

The Influence of Coping on Vision-Related Quality of Life in Patients With Low Vision: A Prospective Longitudinal Study

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PURPOSE. To determine the longitudinal impact of specific coping strategies on vision-related quality of life (VRQoL) in patients with low vision.

METHODS. This was a single-group, longitudinal study utilizing telephone-administered interviews conducted at baseline and at 3 and 6 months with patients (visual acuity < 6/12 in the better eye) recruited from low vision services. The Coping Strategy Indicator (CSI) assessed three strategies used specifically in relation to vision-related problems: avoidant coping, problem-solving coping, and seeking social support. Vision-related quality of life was assessed using the Impact of Vision Impairment (IVI) questionnaire, which comprises two domains: vision-related functioning and vision-related emotional well-being. We used multivariable mixed linear regression including time as an independent variable to assess change in VRQoL.

RESULTS. The study comprised 162 patients (mean age = 69.8 years, 66% female), most with age-related macular degeneration (42%) and moderate vision impairment (41%; <6/18–6/60). Multivariable mixed linear regression showed that avoidant coping was a significant determinant of decline in vision-related functioning ($\beta = -0.11$, 95% confidence interval [CI] -0.22 to -0.01 , $P = 0.036$) and emotional well-being ($\beta = -0.29$, 95% