ composite score at t_2 (0.281, p=0.011). ***Figs 3-52 and 3-53*** also present a graphical representation for contrast sensitivity versus NEI-VFQ 25 composite scores at t_1 & t_2 for the ARMD sample.

Table 29 Correlations between NEI-VFQ 25 Subscales and Overall Items for Initial (t_1) and Follow up (t_2) Administrations with Best Corrected Visual Acuity Score, n=82 for ARMD Population

NEI-VFQ 25 Items with Visual Acuity scores	Correlation Coefficient	P-value
General Health t_1	**-0.262***	0.016
General Vision t_1	**-0.248***	0.023
Ocular Pain t_1	0.048	0.663
Near Activities t_1	0.003	0.976
Distance Activities t_1	-0.034	0.756
Social Functioning t_1	0.043	0.696
Mental Health t_1	0.043	0.698
Role Difficulties t_1	0.186	0.090
Dependency t_1	0.018	0.871
Driving t_1	-0.196	0.136
Color Vision t_1	-0.081	0.466
Peripheral Vision t_1	0.164	0.135
NEI-VFQ Composite t_1	0.049	0.660
General Health t_2	0.000	0.997
General Vision t_2	-0.160	0.145
Ocular Pain t_2	-0.019	0.866
Near Activities t_2	0.030	0.786
Distance Activities t_2	-0.047	0.671
Social Functioning t_2	0.007	0.952
Mental Health t_2	-0.076	0.490
Role Difficulties t_2	-0.055	0.621
Dependency t_2	0.038	0.732
Driving t_2	-0.129	0.323
Color Vision t_2	-0.049	0.662
Peripheral Vision t_2	0.198	0.071
NEI-VFQ Composite t_2	0.006	0.960

*Correlation is significant at the 0.05 level (2-tailed), and correlation coefficient is ≥0.20.

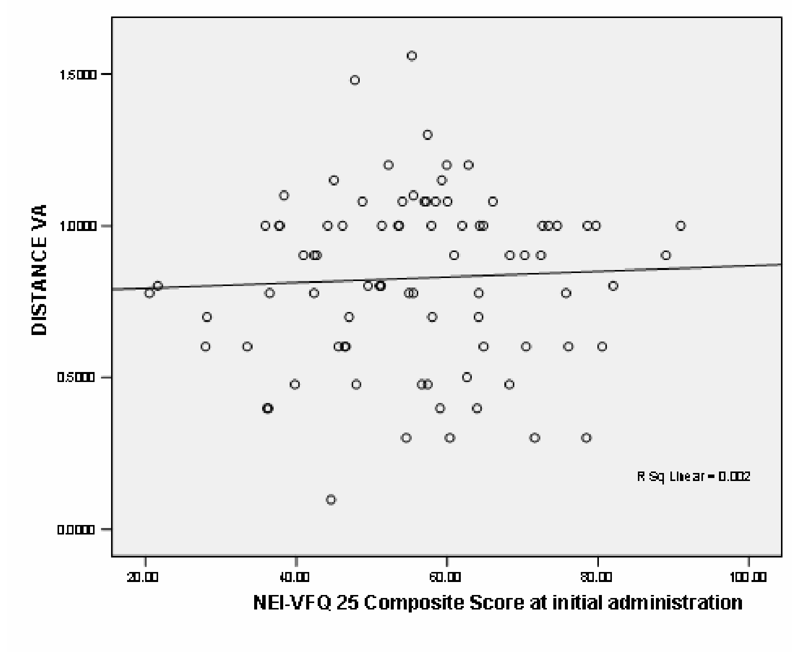


Figure 3-49 Correlation between Visual Acuity and overall NEI-VFQ 25 score at initial administration for ARMD population. Scatter plot indicates very little correlation between NEI-VFQ 25 and VA, n=116

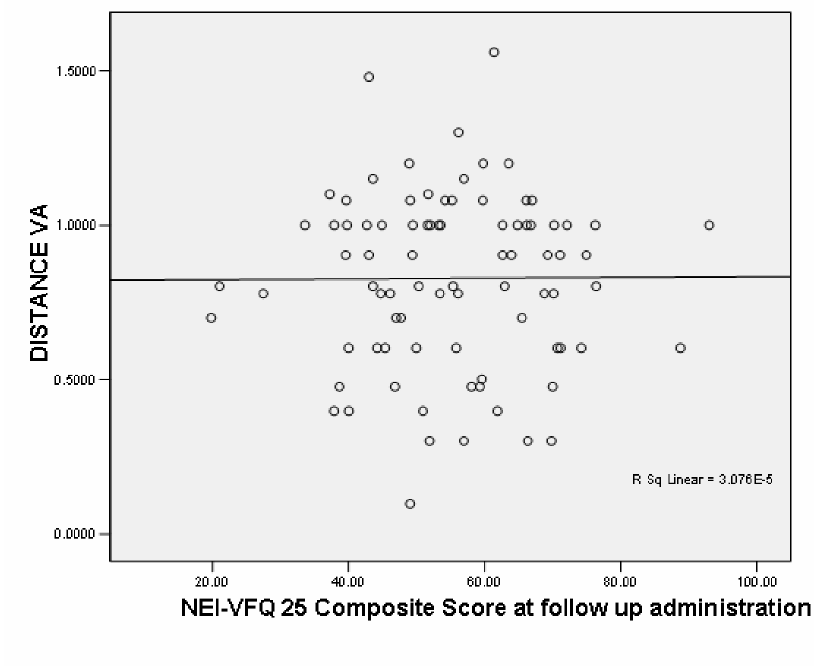


Figure 3-50 Correlation between Visual Acuity and overall NEI-VFQ 25 score at follow up administration for ARMD population. Scatter plot indicates very little correlation between NEI-VFQ 25 and VA, n=116

Table 30 Correlations between NEI-VFQ 25 Subscale Items for Initial (t_1) and Follow up (t_2) Administrations with Pelli-Robson Contrast Sensitivity Test, n=84 for ARMD Population

NEI –VFQ 25 Items with Pelli-Robson scores	Correlation Coefficient	P-value
General Health t_1	0.031	0.785
General Vision t_1	**0.238***	0.031
Ocular Pain t_1	**0.334***	0.002
Near Activities t_1	**0.311***	0.004
Distance Activities t_1	**0.234***	0.034
Social Functioning t_1	0.073	0.512
Mental Health t_1	-0.005	0.967
Role Difficulties t_1	-0.092	0.412
Dependency t_1	0.117	0.295
Driving t_1	0.197	0.137
Color Vision t_1	0.187	0,095
Peripheral Vision t_1	0.079	0.483

NEI-VFQ Composite t_1	**0.242***	0.028
General Health t_2	-0.027	0.807
General Vision t_2	**0.227***	0.040
Ocular Pain t_2	**0.360***	0.001
Near Activities t_2	**0.260***	0.019
Distance Activities t_2	**0.305***	0.005
Social Functioning t_2	0.110	0.326
Mental Health t_2	0.024	0.829
Role Difficulties t_2	0.074	0.510
Dependency t_2	0.163	0.143
Driving t_2	**0.298***	0.022
Color Vision t_2	0.056	0.620
Peripheral Vision t_2	0.134	0.229
NEI-VFQ Composite t_2	**0.281***	0.011

*Correlation is significant at the 0.05 level (2-tailed), and correlation coefficient is ≥0.20.

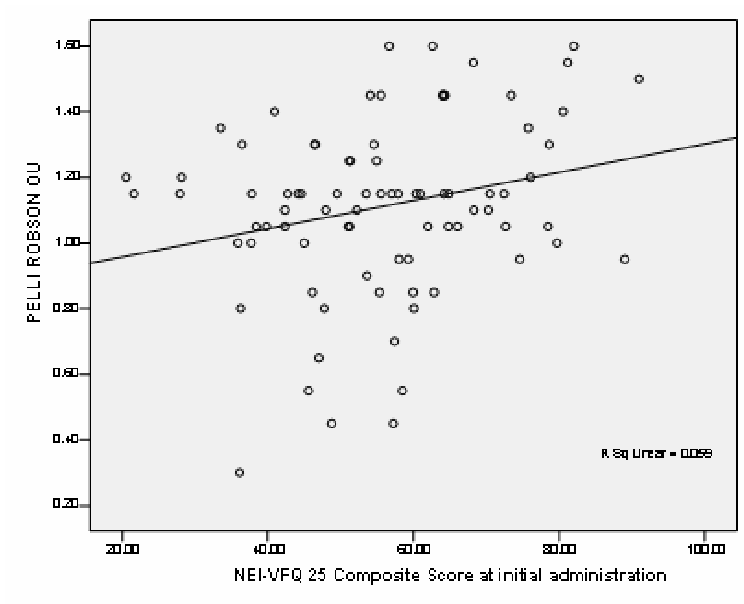


Figure 3-51 Correlation between Contrast Sensitivity and overall NEI-VFQ 25 score at initial administration for ARMD population. Scatter plot indicates modest correlation between PIADS and CS, n=116

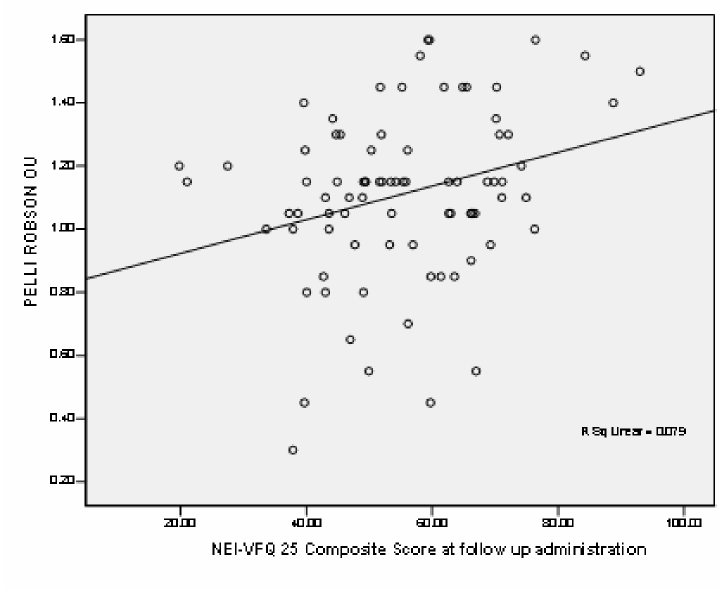


Figure 3-52 Correlation between Contrast Sensitivity and overall NEI-VFQ 25 score at follow up administration for ARMD population. Scatter plot indicates modest correlation between PIADS and CS, n=116

3.2.6 PIADS & NEI-VFQ 25 Within Measure Correlations at Initial and Follow Up Administrations

Table 31 shows the correlations between PIADS subscales and overall scores at initial and follow-up administrations for the ARMD population. Moderate correlations are seen for all scores, thus helping to validate the stability of the relationship within the measures. A graphical representation of the overall PIADS scores at t_1 and t_2 are presented ***(Fig 3-54)*** In addition, the NEI-VFQ 25 subscales and composite scores also exhibited moderate to high correlations **(Table 32)**, over the given time period, also illustrating a stable relationship within the measure. Graphical representation of composite scores between t_1 & t_2 can been seen in ***Fig 3-55.***

Table 31 Correlation between PIADS Subscale Items at Initial and Follow up Administrations (i.e. t_1=Initial, t_2=Follow up). n=85, ARMD Population. Time between Initial and Follow up Administration is 2 weeks.

PIADS Subscale Items	Correlation Coefficient	P-value
PIADS Competence t_1 with Competence t_2	0.535	<0.001

PIADS Adaptability t_1 with Adaptability t_2	0.481	<0.001
PIADS Self-Esteem t_1 with Self Esteem t_2	0.610	<0.001
PIADS Overall t_1 with t_2	0.557	<0.001

*Correlation is significant at the 0.05 level (2-tailed), and correlation coefficient is ≥0.20.

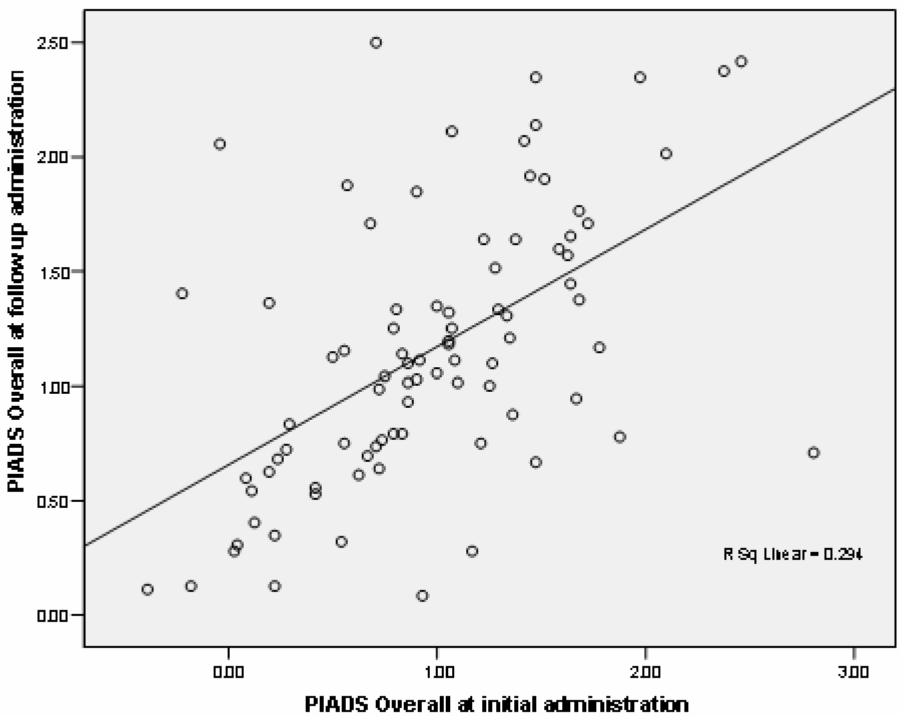


Figure 3-53 Correlations of PIADS overall scores for initial and follow up administrations for ARMD population. Moderate correlations are present for PIADS between administrations during given time period (2 weeks)

Table 32 Correlation between NEI-VFQ 25 Subscale Items at Initial and Follow up Administrations (i.e. t_1=Initial, t_2=Follow up) n=85, ARMD Population

NEI-VFQ-25 Subscale Items	Correlation Coefficient*	P-value
General Health t_1 with t_2	0.608	<0.001
General Vision t_1 with t_2	0.724	<0.001
Ocular Pain t_1 with t_2	0.709	<0.001
Near Activities t_1 with t_2	0.744	<0.001
Distance Activities t_1 with t_2	0.841	<0.001
Social Functioning t_1 with t_2	0.435	<0.001
Mental Health t_1 with t_2	0.690	<0.001
Role Difficulties t_1 with t_2	0.569	<0.001
Dependency t_1 with t_2	0.729	<0.001
Driving t_1 with t_2	0.997	<0.001
Color Vision t_1 with t_2	0.802	<0.001
Peripheral Vision t_1 with t_2	0.760	<0.001
NEI-VFQ Composite t_1 with t_2	0.858	<0.001

*Correlation is significant at the 0.05 level (2-tailed), and correlation coefficient is ≥0.20.

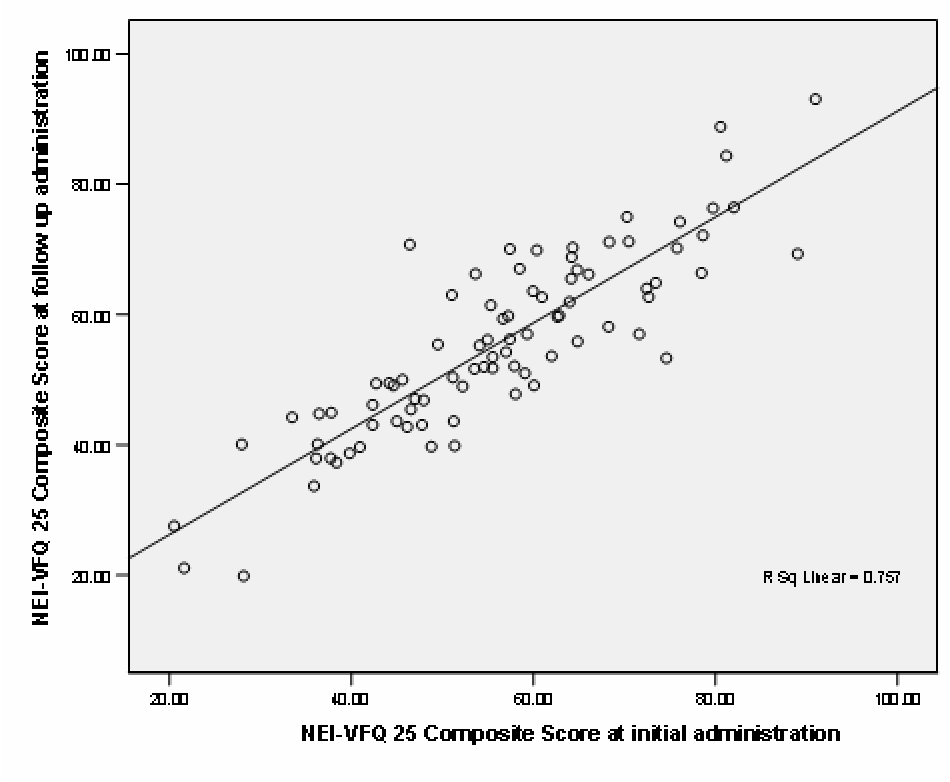


Figure 3-54 Correlations of NEI-VFQ 25 composite scores for initial and follow up administrations for ARMD population. Moderate correlations are present for NEI-VFQ25 between administrations during given time period (2 weeks)

3.2.7 PIADS and NEI-VFQ between Measures Correlations at Initial and Follow-Up Administrations

The correlations between PIADS and NEI-VFQ 25 are summarized for time periods, t_1 and t_2 for the ARMD sample in **Tables 33 and 34**. Correlations between measures were summarized by Spearman correlation coefficient, because the measures were highly skewed and/or ordinal. The correlations were significant at $\alpha = 0.05$, and where the correlation was ≥ 0.20. The bolded items in represent correlations that are statistically significant, but these correlations are only moderate. Several weak but significant correlations were found between subscale items for PIADS and NEI-VFQ 25 at initial administration:

- Vision function status in the areas of near activities (r= 0.230, p=0.035), social functioning (r= 0.216, p=0.047), peripheral vision (r= 0.243, p=0.025) (as revealed by NEI-VFQ 25) and psychosocial impact on competence (as revealed by PIADS).

- Vision function status in the areas of near activities (r= 0.348, p<0.001), mental health (r= 0.267, p=0.014), peripheral vision (r= 0.273, p=0.011), overall composite score (r= 0.226, p=0.038) (as revealed by NEI-VFQ 25) are correlated with adaptability (as revealed by PIADS).
- Vision function status in the areas of peripheral vision (r= 0.263, p=0.015) (as revealed by NEI-VFQ 25) with self-esteem (as revealed by PIADS)
- The PIADS overall score correlated positively with near activities (r= 0.279, p=0.001), mental health (r= 0.225, p=0.038) and peripheral vision (r= 0.284, p=0.008).

Fig 3-56 is a plot of PIADS overall score with the NEI-VFQ 25 composite score at initial administration.

Table 33 Correlation between NEI-VFQ 25 Subscale Items and PIADS Subscale Items at Initial Administration (i.e. t_1=initial) n=85, ARMD Population. Bolded Items Indicate a Correlation Coefficient ≥ 0.20

	PIADS Subscales							
NEI-VFQ-25 Subscale Items	Competence		Adaptability		Self-Esteem		PIADS Composite	
	Correlation Coefficient	p-value	Correlation Coefficient	p-value	Correlation Coefficient	p-value	Correlation Coefficient	p-value
General Health	-0.028	0.797	-0.084	0.444	-0.002	0.986	-0.079	0.474
General Vision	-0.051	0.644	0.095	0.387	0.074	0.502	0.058	0.601
Ocular Pain	-0.178	0.103	-0.072	0.514	-0.139	0.206	-0.139	0.206
Near Activities	**0.230***	0.035	**0.348***	<0.001	0.125	0.256	**0.279***	0.001
Distance Activities	0.078	0.477	0.195	0.074	0.002	0.984	0.110	0.314
Social Functioning	**0.216***	0.047	0.147	0.180	0.080	0.467	0.194	0.075
Mental Health	0.144	0.190	**0.267***	0.014	0.130	0.236	**0.225***	0.038
Role Difficulties	0.195	0.074	0.111	0.313	0.115	0.293	0.170	0.120
Dependency	0.016	0.882	0.005	0.966	-0.089	0.419	0.009	0.934
Driving	-0.051	0.702	-0.015	0.908	-0.140	0.291	-0.081	0.540
Color Vision	0.043	0.697	-0.047	0.670	-0.141	0.200	-0.039	0.724
Peripheral Vision	**0.243***	0.025	**0.273***	0.011	**0.263***	0.015	**0.284***	0.008

NEI-VFQ Composite	0.177	0.105	**0.226***	0.038	0.069	0.529	0.200	0.067

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

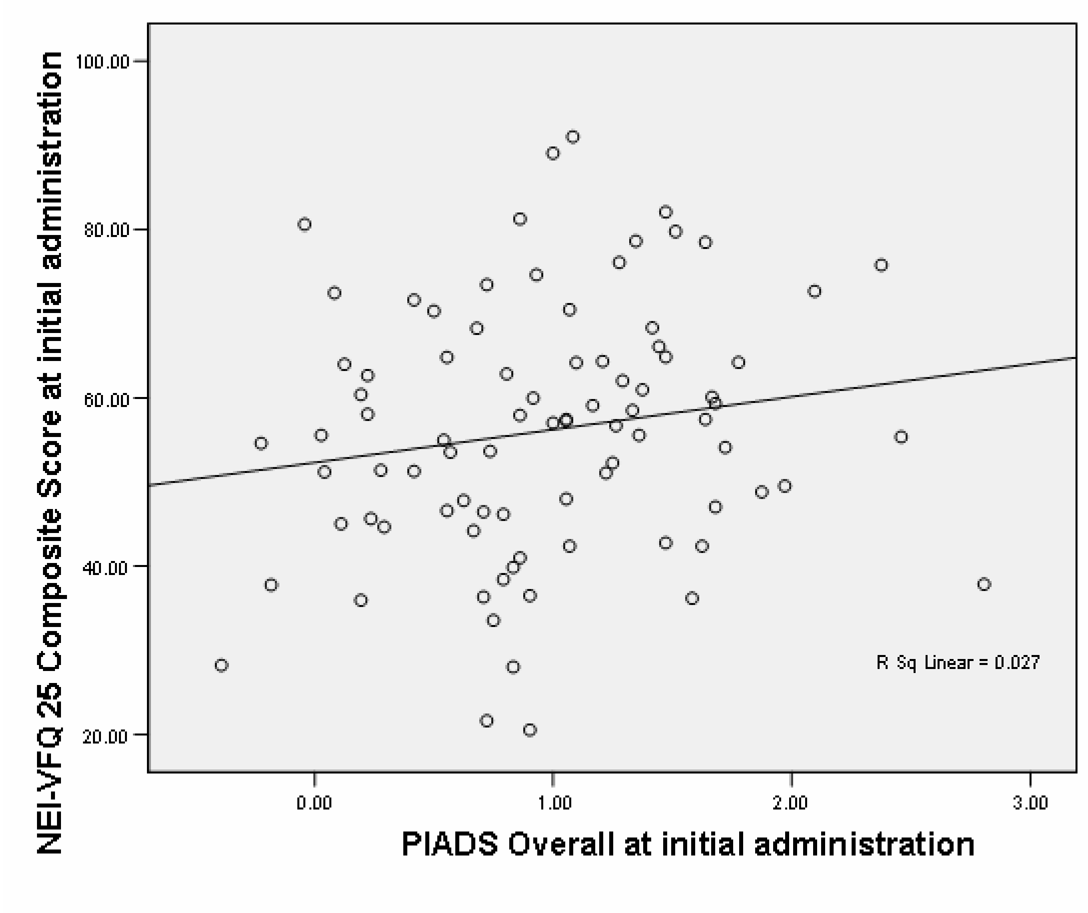


Figure 3-55 Correlations of overall scores between PIADS and NEI-VFQ 25 at initial administration for ARMD population. Several modest correlations are present between PIADS subscales and NEI-VFQ 25 subscales and overall scores.

Several weak but significant correlations were found between subscale items for PIADS and NEI-VFQ 25 at follow-up administration:

- Vision function status in the areas of general health (r= 0.250, p=0.021), mental health (r= 0.229, p=0.035), role difficulties (r= 0.253, p=0.019), dependency (r= 0.302, p=0.005), overall composite score (r= 0.304, p=0.005) (as revealed by NEI-VFQ 25) and psychosocial impact on competence (as revealed by PIADS).
- Vision function status in the areas of general health (r= 0.300, p=0.005), general vision (r= 0.298, p=0.006), near activities (r= 0.311, p=0.004), distance activities (r= 0.348, p=0.001), mental health (r= 0.315, p=0.003), dependency (r= 0.290, p=0.007), overall composite score (r= 0.351, p=0.001) (as revealed by NEI-VFQ 25) are correlated with adaptability (as revealed by PIADS).

- Vision function status in the areas of general health (r= 0.336, p=0.002), general vision (r= 0.262, p=0.016), distance activities (r= 0.241, p=0.026), dependency (r= 0.261, p=0.016), overall composite score (r= 0.275, p=0.011) (as revealed by NEI-VFQ 25) with self-esteem (as revealed by PIADS)
- The PIADS overall score correlated positively with general health (r= 0.328, p=0.002), general vision (r= 0.280, p=0.009), near activities (r= 0.234, p=0.031), distance activities (r= 0.311, p=0.004), mental health (r= 0.288, p=0.007), role difficulties (r= 0.210, p=0.054), dependency (r= 0.333, p=0.002), and the NEI-VFQ 25 composite score (r= 0.359, p=0.001).

Fig 3-57 is a plot of PIADS overall score with the NEI-VFQ 25 composite score at follow up administration.

Table 34 Correlation between NEI-VFQ 25 Subscale Items and PIADS Subscale Items at Follow up Administration (i.e. t_2= follow-up). n=85, ARMD Population. Bolded Items Indicate a Correlation Coefficient ≥ 0.20

	PIADS Subscales							
NEI-VFQ-25 Subscale Items	Competence		Adaptability		Self-Esteem		PIADS Composite	
	Correlation Coefficient	p-value	Correlation Coefficient	p-value	Correlation Coefficient	p-value	Correlation Coefficient	p-value
General Health	**0.250***	0.021	**0.300***	0.005	**0.336***	0.002	**0.328***	0.002
General Vision	0.204	0.061	**0.298***	0.006	**0.262***	0.016	**0.280***	0.009
Ocular Pain	-0.070	0.522	-0.033	0.766	-0.168	0.125	-0.106	0.334
Near Activities	0.146	0.184	**0.311***	0.004	0.170	0.119	**0.234***	0.031
Distance Activities	0.207	0.057	**0.348***	0.001	**0.241***	0.026	**0.311***	0.004
Social Functioning	0.049	0.658	0.090	0.411	0.119	0.280	0.095	0.385
Mental Health	**0.229***	0.035	**0.315***	0.003	0.195	0.074	**0.288***	0.007
Role Difficulties	**0.253***	0.019	0.168	0.123	0.143	0.192	**0.210***	0.054
Dependency	**0.302***	0.005	**0.290***	0.007	**0.261***	0.016	**0.333***	0.002
Driving	0.175	0.178	0.178	0.171	0.075	0.566	0.169	0.194
Color Vision	0.067	0.546	0.064	0.562	0.093	0.402	0.095	0.390
Peripheral Vision	0.171	0.118	0.114	0.300	0.134	0.223	0.175	0.110
NEI-VFQ Composite	**0.304***	0.005	**0.351***	0.001	**0.275***	0.011	**0.359***	0.001

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

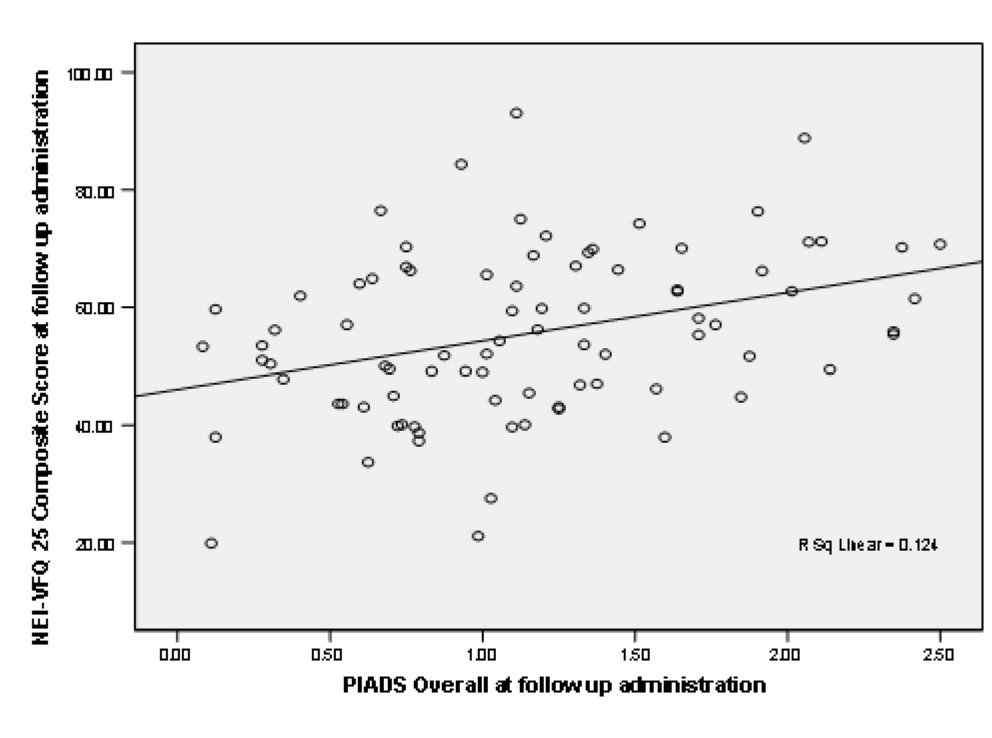


Figure 3-56 Correlations of overall scores between PIADS and NEI-VFQ 25 at follow up administration for ARMD population. Several modest correlations are present between PIADS subscales and NEI-VFQ 25 subscales and overall scores.

Note: Appendix N includes all detailed correlation tests conducted for both measures.

3.2.8 Relationship Changes Over Time for PIADS and NEI-VFQ 25

Table 35 illustrates a significant change is present between times t_1 and t_2 for the PIADS subscales competence (t=-2.998, p=0.004), self-esteem (t= -3.590, p= 0.001), and PIADS overall (t= -2.891, p= 0.005). In each instance, t_2 had a significant higher score, thus indicating that there was a positive change at the follow up administration. Negative values denote the follow up administration was more positive. No significant changes were present for the Adaptability subscale of PIADS or for any of the NEI-VFQ 25 subscale or composite scores.

Table 35 Paired Samples Test assessing whether or not the Relationship between the PIADS and NEI-VFQ 25 measures change between t_1 and t_2. Bolded Values indicate scores for t_2 are of

Significantly Higher Value. In this case, α= 0.05/17 = 0.003, known as the Bonferroni correction, since 17 pairs of tests were run.

	Paired Differences							
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
				Lower	Upper			
PIADS Subscale Competence1 - PIADS Subscale Competence2	**-.22647**	**.69634**	**.07553**	**-.37667**	**-.07627**	**-2.998**	**84**	**.004**
PIADS Subscale Self-Esteem1 - PIADS Subscale Self-Esteem2	**-.22794**	**.58541**	**.06350**	**-.35421**	**-.10167**	**-3.590**	**84**	**.001**
PIADS Subscale Adaptability1-PIADS Subscale Adaptability2	-1.0000	0.73427	0.07964	-.25838	.05838	-1.256	84	.213
PIADSOverall1 - PIADSOverall2	**-.18480**	**.58938**	**.06393**	**-.31193**	**-.05768**	**-2.891**	**84**	**.005**
VFQ Composite Score1 - VFQ Composite Score2	.58073	7.44811	.80786	-1.02579	2.18725	.719	84	.474

Note: Refer to Appendix O for complete list of 17 paired t-tests that were conducted.

3.3 Overall Comparison of Sample Population versus ARMD Population

Comparison of the PIADS and NEI-VFQ 25 subscales and overall scores of the ARMD population to the overall sample of 120 participants revealed no significant differences. The means of the subscales and overall score fall within the 95% Confidence Intervals of the overall population means of the subscales and overall score. For the NEI-VFQ 25, no significant differences were found either, except for the General Health subscales at both the initial and follow up administrations, where the mean scores for these two were just shy of the lower bound of the 95% Confidence Interval. This may imply condition plays a role in perceived health. However the scores were just outside the interval and further investigation is required to resolve this. It is interesting to note that PIADS correlated more strongly with the clinical measures for the ARMD population, whereas there were no significant correlations present for the overall sample. In the case of the NEI-VFQ 25, the overall sample appeared to correlate better with visual acuity than the ARMD sample, but contrast sensitivity correlations were not very different between the samples.

Significant differences were not detected for the correlations for PIADS between t_1 and t_2, as was the case for the NEI-VFQ 25 subscales and composite scores. For the correlations between measures at initial administration, no major differences were detected either as the correlations still remained weak but modest at best for the ARMD sample like the overall population. At the follow up administration, several more correlations between PIADS and NEI-VFQ 25 were apparent for the ARMD sample than the overall population. However, all the correlations between the measures remained relatively weak, falling in the range between 0.2-0.4. When it came to assessing the relationship over time, the ARMD sample exhibited the same pattern as did the overall population, with only significant differences being noted for the competence, self-esteem, and PIADS overall scores. Overall, the ARMD population did not illustrate any distinctive difference from the overall sample population which encompassed various eye conditions.

Refer to Appendix P for results for Confidence Intervals.

3.4 Results Summary

The results of this study are consistent with our previously stated hypotheses. NEI-VFQ 25 correlated more strongly to clinical measures than the PIADS. The measures showed stability, as indicated by the moderate correlations for the time interval. PIADS was shown to be a more responsive measure, able to detect change within the 2 week time interval. Finally, modest correlations existed between the measures (PIADS and NEI-VFQ 25) at initial and follow up administrations

Chapter 4
Discussion

The ever-increasing prevalence/incidence of low vision in North America is associated with dramatic increases in the need for assistive technology device rehabilitation to meet the demands of those who wish to improve their quality of life despite functional vision loss.

Both PIADS and NEI-VFQ 25 are reliable and valid self-reported outcome measures that are relevant for low vision rehabilitation settings. The NEI-VFQ 25 is used to assess the functional vision status of vision loss on the individual's performance of activities that contribute to their quality of life. The PIADS assesses the impact of specific assistive devices on psychosocial factors that contribute to quality of life. The PIADS provides a useful administration tool because the perceived impact of assistive device interventions is measured relatively independently from the device user's functional condition.

For PIADS, there were no significant changes between the overall population and the ARMD population. The study showed PIADS as a reliable tool that is responsive in detecting change as a result of device adoption.

The NEI-VFQ 25 was originally developed to assess visual function in those with ocular disease. Establishing benchmarks standards, however, is important in comparing a diseased population to one without any ocular disease [30]. There is a significant difference between our low vision cohort and the reference group, which confirms that visual function does have an effect on the measures. Significant differences are present for most subscales and the NEI-VFQ 25 composite scores at initial and follow-up administration. This is consistent with other studies that have compared a diseased cohort with a reference group and found that the diseased cohort demonstrates a greater degree of self-reported visual dysfunction [44, 51]. It is interesting to note though that the NEI-VFQ 25 was not designed to incorporate the impact of type of correction for refractive error on functioning and well being [68]. Comparing the overall sample with a published low vision sample [44], reveals no differences in General Health and Ocular Pain subscales. General Vision, Near Activities, Distance Activities, Peripheral Vision, Color Vision, Role Difficulties, Dependency, Social Functioning, and Mental

Health are all significantly higher at both time intervals for the study sample. Driving and Role Difficulties were the only subscales that had lower subscale scores for the study population. The higher subscale scores of the study population may be attributable to the device intervention, since the published low vision sample did not receive any form of intervention. The overall study population exhibited a ceiling effect for the General Health subscale, while the ARMD sample did not. This may suggest that persons with ARMD view their quality of life more negatively than other samples. It is interesting to note that when comparing the ARMD sample population to a published ARMD sample [44], the only subscale with a higher score is Peripheral Vision, and Ocular Pain shows no significant difference. Even a study on patients with uveitis reported NEI-VFQ 25 scores lower than the referenced ARMD population [73]. Ceiling effects for both study samples were noted for the Ocular Pain, Color Vision, and Peripheral Vision subscales. ARMD is characterized by painless loss of the central field of vision, so one might expect it would have little impact on Peripheral Vision and Ocular Pain subscales. It is interesting that NEI-VFQ 25 scores for the ARMD subjects with assistive devices are lower than those of the published sample. Another study showed patients with age-related maculopathy who presented for low vision rehabilitation services have lower NEI-VFQ 25 scores than those who did not [72]. Further investigation into this matter is warranted. Mangione et al [44] present distributions for other ocular conditions as well.

Peripheral vision does not appear to be an issue for the participants in this study. As stated previously, 71% of the study participants have ARMD, which rarely interferes with peripheral vision. At both initial and follow-up administrations, a substantial ceiling effect was noted (51.7% and 48.3% t_1 and t_2, respectively). A study on quality of life in patients with glaucoma indicated that subjects rated peripheral vision loss as less important than other activities associated with central vision and outdoor mobility [7]. Other studies also show that individuals are mainly concerned with central visual acuity as opposed to the cause of the loss [94].

Moreover, the Driving subscale experienced significant floor effects for both overall and ARMD samples, at both administrations. This is likely because most subjects have quit driving and have no reasonable expectation that they will be able to resume driving due to the current vision requirements for driving in Ontario. This is noteworthy because others have reported an association between driving cessation and decreased health-related quality of life and depression [72].

One of the items in the distance activities subscales asks users to rate their difficulty going down steps or stairs in dim light or at night. Studies of quality of life in patients with glaucoma study found 'darkness or glare' to be the chief complaint among the study cohort [7]. Furthermore, it was found that although glaucoma is characterized by central and peripheral vision loss, it is concerns of central vision that are most important to the patients even where the peripheral field loss is only rated as mild [7]. With our subjects, Peripheral Vision does not appear to be the primary complaint since the distribution of scores is normal and not skewed

PIADS subscale and overall scores did not show any significant effects across device categories with the MANOVA test. These results are consistent with an investigation of the psychosocial impact of hearing aids [78]. The NEI-VFQ 25 subscales also did not show any significant effects across device categories with the MANOVA test. Since there is no gold standard for comparing vision-specific quality of life measures or even health related quality of life measures, it is important to evaluate these data alongside clinical measures such as visual acuity and contrast sensitivity [24]. No significant correlations are present between the PIADS subscales and overall score for visual acuity and contrast sensitivity with respect to the overall sample. This finding is consistent with the results of a study involving closed circuit television systems (CCTVs) which found no statistically significant correlations between PIADS scores and visual acuity [3]. The ARMD sample did have a few significant yet modest correlations between visual acuity and the PIADS subscales of Competence at t_1 (0.262, p=0.016), Self esteem at t_1 (0.258, p=0.018), and PIADS overall at t_1 (0.263, p= 0.016). These data are presented in Table 27. Only the PIADS subscale of competence at t_1 (-0.229, p=0.038) is correlated with contrast sensitivity (See **Table 28**). Consistent with other studies [63], it is possible that a health related quality of life measure that includes emotional or psychological dimensions, such as the PIADS, might detect effects from a study population that are independent of visual acuity

Previous studies confirm the NEI-VFQ 25 to be a reliable and valid tool for clinical research seeking to assess vision related related quality of life [36, 54]. NEI-VFQ 25 has been shown to be sensitive to different levels of visual acuity [44, 47, 50, 71].The weak correlations show that the NEI-VFQ 25 is not directly affected by the severity of a participant's eye disease, suggesting that the measure is able to provide reproducible and valid data when used across multiple eye conditions [36]. However, in another study it was noted that such subscales as General Health, General Vision, Near Vision, Distance Vision, and Peripheral Vision are generally worse for subjects with severe ARMD [87]. A study on the quality of life with visual acuity loss from diabetic retinopathy and age related macular degeneration reports that the degree of visual acuity loss rather than the underlying disease causing the visual acuity loss is primarily responsible for the reduction in quality of life [94]. In an ARMD study, participants with better visual function had higher scores on all the NEI-VFQ 25 subscales, especially in the subscales of general vision, near vision, and distance vision [59], whereas those in an age-related maculopathy study reported lower scores with greater visual acuity impairment [72]. The clinical expectation is that there is an inverse relation between increasing severity of ARMD and visual function and quality of life [74]. The NEI-VFQ 25 has been shown to be sensitive to differences in visual acuity [52], and is most responsive when visual acuity loss is binocular [46]. This was also the case in another study, where strong correlations of NEI-VFQ 25 composite scores with binocular visual acuity were noted [49]. Strong associations were also reported between best-corrected visual acuity and the NEI-VFQ 25 composite and subscale scores associated with central vision in a study with people with Diabetes Mellitus 1 [71]. Such data presented here and in previous studies, [54] may provide additional insight into the application of the NEI-VFQ 25 in a clinical setting to offer information about an individual's health, and further to the objective clinical measurements that are normally conducted.

It can be seen that the NEI-VFQ 25 correlates more strongly to visual acuity and contrast sensitivity data than the PIADS. This serves as an indicator that a user's rating of a task or perceived impact cannot be accurately predicted by the type or severity of vision loss. This finding is consistent with other studies [7]. Although the correlations are moderate, the NEI-VFQ 25 seems to be influenced by visual function as measured by acuity. It appears that visual acuity does influence some aspects of quality of life, on a more functional level. Significant associations using the NEI-VFQ 25 have been found between self-reported morbidity limitation and poor visual acuity and contrast sensitivity tests [92]. Other studies also confirm that visual acuity is associated with decreased quality of life and that self reported decrement in quality of life was present even with modest visual loss [32]. It can be assumed that the level of decrease is associated with the level of visual impairment, since the greater the visual loss, the greater decrease in quality of life. In accordance with other studies, the NEI-VFQ 25 has been shown to be sensitive to visual acuity [58, 67]. Weak to modest correlations of visual measures with NEI-VFQ 25 in this study may be due to the restricted range of visual function of participants, as was noted in another study [59]. The driving subscale for the overall sample experienced modest correlations with visual acuity and contrast sensitivity, whereas there were none for the ARMD sample. Other studies have shown that the driving subscale is responsive to changes in visual acuity [47]. As well, other measures such as activities of daily living scale have also been shown to be sensitive to clinical measures [95]. It is important to assess the association between visual acuity and the measures because visual acuity is widely recognized as a major determinant in vision-related quality of life, so much so that ophthalmologists rely primarily on visual acuity to plan patient management [59]. Overall, the NEI-VFQ 25 has been shown to discriminate between different severities of vision loss [44].

Both PIADS and NEI-VFQ 25 for the overall and ARMD population exhibited significant correlations within the measures, thus illustrating the stability within the measures and that scores will be similar between administrations. The research indicates that there although there were several significant correlations between the two outcome measures, they were relatively weak to modest (range $r = 0.20$ to 0.353, $p<0.05$ at initial administration and $r = 0.203$ to 0.292, $p < 0.05$ at follow up administration). I was able to safely reject the null hypothesis since there was a significant difference and the p-values were less than α. However, the fact that the correlations were not strong confirms that the NEI-VFQ 25 and PIADS are relatively independent measures and are attuned to different quality of life constructs. On some level they do look at similar domains or otherwise they would not have correlated at all. Speculation into what the domains might be can simply be traced back to the subscales that had the highest correlations and were present for both initial and follow up administrations. As an example, Adaptability (PIADS) with Mental Health (NEI-VFQ 25) correlated at both time instances. What's interesting to note is that some subscales of one measure correlated with the other at the first time interval but didn't at the second. The possibility that the range of the scales is restricted warrants for suppression and the low correlations. Further research needs to be conducted to explore this relationship.

Significant change over the time period was present for some PIADS subscales but none of the NEI-VFQ 25 subscales. A change in function (NEI-VFQ 25) should not be expected between initial and follow up administrations but should only be expected to change after initial device adoption but won't continue to change afterwards. This is an implication for future research to be conducted in the administration of function change pre and post device adoption. On the other hand, perceived impact (PIADS) will change positively because suddenly an individual is able to perform activities they couldn't do before, and as a consequence, they will start to feel better and continue to feel better about themselves because it is providing a positive impact. This is consistent with the significant change that is present **(Tables 21 and 35)** with PIADS between initial and follow up administrations.

As a result, it appears there is greater opportunity for detecting change through PIADS as it appears to be a more responsive scale when looking at device adoption.

4.1 Limitations

Normally, it can be assumed that we are sampling randomly from the population. However, because of the inclusion/exclusion criteria specified and the source of the sample, this was not the case. The selected population was patients of the Low Vision Clinic, which may have posed some bias. There exists other low vision populations but due to economic and cost limitations, they may not come for an evaluation which they have to pay for, or may be seeking other services, and therefore we were not accessible to these. In addition to introduction of a sample bias, we also introduced an age bias by limiting our sample to those over the age of 18. The reason for this is to obtain more precise and accurate data by ensuring a competent and mature population base.

4.2 Research Shortcomings

Since we did not randomly sample, we cannot estimate how likely our findings can be generalized to the populations with the ocular conditions of those in our study. It should be noted that this type of research makes it extremely difficult to ensure random selection due to the nature of the data collection and the need for reasonable sample sizes. In the future if the study is to be reproduced, subjects should be administered the NEI-VFQ 25 prior to device adoption and then post in order to track any robust change that the device may have made. This is currently being investigated for future research in this area.

4.3 Conclusion

The results of this study are consistent with our hypothesis that subjective reports of changes in functional status following device acquisition (NEI-VFQ 25 results) will be somewhat correlated with self- reported changes in psychosocial status (PIADS results). As was predicted, NEI-VFQ 25 correlated more strongly to clinical measures than the PIADS. The measures showed stability, as indicated by the moderate correlations for the time interval. PIADS was shown to be a more responsive measure, able to detect change within the 2 week time interval. These two instruments evaluate different but complementary aspects of quality of life. When used in tandem, it is believed they provide much greater insight into the impact of device intervention than simply looking at changes in functional status. As well, by incorporating self reports of visual functioning and health related quality of life into clinical studies, it may be possible to demonstrate the negative effects of visual impairment on everyday activities that are not reflected in a clinical measure endpoint such as visual acuity [63]. Due to the dynamic nature of quality of life, these relationships are expected to change over time as people adapt to their newly acquired low vision devices. The longer term data from this prospective cohort study should provide more reliable indicators of successful device adoption.

References

1. Jutai, J. Hooper, P. Strong, G. Cooper, L. Hutnik, C. Sheidow,T.Tingey,. Vision rehabilitation evidence based review: Chapter 1: Terminology, demography, and epidemiology of low vision. *CNIB Baker Foundation for Vision Research.* 2005;1:1-60.

2. Jutai J. Dynamic program approach of modelling assistive technology device outcomes in low vision rehabilitation. Ontario/Canada:2005.

3. Strong, G., Jutai, J.W., Bevers, P., Hartley, M., & Plotkin,A. The psychosocial impact of closed-circuit television (CCTV) low vision aids. *Visual Impairment Research*. 2004;5:179-190.

4. World Health Organization. International classification of functioning, disability and health: ICF. *Geneva, World Health Organization*. 2001.

5. Massof RW. A systems model for low vision rehabilitation. II. measurement of vision disabilities. *Optom Vis Sci*. 1998;75:349-373.

6. Elliott DB, Strong G, Trukolo-Ilic M, Pace RJ, Plotkin A, Bevers P. A comparison of low vision clinic data with low vision survey and blindness registration information. *Optometry and vision science : official publication of the American Academy of Optometry*. 1998;75:272-278.

7. Aspinall PA, Hill AR, Nelson P, et al. Quality of life in patients with glaucoma: A conjoint analysis approach. *Visual Impairment Research* [Quality of Life in Patients with Glaucoma: A Conjoint Analysis Approach]. 2005;7:13-26. Available from: http://journalsonline.tandf.co.uk/link.asp?id=v88j15x4ur1j2157. Accessed April 2005.

8. Bischoff P. Long-term results of low vision rehabilitation in age-related macular degeneration. *Doc Ophthalmol*. 1995;89:305-311.

9. Massof RW, Hsu CT, Baker FH, et al. Visual disability variables. II: The difficulty of tasks for a sample of low-vision patients. *Arch Phys Med Rehabil*. 2005;86:954-967.

10. Massof RW, Hsu CT, Baker FH, et al. Visual disability variables. I: The importance and difficulty of activity goals for a sample of low-vision patients. *Arch Phys Med Rehabil*. 2005;86:946-953.

11. Jutai J, Ladak N, Schuller R, Naumann S, Wright V. Outcomes measurement of assistive technologies: An institutional case study. *Assistive technology : the official journal of RESNA*. 1996;8:110-120.

12. Jutai J. Quality of life impact of assistive technology. *Rehabilitation & Community Care Management*. 1998;14:2-7.

13. Jutai J. Measuring the psychosocial impact of assistive technology. *16th Annual Conference on Technology and Persons with Disabilities.* 2001.

14. DeRuyter F. Evaluating outcomes in assistive technology: Do we understand the commitment? *Assist Technol*. 1995;7:3-8; discussion 9-16.

15. Day H, Jutai J, Campbell KA. Development of a scale to measure the psychosocial impact of assistive devices: Lessons learned and the road ahead. *Disabil Rehabil*. 2002;24:31-37.

16. Horowitz A, Reinhardt JP, Boerner K. The effect of rehabilitation on depression among visually disabled older adults. *Aging Ment Health*. 2005;9:563-570.

17. Pollard TL, Simpson JA, Lamoureux EL, Keeffe JE. Barriers to accessing low vision services. *Ophthalmic Physiol Opt*. 2003;23:321-327.

18. Lenker JA, Scherer MJ, Fuhrer MJ, Jutai JW, DeRuyter F. Psychometric and administrative properties of measures used in assistive technology device outcomes research. *Assist Technol*. 2005;17:7-22.

19. Jutai JW, Fuhrer MJ, Demers L, Scherer MJ, DeRuyter F. Toward a taxonomy of assistive technology device outcomes. *Am J Phys Med Rehabil*. 2005;84:294-302.

20. Andresen EM. Criteria for assessing the tools of disability outcomes research. *Arch Phys Med Rehabil*. 2000;81:S15-20.

21. Espallargues M, Czoski-Murray CJ, Bansback NJ, et al. The impact of age-related macular degeneration on health status utility values. *Invest Ophthalmol Vis Sci*. 2005;46:4016-4023.

22. Fuhrer MJ. Assistive technology outcomes research: Challenges met and yet unmet. *Am J Phys Med Rehabil*. 2001;80:528-535.

23. Harper R. Measuring the outcomes of ophthalmic healthcare: Low vision rehabilitation. *Ophthalmic and Physiological Optics*. 1997;17:540-540.

24. Stelmack J. Quality of life of low-vision patients and outcomes of low-vision rehabilitation. *Optom Vis Sci*. 2001;78:335-342.

25. Dejong G, Horn SD, Gassaway JA, Slavin MD, Dijkers MP. Toward a taxonomy of rehabilitation interventions: Using an inductive approach to examine the "black box" of rehabilitation. *Arch Phys Med Rehabil*. 2004;85:678-686.

26. Hill AR, Cotton LJ. Predicting successful outcomes in the low vision management of elderly people. *Ophthalmic and Physiological Optics*. 1997;17:540-540.

27. Fitzpatrick R, Davey C, Buxton MJ, Jones DR. Evaluating patient-based outcome measures for use in clinical trials. *Health Technol Assess*. 1998;2:i-iv, 1-74.

28. Johnston MV, Keith RA, Hinderer SR. Measurement standards for interdisciplinary medical rehabilitation. *Arch Phys Med Rehabil*. 1992;73:S3-23.

29. Cronbach LE-. Coefficient alpha and the internal structure of tests. *Psychometrika*. 1951;16:297-334.

30. Globe D, Varma R, Azen SP, et al. Psychometric performance of the NEI VFQ-25 in visually normal latinos: The los angeles latino eye study. *Invest Ophthalmol Vis Sci*. 2003;44:1470-1478.

31. Dijkers MP, Kropp GC, Esper RM, Yavuzer G, Cullen N, Bakdalieh Y. Reporting on reliability and validity of outcome measures in medical rehabilitation research. *Disabil Rehabil*. 2002;24:819-827.

32. Broman AT, Munoz B, Rodriguez J, et al. The impact of visual impairment and eye disease on vision-related quality. *Invest Ophthalmol Vis Sci*. 2002;43:3393-3398.

33. Dillon H, So M. Incentives and obstacles to the routine use of outcomes measures by clinicians. *Ear Hear*. 2000;21:2S-6S.

34. Sprangers MA, Moinpour CM, Moynihan TJ, Patrick DL, Revicki DA, Clinical Significance Consensus Meeting Group. Assessing meaningful change in quality of life over time: A users' guide for clinicians. *Mayo Clin Proc*. 2002;77:561-571.

35. Stelmack J. Emergence of a rehabilitation medicine model for low vision service delivery, policy, and funding. *Optometry*. 2005;76:318-326.

36. Childs AL, Submacular Surgery Trials Research Group. Effect of order of administration of health-related quality of life interview instruments on responses. *Qual Life Res*. 2005;14:493-500.

37. Globe DR, Varma R, Torres M, et al. Self-reported comorbidities and visual function in a population-based study: The los angeles latino eye study. *Arch Ophthalmol*. 2005;123:815-821.

38. Babcock-Parziale J, McKnight PE, Head DN. Evaluating psychometric properties of a clinical and a self-report blind rehabilitation outcome measure. *J Rehabil Res Dev*. 2005;42:487-498.

39. Cahill MT, Banks AD, Stinnett SS, Toth CA. Vision-related quality of life in patients with bilateral severe age-related macular degeneration. *Ophthalmology*. 2005;112:152-158.

40. Cahill MT, Stinnett SS, Banks AD, Freedman SF, Toth CA. Quality of life after macular translocation with 360 degrees peripheral retinectomy for age-related macular degeneration. *Ophthalmology*. 2005;112:144-151.

41. McCabe P, Nason F, Demers Turco P, Friedman D, Seddon JM. Evaluating the effectiveness of a vision rehabilitation intervention using an objective and subjective measure of functional performance. *Ophthalmic Epidemiol*. 2000;7:259-270.

42. Wilkinson ME. Low vision rehabilitation: A concise overview. *Insight*. 2003;28:111-7; quiz 118-9.

43. Wolffsohn JS, Cochrane AL. Design of the low vision quality-of-life questionnaire (LVQOL) and measuring the outcome of low-vision rehabilitation. *Am J Ophthalmol*. 2000;130:793-802.

44. Mangione CM, Lee PP, Gutierrez PR, Spritzer K, Benny S, Hays RD. Development of the 25-item national eye institute visual function questionnaire. *Arch Ophthalmol*. 2001;119:1050-1058.

45. Mangione CM. *The National Eye Institute 25-Item Visual Function Questionnaire (VFQ-25) Scoring Algorithm.* National Eye Institute; 2000.

46. Lindblad AS, Clemons TE. Responsiveness of the national eye institute visual function questionnaire to progression to advanced age-related macular degeneration, vision loss, and lens opacity: AREDS report no. 14. *Arch Ophthalmol*. 2005;123:1207-1214.

47. The Submacular Surgery Trials Research Group,. Responsiveness of the national eye institute visual function questionnaire to changes in visual acuity: Findings in patients with subfoveal choroidal neovascularization--SST report no. 1. *Arch Ophthalmol*. 2003;121:531-539. Available from: http://archopht.ama-assn.org/cgi/content/abstract/121/4/531.

48. Hertle RW, Dell'Osso LF, FitzGibbon EJ, Thompson D, Yang D, Mellow SD. Horizontal rectus tenotomy in patients with congenital nystagmus: Results. *Ophthalmology*. 2003;110:2097-2105.

49. Ma SL, Shea JA, Galetta SL, et al. Self-reported visual dysfunction in multiple sclerosis: New data from the VFQ-25 and development of an MS-specific vision questionnaire. *Am J Ophthalmol*. 2002;133:686-692.

50. Mangione CM, Lee PP, Pitts J, et al. Psychometric properties of the national eye institute visual function questionnaire (NEI-VFQ). *Arch Ophthalmol*. 1998;116:1496-1504. Available from: http://archopht.ama-assn.org/cgi/content/abstract/116/11/1496.

51. Balcer LJ, Baier ML, Kunkle AM, et al. Self-reported visual dysfunction in multiple sclerosis: Results from the 25-item national eye institute visual function questionnaire (VFQ-25). *Mult Scler*. 2000;6:382-385.

52. Globe DR, Wu J, Azen SP, Varma R, Los Angeles Latino Eye Study Group. The impact of visual impairment on self-reported visual functioning in latinos: The los angeles latino eye study. *Ophthalmology*. 2004;111:1141-1149.

53. Clemons TE, Chew EY, Bressler SB, McBee W, for the AREDS Research Group,. National eye institute visual function questionnaire in the age-related eye disease study (AREDS): AREDS report no. 10. *Arch Ophthalmol*. 2003;121:211-217. Available from: http://archopht.ama-assn.org/cgi/content/abstract/121/2/211.

54. Cusick M, SanGiovanni JP, Chew EY, et al. Central visual function and the NEI-VFQ-25 near and distance activities subscale scores in people with type 1 and 2 diabetes. *Am J Ophthalmol*. 2005;139:1042-1050.

55. Biousse V, Tusa RJ, Russell B, et al. The use of contact lenses to treat visually symptomatic congenital nystagmus. *J Neurol Neurosurg Psychiatry*. 2004;75:314-316.

56. Massof RW. Application of stochastic measurement models to visual function rating scale questionnaires. *Ophthalmic Epidemiol*. 2005;12:103-124.

57. Nichols KK, Mitchell GL, Zadnik K. Performance and repeatability of the NEI-VFQ-25 in patients with dry eye. *Cornea*. 2002;21:578-583.

58. Burstedt MS, Monestam E, Sandgren O. Associations between specific measures of vision and vision-related quality of life in patients with bothnia dystrophy, a defined type of retinitis pigmentosa. *Retina*. 2005;25:317-323.

59. Maguire M, Complications of Age-Related Macular Degeneration Prevention Trial Research Group. Baseline characteristics, the 25-item national eye institute visual functioning questionnaire, and their associations in the complications of age-related macular degeneration prevention trial (CAPT). *Ophthalmology*. 2004;111:1307-1316.

60. Toprak AB, Eser E, Guler C, Baser FE, Mayali H. Cross-validation of the turkish version of the 25-item national eye institute visual functioning questionnaire (NEI-VFQ 25). *Ophthalmic Epidemiol*. 2005;12:259-269.

61. Vitale S, Goodman LA, Reed GF, Smith JA. Comparison of the NEI-VFQ and OSDI questionnaires in patients with sjogren's syndrome-related dry eye. *Health Qual Life Outcomes*. 2004;2:44.

62. Owsley C, McGwin G,Jr. Depression and the 25-item national eye institute visual function questionnaire in older adults. *Ophthalmology*. 2004;111:2259-2264.

63. Mangione CM, Gutierrez PR, Lowe G, Orav EJ, Seddon JM. Influence of age-related maculopathy on visual functioning and health-related quality of life. *Am J Ophthalmol*. 1999;128:45-53.

64. Massof RW. Likert and guttman scaling of visual function rating scale questionnaires. *Ophthalmic Epidemiol*. 2004;11:381-399.

65. Stelmack JA, Stelmack TR, Massof RW. Measuring low-vision rehabilitation outcomes with the NEI VFQ-25. *Invest Ophthalmol Vis Sci*. 2002;43:2859-2868.

66. Suzukamo Y, Oshika T, Yuzawa M, et al. Psychometric properties of the 25-item national eye institute visual function questionnaire (NEI VFQ-25), japanese version. *Health Qual Life Outcomes*. 2005;3:65.

67. Broman AT, Munoz B, West SK, et al. Psychometric properties of the 25-item NEI-VFQ in a hispanic population: Proyecto VER. *Invest Ophthalmol Vis Sci*. 2001;42:606-613.

68. Hays RD, Mangione CM, Ellwein L, Lindblad AS, Spritzer KL, McDonnell PJ. Psychometric properties of the national eye institute-refractive error quality of life instrument. *Ophthalmology*. 2003;110:2292-2301.

69. Nordmann JP, Auzanneau N, Ricard S, Berdeaux G. Vision related quality of life and topical glaucoma treatment side effects. *Health Qual Life Outcomes*. 2003;1:75.

70. Rossi GC, Milano G, Tinelli C. The italian version of the 25-item national eye institute visual function questionnaire: Translation, validity, and reliability. *J Glaucoma*. 2003;12:213-220.

71. Klein R, Moss SE, Klein BE, Gutierrez P, Mangione CM. The NEI-VFQ-25 in people with long-term type 1 diabetes mellitus: The wisconsin epidemiologic study of diabetic retinopathy. *Arch Ophthalmol*. 2001;119:733-740.

72. Scilley K, DeCarlo DK, Wells J, Owsley C. Vision-specific health-related quality of life in age-related maculopathy patients presenting for low vision services. *Ophthalmic Epidemiol*. 2004;11:131-146.

73. Schiffman RM, Jacobsen G, Whitcup SM. Visual functioning and general health status in patients with uveitis. *Arch Ophthalmol*. 2001;119:841-849.

74. Fuhs A, Dasch B, Behrens T, et al. Visual function and quality of life in patients with age-related maculopathy: Results of the munster age and retina study (MARS). *Klin Monatsbl Augenheilkd*. 2005;222:649-654.

75. Nordmann JP, Viala M, Sullivan K, Arnould B, Berdeaux G. Psychometric validation of the national eye institute visual function questionnaire - 25 (NEI VFQ-25) french version: In a population of patients treated for ocular hypertension and glaucoma. *Pharmacoeconomics*. 2004;22:197-206.

76. Scott IU, Smiddy WE, Schiffman J, Feuer WJ, Pappas CJ. Quality of life of low-vision patients and the impact of low-vision services. *Am J Ophthalmol*. 1999;128:54-62.

77. Jutai JD,H. Psychosocial impact of assistive devices scale (PIADS). *Technology & Disability*. 2002;14:107-111.

78. Saunders GHJ,J.W. Hearing specific and generic measures of the psychosocial impact of hearing aids. *Journal of the American Academy of Audiology*. 2004;15:238-248.

79. Jutai JS,G. Psychosocial outcomes of hearing aids. *In: G.M. Craddock, L.P. McCormack, R.B. Reilly, & H.T.P. Knops (Eds.)*. 2003;Assistive technology – shaping the future. Amsterdam: IOS Press:510-514.

80. Chandarana S, Parnes L, Agrawal S, Fung K. Quality of life following small fenestra stapedotomy. *Ann Otol Rhinol Laryngol*. 2005;114:472-477.

81. Day, H. & Jutai,J. Measuring the psychosocial impact of assistive devices: The PIADS. *Canadian Journal of Rehabilitation*. 1996;9:159-168.

82. Day HY, Jutai J, Woolrich W, Strong G. The stability of impact of assistive devices. *Disabil Rehabil*. 2001;23:400-404.

83. Jutai, J. Bayley, M. Teasell, R. Hartley,M. Psychosocial impact of assistive technology devices in stroke. *In: G.M. Craddock, L.P. McCormack, R.B. Reilly, & H.T.P. Knops (Eds.)*. 2003;Assistive technology – shaping the future. Amsterdam: IOS Press:814-818.

84. Jutai, J. Rigby, P. Ryan, S. Stickel,S. Psychosocial impact of electronic aids to daily living. *Assistive Technology*. 2000;12:123-131.

85. Jutai J, Day H, Woolrich W, Strong G. The predictability of retention and discontinuation of contact lenses. *Optometry*. 2003;74:299-308.

86. Demers L, Monette M, Descent M, Jutai J, Wolfson C. The psychosocial impact of assistive devices scale (PIADS): Translation and preliminary psychometric evaluation of a canadian-french version. *Qual Life Res*. 2002;11:583-592.

87. Gelderblom JG, De White LP. The assessment of assistive device technology, outcomes, effects, and costs. *Tech & Disab*. 2002;14:91-94.

88. Harper R, Doorduyn K, Reeves B, Slater L. Evaluating the outcomes of low vision rehabilitation. *Ophthalmic Physiol Opt*. 1999;19:3-11.

89. Day H, Campbell KA. Is telephone assessment a valid tool in rehabilitation research and practice? *Disability and rehabilitation*. 2003;25:1126-1131.

90. Fuhrer MJ, Jutai JW, Scherer MJ, DeRuyter F. A framework for the conceptual modeling of assistive technology device outcomes. *Disability and rehabilitation*. 2003;25:1243-1251.

91. World Health Organization. Towards a common language for functioning, disability and health: ICF. *Geneva: World Health Organization*. 2002.

92. West CG, Gildengorin G, Haegerstrom-Portnoy G, Schneck ME, Lott L, Brabyn JA. Is vision function related to physical functional ability in older adults? *J Am Geriatr Soc*. 2002;50:136-145.

93. Husted JA, Cook RJ, Farewell VT, Gladman DD. Methods for assessing responsiveness: A critical review and recommendations. *J Clin Epidemiol*. 2000;53:459-468.

94. Brown MM, Brown GC, Sharma S, Landy J, Bakal J. Quality of life with visual acuity loss from diabetic retinopathy and age-related macular degeneration. *Arch Ophthalmol*. 2002;120:481-484.

95. Haymes SA, Johnston AW, Heyes AD. Relationship between vision impairment and ability to perform activities. *Ophthalmic Physiol Opt*. 2002;22:79-91.

.

Appendix A

PIADS Questionnaire

Client Name:_________________________________ ☐ male ☐ female
(Last name, then first name)

Diagnosis:____________________________ Date of Birth:_________________________
Month/day/year

The form is being filled out at **(choose one)** **1.** ☐ home **2.** ☐ a clinic **3.** ☐ other (describe):_________
The form is being filled out by **(choose one)** **1.** ☐ the client, without any help **2.** ☐ the client, with help from the caregiver (e.g., client showed or told caregiver what answers to give) **3.** ☐ the caregiver on behalf of the client, without any direction from the client **4.** ☐ other (describe): _____

Each word or phrase below describes how using an assistive device may affect a user. Some might seem unusual but it is important that you answer every one of the 26 items. So, for each word or phrase, put an "X" in the appropriate box to show how you are affected by using the ___________________________ (device name).

	Decreases	-3	-2	-1	0	1	2	3	Increases
1)	competence	☐	☐	☐	☐	☐	☐	☐	
2)	happiness	☐	☐	☐	☐	☐	☐	☐	
3)	independence	☐	☐	☐	☐	☐	☐	☐	
4)	adequacy	☐	☐	☐	☐	☐	☐	☐	
5)	confusion	☐	☐	☐	☐	☐	☐	☐	
6)	efficiency	☐	☐	☐	☐	☐	☐	☐	
7)	self-esteem	☐	☐	☐	☐	☐	☐	☐	
8)	productivity	☐	☐	☐	☐	☐	☐	☐	
9)	security	☐	☐	☐	☐	☐	☐	☐	
10)	frustration	☐	☐	☐	☐	☐	☐	☐	
11)	usefulness	☐	☐	☐	☐	☐	☐	☐	
12)	self-confidence	☐	☐	☐	☐	☐	☐	☐	
13)	expertise	☐	☐	☐	☐	☐	☐	☐	
14)	skillfulness	☐	☐	☐	☐	☐	☐	☐	
15)	well-being	☐	☐	☐	☐	☐	☐	☐	
16)	capability	☐	☐	☐	☐	☐	☐	☐	
17)	quality of life	☐	☐	☐	☐	☐	☐	☐	
18)	performance	☐	☐	☐	☐	☐	☐	☐	
19)	sense of power	☐	☐	☐	☐	☐	☐	☐	
20)	sense of control	☐	☐	☐	☐	☐	☐	☐	
21)	embarrassment	☐	☐	☐	☐	☐	☐	☐	
22)	willingness to take chances	☐	☐	☐	☐	☐	☐	☐	
23)	ability to participate	☐	☐	☐	☐	☐	☐	☐	
24)	eagerness to try new things	☐	☐	☐	☐	☐	☐	☐	
25)	ability to adapt to the activities of daily living	☐	☐	☐	☐	☐	☐	☐	
26)	ability to take advantage of opportunities	☐	☐	☐	☐	☐	☐	☐	

Appendix B

NEI-VFQ 25 Questionnaire

PB/IA

National Eye Institute
Visual Functioning Questionnaire - 25
(VFQ-25)

version 2000

(INTERVIEWER ADMINISTERED FORMAT)

January 2000

Instructions:

I'm going to read you some statements about problems which involve your vision or feelings that you have about your vision condition. After each question I will read you a list of possible answers. Please choose the response that best describes your situation.

Please answer all the questions as if you were wearing your glasses or contact lenses (if any).

Please take as much time as you need to answer each question. All your answers are confidential. In order for this survey to improve our knowledge about vision problems and how they affect your quality of life, your answers must be as accurate as possible. Remember, if you wear glasses or contact lenses for a particular activity, please answer all of the following questions as though you were wearing them.

Visual Functioning Questionnaire - 25

PART 1 - GENERAL HEALTH AND VISION

1. In general, would you say your overall health is*:

(Circle One)

READ CATEGORIES:

Excellent	1
Very Good	2
Good	3
Fair	4
Poor	5

2. At the present time, would you say your eyesight using both eyes (with glasses or contact lenses, if you wear them) is excellent, good, fair, poor, or very poor or are you completely blind?

(Circle One)

READ CATEGORIES:

Excellent	1
Good	2
Fair	3
Poor	4
Very Poor	5
Completely Blind	6

* Skip Question 1 when the VFQ-25 is administered at the same time as the SF-36 or RAND 36-Item Health Survey 1.0

3. **How much of the time do you <u>worry</u> about your eyesight?**

(Circle One)

READ CATEGORIES:

None of the time	**1**
A little of the time	**2**
Some of the time	**3**
Most of the time	**4**
All of the time?	**5**

4. **How much <u>pain or discomfort</u> have you had <u>in and around your eyes</u> (for example, burning, itching, or aching)? Would you say it is:**

(Circle One)

READ CATEGORIES:

None	**1**
Mild	**2**
Moderate	**3**
Severe, or	**4**
Very severe?	**5**

PART 2 - DIFFICULTY WITH ACTIVITIES

The next questions are about how much difficulty, if any, you have doing certain activities wearing your glasses or contact lenses if you use them for that activity.

5. **How much difficulty do you have <u>reading ordinary print in newspapers</u>? Would you say you have:**
(READ CATEGORIES AS NEEDED)

(Circle One)

No difficulty at all	**1**
A little difficulty	**2**
Moderate difficulty	**3**
Extreme difficulty	**4**
Stopped doing this because of your eyesight	**5**
Stopped doing this for other reasons or not interested in doing this	**6**

6. **How much difficulty do you have doing work or hobbies that require you to <u>see well up close</u>, such as cooking, sewing, fixing things around the house, or using hand tools? Would you say:**
(READ CATEGORIES AS NEEDED)

(Circle One)

No difficulty at all	**1**
A little difficulty	**2**
Moderate difficulty	**3**
Extreme difficulty	**4**
Stopped doing this because of your eyesight	**5**
Stopped doing this for other reasons or not interested in doing this	**6**

7. **Because of your eyesight, how much difficulty do you have <u>finding something on a crowded shelf</u>?**
(READ CATEGORIES AS NEEDED)

(Circle One)

No difficulty at all	**1**
A little difficulty	**2**
Moderate difficulty	**3**
Extreme difficulty	**4**
Stopped doing this because of your eyesight	**5**
Stopped doing this for other reasons or not interested in doing this	**6**

8. **How much difficulty do you have <u>reading street signs or the names of stores</u>?**
(READ CATEGORIES AS NEEDED)

(Circle One)

No difficulty at all	**1**
A little difficulty	**2**
Moderate difficulty	**3**
Extreme difficulty	**4**
Stopped doing this because of your eyesight	**5**
Stopped doing this for other reasons or not interested in doing this	**6**

9. Because of your eyesight, how much difficulty do you have <u>going down steps, stairs, or curbs in dim light or at night</u>?
(READ CATEGORIES AS NEEDED)

(Circle One)

No difficulty at all	**1**
A little difficulty	**2**
Moderate difficulty	**3**
Extreme difficulty	**4**
Stopped doing this because of your eyesight	**5**
Stopped doing this for other reasons or not interested in doing this	**6**

10. Because of your eyesight, how much difficulty do you have <u>noticing objects off to the side while you are walking along</u>?
(READ CATEGORIES AS NEEDED)

(Circle One)

No difficulty at all	**1**
A little difficulty	**2**
Moderate difficulty	**3**
Extreme difficulty	**4**
Stopped doing this because of your eyesight	**5**
Stopped doing this for other reasons or not interested in doing this	**6**

11. Because of your eyesight, how much difficulty do you have <u>seeing how people react to things</u> you say?
(READ CATEGORIES AS NEEDED)

(Circle One)

No difficulty at all	**1**
A little difficulty	**2**
Moderate difficulty	**3**
Extreme difficulty	**4**
Stopped doing this because of your eyesight	**5**
Stopped doing this for other reasons or not interested in doing this	**6**

12. **Because of your eyesight, how much difficulty do you have <u>picking out and matching your own clothes</u>?**
(READ CATEGORIES AS NEEDED)

(Circle One)

No difficulty at all **1**
A little difficulty **2**
Moderate difficulty **3**
Extreme difficulty **4**
Stopped doing this because of your eyesight **5**
Stopped doing this for other reasons or not interested in doing this **6**

13. **Because of your eyesight, how much difficulty do you have <u>visiting with people in their homes, at parties, or in restaurants</u> ?**
(READ CATEGORIES AS NEEDED)

(Circle One)

No difficulty at all **1**
A little difficulty **2**
Moderate difficulty **3**
Extreme difficulty **4**
Stopped doing this because of your eyesight **5**
Stopped doing this for other reasons or not interested in doing this **6**

14. **Because of your eyesight, how much difficulty do you have <u>going out to see movies, plays, or sports events</u>?**
(READ CATEGORIES AS NEEDED)

(Circle One)

No difficulty at all **1**
A little difficulty **2**
Moderate difficulty **3**
Extreme difficulty **4**
Stopped doing this because of your eyesight **5**
Stopped doing this for other reasons or not interested in doing this **6**

15. Now, I'd like to ask about <u>driving a car</u>. Are you <u>currently driving</u>, at least once in a while?

(Circle One)

Yes .... **1** *Skip To Q 15c*

No **2**

15a. IF NO, ASK: Have you <u>never</u> driven a car or have you <u>given up driving</u>?

(Circle One)

Never drove ...... **1** *Skip To Part 3, Q 17*

Gave up............ **2**

15b. IF GAVE UP DRIVING: Was that <u>mainly because of your eyesight</u>, <u>mainly for some other reason</u>, or because of <u>both your eyesight and other reasons</u>?

(Circle One)

Mainly eyesight .... **1** *Skip To Part 3, Q 17*

Mainly other reasons .... **2** *Skip To Part 3, Q 17*

Both eyesight and other reasons ... **3** *Skip To Part 3, Q 17*

15c. IF CURRENTLY DRIVING: How much difficulty do you have <u>driving during the daytime in familiar places</u>? Would you say you have:

(Circle One)

No difficulty at all **1**
A little difficulty **2**
Moderate difficulty **3**
Extreme difficulty **4**

16. **How much difficulty do you have <u>driving at night</u>? Would you say you have:** (READ CATEGORIES AS NEEDED)

(Circle One)

No difficulty at all.................................... 1

A little difficulty....................................... 2

Moderate difficulty.................................. 3

Extreme difficulty.................................... 4

Have you stopped doing this because of your eyesight 5

Have you stopped doing this for other reasons or are you not interested in doing this 6

16a. **How much difficulty do you have <u>driving in difficult conditions, such as in bad weather, during rush hour, on the freeway, or in city traffic</u>? Would you say you have:**
(READ CATEGORIES AS NEEDED)

(Circle One)

No difficulty at all.................................... 1

A little difficulty....................................... 2

Moderate difficulty.................................. 3

Extreme difficulty.................................... 4

Have you stopped doing this because of your eyesight 5

Have you stopped doing this for other reasons or are you not interested in doing this 6

PART 3: RESPONSES TO VISION PROBLEMS

The next questions are about how things you do may be affected by your vision. For each one, I'd like you to tell me if this is true for you all, most, some, a little, or none of the time.

(Circle One On Each Line)

READ CATEGORIES:	**All of the time**	**Most of the time**	**Some of the time**	**A little of the time**	**None of the time**
17. Do you accomplish less than you would like because of your vision?	1	2	3	4	5
18. Are you limited in how long you can work or do other activities because of your vision?	1	2	3	4	5
19. How much does pain or discomfort in or around your eyes, for example, burning, itching, or aching, keep you from doing what you'd like to be doing? Would you say:	1	2	3	4	5

For each of the following statements, please tell me if it is definitely true, mostly true, mostly false, or definitely false for you or you are not sure.

(Circle One On Each Line)

	Definitely True	Mostly True	Not Sure	Mostly False	Definitely False
20. I stay home most of the time because of my eyesight.....	**1**	**2**	**3**	**4**	**5**
21. I feel frustrated a lot of the time because of my eyesight..............................	**1**	**2**	**3**	**4**	**5**
22. I have much less control over what I do, because of my eyesight.	**1**	**2**	**3**	**4**	**5**
23. Because of my eyesight, I have to rely too much on what other people tell me..	**1**	**2**	**3**	**4**	**5**
24. I need a lot of help from others because of my eyesight..............................	**1**	**2**	**3**	**4**	**5**
25. I worry about doing things that will embarrass myself or others, because of my eyesight..............................	**1**	**2**	**3**	**4**	**5**

That's the end of the interview. Thank you very much for your time and your help.

Appendix C

Reliability Statistics

PIADS at Initial Assessment

Reliability Statistics

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.891	.892	3

Inter-Item Correlation Matrix

	PIADS Subscale Competence1	PIADS Subscale Adaptability1	PIADS Subscale Self-Esteem1
PIADS Subscale Competence1	1.000	.770	.731
PIADS Subscale Adaptability1	.770	1.000	.700
PIADS Subscale Self-Esteem1	.731	.700	1.000

The covariance matrix is calculated and used in the analysis.

PIADS at Follow up Administration

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.861	.862	3

Inter-Item Correlation Matrix

	PIADS Subscale Competence2	PIADS Subscale Adaptability2	PIADS Subscale Self-Esteem2
PIADS Subscale Competence2	1.000	.692	.771
PIADS Subscale Adaptability2	.692	1.000	.563
PIADS Subscale Self-Esteem2	.771	.563	1.000

The covariance matrix is calculated and used in the analysis.

NEI-VFQ 25 at Initial Administration

Reliability Statistics

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.679	.695	12

Inter-Item Correlation Matrix

	VFQ Subscale General Health1	VFQ Subscale General Vision1	VFQ Subscale Ocular Pain1	VFQ Subscale Near Activities1	VFQ Subscale Distance Activities1	VFQ Subscale Social Functioning1	VFQ Subscale Mental Health1	VFQ Subscale Role Difficulties1	VFQ Subscale Dependency1	VFQ Subscale Driving1	VFQ Subscale Color Vision1	VFQ Subscale Peripheral Vision1
VFQ Subscale Gener Health1	1.000	.217	.224	.052	-.076	-.163	.126	.082	-.018	.080	.014	-.054
VFQ Subscale Gener Vision1	.217	1.000	.238	.265	.216	.055	.192	.319	.267	.260	.098	-.190
VFQ Subscale Ocula Pain1	.224	.238	1.000	.201	.134	-.049	.070	.274	.044	-.012	.183	.029
VFQ Subscale Near Activities1	.052	.265	.201	1.000	.436	.230	.352	.111	.358	.096	.170	.210
VFQ Subscale Distance Activities1	-.076	.216	.134	.436	1.000	.527	.368	.303	.392	.243	.295	.099
VFQ Subscale Social Functioning1	-.163	.055	-.049	.230	.527	1.000	.223	.205	.320	.089	.247	-.013
VFQ Subscale Menta Health1	.126	.192	.070	.352	.368	.223	1.000	.373	.345	-.082	.150	.024
VFQ Subscale Role Difficulties1	.082	.319	.274	.111	.303	.205	.373	1.000	.225	-.082	.350	-.102
VFQ Subscale Dependency1	-.018	.267	.044	.358	.392	.320	.345	.225	1.000	.315	.319	.031
VFQ Subscale Driving	.080	.260	-.012	.096	.243	.089	-.082	-.082	.315	1.000	.187	.032
VFQ Subscale Color Vision1	.014	.098	.183	.170	.295	.247	.150	.350	.319	.187	1.000	.124
VFQ Subscale Peripheral Vision1	-.054	-.190	.029	.210	.099	-.013	.024	-.102	.031	.032	.124	1.000

The covariance matrix is calculated and used in the analysis.

NEI-VFQ 25 at Follow up Administration

Reliability Statistics

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.723	.733	12

Inter-Item Correlation Matrix

	VFQ Subscale General Health2	VFQ Subscale General Vision2	VFQ Subscale Ocular Pain2	VFQ Subscale Near Activities2	VFQ Distance Activities2	VFQ Social Functioning2	VFQ Mental Health2	VFQ Role Difficulties2	VFQ Dependency2	VFQ Driving2	VFQ Color Vision2	VFQ Peripheral Vision2
VFQ Subscale General Health2	1.000	.243	.203	.030	.075	.157	.150	.216	.111	-.055	.050	-.051
VFQ Subscale General Vision2	.243	1.000	.198	.135	.254	.263	.351	.357	.352	.088	.115	-.104
VFQ Subscale Ocular Pain2	.203	.198	1.000	.012	.007	-.128	.088	.220	-.006	-.103	.033	.151
VFQ Subscale Near Activities2	.030	.135	.012	1.000	.436	.181	.372	.189	.396	.121	.290	.331
VFQ Distance Activities2	.075	.254	.007	.436	1.000	.356	.289	.323	.458	.312	.142	.166
VFQ Social Functioning2	.157	.263	-.128	.181	.356	1.000	.250	.399	.305	.273	.224	-.089
VFQ Mental Health2	.150	.351	.088	.372	.289	.250	1.000	.364	.426	.118	.131	-.007
VFQ Role Difficulties2	.216	.357	.220	.189	.323	.399	.364	1.000	.357	.251	.168	.052
VFQ Dependency2	.111	.352	-.006	.396	.458	.305	.426	.357	1.000	.301	.353	.056
VFQ Driving2	-.055	.088	-.103	.121	.312	.273	.118	.251	.301	1.000	.185	.162
VFQ Color Vision2	.050	.115	.033	.290	.142	.224	.131	.168	.353	.185	1.000	.230
VFQ Peripheral Vision2	-.051	-.104	.151	.331	.166	-.089	-.007	.052	.056	.162	.230	1.000

The covariance matrix is calculated and used in the analysis.

Appendix D

PIADS Frequency Distributions for Overall Sample Population

		PIADS Subscale Competence 1	PIADS Subscale Adaptability 1	PIADS Subscale Self-Esteem 1	PIADS Overall 1	PIADS Subscale Competence 2	PIADS Subscale Adaptability 2	PIADS Subscale Self-Esteem 2	PIADS Overall2
N		120	120	120	120	120	120	120	120
Mean		1.1611	.9764	.8146	.9840	1.3542	1.1028	1.0333	1.1634
Median		1.2500	1.0000	.8125	.9444	1.2500	1.0000	.8750	1.1181
Std. Deviation		.77354	.73948	.66441	.65886	.71075	.69686	.63340	.60271
Variance		.598	.547	.441	.434	.505	.486	.401	.363
Skewness		-.244	.255	.332	.112	.076	.554	.416	.323
Std. Error of Skewness		.221	.221	.221	.221	.221	.221	.221	.221
Minimum		-1.33	-1.00	-.50	-.82	-.50	-.33	-.13	.08
Maximum		2.92	3.00	2.63	2.81	2.92	3.00	2.50	2.50
Percentiles	25	.6667	.5000	.2500	.5451	.8333	.5417	.5000	.6840
	50	1.2500	1.0000	.8125	.9444	1.2500	1.0000	.8750	1.1181
	75	1.7292	1.5000	1.2500	1.4444	1.8958	1.5000	1.5000	1.5938

Appendix E

NEI-VFQ 25 Graphs for Subscales for Overall Sample Population

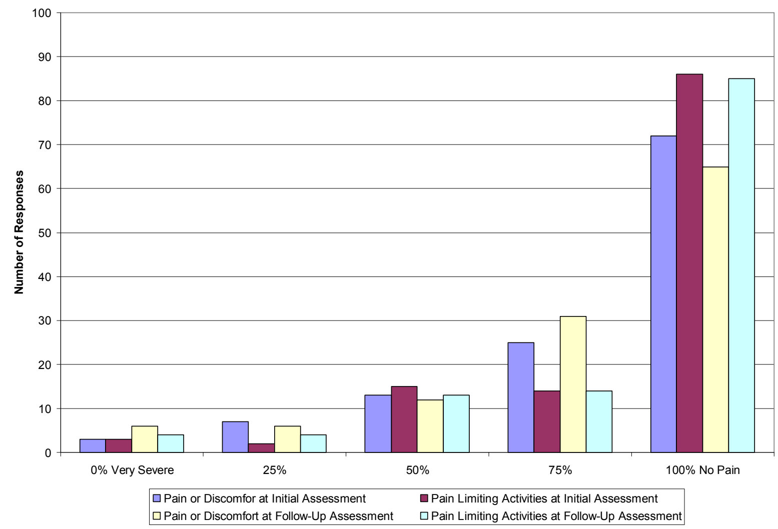


Fig: Distribution of VFQ results for ocular pain at initial and follow-up administrations.

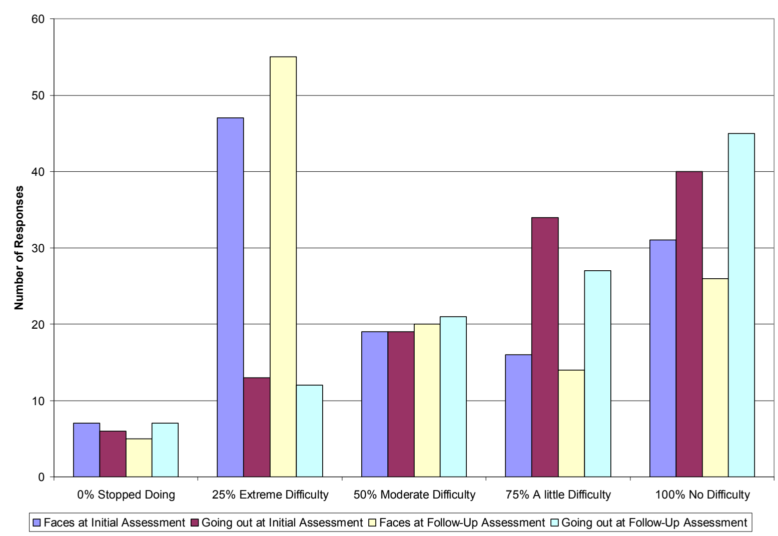


Fig: Distribution of VFQ results for social functioning at initial and follow-up administrations.

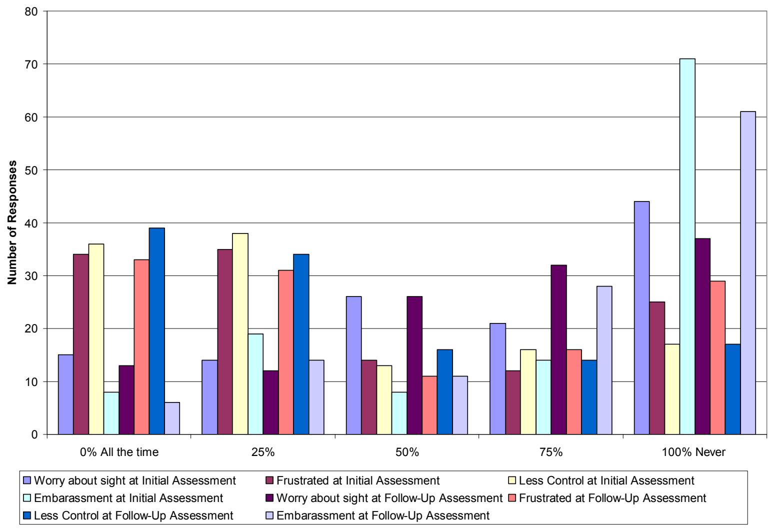


Fig: Distribution of VFQ results for mental health at initial and follow-up administrations.

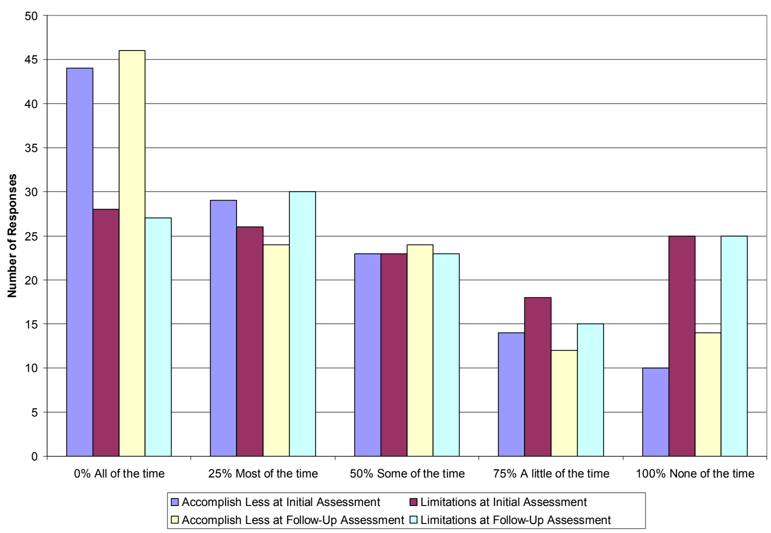


Fig: Distribution of VFQ results for role difficulties at initial and follow-up administrations.

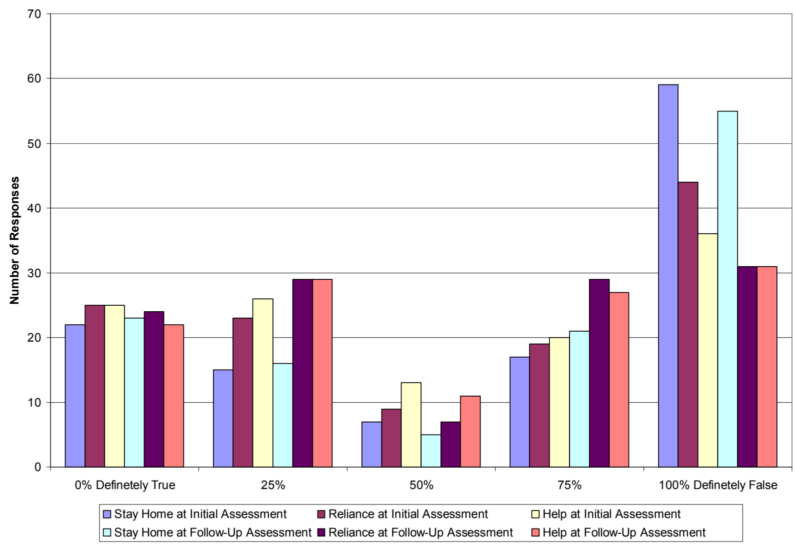


Fig: Distribution of VFQ results for dependency at initial and follow-up administrations.

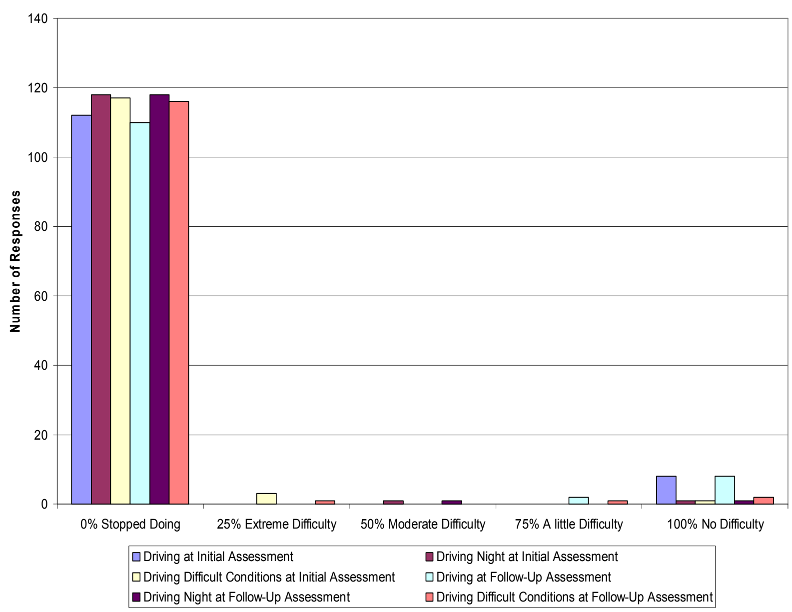


Fig: Distribution of VFQ results for driving at initial and follow-up administrations.

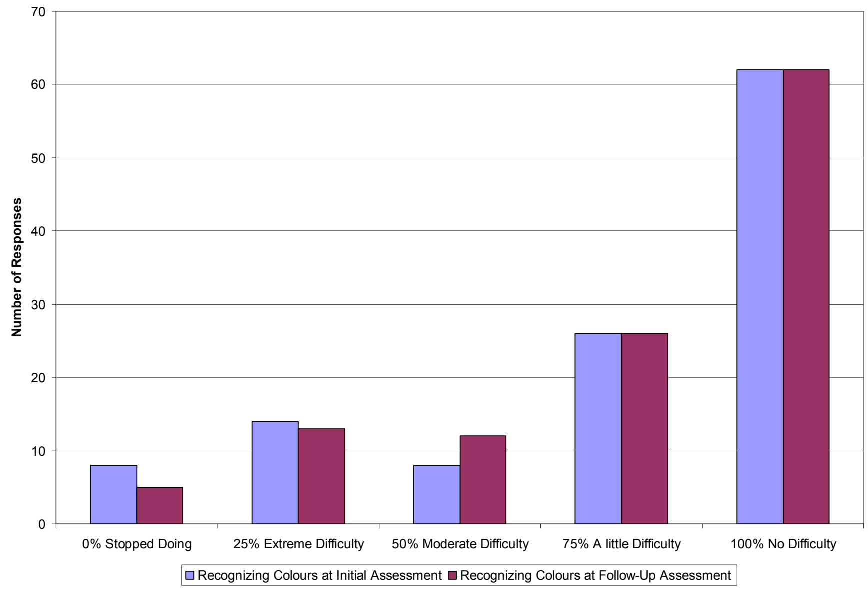


Fig: Distribution of VFQ results for color vision at initial and follow-up administrations.

Appendix F
Responsiveness Statistics

Note: Partial Eta Squared is value of effect size.

Within-Subjects Factors

Measure: MEASURE_1

factor1	Dependent Variable
1	competence_1
2	competence_2

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	379.597	1	379.597	434.376	.000	.785
Error	103.993	119	.874			

Within-Subjects Factors

Measure: MEASURE_1

factor1	Dependent Variable
1	PIADSoverall1
2	PIADSoverall2

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	276.693	1	276.693	437.647	.000	.786
Error	75.235	119	.632			

Within-Subjects Factors

Measure: MEASURE_1

factor1	Dependent Variable
1	self_esteem_1
2	self_esteem_2

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	204.888	1	204.888	306.556	.000	.720
Error	79.534	119	.668			

Within-Subjects Factors

Measure: MEASURE_1

factor1	Dependent Variable
1	adaptability_1
2	adaptability_2

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	259.376	1	259.376	334.693	.000	.738
Error	92.221	119	.775			

Within-Subjects Factors

Measure: MEASURE_1

factor1	Dependent Variable
1	vfq_ generalhealth_1
2	vfq_ generalhealth_2

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	802148.438	1	802148.438	605.917	.000	.836
Error	157539.063	119	1323.858			

Within-Subjects Factors

Measure: MEASURE_1

factor1	Dependent Variable
1	vfq_ generalvision_1
2	vfq_ generalvision_2

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	515226.667	1	515226.667	876.219	.000	.880
Error	69973.333	119	588.011			

Within-Subjects Factors

Measure: MEASURE_1

factor1	Dependent Variable
1	vfq_ ocularpain_1
2	vfq_ ocularpain_2

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	1686726.667	1	1686726.667	1845.416	.000	.939
Error	108767.083	119	914.009			

Within-Subjects Factors

Measure: MEASURE_1

factor1	Dependent Variable
1	vfq_ nearactivities _1
2	vfq_ nearactivities _2

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	639805.845	1	639805.845	685.105	.000	.852
Error	111131.655	119	933.879			

Within-Subjects Factors

Measure: MEASURE_1

factor1	Dependent Variable
1	vfq_ distanceactiv ities_1
2	vfq_ distanceactiv ities_2

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	585093.750	1	585093.750	641.716	.000	.844
Error	108500.000	119	911.765			

Within-Subjects Factors

Measure: MEASURE_1

factor1	Dependent Variable
1	vfq_ socialfunctioning_1
2	vfq_ socialfunctioning_2

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	911125.651	1	911125.651	865.989	.000	.879
Error	125202.474	119	1052.122			

Within-Subjects Factors

Measure: MEASURE_1

factor1	Dependent Variable
1	vfq_ mentalhealth _1
2	vfq_ mentalhealth _2

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	724625.651	1	724625.651	707.400	.000	.856
Error	121897.786	119	1024.351			

Within-Subjects Factors

Measure: MEASURE_1

factor1	Dependent Variable
1	vfq_ roledifficulties_1
2	vfq_ roledifficulties_2

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	384000.000	1	384000.000	304.196	.000	.719
Error	150218.750	119	1262.342			

Within-Subjects Factors

Measure: MEASURE_1

factor1	Dependent Variable
1	vfq_ dependency _1
2	vfq_ dependency _2

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	802148.438	1	802148.438	522.933	.000	.815
Error	182539.063	119	1533.942			

Within-Subjects Factors

Measure: MEASURE_1

factor1	Dependent Variable
1	vfq_driving_1
2	vfq_driving_2

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	4771.198	1	4771.198	8.650	.004	.098
Error	44126.372	80	551.580			

Within-Subjects Factors

Measure: MEASURE_1

factor1	Dependent Variable
1	vfq_ colorvision_ 1
2	vfq_ colorvision_ 2

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	1369070.445	1	1369070.445	781.402	.000	.870
Error	204992.055	117	1752.069			

Within-Subjects Factors

Measure: MEASURE_1

factor1	Dependent Variable
1	vfq_ peripheralvision_1
2	vfq_ peripheralvision_2

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	1357510.417	1	1357510.417	805.244	.000	.871
Error	200614.583	119	1685.837			

Within-Subjects Factors

Measure: MEASURE_1

factor1	Dependent Variable
1	vfq_ composite_1
2	vfq_ composite_2

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	754713.868	1	754713.868	2147.661	.000	.947
Error	41818.023	119	351.412			

Appendix G

MANOVA Results for PIADS and NEI-VFQ 25 as a Function of Device

Between-Subjects Factors

		N
Device Choice	Adaptive Computer Equipment	2
	CCTV System	31
	Field Enhancement Device	3
	Hand or Stand Magnifier	20
	Rx Spectacle	18
	Telescope or Binoculars	6

Tests of Between-Subjects Effects

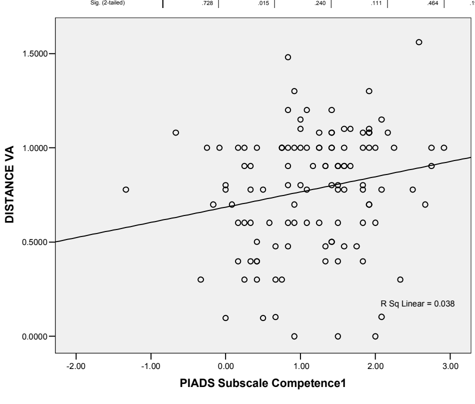
Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	PIADS Subscale Competence1	2.612[a]	5	.522	.882	.497
	PIADS Subscale Adaptability1	4.119[b]	5	.824	1.821	.119
	PIADS Subscale Self-Esteem1	1.391[c]	5	.278	.562	.729
	PIADSOverall1	2.306[d]	5	.461	1.077	.380
	PIADS Subscale Competence2	2.318[e]	5	.464	.945	.457
	PIADS Subscale Adaptability2	3.022[f]	5	.604	1.404	.233
	PIADS Subscale Self-Esteem2	1.918[g]	5	.384	1.033	.405
	PIADSOverall2	2.182[h]	5	.436	1.296	.275
	VFQ Subscale General Health1	4486.671[i]	5	897.334	1.052	.394
	VFQ Subscale General Vision1	2380.502[j]	5	476.100	1.089	.373
	VFQ Subscale Ocular Pain1	781.322[k]	5	156.264	.271	.928
	VFQ Subscale Near Activities1	2424.312[l]	5	484.862	1.056	.391
	VFQ Subscale Distance Activities1	1855.424[m]	5	371.085	.752	.587
	VFQ Subscale Social Functioning1	5063.284[n]	5	1012.657	1.212	.312
	VFQ Subscale Mental Health1	108.957[o]	5	21.791	.032	.999
	VFQ Subscale Role Difficulties1	5852.823[p]	5	1170.565	1.663	.154
	VFQ Subscale Dependency1	6919.134[q]	5	1383.827	1.548	.186
	VFQ Subscale Driving1	874.515[r]	5	174.903	.536	.749
	VFQ Subscale Color Vision1	4342.070[s]	5	868.414	.894	.490
	VFQ Subscale Peripheral Vision1	8281.362[t]	5	1656.272	1.804	.122
	VFQ Composite Score1	1001.427[u]	5	200.285	1.208	.314
	VFQ Subscale General Health2	7556.116[v]	5	1511.223	2.298	.054
	VFQ Subscale General Vision2	845.878[w]	5	169.176	.523	.758
	VFQ Subscale Ocular Pain2	1824.352[x]	5	364.870	.660	.655
	VFQ Subscale Near Activities2	2777.191[y]	5	555.438	1.266	.288
	VFQ Distance Activities2	1113.330[z]	5	222.666	.472	.796
	VFQ Social Functioning2	6084.117[aa]	5	1216.823	2.184	.065
	VFQ Mental Health2	951.447[bb]	5	190.289	.365	.871
	VFQ Role Difficulties2	6475.869[cc]	5	1295.174	1.896	.105
	VFQ Dependency2	5601.108[dd]	5	1120.222	1.315	.267
	VFQ Driving2	528.798[bb]	5	105.760	.368	.869
	VFQ Color Vision2	4645.497[e]	5	929.099	.944	.458
	VFQ Peripheral Vision2	8625.112[ee]	5	1725.022	1.961	.094
	VFQ Composte Score2	1088.491[ff]	5	217.698	1.448	.217
Intercept	PIADS Subscale Competence1	44.541	1	44.541	75.212	.000
	PIADS Subscale Adaptability1	34.424	1	34.424	76.088	.000
	PIADS Subscale Self-Esteem1	21.413	1	21.413	43.287	.000
	PIADSOverall1	32.751	1	32.751	76.484	.000
	PIADS Subscale Competence2	47.350	1	47.350	96.473	.000
	PIADS Subscale Adaptability2	32.898	1	32.898	76.414	.000
	PIADS Subscale Self-Esteem2	28.922	1	28.922	77.882	.000
	PIADSOverall2	35.979	1	35.979	106.843	.000
	VFQ Subscale General Health1	121407.794	1	121407.794	142.294	.000
	VFQ Subscale General Vision1	71421.031	1	71421.031	163.427	.000
	VFQ Subscale Ocular Pain1	213222.094	1	213222.094	369.706	.000
	VFQ Subscale Near Activities1	83258.114	1	83258.114	181.408	.000
	VFQ Subscale Distance Activities1	85110.872	1	85110.872	172.544	.000
	VFQ Subscale Social Functioning1	143773.980	1	143773.980	172.146	.000
	VFQ Subscale Mental Health1	96309.844	1	96309.844	142.907	.000
	VFQ Subscale Role Difficulties1	51331.804	1	51331.804	72.941	.000
	VFQ Subscale Dependency1	135207.218	1	135207.218	151.222	.000
	VFQ Subscale Driving1	1123.243	1	1123.243	3.441	.068
	VFQ Subscale Color Vision1	195334.232	1	195334.232	201.105	.000
	VFQ Subscale Peripheral Vision1	134806.991	1	134806.991	146.837	.000
	VFQ Composite Score1	97554.885	1	97554.885	588.494	.000
	VFQ Subscale General Health2	131877.575	1	131877.575	200.543	.000
	VFQ Subscale General Vision2	82477.922	1	82477.922	255.007	.000
	VFQ Subscale Ocular Pain2	188662.926	1	188662.926	341.018	.000
	VFQ Subscale Near Activities2	104439.685	1	104439.685	238.129	.000
	VFQ Distance Activities2	79348.519	1	79348.519	168.161	.000
	VFQ Social Functioning2	131318.384	1	131318.384	235.745	.000
	VFQ Mental Health2	88080.873	1	88080.873	168.831	.000
	VFQ Role Difficulties2	50182.097	1	50182.097	73.456	.000
	VFQ Dependency2	107897.960	1	107897.960	126.621	.000
	VFQ Driving2	1025.789	1	1025.789	3.565	.063
	VFQ Color Vision2	191488.434	1	191488.434	194.583	.000
	VFQ Peripheral Vision2	141485.023	1	141485.023	160.844	.000
	VFQ Composte Score2	94630.333	1	94630.333	629.438	.000
devicechoice	PIADS Subscale Competence1	2.612	5	.522	.882	.497
	PIADS Subscale	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

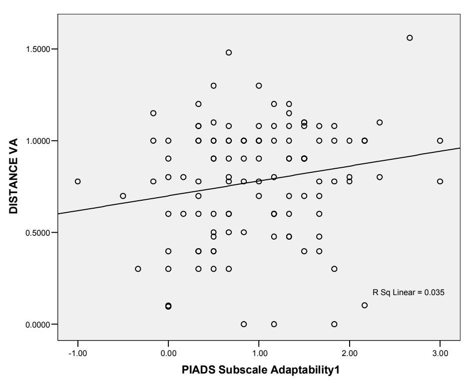
Appendix H

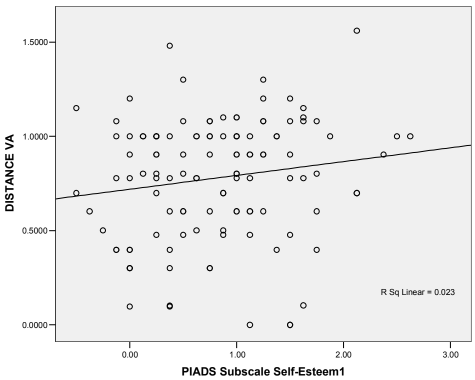
Clinical Measures, Correlations and Graphs for Overall Sample Population

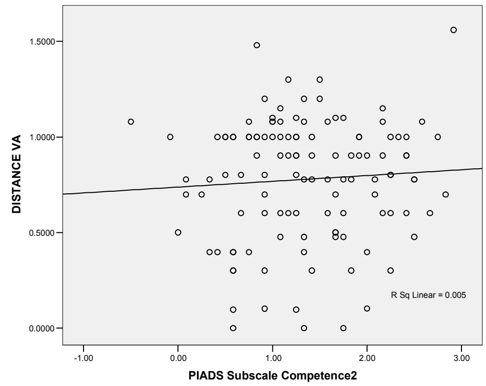
Correlations

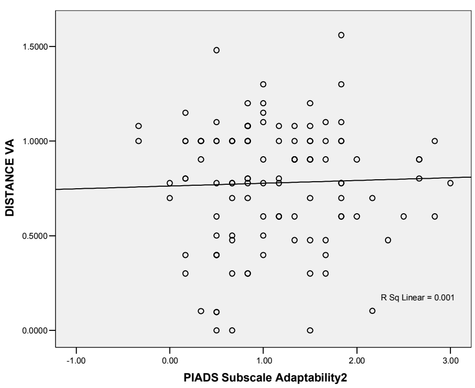
		PELLI ROBSON OU	DISTANCE VA	PIADS Subscale Competence1	PIADS Subscale Adaptability1	PIADS Subscale Self-Esteem1	PIADSOverall1	PIADS Subscale Competence2	PIADS Subscale Adaptability2	PIADS Subscale Self-Esteem2	PIADSOverall2	VFQ Subscale General Health1	VFQ Subscale General Vision1	VFQ Subscale Ocular Pain1	VFQ Subscale Near Activities1	VFQ Subscale Distance Activities1	VFQ Subscale Social Functioning1	VFQ Subscale Mental Health1	VFQ Subscale Role Difficulties1
PELLI ROBSON OU	Pearson Correlation	1	-.368**	-.059	.023	-.042	-.029	-.025	.008	-.026	-.016	.040	.141	.102	.279**	.250**	.098	-.025	.052
	Sig. (2-tailed)		.000	.527	.810	.654	.759	.794	.928	.779	.867	.672	.132	.275	.002	.007	.295	.789	.579
	N	116	115	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116
DISTANCE VA	Pearson Correlation	-.368**	1	.196*	.187*	.152	.198*	.067	.032	.196*	.107	-.136	-.218*	.054	-.040	-.022	.009	.050	.084
	Sig. (2-tailed)	.000		.033	.041	.098	.031	.467	.730	.033	.245	.140	.017	.558	.667	.813	.926	.586	.364
	N	115	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119
PIADS Subscale Competence1	Pearson Correlation	-.059	.196*	1	.770**	.731**	.925**	.586**	.407**	.430**	.538**	.100	.125	-.032	.308**	.185*	.168	.111	.206*
	Sig. (2-tailed)	.527	.033		.000	.000	.000	.000	.000	.000	.000	.277	.174	.726	.001	.043	.067	.229	.024
	N	116	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
PIADS Subscale Adaptability1	Pearson Correlation	.023	.187*	.770**	1	.700**	.911**	.439**	.502**	.383**	.500**	.070	.152	-.007	.350**	.182*	.081	.217*	.148
	Sig. (2-tailed)	.810	.041	.000		.000	.000	.000	.000	.000	.000	.447	.097	.939	.000	.047	.381	.017	.108
	N	116	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
PIADS Subscale Self-Esteem1	Pearson Correlation	-.042	.152	.731**	.700**	1	.884**	.518**	.409**	.587**	.567**	.020	.185*	-.015	.192*	.026	.012	.149	.169
	Sig. (2-tailed)	.654	.098	.000	.000		.000	.000	.000	.000	.000	.829	.043	.873	.036	.781	.899	.106	.065
	N	116	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
PIADSOverall1	Pearson Correlation	-.029	.198*	.925**	.911**	.884**	1	.567**	.485**	.509**	.588**	.072	.168	-.020	.316**	.149	.100	.174	.192*
	Sig. (2-tailed)	.759	.031	.000	.000	.000		.000	.000	.000	.000	.434	.067	.826	.000	.104	.278	.057	.035
	N	116	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
PIADS Subscale Competence2	Pearson Correlation	-.025	.067	.586**	.439**	.518**	.567**	1	.692**	.771**	.930**	.106	.145	.045	.079	.120	-.010	.013	.197*
	Sig. (2-tailed)	.794	.467	.000	.000	.000	.000		.000	.000	.000	.248	.114	.626	.394	.192	.914	.885	.031
	N	116	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
PIADS Subscale Adaptability2	Pearson Correlation	.008	.032	.407**	.502**	.409**	.485**	.692**	1	.563**	.855**	.285**	.276**	.106	.198*	.189*	-.040	.126	.047
	Sig. (2-tailed)	.928	.730	.000	.000	.000	.000	.000		.000	.000	.002	.002	.250	.030	.039	.661	.170	.609
	N	116	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
PIADS Subscale Self-Esteem2	Pearson Correlation	-.026	.196*	.430**	.383**	.587**	.509**	.771**	.563**	1	.870**	.024	.139	.007	.001	.080	-.052	.000	.145
	Sig. (2-tailed)	.779	.033	.000	.000	.000	.000	.000	.000		.000	.797	.129	.943	.992	.387	.572	.998	.114
	N	116	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
PIADSOverall2	Pearson Correlation	-.016	.107	.538**	.500**	.567**	.588**	.930**	.855**	.870**	1	.160	.212*	.061	.107	.148	-.038	.054	.146
	Sig. (2-tailed)	.867	.245	.000	.000	.000	.000	.000	.000	.000		.081	.020	.510	.243	.107	.682	.560	.111
	N	116	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
VFQ Subscale General Health1	Pearson Correlation	.040	-.136	.100	.070	.020	.072	.106	.285**	.024	.160	1	.179	.134	.124	.029	-.080	.024	.022
	Sig. (2-tailed)	.672	.140	.277	.447	.829	.434	.248	.002	.797	.081		.051	.144	.177	.750	.382	.795	.809
	N	116	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
VFQ Subscale General Vision1	Pearson Correlation	.141	-.218*	.125	.152	.185*	.168	.145	.276**	.139	.212*	.179	1	.236**	.244**	.231*	.067	.232*	.209*
	Sig. (2-tailed)	.132	.017	.174	.097	.043	.067	.114	.002	.129	.020	.051		.009	.007	.011	.465	.011	.022
	N	116	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
VFQ Subscale Ocular Pain1	Pearson Correlation	.102	.054	-.032	-.007	-.015	-.020	.045	.106	.007	.061	.134	.236**	1	.174	.142	-.017	.078	.194*
	Sig. (2-tailed)	.275	.558	.726	.939	.873	.826	.626	.250	.943	.510	.144	.009		.058	.121	.856	.397	.033
	N	116	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
VFQ Subscale Near Activities1	Pearson Correlation	.279**	-.040	.308**	.350**	.192*	.316**	.079	.198*	.001	.107	.124	.244**	.174	1	.474**	.268**	.268**	.156
	Sig. (2-tailed)	.002	.667	.001	.000	.036	.000	.394	.030	.992	.243	.177	.007	.058		.000	.003	.003	.089
	N	116	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
VFQ Subscale Distance Activities1	Pearson Correlation	.250**	-.022	.185*	.182*	.026	.149	.120	.189*	.080	.148	.029	.231*	.142	.474**	1	.571**	.323**	.344**
	Sig. (2-tailed)	.007	.813	.043	.047	.781	.104	.192	.039	.387	.107	.750	.011	.121	.000		.000	.000	.000
	N	116	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
VFQ Subscale Social Functioning1	Pearson Correlation	.098	.009	.168	.081	.012	.100	-.010	-.040	-.052	-.038	-.080	.067	-.017	.268**	.571**	1	.289**	.302**
	Sig. (2-tailed)	.295	.926	.067	.381	.899	.278	.914	.661	.572	.682	.382	.465	.856	.003	.000		.001	.001
	N	116	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
VFQ Subscale Mental Health1	Pearson Correlation	-.025	.050	.111	.217*	.149	.174	.013	.126	.000	.054	.024	.232*	.078	.268**	.323**	.289**	1	.420**
	Sig. (2-tailed)	.789	.586	.229	.017	.106	.057	.885	.170	.998	.560	.795	.011	.397	.003	.000	.001		.000
	N	116	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
VFQ Subscale Role Difficulties1	Pearson Correlation	.052	.084	.206*	.148	.169	.192*	.197*	.047	.145	.146	.022	.209*	.194*	.156	.344**	.302**	.420**	1
	Sig. (2-tailed)	.579	.364	.024	.108	.065	.035	.031	.609	.114	.111	.809	.022	.033	.089	.000	.001	.000	
	N	116	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
VFQ Subscale Dependency1	Pearson Correlation	.181	-.054	.075	.055	-.007	.047	.081	.101	.086	.101	-.056	.298**	.074	.362**	.392**	.325**	.432**	.313**
	Sig. (2-tailed)	.051	.563	.415	.554	.938	.607	.381	.273	.353	.275	.540	.001	.421	.000	.000	.000	.000	.000
	N	116	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
VFQ Subscale Driving1	Pearson Correlation	.258*	-.292**	-.061	-.143	-.142	-.124	.093	.080	.043	.082	.081	.262*	-.014	.099	.243*	.084	-.085	-.085
	Sig. (2-tailed)	.019	.007	.578	.190	.196	.258	.395	.467	.699	.455	.462	.015	.895	.367	.025	.444	.438	.440
	N	83	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85
VFQ Subscale Color Vision1	Pearson Correlation	.297**	-.110	.163	.021	-.020	.065	.056	.042	-.004	.037	.069	.117	.153	.269**	.329**	.275**	.158	.360**
	Sig. (2-tailed)	.001	.237	.077	.820	.825	.485	.544	.649	.967	.689	.456	.207	.096	.003	.000	.002	.087	.000
	N	115	118	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119	119
VFQ Subscale Peripheral Vision1	Pearson Correlation	.022	.240**	.095	.171	.107	.137	.071	.094	-.023	.056	-.112	-.192*	.089	.243**	.154	.114	.131	.056
	Sig. (2-tailed)	.811	.009	.300	.062	.247	.135	.439	.309	.804	.543	.222	.036	.335	.008	.092	.215	.154	.543
	N	116	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
VFQ Composite Score1	Pearson Correlation	.270**	.009	.252**	.236**	.126	.229*	.159	.203*	.080	.169	.030	.387**	.345**	.580**	.684**	.582**	.574**	.597**
	Sig. (2-tailed)	.003	.924	.005	.009	.171	.012	.083	.026	.384	.065	.743	.000	.000	.000	.000	.000	.000	.000
	N	116	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
VFQ Subscale General Health2	Pearson Correlation	-.002	.010	.177	.199*	.144	.192*	.216*	.306**	.266**	.296**	.653**	.186*	.207*	.140	.193*	-.047	-.040	.147
	Sig. (2-tailed)	.981	.916	.053	.029	.115	.035	.018	.001	.003	.001	.000	.042	.024	.126	.035	.613	.665	.110
	N	116	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
VFQ Subscale General Vision2	Pearson Correlation	.167	-.171	.116	.151	.193*	.167	.163	.214*	.194*	.214*	.182*	.636**	.237**	.290**	.279**	.088	.243**	.241**
	Sig. (2-tailed)	.074	.063	.205	.100	.035	.069	.075	.019	.034	.019	.046	.000	.009	.001	.002	.342	.007	.008
	N	116	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
VFQ Subscale Ocular Pain2	Pearson Correlation	.098	.077	-.087	-.024	-.103	-.078	.049	.075	.003	.049	.101	.114	.776**	.120	.127	.033	.056	.102
	Sig. (2-tailed)	.295	.408	.346	.791	.261	.398	.595	.415	.976	.594	.274	.214	.000	.191	.168	.722	.545	.267
	N	116	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
VFQ Subscale Near Activities2	Pearson Correlation	.170	.025	.222*	.335**	.122	.253**	.144	.220*	.106	.178	.115	.219*	.122	.728**	.436**	.237**	.253**	.024
	Sig. (2-tailed)	.068	.786	.015	.000	.183	.005	.117	.016	.251	.051	.210	.016	.184	.000	.000	.009	.005	.794
	N	116	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
VFQ Distance Activities2	Pearson Correlation	.260**	-.055	.124	.172	.065	.135	.144	.242**	.107	.187*	.027	.253**	.089	.454**	.833**	.454**	.265**	.262**
	Sig. (2-tailed)	.005	.554	.176	.061	.479	.142	.116	.008	.246	.040	.767	.005	.333	.000	.000	.000	.003	.004
	N	116	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
VFQ Social Functioning2	Pearson Correlation	.167	-.131	.190*	.135	.138	.171	.036	.081	.023	.054	.142	.246**	.041	.243**	.405**	.440**	.268**	.396**
	Sig. (2-tailed)	.073	.154	.038	.141	.132	.061	.696	.376	.802	.561	.121	.007	.659	.007	.000	.000	.003	.000
	N	116	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
VFQ Mental Health2	Pearson Correlation	-.046	.105	.056	.126	.123	.110	.221*	.251**	.138	.232*	.101	.164	.196*	.209*	.335**	.165	.741**	.370**
	Sig. (2-tailed)	.625	.255	.542	.171	.180	.230	.015	.006	.132	.011	.274	.074	.032	.022	.000	.072	.000	.000
	N	116	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
VFQ Role Difficulties2	Pearson Correlation	.141	-.087	.163	.086	.105	.131	.265**	.178	.116	.214*	.235**	.149	.223*	.060	.238**	.136	.281**	.597**
	Sig. (2-tailed)	.131	.346	.076	.353	.255	.154	.003	.051	.207	.019	.010	.105	.014	.514	.009	.138	.002	.000
	N	116	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
VFQ Dependency2	Pearson Correlation	.168	-.035	.125	.138	.082	.128	.225*	.165	.203*	.223*	.016	.206*	.031	.340**	.372**	.290**	.349**	.346**
	Sig. (2-tailed)	.072	.707	.172	.133	.370	.162	.013	.071	.026	.014	.863	.024	.737	.000	.000	.001	.000	.000
	N	116	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
VFQ Driving2	Pearson Correlation	.319**	-.266*	.014	-.051	-.008	-.015	.025	.048	-.006	.026	.047	.204	-.007	.145	.282**	.110	.035	.005
	Sig. (2-tailed)	.003	.013	.896	.638	.945	.890	.815	.657	.958	.813	.665	.058	.951	.182	.008	.309	.746	.965
	N	84	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87
																			.295**
	Sig. (2-tailed)	.003	.150	.012	.394	.325	.104	.392	.467	.343	.342	.373	.899	.225	.001	.007	.002	.086	.001
	N	114	117	118	118	118	118	118	118	118	118	118	118	118	118	118	118	118	118
VFQ Peripheral Vision2	Pearson Correlation	.033	.221*	.108	.146	.068	.120	.062	.066	-.003	.049	-.099	-.022	.184*	.263**	.218*	.133	.119	-.004
	Sig. (2-tailed)	.728	.015	.240	.111	.464	.193	.502	.476	.973	.599	.284	.810	.045	.004	.017	.147	.195	.968

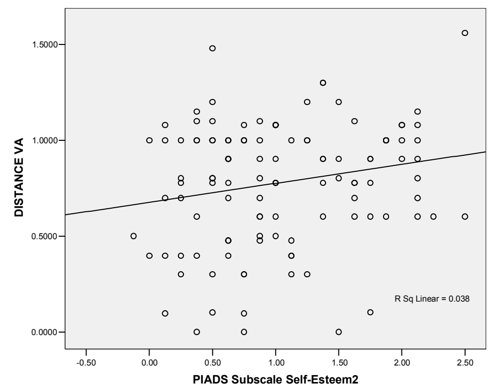


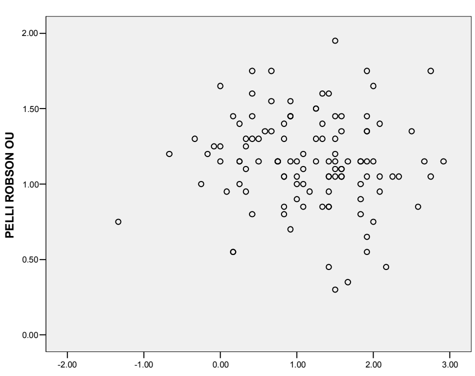


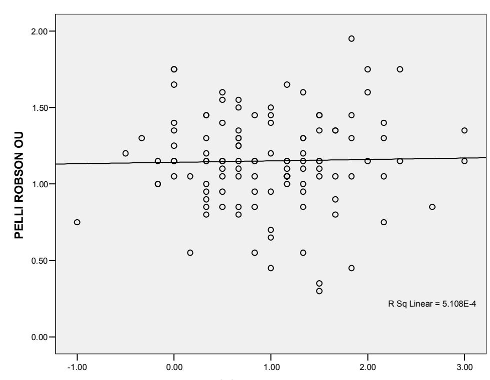

DISTANCE VA
PIADS Subscale Self-Esteem1
R Sq Linear = 0.023

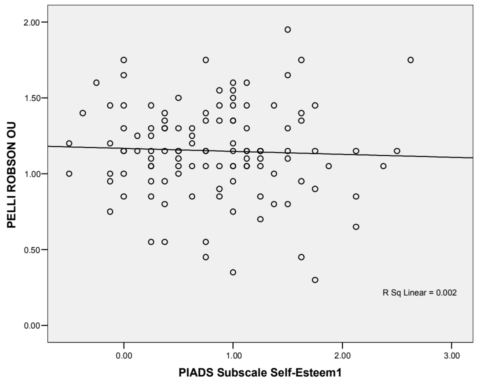

DISTANCE VA
PIADS Subscale Competence2
R Sq Linear = 0.005

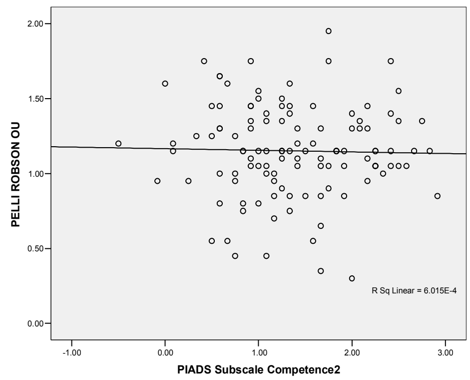

DISTANCE VA
PIADS Subscale Adaptability2
R Sq Linear = 0.001

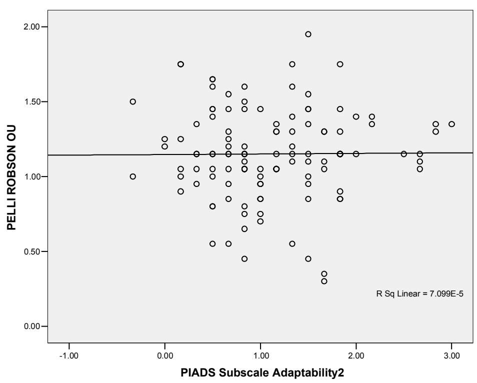

DISTANCE VA
PIADS Subscale Self-Esteem2
R Sq Linear = 0.038

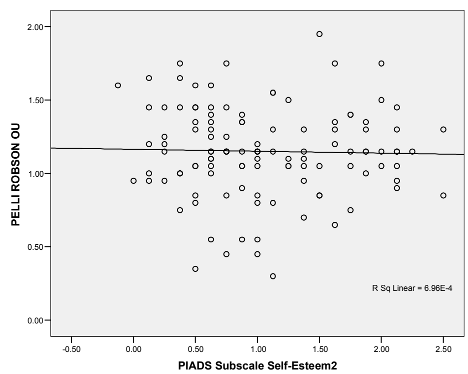

PELLI ROBSON OU
PIADS Subscale Competence1

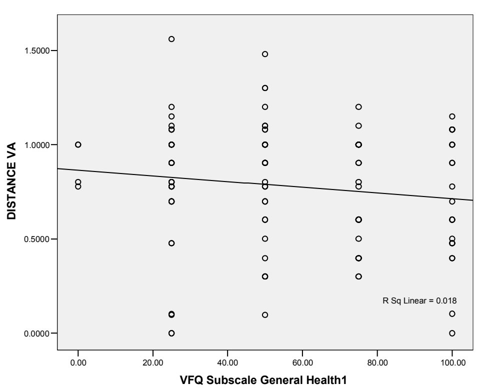

PELLI ROBSON OU
PIADS Subscale Adaptability1
R Sq Linear = 5.108E-4

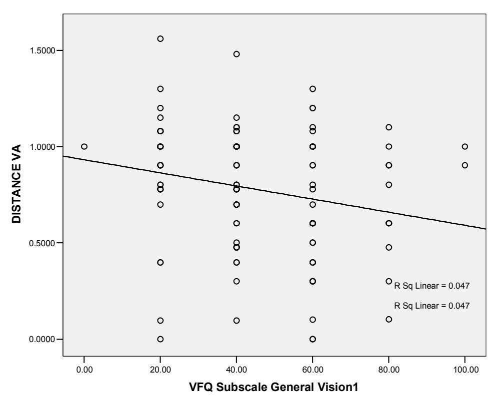

PELLI ROBSON OU
PIADS Subscale Self-Esteem1
R Sq Linear = 0.002

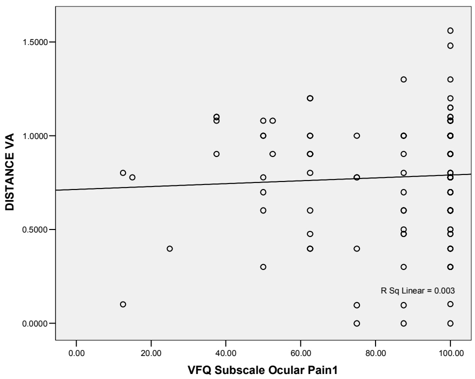

PELLI ROBSON OU
PIADS Subscale Competence2
R Sq Linear = 6.015E-4

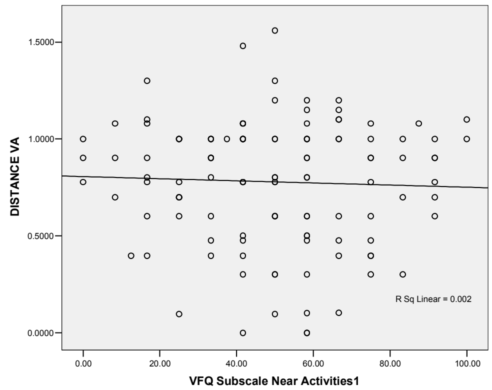

PELLI ROBSON OU
PIADS Subscale Adaptability2
R Sq Linear = 7.099E-5

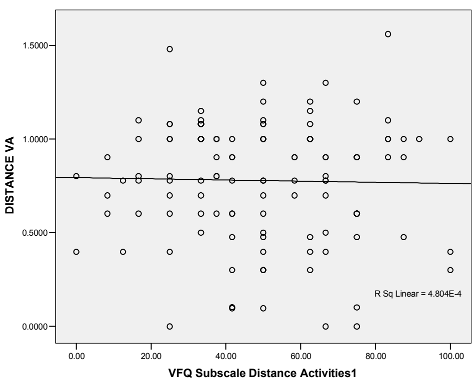

PELLI ROBSON OU
PIADS Subscale Self-Esteem2
R Sq Linear = 6.96E-4

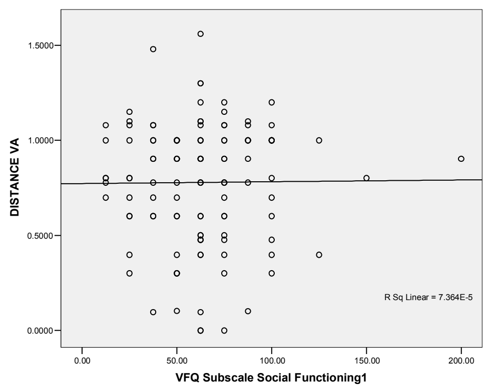

DISTANCE VA
VFQ Subscale General Health1
R Sq Linear = 0.018

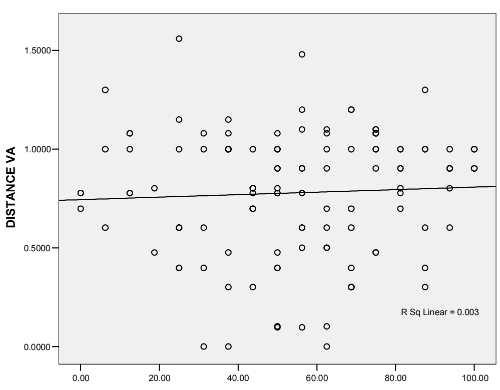

DISTANCE VA
VFQ Subscale General Vision1
R Sq Linear = 0.047
R Sq Linear = 0.047

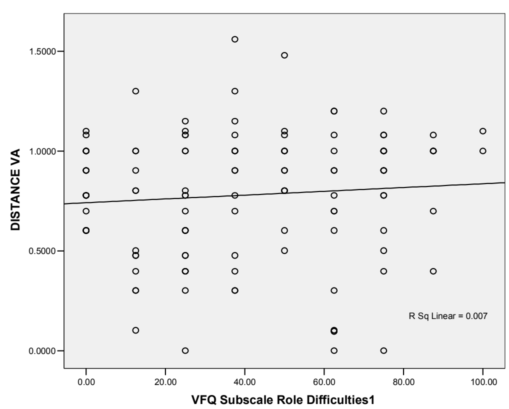

DISTANCE VA
1.5000
1.0000
0.5000
0.0000
R Sq Linear = 0.003
0.00
20.00
40.00
60.00
80.00
100.00
VFQ Subscale Ocular Pain1

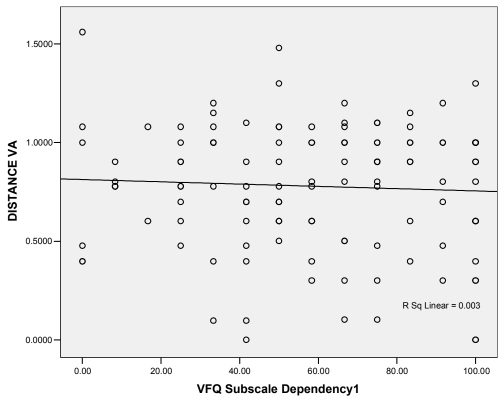

DISTANCE VA
1.5000
1.0000
0.5000
0.0000
R Sq Linear = 0.002
0.00
20.00
40.00
60.00
80.00
100.00
VFQ Subscale Near Activities1

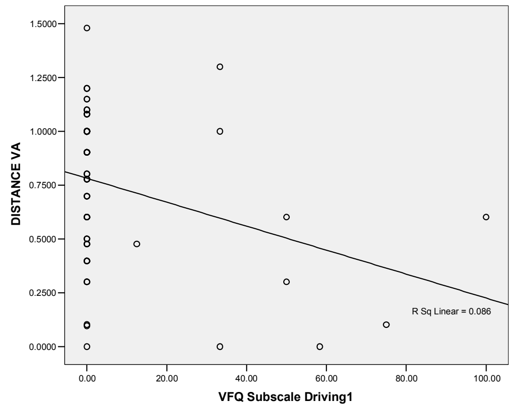

DISTANCE VA
1.5000
1.0000
0.5000
0.0000
R Sq Linear = 4.804E-4
0.00
20.00
40.00
60.00
80.00
100.00
VFQ Subscale Distance Activities1

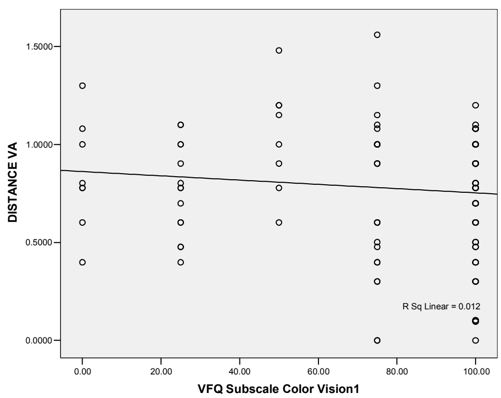

DISTANCE VA
1.5000
1.0000
0.5000
0.0000
R Sq Linear = 7.364E-5
0.00
50.00
100.00
150.00
200.00
VFQ Subscale Social Functioning1

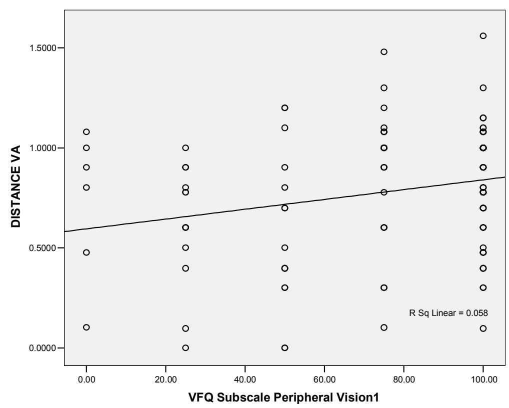

DISTANCE VA
1.5000
1.0000
0.5000
0.0000
R Sq Linear = 0.003
0.00
20.00
40.00
60.00
80.00
100.00
VFQ Subscale Mental Health1

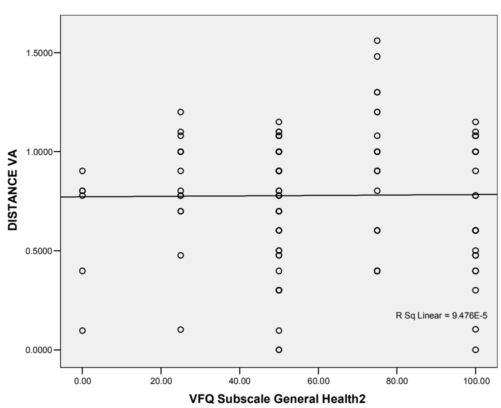

DISTANCE VA
1.5000
1.0000
0.5000
0.0000
R Sq Linear = 0.007
0.00
20.00
40.00
60.00
80.00
100.00
VFQ Subscale Role Difficulties1

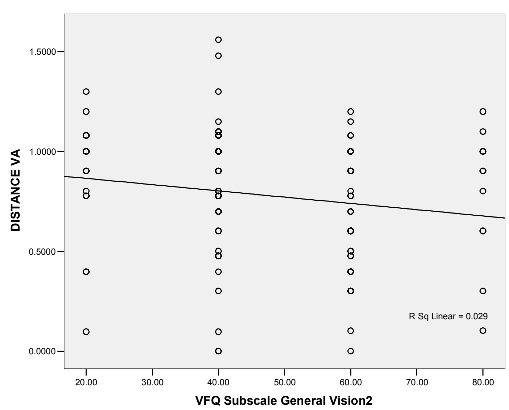

DISTANCE VA
VFQ Subscale Dependency1
R Sq Linear = 0.003

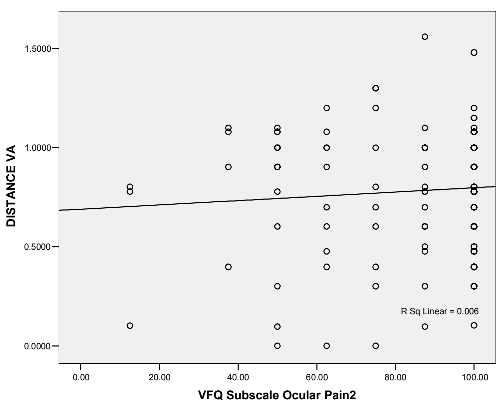

DISTANCE VA
VFQ Subscale Driving1
R Sq Linear = 0.086

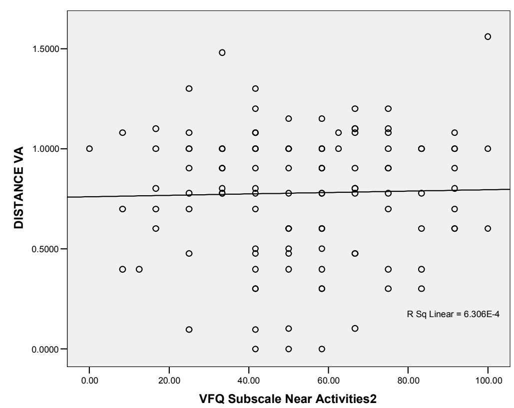

DISTANCE VA
VFQ Subscale Color Vision1
R Sq Linear = 0.012

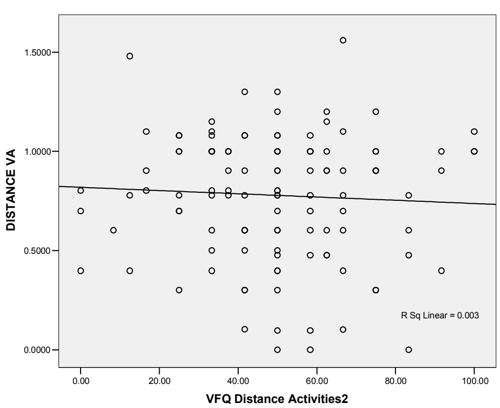

DISTANCE VA
VFQ Subscale Peripheral Vision1
R Sq Linear = 0.058

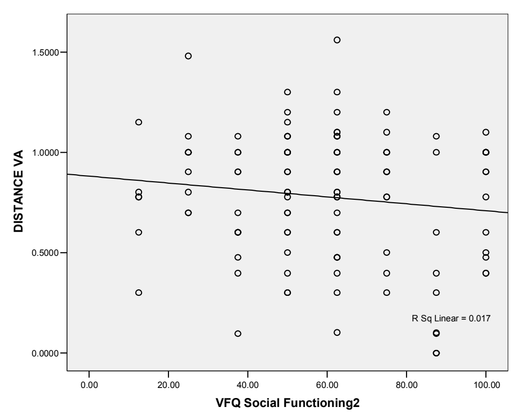

DISTANCE VA
VFQ Subscale General Health2
R Sq Linear = 9.476E-5

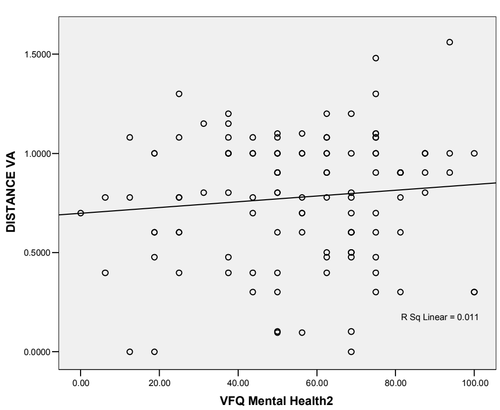

DISTANCE VA
VFQ Subscale General Vision2
R Sq Linear = 0.029

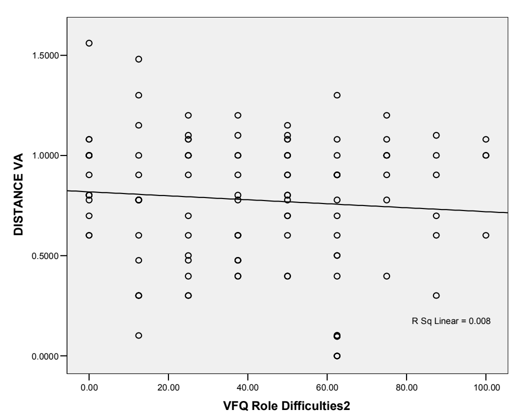

DISTANCE VA
VFQ Subscale Ocular Pain2
R Sq Linear = 0.006
0.0000
0.5000
1.0000
1.5000
0.00
20.00
40.00
60.00
80.00
100.00

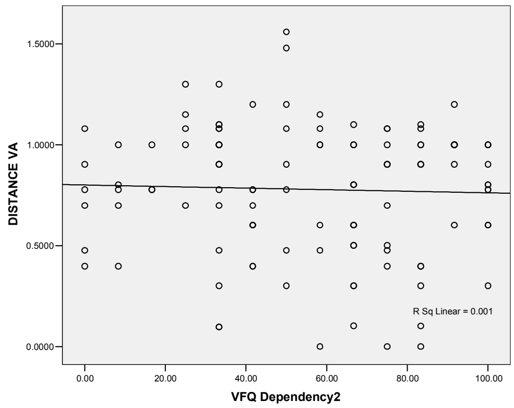

DISTANCE VA
VFQ Subscale Near Activities2
R Sq Linear = 6.306E-4
0.0000
0.5000
1.0000
1.5000
0.00
20.00
40.00
60.00
80.00
100.00

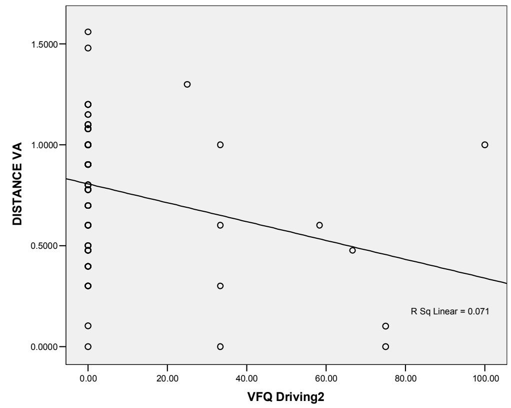

DISTANCE VA
VFQ Distance Activities2
R Sq Linear = 0.003
0.0000
0.5000
1.0000
1.5000
0.00
20.00
40.00
60.00
80.00
100.00

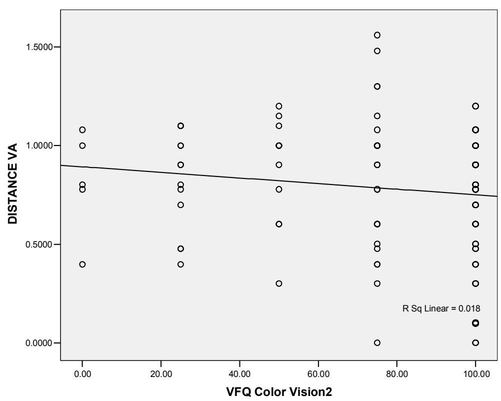

DISTANCE VA
VFQ Social Functioning2
R Sq Linear = 0.017
0.0000
0.5000
1.0000
1.5000
0.00
20.00
40.00
60.00
80.00
100.00

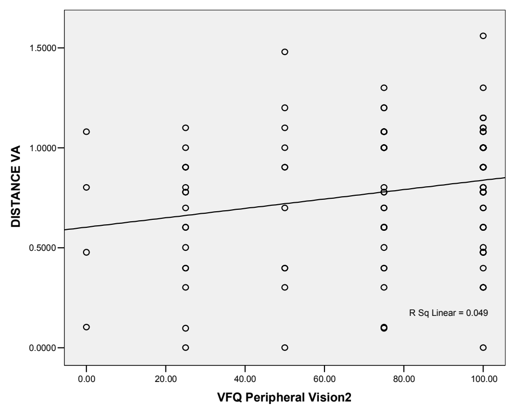

DISTANCE VA
VFQ Mental Health2
R Sq Linear = 0.011
0.0000
0.5000
1.0000
1.5000
0.00
20.00
40.00
60.00
80.00
100.00

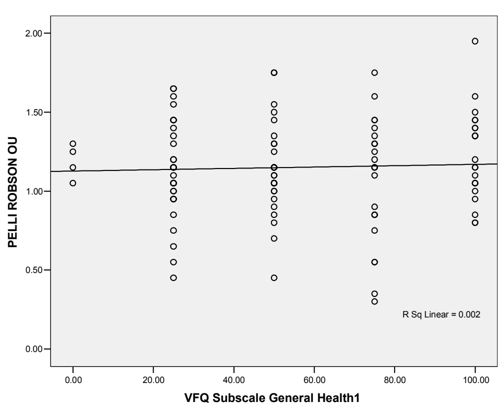

DISTANCE VA
VFQ Role Difficulties2
R Sq Linear = 0.008
0.0000
0.5000
1.0000
1.5000
0.00
20.00
40.00
60.00
80.00
100.00

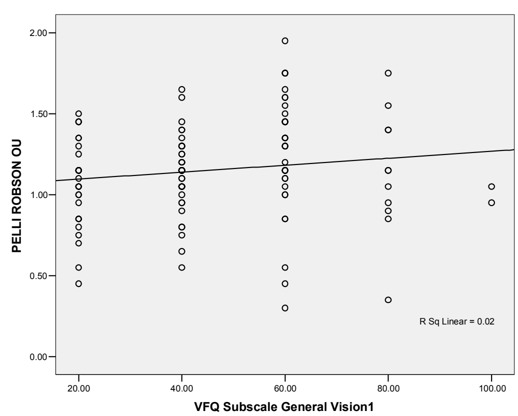

DISTANCE VA
VFQ Dependency2
R Sq Linear = 0.001

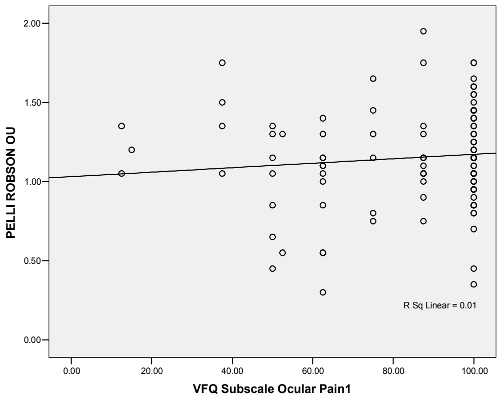

DISTANCE VA
VFQ Driving2
R Sq Linear = 0.071

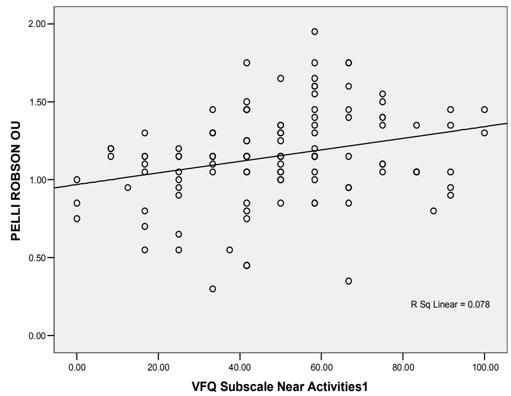

DISTANCE VA
VFQ Color Vision2
R Sq Linear = 0.018

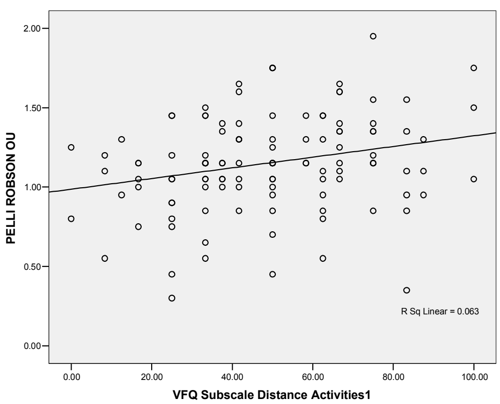

DISTANCE VA
VFQ Peripheral Vision2
R Sq Linear = 0.049

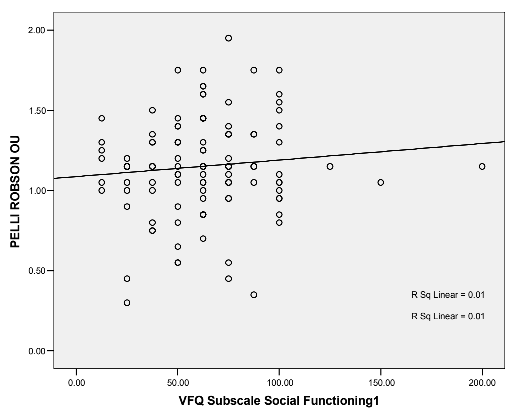

PELLI ROBSON OU
VFQ Subscale General Health1
R Sq Linear = 0.002

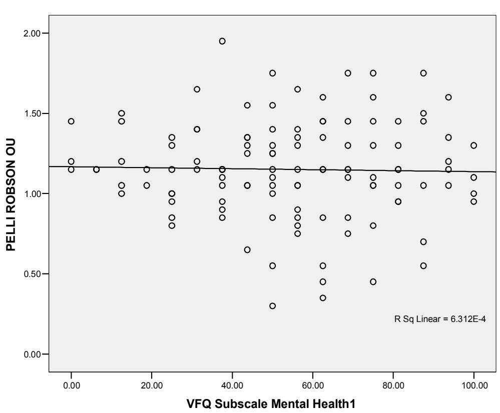

PELLI ROBSON OU
VFQ Subscale General Vision1
R Sq Linear = 0.02

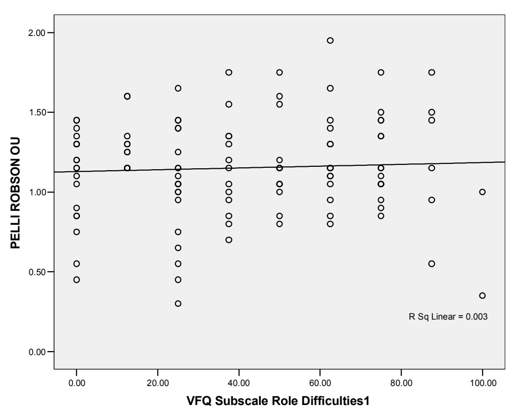

PELLI ROBSON OU
2.00
1.50
1.00
0.50
0.00
R Sq Linear = 0.01
0.00
20.00
40.00
60.00
80.00
100.00
VFQ Subscale Ocular Pain1

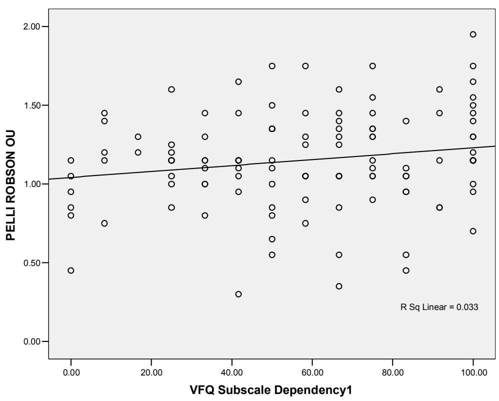

PELLI ROBSON OU
2.00
1.50
1.00
0.50
0.00
R Sq Linear = 0.078
0.00
20.00
40.00
60.00
80.00
100.00
VFQ Subscale Near Activities1

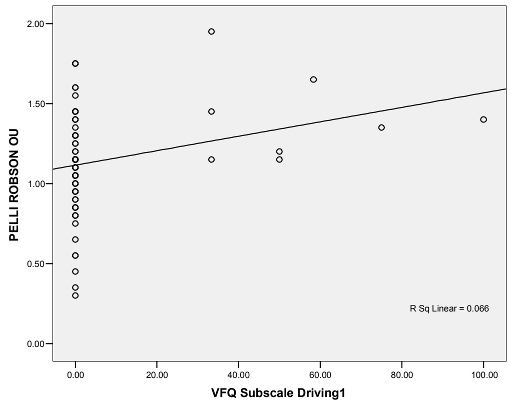

PELLI ROBSON OU
2.00
1.50
1.00
0.50
0.00
R Sq Linear = 0.063
0.00
20.00
40.00
60.00
80.00
100.00
VFQ Subscale Distance Activities1

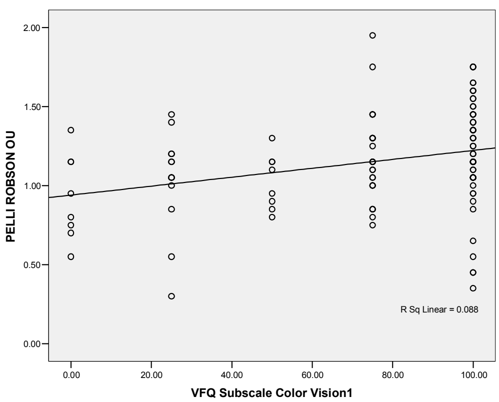

PELLI ROBSON OU
2.00
1.50
1.00
0.50
0.00
R Sq Linear = 0.01
R Sq Linear = 0.01
0.00
50.00
100.00
150.00
200.00
VFQ Subscale Social Functioning1

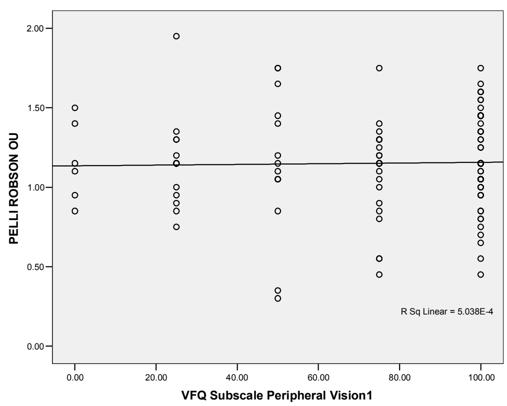

PELLI ROBSON OU
2.00
1.50
1.00
0.50
0.00
R Sq Linear = 6.312E-4
0.00
20.00
40.00
60.00
80.00
100.00
VFQ Subscale Mental Health1

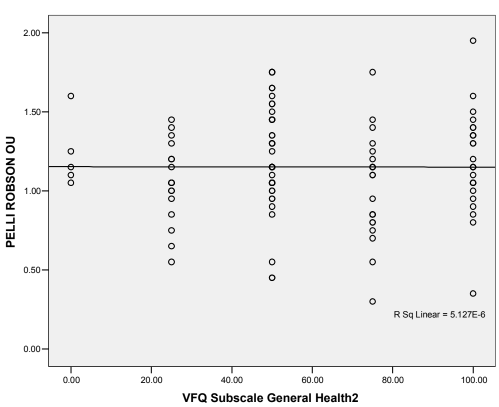

PELLI ROBSON OU
2.00
1.50
1.00
0.50
0.00
R Sq Linear = 0.003
0.00
20.00
40.00
60.00
80.00
100.00
VFQ Subscale Role Difficulties1

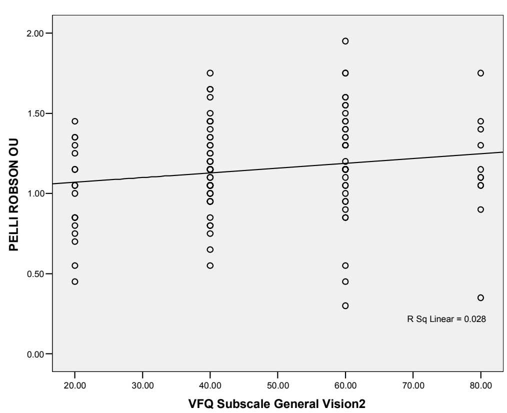

PELLI ROBSON OU
VFQ Subscale Dependency1
R Sq Linear = 0.033

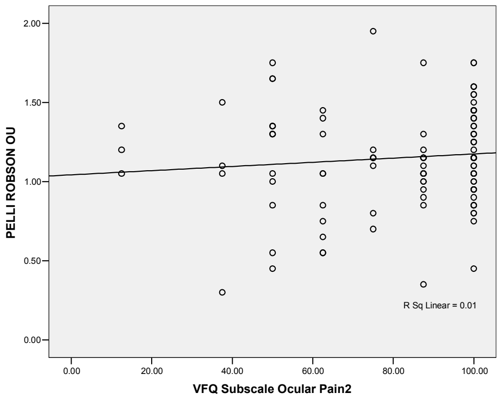

PELLI ROBSON OU
VFQ Subscale Driving1
R Sq Linear = 0.066

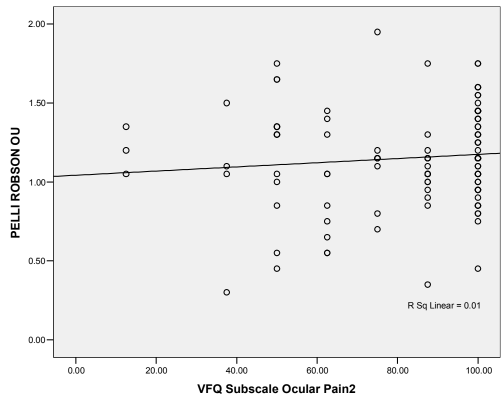

PELLI ROBSON OU
VFQ Subscale Color Vision1
R Sq Linear = 0.088

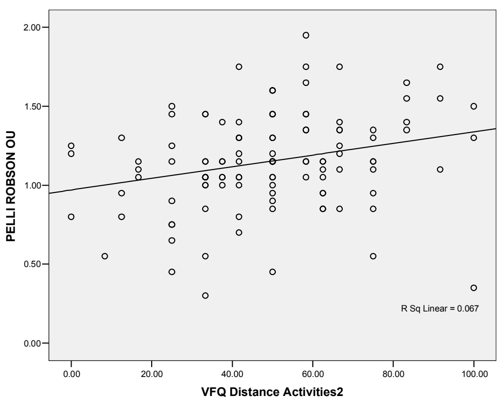

PELLI ROBSON OU
VFQ Subscale Peripheral Vision1
R Sq Linear = 5.038E-4

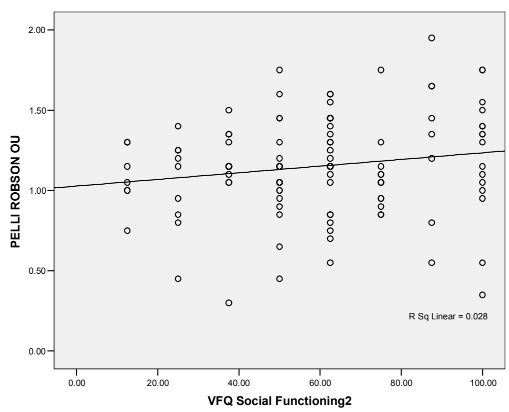

PELLI ROBSON OU
VFQ Subscale General Health2
R Sq Linear = 5.127E-6

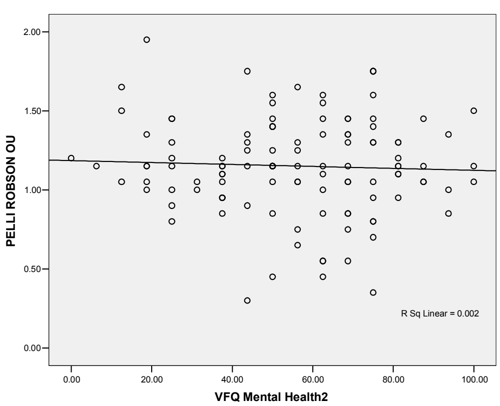

PELLI ROBSON OU
VFQ Subscale General Vision2
R Sq Linear = 0.028

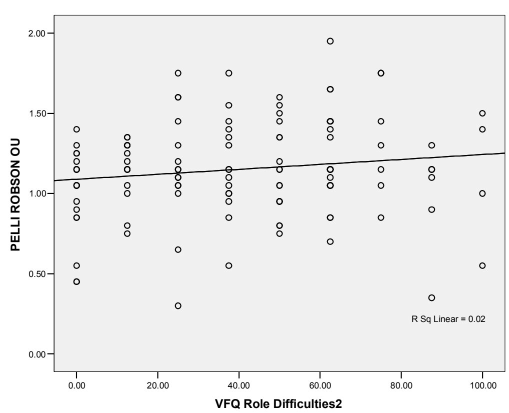

PELLI ROBSON OU
VFQ Subscale Ocular Pain2
R Sq Linear = 0.01

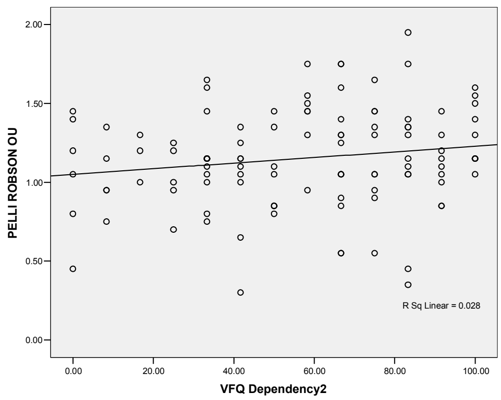

PELLI ROBSON OU
VFQ Subscale Ocular Pain2
R Sq Linear = 0.01

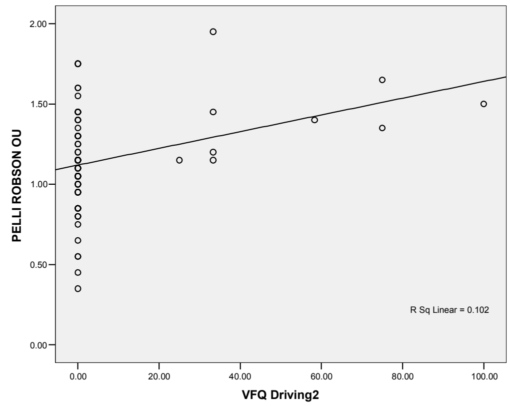

PELLI ROBSON OU
VFQ Distance Activities2
R Sq Linear = 0.067

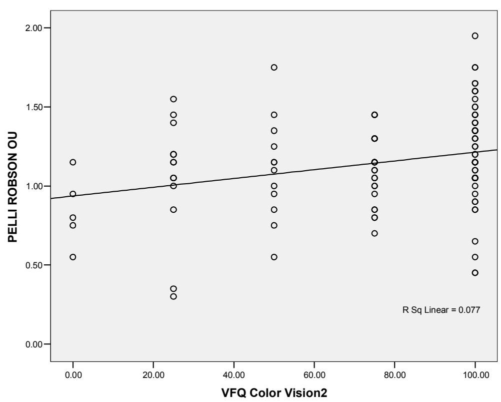

PELLI ROBSON OU
VFQ Social Functioning2
R Sq Linear = 0.028

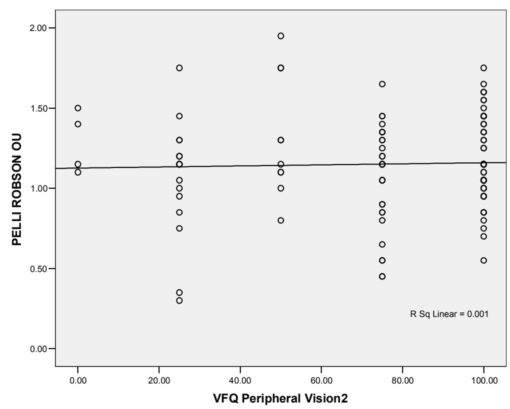

PELLI ROBSON OU
VFQ Mental Health2
R Sq Linear = 0.002


PELLI ROBSON OU
VFQ Role Difficulties2
R Sq Linear = 0.02


PELLI ROBSON OU
VFQ Dependency2
R Sq Linear = 0.028


PELLI ROBSON OU
VFQ Driving2
R Sq Linear = 0.102


PELLI ROBSON OU
VFQ Color Vision2
R Sq Linear = 0.077


PELLI ROBSON OU
VFQ Peripheral Vision2
R Sq Linear = 0.001

Appendix I
Statistical Tests for Correlations of PIADS and NEI-VFQ Measures for Overall Sample Population

PIADS Initial and Follow up Administration Correlations

Correlations

			PIADS Subscale Competence1	PIADS Subscale Adaptability1	PIADS Subscale Self-Esteem1	PIADSOverall1	PIADS Subscale Competence2	PIADS Subscale Adaptability2	PIADS Subscale Self-Esteem2	PIADSOverall2
Spearman's rho	PIADS Subscale Competence1	Correlation Coefficient	1.000	.757**	.705**	.916**	.593**	.435**	.452**	.564**
		Sig. (2-tailed)	.	.000	.000	.000	.000	.000	.000	.000
		N	120	120	120	120	120	120	120	120
	PIADS Subscale Adaptability1	Correlation Coefficient	.757**	1.000	.686**	.906**	.444**	.528**	.392**	.517**
		Sig. (2-tailed)	.000	.	.000	.000	.000	.000	.000	.000
		N	120	120	120	120	120	120	120	120
	PIADS Subscale Self-Esteem1	Correlation Coefficient	.705**	.686**	1.000	.869**	.508**	.422**	.613**	.572**
		Sig. (2-tailed)	.000	.000	.	.000	.000	.000	.000	.000
		N	120	120	120	120	120	120	120	120
	PIADSOverall1	Correlation Coefficient	.916**	.906**	.869**	1.000	.569**	.514**	.531**	.609**
		Sig. (2-tailed)	.000	.000	.000	.	.000	.000	.000	.000
		N	120	120	120	120	120	120	120	120
	PIADS Subscale Competence2	Correlation Coefficient	.593**	.444**	.508**	.569**	1.000	.713**	.764**	.933**
		Sig. (2-tailed)	.000	.000	.000	.000	.	.000	.000	.000
		N	120	120	120	120	120	120	120	120
	PIADS Subscale Adaptability2	Correlation Coefficient	.435**	.528**	.422**	.514**	.713**	1.000	.576**	.857**
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.	.000	.000
		N	120	120	120	120	120	120	120	120
	PIADS Subscale Self-Esteem2	Correlation Coefficient	.452**	.392**	.613**	.531**	.764**	.576**	1.000	.866**
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.	.000
		N	120	120	120	120	120	120	120	120
	PIADSOverall2	Correlation Coefficient	.564**	.517**	.572**	.609**	.933**	.857**	.866**	1.000
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.
		N	120	120	120	120	120	120	120	120

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

NEI-VFQ 25 Initial and Follow Up Administration Correlations

Correlations

			Q Subsca General Health1	Q Subsca General Vision1	Q Subsca cular Pain	Q Subsca Near Activities1	Q Subsca Distance Activities1	Q Subsca Social unctioning	Q Subsca Mental Health1	Q Subsca Role Difficulties	Q Subsca ependency	Q Subsca Driving1	Q Subsca olor Vision	Q Subsca Peripheral Vision1	VFQ Composite Score1	Q Subsca General Health2	Q Subsca General Vision2	Q Subsca cular Pain	Q Sub Nea Activiti
Spearman'	VFQ Subscale (Health1	Correlation Co	1.000	.186*	.092	.153	.038	-.049	.019	.014	-.050	.119	.049	-.088	.045	.670*	.185*	.082	.1
		Sig. (2-tailed)	.	.042	.317	.096	.677	.595	.840	.876	.584	.280	.595	.338	.625	.000	.044	.371	.1
		N	120	120	120	120	120	120	120	120	120	85	119	120	120	120	120	120	1
	VFQ Subscale (Vision1	Correlation Co	.186*	1.000	.228*	.271*	.216*	.125	.231*	.174	.303*	.281*	.092	-.170	.396*	.181*	.665*	.137	.2
		Sig. (2-tailed)	.042	.	.012	.003	.018	.173	.011	.057	.001	.009	.319	.064	.000	.048	.000	.135	.0
		N	120	120	120	120	120	120	120	120	120	85	119	120	120	120	120	120	1
	VFQ Subscale (Pain1	Correlation Co	.092	.228*	1.000	.237*	.151	.089	.082	.159	.078	.033	.148	.146	.384*	.167	.229*	.745*	.1
		Sig. (2-tailed)	.317	.012	.	.009	.099	.336	.370	.083	.398	.762	.108	.112	.000	.068	.012	.000	.0
		N	120	120	120	120	120	120	120	120	120	85	119	120	120	120	120	120	1
	VFQ Subscale I Activities1	Correlation Co	.153	.271*	.237*	1.000	.471*	.364*	.266*	.177	.359*	.107	.271*	.243*	.585*	.146	.285*	.185*	.7
		Sig. (2-tailed)	.096	.003	.009	.	.000	.000	.003	.053	.000	.331	.003	.007	.000	.112	.002	.043	.0
		N	120	120	120	120	120	120	120	120	120	85	119	120	120	120	120	120	1
	VFQ Subscale I Activities1	Correlation Co	.038	.216*	.151	.471*	1.000	.629*	.292*	.309*	.395*	.273*	.329*	.178	.640*	.179*	.270*	.109	.4
		Sig. (2-tailed)	.677	.018	.099	.000	.	.000	.001	.001	.000	.012	.000	.052	.000	.050	.003	.233	.0
		N	120	120	120	120	120	120	120	120	120	85	119	120	120	120	120	120	1
	VFQ Subscale : Functioning1	Correlation Co	-.049	.125	.089	.364*	.629*	1.000	.294*	.372*	.338*	.083	.330*	.239*	.664*	-.001	.102	.102	.2
		Sig. (2-tailed)	.595	.173	.336	.000	.000	.	.001	.000	.000	.451	.000	.009	.000	.988	.269	.269	.0
		N	120	120	120	120	120	120	120	120	120	85	119	120	120	120	120	120	1
	VFQ Subscale I Health1	Correlation Co	.019	.231*	.082	.266*	.292*	.294*	1.000	.414*	.413*	-.057	.173	.113	.561*	-.015	.259*	.071	.2
		Sig. (2-tailed)	.840	.011	.370	.003	.001	.001	.	.000	.000	.603	.060	.219	.000	.871	.004	.439	.0
		N	120	120	120	120	120	120	120	120	120	85	119	120	120	120	120	120	1
	VFQ Subscale I Difficulties1	Correlation Co	.014	.174	.159	.177	.309*	.372*	.414*	1.000	.300*	-.072	.385*	.092	.603*	.142	.236*	.062	.0
		Sig. (2-tailed)	.876	.057	.083	.053	.001	.000	.000	.	.001	.514	.000	.315	.000	.123	.009	.502	.7
		N	120	120	120	120	120	120	120	120	120	85	119	120	120	120	120	120	1
	VFQ Subscale Dependency1	Correlation Co	-.050	.303*	.078	.359*	.395*	.338*	.413*	.300*	1.000	.368*	.332*	.065	.627*	-.031	.346*	.015	.3
		Sig. (2-tailed)	.584	.001	.398	.000	.000	.000	.000	.001	.	.001	.000	.478	.000	.734	.000	.867	.0
		N	120	120	120	120	120	120	120	120	120	85	119	120	120	120	120	120	1
	VFQ Subscale I	Correlation Co	.119	.281*	.033	.107	.273*	.083	-.057	-.072	.368*	1.000	.139	-.023	.304*	.024	.167	-.106	.0
		Sig. (2-tailed)	.280	.009	.762	.331	.012	.451	.603	.514	.001	.	.206	.835	.005	.829	.126	.336	.8
		N	85	85	85	85	85	85	85	85	85	85	84	85	85	85	85	85	
	VFQ Subscale (Vision1	Correlation Co	.049	.092	.148	.271*	.329*	.330*	.173	.385*	.332*	.139	1.000	.199*	.602*	-.053	.151	.068	.2
		Sig. (2-tailed)	.595	.319	.108	.003	.000	.000	.060	.000	.000	.206	.	.030	.000	.569	.100	.460	.0
		N	119	119	119	119	119	119	119	119	119	84	119	119	119	119	119	119	1
	VFQ Subscale Peripheral Visic	Correlation Co	-.088	-.170	.146	.243*	.178	.239*	.113	.092	.065	-.023	.199*	1.000	.370*	-.023	-.085	.202*	.1
		Sig. (2-tailed)	.338	.064	.112	.007	.052	.009	.219	.315	.478	.835	.030	.	.000	.805	.357	.027	.0
		N	120	120	120	120	120	120	120	120	120	85	119	120	120	120	120	120	1
	VFQ Composite	Correlation Co	.045	.396*	.384*	.585*	.640*	.664*	.561*	.603*	.627*	.304*	.602*	.370*	1.000	.070	.398*	.265*	.4
		Sig. (2-tailed)	.625	.000	.000	.000	.000	.000	.000	.000	.000	.005	.000	.000	.	.450	.000	.003	.0
		N	120	120	120	120	120	120	120	120	120	85	119	120	120	120	120	120	1
	VFQ Subscale (Health2	Correlation Co	.670*	.181*	.167	.146	.179*	-.001	-.015	.142	-.031	.024	-.053	-.023	.070	1.000	.302*	.013	.1
		Sig. (2-tailed)	.000	.048	.068	.112	.050	.988	.871	.123	.734	.829	.569	.805	.450	.	.001	.887	.1
		N	120	120	120	120	120	120	120	120	120	85	119	120	120	120	120	120	1
	VFQ Subscale (Vision2	Correlation Co	.185*	.665*	.229*	.285*	.270*	.102	.259*	.236*	.346*	.167	.151	-.085	.398*	.302*	1.000	.175	.2
		Sig. (2-tailed)	.044	.000	.012	.002	.003	.269	.004	.009	.000	.126	.100	.357	.000	.001	.	.055	.0
		N	120	120	120	120	120	120	120	120	120	85	119	120	120	120	120	120	1
	VFQ Subscale (Pain2	Correlation Co	.082	.137	.745*	.185*	.109	.102	.071	.062	.015	-.106	.068	.202*	.265*	.013	.175	1.000	.1
		Sig. (2-tailed)	.371	.135	.000	.043	.238	.269	.439	.502	.867	.336	.460	.027	.003	.887	.055	.	.2
		N	120	120	120	120	120	120	120	120	120	85	119	120	120	120	120	120	1
	VFQ Subscale I Activities2	Correlation Co	.146	.254*	.177	.737*	.416*	.298*	.260*	.032	.319*	.026	.215*	.158	.440*	.143	.237*	.113	1.0
		Sig. (2-tailed)	.112	.005	.053	.000	.000	.001	.004	.731	.000	.811	.019	.085	.000	.120	.009	.221	
		N	120	120	120	120	120	120	120	120	120	85	119	120	120	120	120	120	1
	VFQ Distance A	Correlation Co	.047	.250*	.092	.453*	.827*	.481*	.233*	.214*	.291*	.245*	.268*	.074	.516*	.171	.214*	-.006	.4
		Sig. (2-tailed)	.608	.006	.317	.000	.000	.000	.010	.019	.001	.024	.003	.423	.000	.062	.019	.952	.0
		N	120	120	120	120	120	120	120	120	120	85	119	120	120	120	120	120	1
	VFQ Social Fur	Correlation Co	.134	.249*	.030	.242*	.367*	.482*	.256*	.371*	.380*	.220*	.326*	.009	.486*	.203*	.214*	-.139	.2
		Sig. (2-tailed)	.144	.006	.743	.008	.000	.000	.005	.000	.000	.043	.000	.924	.000	.026	.019	.130	.0
		N	120	120	120	120	120	120	120	120	120	85	119	120	120	120	120	120	1
	VFQ Mental He	Correlation Co	.103	.159	.177	.212*	.305*	.180*	.740*	.380*	.355*	.074	.185*	.164	.516*	.131	.222*	.059	.2
		Sig. (2-tailed)	.263	.082	.053	.020	.001	.049	.000	.000	.000	.504	.044	.074	.000	.155	.015	.523	.0
		N	120	120	120	120	120	120	120	120	120	85	119	120	120	120	120	120	1
	VFQ Role Diffic	Correlation Co	.242*	.157	.197*	.087	.214*	.212*	.279*	.591*	.201*	.171	.351*	.142	.462*	.159	.216*	.100	.0
		Sig. (2-tailed)	.008	.087	.031	.345	.019	.020	.002	.000	.027	.117	.000	.121	.000	.083	.018	.275	.5
		N	120	120	120	120	120	120	120	120	120	85	119	120	120	120	120	120	1
	VFQ Dependen	Correlation Co	.026	.230*	.052	.340*	.366*	.296*	.324*	.342*	.764*	.273*	.344*	.091	.564*	.065	.348*	.030	.3
		Sig. (2-tailed)	.778	.011	.576	.000	.000	.001	.000	.000	.000	.011	.000	.326	.000	.483	.000	.746	.0
		N	120	120	120	120	120	120	120	120	120	85	119	120	120	120	120	120	1
	VFQ Driving2	Correlation Co	.103	.274*	.028	.124	.285*	.108	.002	-.015	.380*	.998*	.146	.000	.311*	-.012	.151	-.072	.0
		Sig. (2-tailed)	.343	.010	.799	.253	.007	.319	.988	.893	.000	.000	.180	.998	.003	.914	.162	.509	.6
		N	87	87	87	87	87	87	87	87	87	81	86	87	87	87	87	87	
	VFQ Color Visic	Correlation Co	.096	.010	.078	.314*	.262*	.339*	.171	.319*	.329*	.128	.806*	.221*	.531*	.022	.128	.070	.2
		Sig. (2-tailed)	.302	.918	.399	.001	.004	.000	.063	.000	.000	.246	.000	.016	.000	.815	.166	.449	.0
		N	118	118	118	118	118	118	118	118	118	84	118	118	118	118	118	118	1
	VFQ Peripheral	Correlation Co	-.058	-.020	.256*	.258*	.229*	.226*	.092	.020	.165	.121	.211*	.783*	.364*	-.009	-.087	.233*	.2
		Sig. (2-tailed)	.529	.826	.005	.004	.012	.013	.318	.830	.072	.270	.021	.000	.000	.926	.347	.009	.0
		N	120	120	120	120	120	120	120	120	120	85	119	120	120	120	120	120	1
	VFQ Composte	Correlation Co	.134	.357*	.377*	.495*	.528*	.447*	.442*	.482*	.565*	.331*	.555*	.332*	.843*	.169	.428*	.269*	.4
		Sig. (2-tailed)	.145	.000	.000	.000	.000	.000	.000	.000	.000	.002	.000	.000	.000	.065	.000	.003	.0
		N	120	120	120	120	120	120	120	120	120	85	119	120	120	120	120	120	1

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

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

PIADS and NEI-VFQ at Initial Administration

Correlations

			PIADS ubscal npeten	PIADS ubscal aptabili	PIADS ubscal f-Estee	ADS erall1	Q Subs Genera Health1	Q Subs Genera Vision1	Q Subs ular Pa	Q Subs Near ctivities	Q Subs Distance ctivities	Q Subs Social nctionin	Q Subs Mental Health1	Q Subs Role fficultie	Q Subs penden	Q Subs Driving1	Q Subs or Visi	Q Subs eripher Vision1	VFQ mposi Score1
Spearm	PIADS Sul Competen	Correlatio	1.000	.757*	.705*	.916*	.092	.057	-.076	.290*	.132	.211*	.101	.192*	.055	.017	.118	.131	.215*
		Sig. (2-tai	.	.000	.000	.000	.319	.539	.410	.001	.152	.020	.272	.036	.548	.881	.202	.153	.018
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	85	119	120	120
	PIADS Sul Adaptabilit	Correlatio	.757*	1.000	.686*	.906*	.050	.143	-.035	.353*	.163	.151	.240*	.149	.081	-.051	-.029	.199*	.233*
		Sig. (2-tai	.000	.	.000	.000	.586	.119	.704	.000	.075	.100	.008	.105	.377	.641	.755	.029	.010
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	85	119	120	120
	PIADS Sul Self-Estee	Correlatio	.705*	.686*	1.000	.869*	.009	.165	-.072	.208*	.014	.057	.154	.166	.020	-.063	-.081	.135	.117
		Sig. (2-tai	.000	.000	.	.000	.920	.072	.437	.023	.882	.537	.094	.070	.833	.569	.379	.142	.204
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	85	119	120	120
	PIADSOve	Correlatio	.916*	.906*	.869*	.000	.039	.138	-.060	.321*	.118	.168	.200*	.201*	.076	-.035	.011	.167	.226*
		Sig. (2-tai	.000	.000	.000	.	.671	.132	.517	.000	.198	.067	.028	.027	.407	.750	.903	.069	.013
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	85	119	120	120
	VFQ Subs Health1	Correlatio	.092	.050	.009	.039	1.000	.186*	.092	.153	.038	-.049	.019	.014	-.050	.119	.049	-.088	.045
		Sig. (2-tai	.319	.586	.920	.671	.	.042	.317	.096	.677	.595	.840	.876	.584	.280	.595	.338	.625
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	85	119	120	120
	VFQ Subs Vision1	Correlatio	.057	.143	.165	.138	.186*	1.000	.228*	.271*	.216*	.125	.231*	.174	.303*	.281*	.092	-.170	.396*
		Sig. (2-tai	.539	.119	.072	.132	.042	.	.012	.003	.018	.173	.011	.057	.001	.009	.319	.064	.000
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	85	119	120	120
	VFQ Subs Pain1	Correlatio	-.076	-.035	-.072	-.060	.092	.228*	1.000	.237*	.151	.089	.082	.159	.078	.033	.148	.146	.384*
		Sig. (2-tai	.410	.704	.437	.517	.317	.012	.	.009	.099	.336	.370	.083	.398	.762	.108	.112	.000
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	85	119	120	120
	VFQ Subs Activities1	Correlatio	.290*	.353*	.208*	.321*	.153	.271*	.237*	1.000	.471*	.364*	.266*	.177	.359*	.107	.271*	.243*	.585*
		Sig. (2-tai	.001	.000	.023	.000	.096	.003	.009	.	.000	.000	.003	.053	.000	.331	.003	.007	.000
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	85	119	120	120
	VFQ Subs Activities1	Correlatio	.132	.163	.014	.118	.038	.216*	.151	.471*	1.000	.629*	.292*	.309*	.395*	.273*	.329*	.178	.640*
		Sig. (2-tai	.152	.075	.882	.198	.677	.018	.099	.000	.	.000	.001	.001	.000	.012	.000	.052	.000
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	85	119	120	120
	VFQ Subs Functionin	Correlatio	.211*	.151	.057	.168	-.049	.125	.089	.364*	.629*	1.000	.294*	.372*	.338*	.083	.330*	.239*	.664*
		Sig. (2-tai	.020	.100	.537	.067	.595	.173	.336	.000	.000	.	.001	.000	.000	.451	.000	.009	.000
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	85	119	120	120
	VFQ Subs Health1	Correlatio	.101	.240*	.154	.200*	.019	.231*	.082	.266*	.292*	.294*	1.000	.414*	.413*	-.057	.173	.113	.561*
		Sig. (2-tai	.272	.008	.094	.028	.840	.011	.370	.003	.001	.001	.	.000	.000	.603	.060	.219	.000
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	85	119	120	120
	VFQ Subs Difficulties	Correlatio	.192*	.149	.166	.201*	.014	.174	.159	.177	.309*	.372*	.414*	1.000	.300*	-.072	.385*	.092	.603*
		Sig. (2-tai	.036	.105	.070	.027	.876	.057	.083	.053	.001	.000	.000	.	.001	.514	.000	.315	.000
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	85	119	120	120
	VFQ Subs Dependen	Correlatio	.055	.081	.020	.076	-.050	.303*	.078	.359*	.395*	.338*	.413*	.300*	1.000	.368*	.332*	.065	.627*
		Sig. (2-tai	.548	.377	.833	.407	.584	.001	.398	.000	.000	.000	.000	.001	.	.001	.000	.478	.000
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	85	119	120	120
	VFQ Subs	Correlatio	.017	-.051	-.063	-.035	.119	.281*	.033	.107	.273*	.083	-.057	-.072	.368*	1.000	.139	-.023	.304*
		Sig. (2-tai	.881	.641	.569	.750	.280	.009	.762	.331	.012	.451	.603	.514	.001	.	.206	.835	.005
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	85	84	85	85
	VFQ Subs Vision1	Correlatio	.118	-.029	-.081	.011	.049	.092	.148	.271*	.329*	.330*	.173	.385*	.332*	.139	1.000	.199*	.602*
		Sig. (2-tai	.202	.755	.379	.903	.595	.319	.108	.003	.000	.000	.060	.000	.000	.206	.	.030	.000
		N	119	119	119	119	119	119	119	119	119	119	119	119	119	84	119	119	119
	VFQ Subs Peripheral	Correlatio	.131	.199*	.135	.167	-.088	-.170	.146	.243*	.178	.239*	.113	.092	.065	-.023	.199*	1.000	.370*
		Sig. (2-tai	.153	.029	.142	.069	.338	.064	.112	.007	.052	.009	.219	.315	.478	.835	.030	.	.000
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	85	119	120	120
	VFQ Comp	Correlatio	.215*	.233*	.117	.226*	.045	.396*	.384*	.585*	.640*	.664*	.561*	.603*	.627*	.304*	.602*	.370*	1.000
		Sig. (2-tai	.018	.010	.204	.013	.625	.000	.000	.000	.000	.000	.000	.000	.000	.005	.000	.000	.
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	85	119	120	120

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

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

PIADS and NEI-VFQ 25 at Follow Up Administration

Correlations

			PIADS ubscal npeten	PIADS ubscal aptabili	PIADS ubscal f-Estee	ADSO erall2	Q Subs Genera Health2	Q Subs Genera Vision2	Q Subs ular Pa	Q Subs Near ctivities	Q Dista ctivities	FQ Soc nctionin	Q Men Health2	FQ Rol fficultie	VFQ ependen	Q Drivi	Q Co ision2	VFQ eripher Vision2	/FQ mpos core2
Spearm	PIADS Sub Competenc	Correlatior	1.000	.713*	.764*	.933*	.203*	.153	.018	.128	.151	.017	.187*	.261*	.212*	.078	.081	.087	.274*
		Sig. (2-tail	.	.000	.000	.000	.026	.096	.848	.165	.100	.851	.041	.004	.020	.473	.385	.344	.002
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	87	118	120	120
	PIADS Sub Adaptability	Correlatior	.713*	1.000	.576*	.857*	.292*	.164	.045	.244*	.259*	.023	.212*	.161	.150	.086	.057	.074	.271*
		Sig. (2-tail	.000	.	.000	.000	.001	.073	.629	.007	.004	.799	.020	.079	.102	.430	.537	.422	.003
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	87	118	120	120
	PIADS Sub Self-Esteen	Correlatior	.764*	.576*	1.000	.866*	.237*	.179	-.063	.078	.108	-.001	.129	.081	.190*	.031	.060	.005	.152
		Sig. (2-tail	.000	.000	.	.000	.009	.051	.493	.400	.242	.992	.160	.381	.038	.778	.517	.959	.098
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	87	118	120	120
	PIADSOve	Correlatior	.933*	.857*	.866*	.000	.271*	.183*	.000	.179	.210*	.020	.215*	.203*	.218*	.071	.082	.076	.281*
		Sig. (2-tail	.000	.000	.000	.	.003	.045	.998	.051	.021	.826	.018	.026	.017	.515	.379	.408	.002
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	87	118	120	120
	VFQ Subsc Health2	Correlatior	.203*	.292*	.237*	.271*	1.000	.302*	.013	.143	.171	.203*	.131	.159	.065	-.012	.022	-.009	.169
		Sig. (2-tail	.026	.001	.009	.003	.	.001	.887	.120	.062	.026	.155	.083	.483	.914	.815	.926	.065
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	87	118	120	120
	VFQ Subsc Vision2	Correlatior	.153	.164	.179	.183*	.302*	1.000	.175	.237*	.214*	.214*	.222*	.216*	.348*	.151	.128	-.087	.428*
		Sig. (2-tail	.096	.073	.051	.045	.001	.	.055	.009	.019	.019	.015	.018	.000	.162	.166	.347	.000
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	87	118	120	120
	VFQ Subsc Pain2	Correlatior	.018	.045	-.063	.000	.013	.175	1.000	.113	-.006	-.139	.059	.100	.030	-.072	.070	.238*	.269*
		Sig. (2-tail	.848	.629	.493	.998	.887	.055	.	.221	.952	.130	.523	.275	.746	.509	.449	.009	.003
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	87	118	120	120
	VFQ Subsc Activities2	Correlatior	.128	.244*	.078	.179	.143	.237*	.113	1.000	.483*	.206*	.221*	.058	.330*	.051	.266*	.275*	.495*
		Sig. (2-tail	.165	.007	.400	.051	.120	.009	.221	.	.000	.024	.015	.531	.000	.638	.004	.002	.000
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	87	118	120	120
	VFQ Distar	Correlatior	.151	.259*	.108	.210*	.171	.214*	-.006	.483*	1.000	.379*	.264*	.236*	.359*	.265*	.188*	.217*	.531*
		Sig. (2-tail	.100	.004	.242	.021	.062	.019	.952	.000	.	.000	.004	.009	.000	.013	.042	.017	.000
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	87	118	120	120
	VFQ Social	Correlatior	.017	.023	-.001	.020	.203*	.214*	-.139	.206*	.379*	1.000	.321*	.416*	.355*	.235*	.280*	.048	.560*
		Sig. (2-tail	.851	.799	.992	.826	.026	.019	.130	.024	.000	.	.000	.000	.000	.028	.002	.601	.000
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	87	118	120	120
	VFQ Menta	Correlatior	.187*	.212*	.129	.215*	.131	.222*	.059	.221*	.264*	.321*	1.000	.372*	.427*	.107	.118	.097	.544*
		Sig. (2-tail	.041	.020	.160	.018	.155	.015	.523	.015	.004	.000	.	.000	.000	.324	.201	.292	.000
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	87	118	120	120
	VFQ Role [	Correlatior	.261*	.161	.081	.203*	.159	.216*	.100	.058	.236*	.416*	.372*	1.000	.295*	.214*	.249*	.138	.602*
		Sig. (2-tail	.004	.079	.381	.026	.083	.018	.275	.531	.009	.000	.000	.	.001	.047	.007	.133	.000
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	87	118	120	120
	VFQ Deper	Correlatior	.212*	.150	.190*	.218*	.065	.348*	.030	.330*	.359*	.355*	.427*	.295*	1.000	.307*	.343*	.125	.673*
		Sig. (2-tail	.020	.102	.038	.017	.483	.000	.746	.000	.000	.000	.000	.001	.	.004	.000	.175	.000
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	87	118	120	120
	VFQ Drivin	Correlatior	.078	.086	.031	.071	-.012	.151	-.072	.051	.265*	.235*	.107	.214*	.307*	1.000	.158	.120	.365*
		Sig. (2-tail	.473	.430	.778	.515	.914	.162	.509	.638	.013	.028	.324	.047	.004	.	.147	.270	.001
		N	87	87	87	87	87	87	87	87	87	87	87	87	87	87	86	87	87
	VFQ Color	Correlatior	.081	.057	.060	.082	.022	.128	.070	.266*	.188*	.280*	.118	.249*	.343*	.158	1.000	.207*	.567*
		Sig. (2-tail	.385	.537	.517	.379	.815	.166	.449	.004	.042	.002	.201	.007	.000	.147	.	.025	.000
		N	118	118	118	118	118	118	118	118	118	118	118	118	118	86	118	118	118
	VFQ Periph	Correlatior	.087	.074	.005	.076	-.009	-.087	.238*	.275*	.217*	.048	.097	.138	.125	.120	.207*	1.000	.413*
		Sig. (2-tail	.344	.422	.959	.408	.926	.347	.009	.002	.017	.601	.292	.133	.175	.270	.025	.	.000
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	87	118	120	120
	VFQ Comp	Correlatior	.274*	.271*	.152	.281*	.169	.428*	.269*	.495*	.531*	.560*	.544*	.602*	.673*	.365*	.567*	.413*	.000
		Sig. (2-tail	.002	.003	.098	.002	.065	.000	.003	.000	.000	.000	.000	.000	.000	.001	.000	.000	.
		N	120	120	120	120	120	120	120	120	120	120	120	120	120	87	118	120	120

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

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

Appendix J

Change in Time for PIADS and NEI-VFQ 25 for Overall Sample Population

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	PIADS Subscale Competence1 - PIADS Subscale Competence2	-.19306	.67769	.06186	-.31555	-.07056	-3.121	119	.002
Pair 2	PIADS Subscale Adaptability1 - PIADS Subscale Adaptability2	-.12639	.71759	.06551	-.25610	.00332	-1.929	119	.056
Pair 3	PIADS Subscale Self-Esteem1 - PIADS Subscale Self-Esteem2	-.21875	.59037	.05389	-.32546	-.11204	-4.059	119	.000
Pair 4	PIADSOverall1 - PIADSOverall2	-.17940	.57467	.05246	-.28327	-.07552	-3.420	119	.001
Pair 5	VFQ Subscale General Health1 - VFQ Subscale General Health2	-2.29167	23.59404	2.15383	-6.55647	1.97314	-1.064	119	.289
Pair 6	VFQ Subscale General Vision1 - VFQ Subscale General Vision2	-2.66667	16.38473	1.49571	-5.62833	.29500	-1.783	119	.077
Pair 7	VFQ Subscale Ocular Pain1 - VFQ Subscale Ocular Pain2	2.04167	15.19821	1.38740	-.70553	4.78886	1.472	119	.144
Pair 8	VFQ Subscale Near Activities1 - VFQ Subscale Near Activities2	-3.33333	17.16346	1.56680	-6.43576	-.23091	-2.127	119	.035
Pair 9	VFQ Subscale Distance Activities1 - VFQ Distance Activities2	-.06944	12.90750	1.17829	-2.40257	2.26368	-.059	119	.953
Pair 10	VFQ Subscale Social Functioning1 - VFQ Social Functioning2	3.22917	28.82940	2.63175	-1.98196	8.44030	1.227	119	.222
Pair 11	VFQ Subscale Mental Health1 - VFQ Mental Health2	-1.04167	17.59080	1.60581	-4.22134	2.13800	-.649	119	.518
Pair 12	VFQ Subscale Role Difficulties1 - VFQ Role Difficulties2	-.20833	25.26037	2.30595	-4.77434	4.35767	-.090	119	.928
Pair 13	VFQ Subscale Dependency1 - VFQ Dependency2	1.87500	19.81658	1.80900	-1.70700	5.45700	1.036	119	.302
Pair 14	VFQ Subscale Driving1 - VFQ Driving2	.15432	8.34490	.92721	-1.69089	1.99953	.166	80	.868
Pair 15	VFQ Subscale Color Vision1 - VFQ Color Vision2	-1.48305	20.74787	1.91000	-5.26570	2.29960	-.776	117	.439
Pair 16	VFQ Subscale Peripheral Vision1 - VFQ Peripheral Vision2	.00000	20.24015	1.84766	-3.65856	3.65856	.000	119	1.000
Pair 17	VFQ Composite Score1 - VFQ Composte Score2	-.04439	7.24759	.66161	-1.35444	1.26567	-.067	119	.947

Appendix K

PIADS Frequency Distributions for ARMD Sample

Statistics

		PIADS Subscale ›mpetenc	PIADS Subscale daptability	PIADS Subscale elf-Esteen	IADSO erall1	PIADS Subscale ›mpetenc	PIADS Subscale daptability	PIADS Subscale elf-Esteen	IADSO erall2
N	Valid	85	85	85	85	85	85	85	85
	Missing	289	289	289	289	289	289	289	289
Mean		1.1137	.9804	.8118	.9686	1.3402	1.0804	1.0397	.1534
Median		1.0833	1.0000	.8750	.9167	1.2500	.8333	1.0000	.1111
Std. Deviation		.71684	.73886	.63873	63138	.70737	.68120	.62387	59867
Variance		.514	.546	.408	.399	.500	.464	.389	.358
Skewness		.096	.453	.099	.278	.197	.679	.413	.349
Std. Error of Skewness		.261	.261	.261	.261	.261	.261	.261	.261
Percentiles	25	.5417	.4167	.2500	.5556	.8333	.5000	.6250	.7153
	50	1.0833	1.0000	.8750	.9167	1.2500	.8333	1.0000	.1111
	75	1.5833	1.5000	1.2500	.3958	1.9167	1.5000	1.4375	.5833

Appendix L

NEI-VFQ 25 Frequency Distributions for ARMD Sample

Statistics

	VFQ bsca ener ealth	VFQ bsca ener ision	VFQ bsca Ocula Pain 1	VFQ bsca Near tivitie	VFQ bsca stan ivitie	VFQ bsca Socia ction 1	VFQ bsca lenta ealth	VFQ bsca Role ficult 1	VFQ bsca ende 1	VFQ bsca iving	VFQ bsca Colo sion	VFQ bsca riphe ision	VFQ mp ite core	VFQ bsca ener ealth	VFQ bsca ener ision	VFQ bsca Ocula Pain2	VFQ bsca Near tivitie	VFQ stan ivitie	Q So ction 2	VFQ lenta ealth	Q R ficult 2	VFQ ende 2	VF ivi 2	VFQ Colo sion
N	85	85	85	85	85	85	85	85	85	59	84	85	85	85	85	85	85	85	85	85	85	85	61	84
	289	289	289	289	289	289	289	289	289	315	290	289	289	289	289	289	289	289	289	289	289	289	31	290
Mean	52.0	44.0	86.2	49.0	47.8	63.5	54.4	39.1	58.8	4.16	72.3	80.8	56.0	55.8	47.0	85.0	52.1	47.3	56.0	55.6	37.0	56.0	5.3	75.
Median	50.0	40.0	100	50.0	50.0	62.5	56.2	37.5	58.3	.000	75.0	100.	56.0	50.0	40.0	100	50.0	50.0	62.5	56.2	37.5	50.0	.00	75.0
Std. Dev	28.4	19.2	22.1	22.8	23.3	32.5	25.7	27.4	31.0	16.2	33.3	28.7	14.9	27.7	16.5	21.7	23.5	22.1	23.7	23.5	28.9	29.8	18.	29.4
Variance	806	369.	492	520	545	1057	660	754.	962.	262	111	828.	224	768.	273	471	552.	489	564.	555	838.	893.	324	865
Skewnes	.234	.409	-1.5	.104	.130	1.04	-.21	.169	-.227	4.58	-.85	-1.4	.000	.000	.032	-1.5	.121	.124	.172	-.25	.456	-.092	3.7	-.93
Std. Erro	.261	.261	.261	.261	.261	.261	.261	.261	.261	.311	.263	.261	.261	.261	.261	.261	.261	.261	.261	.261	.261	.261	.30	.263
Percent	25.0	20.0	75.0	33.3	33.3	37.5	37.5	12.5	33.3	.000	50.0	75.0	45.8	50.0	40.0	75.0	33.3	33.3	37.5	37.5	12.5	33.3	.00	50.0
	50.0	40.0	100	50.0	50.0	62.5	56.2	37.5	58.3	.000	75.0	100.	56.0	50.0	40.0	100	50.0	50.0	62.5	56.2	37.5	50.0	.00	75.0
	75.0	60.0	100	66.6	64.5	75.0	75.0	62.5	87.5	.000	100	100.	64.8	75.0	60.0	100	66.6	62.5	62.5	75.0	56.2	83.3	.00	100

Appendix M

Clinical Measures and Correlations for ARMD Sample Population

Correlations

		PELLI ROBSON OU	DISTANCE VA	PIADS Subscale Competence1	PIADS Subscale Adaptability1	PIADS Subscale Self-Esteem1	PIADSOverall1	PIADS Subscale Competence2	PIADS Subscale Adaptability2	PIADS Subscale Self-Esteem2	PIADSOverall2	VFQ Subscale General Health1	VFQ Subscale General Vision1	VFQ Subscale Ocular Pain1	VFQ Subscale Near Activities1	VFQ Subscale Distance Activities1	VFQ Subscale Social Functioning1	VFQ Subscale Mental Health1	VFQ ubscale ole Dif ulties1	VFC Dep
PELLI ROBSON OU	Pearson Correlation	1	-.269*	-.229*	-.005	-.193	-.153	-.041	.061	-.074	-.019	.031	.238*	.334**	.311**	.234*	.073	-.005	-.092	
	Sig. (2-tailed)		.015	.038	.965	.083	.171	.712	.584	.510	.868	.785	.031	.002	.004	.034	.512	.967	.412	
	N	82	81	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	
DISTANCE VA	Pearson Correlation	-.269*	1	.262*	.197	.258*	.263*	.024	-.103	.164	.027	-.262*	-.248*	.048	.003	-.034	.043	.043	.186	
	Sig. (2-tailed)	.015		.016	.072	.018	.016	.829	.350	.135	.804	.016	.023	.663	.976	.756	.696	.698	.090	
	N	81	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	
PIADS Subscale Competence1	Pearson Correlation	-.229*	.262*	1	.781**	.704**	.921**	.522**	.322**	.420**	.474**	-.007	-.023	-.136	.222*	.143	.148	.137	.188	
	Sig. (2-tailed)	.038	.016		.000	.000	.000	.000	.003	.000	.000	.951	.832	.216	.041	.190	.176	.213	.084	
	N	82	84	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
PIADS Subscale Adaptability1	Pearson Correlation	-.005	.197	.781**	1	.686**	.917**	.409**	.468**	.394**	.475**	-.048	.081	-.046	.333**	.219*	.089	.236*	.116	
	Sig. (2-tailed)	.965	.072	.000		.000	.000	.000	.000	.000	.000	.665	.461	.674	.002	.044	.420	.030	.288	
	N	82	84	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
PIADS Subscale Self-Esteem1	Pearson Correlation	-.193	.258*	.704**	.686**	1	.871**	.469**	.377**	.570**	.526**	-.017	.038	-.083	.102	.022	.000	.109	.089	
	Sig. (2-tailed)	.083	.018	.000	.000		.000	.000	.000	.000	.000	.875	.731	.452	.353	.841	.996	.322	.420	
	N	82	84	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
PIADSOverall1	Pearson Correlation	-.153	.263*	.921**	.917**	.871**	1	.515**	.431**	.505**	.542**	-.027	.036	-.097	.249*	.147	.091	.180	.147	
	Sig. (2-tailed)	.171	.016	.000	.000	.000		.000	.000	.000	.000	.806	.747	.376	.022	.178	.409	.099	.181	
	N	82	84	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
PIADS Subscale Competence2	Pearson Correlation	-.041	.024	.522**	.409**	.469**	.515**	1	.671**	.799**	.926**	.067	.103	.000	.047	.127	-.075	-.024	.137	
	Sig. (2-tailed)	.712	.829	.000	.000	.000	.000		.000	.000	.000	.541	.348	.997	.672	.246	.497	.831	.212	
	N	82	84	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
PIADS Subscale Adaptability2	Pearson Correlation	.061	-.103	.322**	.468**	.377**	.431**	.671**	1	.612**	.856**	.243*	.287**	.049	.201	.204	-.082	.163	-.008	
	Sig. (2-tailed)	.584	.350	.003	.000	.000	.000	.000		.000	.000	.025	.008	.653	.065	.061	.455	.135	.939	
	N	82	84	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
PIADS Subscale Self-Esteem2	Pearson Correlation	-.074	.164	.420**	.394**	.570**	.505**	.799**	.612**	1	.894**	-.024	.121	.000	.012	.169	-.019	-.014	.109	
	Sig. (2-tailed)	.510	.135	.000	.000	.000	.000	.000	.000		.000	.831	.272	.997	.912	.122	.860	.902	.320	
	N	82	84	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
PIADSOverall2	Pearson Correlation	-.019	.027	.474**	.475**	.526**	.542**	.926**	.856**	.894**	1	.110	.191	.018	.099	.186	-.067	.048	.089	
	Sig. (2-tailed)	.868	.804	.000	.000	.000	.000	.000	.000	.000		.315	.079	.867	.368	.088	.540	.663	.420	
	N	82	84	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
VFQ Subscale General Health1	Pearson Correlation	.031	-.262*	-.007	-.048	-.017	-.027	.067	.243*	-.024	.110	1	.181	.155	.126	.003	-.091	.122	.000	
	Sig. (2-tailed)	.785	.016	.951	.665	.875	.806	.541	.025	.831	.315		.097	.156	.252	.979	.408	.265	.997	
	N	82	84	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
VFQ Subscale General Vision1	Pearson Correlation	.238*	-.248*	-.023	.081	.038	.036	.103	.287**	.121	.191	.181	1	.276*	.307**	.309**	.055	.334**	.258*	
	Sig. (2-tailed)	.031	.023	.832	.461	.731	.747	.348	.008	.272	.079	.097		.011	.004	.004	.616	.002	.017	
	N	82	84	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
VFQ Subscale Ocular Pain1	Pearson Correlation	.334**	.048	-.136	-.046	-.083	-.097	.000	.049	.000	.018	.155	.276*	1	.297**	.228*	-.032	.199	.254*	
	Sig. (2-tailed)	.002	.663	.216	.674	.452	.376	.997	.653	.997	.867	.156	.011		.006	.036	.773	.068	.019	
	N	82	84	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
VFQ Subscale Near Activities1	Pearson Correlation	.311**	.003	.222*	.333**	.102	.249*	.047	.201	.012	.099	.126	.307**	.297**	1	.465**	.216*	.280**	.190	
	Sig. (2-tailed)	.004	.976	.041	.002	.353	.022	.672	.065	.912	.368	.252	.004	.006		.000	.047	.009	.081	
	N	82	84	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
VFQ Subscale Distance Activities1	Pearson Correlation	.234*	-.034	.143	.219*	.022	.147	.127	.204	.169	.186	.003	.309**	.228*	.465**	1	.554**	.350**	.359**	
	Sig. (2-tailed)	.034	.756	.190	.044	.841	.178	.246	.061	.122	.088	.979	.004	.036	.000		.000	.001	.001	
	N	82	84	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
VFQ Subscale Social Functioning1	Pearson Correlation	.073	.043	.148	.089	.000	.091	-.075	-.082	-.019	-.067	-.091	.055	-.032	.216*	.554**	1	.313**	.306**	
	Sig. (2-tailed)	.512	.696	.176	.420	.996	.409	.497	.455	.860	.540	.408	.616	.773	.047	.000		.004	.004	
	N	82	84	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
VFQ Subscale Mental Health1	Pearson Correlation	-.005	.043	.137	.236*	.109	.180	-.024	.163	-.014	.048	.122	.334**	.199	.280**	.350**	.313**	1	.473**	
	Sig. (2-tailed)	.967	.698	.213	.030	.322	.099	.831	.135	.902	.663	.265	.002	.068	.009	.001	.004		.000	
	N	82	84	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
VFQ Subscale Role Difficulties1	Pearson Correlation	-.092	.186	.188	.116	.089	.147	.137	-.008	.109	.089	.000	.258*	.254*	.190	.359**	.306**	.473**	1	
	Sig. (2-tailed)	.412	.090	.084	.288	.420	.181	.212	.939	.320	.420	.997	.017	.019	.081	.001	.004	.000		
	N	82	84	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
VFQ Subscale Dependency1	Pearson Correlation	.117	.018	-.016	-.046	-.126	-.066	.114	.156	.119	.146	-.046	.333**	.202	.294**	.318**	.314**	.443**	.337**	
	Sig. (2-tailed)	.295	.871	.885	.678	.250	.546	.299	.154	.276	.184	.675	.002	.064	.006	.003	.003	.000	.002	
	N	82	84	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
VFQ Subscale Driving1	Pearson Correlation	.197	-.196	-.139	-.126	-.234	-.181	.230	.210	.143	.223	.280*	.309*	.168	.136	.198	.051	.004	-.004	
	Sig. (2-tailed)	.137	.136	.295	.341	.074	.171	.080	.111	.279	.089	.032	.017	.203	.304	.134	.699	.974	.974	
	N	58	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	
VFQ Subscale Color Vision1	Pearson Correlation	.187	-.081	.027	-.042	-.122	-.047	.015	.028	.028	.026	.030	.122	.242*	.197	.270*	.272*	.182	.352**	
	Sig. (2-tailed)	.095	.466	.807	.705	.270	.668	.891	.802	.797	.811	.789	.270	.027	.072	.013	.012	.097	.001	
	N	81	83	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	
VFQ Subscale Peripheral Vision1	Pearson Correlation	.079	.164	.182	.218*	.237*	.234*	.182	.115	.180	.178	-.015	-.118	.133	.237*	.144	.069	.173	.200	
	Sig. (2-tailed)	.483	.135	.095	.045	.029	.031	.096	.296	.100	.104	.892	.281	.225	.029	.188	.530	.114	.067	
	N	82	84	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
VFQ Composite Score1	Pearson Correlation	.242*	.049	.173	.208	.055	.165	.129	.194	.146	.175	.053	.452**	.452**	.561**	.653**	.557**	.632**	.644**	
	Sig. (2-tailed)	.028	.660	.114	.056	.618	.131	.241	.074	.183	.109	.630	.000	.000	.000	.000	.000	.000	.000	
	N	82	84	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
VFQ Subscale General Health2	Pearson Correlation	-.027	.000	.169	.153	.194	.189	.298**	.340**	.356**	.370**	.599**	.212	.246*	.207	.249*	-.015	.070	.139	
	Sig. (2-tailed)	.807	.997	.121	.161	.076	.083	.006	.001	.001	.000	.000	.051	.023	.057	.021	.891	.527	.205	
	N	82	84	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
VFQ Subscale General Vision2	Pearson Correlation	.227*	-.160	.013	.122	.099	.086	.221*	.347**	.258*	.309**	.184	.689**	.283**	.228*	.309**	.069	.320**	.191	
	Sig. (2-tailed)	.040	.145	.902	.266	.367	.433	.042	.001	.017	.004	.092	.000	.009	.036	.004	.528	.003	.080	
	N	82	84	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
VFQ Subscale Ocular Pain2	Pearson Correlation	.360**	-.019	-.111	-.028	-.136	-.099	-.016	.002	-.063	-.027	.093	.188	.743**	.274*	.244*	.054	.160	.141	
	Sig. (2-tailed)	.001	.866	.310	.800	.214	.368	.886	.985	.569	.805	.398	.085	.000	.011	.025	.625	.143	.198	
	N	82	84	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
VFQ Subscale Near Activities2	Pearson Correlation	.260*	.030	.154	.341**	.123	.233*	.181	.290**	.199	.250*	.083	.284**	.186	.731**	.445**	.210	.262*	.127	
	Sig. (2-tailed)	.019	.786	.158	.001	.261	.032	.097	.007	.068	.021	.453	.008	.089	.000	.000	.053	.015	.246	
	N	82	84	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
VFQ Distance Activities2	Pearson Correlation	.305**	-.047	.090	.208	.073	.140	.204	.326**	.233*	.285**	.038	.293**	.144	.477**	.840**	.450**	.262*	.287**	
	Sig. (2-tailed)	.005	.671	.414	.057	.506	.202	.061	.002	.032	.008	.727	.006	.190	.000	.000	.000	.015	.008	
	N	82	84	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
VFQ Social Functioning2	Pearson Correlation	.110	.007	.184	.145	.159	.180	.054	.146	.138	.124	.130	.292**	.099	.199	.368**	.435**	.296**	.441**	
	Sig. (2-tailed)	.326	.952	.093	.184	.146	.100	.626	.182	.208	.256	.235	.007	.369	.067	.001	.000	.006	.000	
	N	82	84	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
VFQ Mental Health2	Pearson Correlation	.024	.076	.117	.188	.172	.175	.261*	.326**	.220*	.303**	.216*	.307**	.376**	.235*	.357**	.125	.696**	.401**	
	Sig. (2-tailed)	.829	.490	.286	.085	.116	.108	.016	.002	.043	.005	.047	.004	.000	.031	.001	.256	.000	.000	
	N	82	84	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
VFQ Role Difficulties2	Pearson Correlation	.074	-.055	.036	.017	.048	.037	.245*	.189	.171	.227*	.232*	.180	.230*	.047	.183	.083	.290**	.567**	
	Sig. (2-tailed)	.510	.621	.740	.877	.664	.740	.024	.083	.118	.036	.033	.100	.035	.668	.094	.448	.007	.000	
	N	82	84	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
VFQ Dependency2	Pearson Correlation	.163	.038	.088	.106	.010	.078	.303**	.279**	.256*	.314**	.032	.202	.163	.291**	.324**	.274*	.301**	.367**	
	Sig. (2-tailed)	.143	.732	.425	.335	.928	.479	.005	.010	.018	.003	.772	.063	.137	.007	.002	.011	.005	.001	
	N	82	84	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
VFQ Driving2	Pearson Correlation	.298*	-.129	-.011	-.006	-.038	-.020	.127	.171	.069	.139	.227	.223	.148	.191	.274*	.100	.167	.128	
	Sig. (2-tailed)	.022	.323	.932	.963	.771	.881	.330	.189	.595	.285	.079	.085	.254	.141	.033	.443	.198	.327	
	N	59	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	
[illegible]	[illegible]																		.325**	
	Sig. (2-tailed)	.620	.662	.214	.722	.950	.530	.703	.612	.374	.514	.576	.940	.095	.079	.072	.004	.042	.003	
	N	81	83	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	
VFQ Peripheral Vision2	Pearson Correlation	.134	.198	.151	.189	.183	.193	.154	.098	.155	.152	-.041	.076	.196	.306**	.248*	.119	.252*	.269*	
	Sig. (2-tailed)	.229	.071	.167	.083	.093	.077	.159	.372	.157	.166	.710	.489	.072	.004	.022	.280	.020	.013	

Appendix N

Statistical Tests for Correlations of PIADS and NEI-VFQ Measures for ARMD Sample Population

PIADS Correlations at Initial and Follow up Administrations

Correlations

			PIADS Subscale Competence1	PIADS Subscale Adaptability1	PIADS Subscale Self-Esteem1	PIADSOverall1	PIADS Subscale Competence2	PIADS Subscale Adaptability2	PIADS Subscale Self-Esteem2	PIADSOverall2
Spearman's rho	PIADS Subscale Competence1	Correlation Coefficier	1.000	.753**	.679**	.911**	.535**	.330**	.430**	.492**
		Sig. (2-tailed)	.	.000	.000	.000	.000	.002	.000	.000
		N	85	85	85	85	85	85	85	85
	PIADS Subscale Adaptability1	Correlation Coefficier	.753**	1.000	.642**	.903**	.381**	.481**	.377**	.470**
		Sig. (2-tailed)	.000	.	.000	.000	.000	.000	.000	.000
		N	85	85	85	85	85	85	85	85
	PIADS Subscale Self-Esteem1	Correlation Coefficier	.679**	.642**	1.000	.843**	.473**	.406**	.610**	.550**
		Sig. (2-tailed)	.000	.000	.	.000	.000	.000	.000	.000
		N	85	85	85	85	85	85	85	85
	PIADSOverall1	Correlation Coefficier	.911**	.903**	.843**	1.000	.508**	.448**	.520**	.557**
		Sig. (2-tailed)	.000	.000	.000	.	.000	.000	.000	.000
		N	85	85	85	85	85	85	85	85
	PIADS Subscale Competence2	Correlation Coefficier	.535**	.381**	.473**	.508**	1.000	.681**	.767**	.917**
		Sig. (2-tailed)	.000	.000	.000	.000	.	.000	.000	.000
		N	85	85	85	85	85	85	85	85
	PIADS Subscale Adaptability2	Correlation Coefficier	.330**	.481**	.406**	.448**	.681**	1.000	.616**	.856**
		Sig. (2-tailed)	.002	.000	.000	.000	.000	.	.000	.000
		N	85	85	85	85	85	85	85	85
	PIADS Subscale Self-Esteem2	Correlation Coefficier	.430**	.377**	.610**	.520**	.767**	.616**	1.000	.883**
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.	.000
		N	85	85	85	85	85	85	85	85
	PIADSOverall2	Correlation Coefficier	.492**	.470**	.550**	.557**	.917**	.856**	.883**	1.000
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.
		N	85	85	85	85	85	85	85	85

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

NEI-VFQ 25 Correlations at Initial and Follow up Administrations

Correlations

			FQ Subsca General Health1	FQ Subsca General Vision1	FQ Subsca Ocular Pain1	FQ Subsca Near Activities1	FQ Subsca Distance Activities1	FQ Subsca Social Functioning1	FQ Subsca Mental Health1	FQ Subsca Role Difficulties1	FQ Subsca Dependency	FQ Subsca Driving1	FQ Subsca Color Vision	FQ Subsca Peripheral Vision1	VFQ Composite Score1	FQ Subsca General Health2	FQ Subsca General Vision2	FQ Subsca Ocular Pain2	FQ Sub Nea Activitie
Spearman's	VFQ Subscale General Health1	Correlation Coe	1.000	.215*	.104	.158	.013	-.077	.114	-.003	-.041	.318*	.002	-.038	.080	.608*	.190	.054	.0
		Sig. (2-tailed)	.	.048	.345	.149	.905	.482	.300	.980	.707	.014	.986	.728	.469	.000	.081	.622	.4
		N	85	85	85	85	85	85	85	85	85	59	84	85	85	85	85	85	
	VFQ Subscale General Vision1	Correlation Coe	.215*	1.000	.256*	.308*	.255*	.120	.339*	.225*	.324*	.283*	.119	-.087	.460*	.215*	.724*	.200	.2
		Sig. (2-tailed)	.048	.	.018	.004	.018	.275	.001	.038	.002	.030	.283	.428	.000	.048	.000	.067	.0
		N	85	85	85	85	85	85	85	85	85	59	84	85	85	85	85	85	
	VFQ Subscale Ocular Pain1	Correlation Coe	.104	.256*	1.000	.370*	.234*	.089	.204	.221*	.194	.165	.222*	.163	.511*	.180	.255*	.709*	.2
		Sig. (2-tailed)	.345	.018	.	.000	.031	.418	.061	.042	.075	.213	.042	.136	.000	.099	.018	.000	.0
		N	85	85	85	85	85	85	85	85	85	59	84	85	85	85	85	85	
	VFQ Subscale Near Activities1	Correlation Coe	.158	.308*	.370*	1.000	.462*	.302*	.285*	.218*	.293*	.146	.209	.262*	.574*	.206	.236*	.374*	.7
		Sig. (2-tailed)	.149	.004	.000	.	.000	.005	.008	.045	.006	.269	.056	.015	.000	.058	.030	.000	.0
		N	85	85	85	85	85	85	85	85	85	59	84	85	85	85	85	85	
	VFQ Subscale Distance Activities1	Correlation Coe	.013	.255*	.234*	.462*	1.000	.614*	.319*	.329*	.329*	.190	.256*	.223*	.597*	.238*	.303*	.231*	.4
		Sig. (2-tailed)	.905	.018	.031	.000	.	.000	.003	.002	.002	.149	.019	.040	.000	.028	.005	.033	.0
		N	85	85	85	85	85	85	85	85	85	59	84	85	85	85	85	85	
	VFQ Subscale Social Functioning1	Correlation Coe	-.077	.120	.089	.302*	.614*	1.000	.332*	.388*	.330*	.015	.309*	.260*	.639*	.033	.085	.157	.2
		Sig. (2-tailed)	.482	.275	.418	.005	.000	.	.002	.000	.002	.911	.004	.016	.000	.763	.438	.152	.0
		N	85	85	85	85	85	85	85	85	85	59	84	85	85	85	85	85	
	VFQ Subscale Mental Health1	Correlation Coe	.114	.339*	.204	.285*	.319*	.332*	1.000	.465*	.436*	.108	.203	.169	.622*	.098	.338*	.185	.2
		Sig. (2-tailed)	.300	.001	.061	.008	.003	.002	.	.000	.000	.415	.064	.122	.000	.371	.002	.091	.0
		N	85	85	85	85	85	85	85	85	85	59	84	85	85	85	85	85	
	VFQ Subscale Role Difficulties1	Correlation Coe	-.003	.225*	.221*	.218*	.329*	.388*	.465*	1.000	.330*	.004	.377*	.267*	.648*	.154	.198	.088	.1
		Sig. (2-tailed)	.980	.038	.042	.045	.002	.000	.000	.	.002	.973	.000	.013	.000	.160	.070	.425	.2
		N	85	85	85	85	85	85	85	85	85	59	84	85	85	85	85	85	
	VFQ Subscale Dependency1	Correlation Coe	-.041	.324*	.194	.293*	.329*	.330*	.436*	.330*	1.000	.399*	.340*	.093	.630*	-.012	.345*	.181	.2
		Sig. (2-tailed)	.707	.002	.075	.006	.002	.002	.000	.002	.	.002	.002	.397	.000	.917	.001	.098	.0
		N	85	85	85	85	85	85	85	85	85	59	84	85	85	85	85	85	
	VFQ Subscale Driving1	Correlation Coe	.318*	.283*	.165	.146	.190	.015	.108	.004	.399*	1.000	.168	.072	.344*	.076	.298*	.078	.1
		Sig. (2-tailed)	.014	.030	.213	.269	.149	.911	.415	.973	.002	.	.208	.587	.008	.569	.022	.556	.3
		N	59	59	59	59	59	59	59	59	59	59	58	59	59	59	59	59	
	VFQ Subscale Color Vision1	Correlation Coe	.002	.119	.222*	.209	.256*	.309*	.203	.377*	.340*	.168	1.000	.229*	.585*	-.073	.118	.195	.2
		Sig. (2-tailed)	.986	.283	.042	.056	.019	.004	.064	.000	.002	.208	.	.036	.000	.507	.286	.075	.0
		N	84	84	84	84	84	84	84	84	84	58	84	84	84	84	84	84	
	VFQ Subscale Peripheral Vision1	Correlation Coe	-.038	-.087	.163	.262*	.223*	.260*	.169	.267*	.093	.072	.229*	1.000	.412*	.092	-.041	.259*	.1
		Sig. (2-tailed)	.728	.428	.136	.015	.040	.016	.122	.013	.397	.587	.036	.	.000	.405	.709	.017	.2
		N	85	85	85	85	85	85	85	85	85	59	84	85	85	85	85	85	
	VFQ Composite Score1	Correlation Coe	.080	.460*	.511*	.574*	.597*	.639*	.622*	.648*	.630*	.344*	.585*	.412*	1.000	.145	.430*	.429*	.4
		Sig. (2-tailed)	.469	.000	.000	.000	.000	.000	.000	.000	.000	.008	.000	.000	.	.185	.000	.000	.0
		N	85	85	85	85	85	85	85	85	85	59	84	85	85	85	85	85	
	VFQ Subscale General Health2	Correlation Coe	.608*	.215*	.180	.206	.238*	.033	.098	.154	-.012	.076	-.073	.092	.145	1.000	.345*	-.040	.1
		Sig. (2-tailed)	.000	.048	.099	.058	.028	.763	.371	.160	.917	.569	.507	.405	.185	.	.001	.717	.2
		N	85	85	85	85	85	85	85	85	85	59	84	85	85	85	85	85	
	VFQ Subscale General Vision2	Correlation Coe	.190	.724*	.255*	.236*	.303*	.085	.338*	.198	.345*	.298*	.118	-.041	.430*	.345*	1.000	.221*	.2
		Sig. (2-tailed)	.081	.000	.018	.030	.005	.438	.002	.070	.001	.022	.286	.709	.000	.001	.	.042	.0
		N	85	85	85	85	85	85	85	85	85	59	84	85	85	85	85	85	
	VFQ Subscale Ocular Pain2	Correlation Coe	.054	.200	.709*	.374*	.231*	.157	.185	.088	.181	.078	.195	.259*	.429*	-.040	.221*	1.000	.1
		Sig. (2-tailed)	.622	.067	.000	.000	.033	.152	.091	.425	.098	.556	.075	.017	.000	.717	.042	.	.0
		N	85	85	85	85	85	85	85	85	85	59	84	85	85	85	85	85	
	VFQ Subscale Near Activities2	Correlation Coe	.081	.295*	.235*	.744*	.420*	.262*	.271*	.135	.297*	.128	.204	.133	.462*	.135	.252*	.194	1.0
		Sig. (2-tailed)	.460	.006	.030	.000	.000	.015	.012	.217	.006	.335	.063	.224	.000	.217	.020	.075	
		N	85	85	85	85	85	85	85	85	85	59	84	85	85	85	85	85	
	VFQ Distance Ac	Correlation Coe	.056	.261*	.142	.471*	.841*	.478*	.232*	.250*	.244*	.229	.226*	.123	.500*	.224*	.243*	.050	.4
		Sig. (2-tailed)	.608	.016	.196	.000	.000	.000	.033	.021	.024	.081	.038	.261	.000	.039	.025	.652	.0
		N	85	85	85	85	85	85	85	85	85	59	84	85	85	85	85	85	
	VFQ Social Func	Correlation Coe	.128	.280*	.076	.181	.310*	.435*	.287*	.419*	.356*	.245	.325*	.115	.503*	.208	.245*	-.045	.1
		Sig. (2-tailed)	.243	.010	.489	.097	.004	.000	.008	.000	.001	.062	.003	.294	.000	.056	.024	.681	.2
		N	85	85	85	85	85	85	85	85	85	59	84	85	85	85	85	85	
	VFQ Mental Heal	Correlation Coe	.231*	.314*	.351*	.239*	.311*	.129	.690*	.399*	.390*	.349*	.206	.210	.563*	.308*	.359*	.153	.2
		Sig. (2-tailed)	.033	.003	.001	.028	.004	.238	.000	.000	.000	.007	.060	.054	.000	.004	.001	.143	.0
		N	85	85	85	85	85	85	85	85	85	59	84	85	85	85	85	85	
	VFQ Role Difficul	Correlation Coe	.251*	.206	.204	.077	.157	.152	.302*	.569*	.216*	.293*	.278*	.312*	.458*	.134	.230*	.123	-.0
		Sig. (2-tailed)	.020	.058	.061	.484	.152	.164	.005	.000	.047	.024	.011	.004	.000	.222	.035	.263	.9
		N	85	85	85	85	85	85	85	85	85	59	84	85	85	85	85	85	
	VFQ Dependency	Correlation Coe	.034	.252*	.153	.304*	.318*	.267*	.281*	.364*	.729*	.332*	.355*	.193	.580*	.107	.348*	.201	.3
		Sig. (2-tailed)	.755	.020	.163	.005	.003	.013	.009	.001	.000	.010	.001	.077	.000	.328	.001	.065	.0
		N	85	85	85	85	85	85	85	85	85	59	84	85	85	85	85	85	
	VFQ Driving2	Correlation Coe	.280*	.283*	.147	.163	.227	.070	.179	.085	.408*	.997*	.180	.100	.363*	.018	.238	.114	.1
		Sig. (2-tailed)	.029	.027	.257	.209	.078	.592	.167	.515	.001	.000	.168	.442	.004	.889	.065	.384	.2
		N	61	61	61	61	61	61	61	61	61	56	60	61	61	61	61	61	
	VFQ Color Vision	Correlation Coe	.056	.020	.123	.233*	.200	.363*	.246*	.344*	.329*	.083	.802*	.270*	.534*	.004	.058	.165	.2
		Sig. (2-tailed)	.615	.855	.263	.033	.069	.001	.024	.001	.002	.533	.000	.013	.000	.969	.603	.133	.0
		N	84	84	84	84	84	84	84	84	84	58	84	84	84	84	84	84	
	VFQ Peripheral V	Correlation Coe	-.033	.058	.247*	.278*	.273*	.231*	.221*	.264*	.221*	.184	.254*	.760*	.439*	.092	.006	.243*	.2
		Sig. (2-tailed)	.765	.597	.023	.010	.011	.034	.042	.015	.042	.164	.019	.000	.000	.400	.960	.022	.0
		N	85	85	85	85	85	85	85	85	85	59	84	85	85	85	85	85	
	VFQ Composte S	Correlation Coe	.137	.419*	.454*	.456*	.479*	.394*	.498*	.550*	.575*	.424*	.539*	.404*	.858*	.197	.477*	.387*	.4
		Sig. (2-tailed)	.211	.000	.000	.000	.000	.000	.000	.000	.000	.001	.000	.000	.000	.070	.000	.000	.0
		N	85	85	85	85	85	85	85	85	85	59	84	85	85	85	85	85	

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

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

PIADS and NEI-VFQ 25 at Initial Administration

Correlations

			PIADS Subscale Competen	PIADS Subscale Adaptabilit	PIADS Subscale Self-Esteem	PIADSOverall1	VFQ Subsc General Health1	VFQ Subsc General Vision1	VFQ Subsc Ocular Pain1	VFQ Subsc Near Activities	VFQ Subsc Distance Activities	VFQ Subsc Social Functioning	VFQ Subsc Mental Health1	VFQ Subsc Role Difficulties	VFQ Subsc Dependency	VFQ Subsc Driving1	VFQ Subsc Color Vision	VFQ Subsc Peripheral Vision1	VFQ Composite Score1
Spearm	PIADS Sub Competenc	Correlation	1.000	.753*	.679*	.911*	-.028	-.051	-.178	.230*	.078	.216*	.144	.195	.016	-.051	.043	.243*	.177
		Sig. (2-tailed)	.	.000	.000	.000	.797	.644	.103	.035	.477	.047	.190	.074	.882	.702	.697	.025	.105
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	59	84	85	85
	PIADS Sub Adaptability	Correlation	.753*	1.000	.642*	.903*	-.084	.095	-.072	.348*	.195	.180	.267*	.111	.005	-.015	-.047	.273*	.226*
		Sig. (2-tailed)	.000	.	.000	.000	.444	.387	.514	.001	.074	.098	.014	.313	.966	.908	.670	.011	.038
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	59	84	85	85
	PIADS Sub Self-Esteem	Correlation	.679*	.642*	1.000	.843*	-.002	.074	-.139	.125	.002	.080	.130	.115	-.089	-.140	-.141	.263*	.069
		Sig. (2-tailed)	.000	.000	.	.000	.986	.502	.206	.256	.984	.467	.236	.293	.419	.291	.200	.015	.529
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	59	84	85	85
	PIADSOve	Correlation	.911*	.903*	.843*	.000	-.079	.058	-.139	.279*	.110	.194	.225*	.170	.009	-.081	-.039	.284*	.200
		Sig. (2-tailed)	.000	.000	.000	.	.474	.601	.206	.010	.314	.075	.038	.120	.934	.540	.724	.008	.067
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	59	84	85	85
	VFQ Subsc Health1	Correlation	-.028	-.084	-.002	-.079	1.000	.215*	.104	.158	.013	-.077	.114	-.003	-.041	.318*	.002	-.038	.080
		Sig. (2-tailed)	.797	.444	.986	.474	.	.048	.345	.149	.905	.482	.300	.980	.707	.014	.986	.728	.469
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	59	84	85	85
	VFQ Subsc Vision1	Correlation	-.051	.095	.074	.058	.215*	1.000	.256*	.308*	.255*	.120	.339*	.225*	.324*	.283*	.119	-.087	.460*
		Sig. (2-tailed)	.644	.387	.502	.601	.048	.	.018	.004	.018	.275	.001	.038	.002	.030	.283	.428	.000
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	59	84	85	85
	VFQ Subsc Pain1	Correlation	-.178	-.072	-.139	-.139	.104	.256*	1.000	.370*	.234*	.089	.204	.221*	.194	.165	.222*	.163	.511*
		Sig. (2-tailed)	.103	.514	.206	.206	.345	.018	.	.000	.031	.418	.061	.042	.075	.213	.042	.136	.000
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	59	84	85	85
	VFQ Subsc Activities1	Correlation	.230*	.348*	.125	.279*	.158	.308*	.370*	1.000	.462*	.302*	.285*	.218*	.293*	.146	.209	.262*	.574*
		Sig. (2-tailed)	.035	.001	.256	.010	.149	.004	.000	.	.000	.005	.008	.045	.006	.269	.056	.015	.000
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	59	84	85	85
	VFQ Subsc Activities1	Correlation	.078	.195	.002	.110	.013	.255*	.234*	.462*	1.000	.614*	.319*	.329*	.329*	.190	.256*	.223*	.597*
		Sig. (2-tailed)	.477	.074	.984	.314	.905	.018	.031	.000	.	.000	.003	.002	.002	.149	.019	.040	.000
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	59	84	85	85
	VFQ Subsc Functioning	Correlation	.216*	.180	.080	.194	-.077	.120	.089	.302*	.614*	1.000	.332*	.388*	.330*	.015	.309*	.260*	.639*
		Sig. (2-tailed)	.047	.098	.467	.075	.482	.275	.418	.005	.000	.	.002	.000	.002	.911	.004	.016	.000
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	59	84	85	85
	VFQ Subsc Health1	Correlation	.144	.267*	.130	.225*	.114	.339*	.204	.285*	.319*	.332*	1.000	.465*	.436*	.108	.203	.169	.622*
		Sig. (2-tailed)	.190	.014	.236	.038	.300	.001	.061	.008	.003	.002	.	.000	.000	.415	.064	.122	.000
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	59	84	85	85
	VFQ Subsc Difficulties1	Correlation	.195	.111	.115	.170	-.003	.225*	.221*	.218*	.329*	.388*	.465*	1.000	.330*	.004	.377*	.267*	.648*
		Sig. (2-tailed)	.074	.313	.293	.120	.980	.038	.042	.045	.002	.000	.000	.	.002	.973	.000	.013	.000
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	59	84	85	85
	VFQ Subsc Dependenc	Correlation	.016	.005	-.089	.009	-.041	.324*	.194	.293*	.329*	.330*	.436*	.330*	1.000	.399*	.340*	.093	.630*
		Sig. (2-tailed)	.882	.966	.419	.934	.707	.002	.075	.006	.002	.002	.000	.002	.	.002	.002	.397	.000
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	59	84	85	85
	VFQ Subsc	Correlation	-.051	-.015	-.140	-.081	.318*	.283*	.165	.146	.190	.015	.108	.004	.399*	1.000	.168	.072	.344*
		Sig. (2-tailed)	.702	.908	.291	.540	.014	.030	.213	.269	.149	.911	.415	.973	.002	.	.208	.587	.008
		N	59	59	59	59	59	59	59	59	59	59	59	59	59	59	58	59	59
	VFQ Subsc Vision1	Correlation	.043	-.047	-.141	-.039	.002	.119	.222*	.209	.256*	.309*	.203	.377*	.340*	.168	1.000	.229*	.585*
		Sig. (2-tailed)	.697	.670	.200	.724	.986	.283	.042	.056	.019	.004	.064	.000	.002	.208	.	.036	.000
		N	84	84	84	84	84	84	84	84	84	84	84	84	84	58	84	84	84
	VFQ Subsc Peripheral	Correlation	.243*	.273*	.263*	.284*	-.038	-.087	.163	.262*	.223*	.260*	.169	.267*	.093	.072	.229*	1.000	.412*
		Sig. (2-tailed)	.025	.011	.015	.008	.728	.428	.136	.015	.040	.016	.122	.013	.397	.587	.036	.	.000
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	59	84	85	85
	VFQ Comp	Correlation	.177	.226*	.069	.200	.080	.460*	.511*	.574*	.597*	.639*	.622*	.648*	.630*	.344*	.585*	.412*	1.000
		Sig. (2-tailed)	.105	.038	.529	.067	.469	.000	.000	.000	.000	.000	.000	.000	.000	.008	.000	.000	.
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	59	84	85	85

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

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

PIADS and NEI-VFQ 25 at Follow up Administration

Correlations

			PIADS Subscale mpetenc	PIADS Subscale aptabilit	PIADS Subscale lf-Estee	ADSO erall2	Q Subsc General Health2	Q Subsc General Vision2	Q Subsc ular Pai	Q Subsc Near ctivities	Q Distar ctivities	FQ Soci nctionin	Q Men Health2	FQ Rol fficultie	VFQ penden	Q Drivi	FQ Col Vision2	VFQ eripher Vision2	VFQ mpost Score2
Spearma	PIADS Subs Competence	Correlation	1.000	.681*	.767*	.917*	.250*	.204	-.070	.146	.207	.049	.229*	.253*	.302*	.175	.067	.171	.304*
		Sig. (2-taile	.	.000	.000	.000	.021	.061	.522	.184	.057	.658	.035	.019	.005	.178	.546	.118	.005
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	61	84	85	85
	PIADS Subs Adaptability2	Correlation	.681*	1.000	.616*	.856*	.300*	.298*	-.033	.311*	.348*	.090	.315*	.168	.290*	.178	.064	.114	.351*
		Sig. (2-taile	.000	.	.000	.000	.005	.006	.766	.004	.001	.411	.003	.123	.007	.171	.562	.300	.001
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	61	84	85	85
	PIADS Subs Self-Esteem	Correlation	.767*	.616*	1.000	.883*	.336*	.262*	-.168	.170	.241*	.119	.195	.143	.261*	.075	.093	.134	.275*
		Sig. (2-taile	.000	.000	.	.000	.002	.016	.125	.119	.026	.280	.074	.192	.016	.566	.402	.223	.011
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	61	84	85	85
	PIADSOvera	Correlation	.917*	.856*	.883*	1.000	.328*	.280*	-.106	.234*	.311*	.095	.288*	.210	.333*	.169	.095	.175	.359*
		Sig. (2-taile	.000	.000	.000	.	.002	.009	.334	.031	.004	.385	.007	.054	.002	.194	.390	.110	.001
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	61	84	85	85
	VFQ Subsca Health2	Correlation	.250*	.300*	.336*	.328*	1.000	.345*	-.040	.135	.224*	.208	.308*	.134	.107	.018	.004	.092	.197
		Sig. (2-taile	.021	.005	.002	.002	.	.001	.717	.217	.039	.056	.004	.222	.328	.889	.969	.400	.070
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	61	84	85	85
	VFQ Subsca Vision2	Correlation	.204	.298*	.262*	.280*	.345*	1.000	.221*	.252*	.243*	.245*	.359*	.230*	.348*	.238	.058	.006	.477*
		Sig. (2-taile	.061	.006	.016	.009	.001	.	.042	.020	.025	.024	.001	.035	.001	.065	.603	.960	.000
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	61	84	85	85
	VFQ Subsca Pain2	Correlation	-.070	-.033	-.168	-.106	-.040	.221*	1.000	.194	.050	-.045	.158	.123	.201	.114	.165	.248*	.387*
		Sig. (2-taile	.522	.766	.125	.334	.717	.042	.	.075	.652	.681	.148	.263	.065	.384	.133	.022	.000
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	61	84	85	85
	VFQ Subsca Activities2	Correlation	.146	.311*	.170	.234*	.135	.252*	.194	1.000	.476*	.135	.256*	-.002	.338*	.164	.278*	.210	.454*
		Sig. (2-taile	.184	.004	.119	.031	.217	.020	.075	.	.000	.218	.018	.982	.002	.207	.011	.054	.000
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	61	84	85	85
	VFQ Distan	Correlation	.207	.348*	.241*	.311*	.224*	.243*	.050	.476*	1.000	.308*	.285*	.178	.350*	.277*	.161	.255*	.479*
		Sig. (2-taile	.057	.001	.026	.004	.039	.025	.652	.000	.	.004	.008	.103	.001	.031	.144	.019	.000
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	61	84	85	85
	VFQ Social	Correlation	.049	.090	.119	.095	.208	.245*	-.045	.135	.308*	1.000	.347*	.447*	.275*	.279*	.307*	.143	.551*
		Sig. (2-taile	.658	.411	.280	.385	.056	.024	.681	.218	.004	.	.001	.000	.011	.029	.005	.192	.000
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	61	84	85	85
	VFQ Mental	Correlation	.229*	.315*	.195	.288*	.308*	.359*	.158	.256*	.285*	.347*	1.000	.427*	.429*	.365*	.216*	.234*	.638*
		Sig. (2-taile	.035	.003	.074	.007	.004	.001	.148	.018	.008	.001	.	.000	.000	.004	.048	.031	.000
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	61	84	85	85
	VFQ Role D	Correlation	.253*	.168	.143	.210	.134	.230*	.123	-.002	.178	.447*	.427*	1.000	.312*	.346*	.215*	.277*	.610*
		Sig. (2-taile	.019	.123	.192	.054	.222	.035	.263	.982	.103	.000	.000	.	.004	.006	.050	.010	.000
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	61	84	85	85
	VFQ Depen	Correlation	.302*	.290*	.261*	.333*	.107	.348*	.201	.338*	.350*	.275*	.429*	.312*	1.000	.374*	.375*	.211	.707*
		Sig. (2-taile	.005	.007	.016	.002	.328	.001	.065	.002	.001	.011	.000	.004	.	.003	.000	.052	.000
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	61	84	85	85
	VFQ Driving	Correlation	.175	.178	.075	.169	.018	.238	.114	.164	.277*	.279*	.365*	.346*	.374*	1.000	.123	.191	.462*
		Sig. (2-taile	.178	.171	.566	.194	.889	.065	.384	.207	.031	.029	.004	.006	.003	.	.348	.140	.000
		N	61	61	61	61	61	61	61	61	61	61	61	61	61	61	60	61	61
	VFQ Color V	Correlation	.067	.064	.093	.095	.004	.058	.165	.278*	.161	.307*	.216*	.215*	.375*	.123	1.000	.223*	.569*
		Sig. (2-taile	.546	.562	.402	.390	.969	.603	.133	.011	.144	.005	.048	.050	.000	.348	.	.041	.000
		N	84	84	84	84	84	84	84	84	84	84	84	84	84	60	84	84	84
	VFQ Periph	Correlation	.171	.114	.134	.175	.092	.006	.248*	.210	.255*	.143	.234*	.277*	.211	.191	.223*	1.000	.461*
		Sig. (2-taile	.118	.300	.223	.110	.400	.960	.022	.054	.019	.192	.031	.010	.052	.140	.041	.	.000
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	61	84	85	85
	VFQ Compo	Correlation	.304*	.351*	.275*	.359*	.197	.477*	.387*	.454*	.479*	.551*	.638*	.610*	.707*	.462*	.569*	.461*	1.000
		Sig. (2-taile	.005	.001	.011	.001	.070	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.
		N	85	85	85	85	85	85	85	85	85	85	85	85	85	61	84	85	85

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

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

Appendix O

Relationship Change over time for PIADS and NEI-VFQ 25 for ARMD Sample

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	PIADS Subscale Competence1 - PIADS Subscale Competence2	-.22647	.69634	.07553	-.37667	-.07627	-2.998	84	.004
Pair 2	PIADS Subscale Adaptability1 - PIADS Subscale Adaptability2	-.10000	.73427	.07964	-.25838	.05838	-1.256	84	.213
Pair 3	PIADS Subscale Self-Esteem1 - PIADS Subscale Self-Esteem2	-.22794	.58541	.06350	-.35421	-.10167	-3.590	84	.001
Pair 4	PIADSOverall1 - PIADSOverall2	-.18480	.58938	.06393	-.31193	-.05768	-2.891	84	.005
Pair 5	VFQ Subscale General Health1 - VFQ Subscale General Health2	-3.82353	25.15011	2.72791	-9.24828	1.60122	-1.402	84	.165
Pair 6	VFQ Subscale General Vision1 - VFQ Subscale General Vision2	-3.05882	14.31146	1.55230	-6.14573	.02809	-1.971	84	.052
Pair 7	VFQ Subscale Ocular Pain1 - VFQ Subscale Ocular Pain2	1.23529	15.74359	1.70763	-2.16052	4.63111	.723	84	.471
Pair 8	VFQ Subscale Near Activities1 - VFQ Subscale Near Activities2	-3.03922	17.00291	1.84422	-6.70666	.62823	-1.648	84	.103
Pair 9	VFQ Subscale Distance Activities1 - VFQ Distance Activities2	.53922	12.91936	1.40130	-2.24743	3.32586	.385	84	.701
Pair 10	VFQ Subscale Social Functioning1 - VFQ Social Functioning2	7.50000	30.81241	3.34208	.85392	14.14608	2.244	84	.027
Pair 11	VFQ Subscale Mental Health1 - VFQ Mental Health2	-1.17647	19.32391	2.09597	-5.34454	2.99160	-.561	84	.576
Pair 12	VFQ Subscale Role Difficulties1 - VFQ Role Difficulties2	2.05882	26.29440	2.85203	-3.61275	7.73039	.722	84	.472
Pair 13	VFQ Subscale Dependency1 - VFQ Dependency2	2.74510	21.76064	2.36027	-1.94856	7.43876	1.163	84	.248
Pair 14	VFQ Subscale Color Vision1 - VFQ Color Vision2	-2.97619	21.74772	2.37287	-7.69573	1.74335	-1.254	83	.213
Pair 15	VFQ Subscale Peripheral Vision1 - VFQ Peripheral Vision2	1.17647	18.05493	1.95833	-2.71789	5.07083	.601	84	.550
Pair 16	VFQ Composite Score1 - VFQ Composte Score2	.58073	7.44811	.80786	-1.02579	2.18725	.719	84	.474
Pair 17	VFQ Subscale Driving1 - VFQ Driving2	.37202	9.74021	1.30159	-2.23642	2.98047	.286	55	.776

Appendix P

Example of 95% Confidence Intervals for Comparison of ARMD Population to Overall Sample

Descriptives

			Statistic	Std. Error
PIADS Subscale Competence1	Mean		1.1615	.08572
	95% Confidence Interval for Mean	Lower Bound	.9908	
		Upper Bound	1.3321	
	5% Trimmed Mean		1.1551	
	Median		1.0833	
	Variance		.588	
	Std. Deviation		.76667	
	Minimum		-.67	
	Maximum		2.92	
	Range		3.58	
	Interquartile Range		1.00	
	Skewness		.034	.269
	Kurtosis		-.385	.532
PIADS Subscale Adaptability1	Mean		.9708	.07713
	95% Confidence Interval for Mean	Lower Bound	.8173	
		Upper Bound	1.1244	
	5% Trimmed Mean		.9537	
	Median		.9167	
	Variance		.476	
	Std. Deviation		.68988	
	Minimum		-.33	
	Maximum		3.00	
	Range		3.33	
	Interquartile Range		1.00	
	Skewness		.362	.269
	Kurtosis		-.156	.532
PIADS Subscale Self-Esteem1	Mean		.8063	.07754
	95% Confidence Interval for Mean	Lower Bound	.6519	
		Upper Bound	.9606	
	5% Trimmed Mean		.7795	
	Median		.7500	
	Variance		.481	
	Std. Deviation		.69352	
	Minimum		-.50	
	Maximum		2.63	
	Range		3.13	
	Interquartile Range		1.00	
	Skewness		.468	.269
	Kurtosis		-.201	.532
PIADSOverall1	Mean		.9795	.07334
	95% Confidence Interval for Mean	Lower Bound	.8335	
		Upper Bound	1.1255	
	5% Trimmed Mean		.9645	
	Median		.9167	
	Variance		.430	
	Std. Deviation		.65597	
	Minimum		-.22	
	Maximum		2.81	
	Range		3.03	
	Interquartile Range		.98	
	Skewness		.302	.269
	Kurtosis		-.335	.532
PIADS Subscale Competence2	Mean		1.3052	.07819
	95% Confidence Interval for Mean	Lower Bound	1.1496	
		Upper Bound	1.4608	
	5% Trimmed Mean		1.3113	
	Median		1.2500	
	Variance		.489	
	Std. Deviation		.69935	
	Minimum		-.50	
	Maximum		2.83	
	Range		3.33	
	Interquartile Range		.92	
	Skewness		.055	.269
	Kurtosis		-.350	.532
PIADS Subscale Adaptability2	Mean		1.0729	.07429
	95% Confidence Interval for Mean	Lower Bound	.9250	
		Upper Bound	1.2208	
	5% Trimmed Mean		1.0463	
	Median		.9167	
	Variance		.442	
	Std. Deviation		.66447	
	Minimum		-.33	
	Maximum		2.67	
	Range		3.00	
	Interquartile Range		1.00	
	Skewness		.545	.269
	Kurtosis		-.151	.532
PIADS Subscale Self-Esteem2	Mean		.9828	.06820
	95% Confidence Interval for Mean	Lower Bound	.8471	
		Upper Bound	1.1186	
	5% Trimmed Mean		.9705	
	Median		.8125	
	Variance		.372	
	Std. Deviation		.61002	
	Minimum		-.13	
	Maximum		2.25	
	Range		2.38	
	Interquartile Range		.97	
	Skewness		.503	.269
	Kurtosis		-.798	.532
PIADSOverall2	Mean		1.1203	.06548
	95% Confidence Interval for Mean	Lower Bound	.9900	
		Upper Bound	1.2507	
	5% Trimmed Mean		1.1098	
	Median		1.0972	
	Variance		.343	
	Std. Deviation		.58571	
	Minimum		.08	
	Maximum		2.35	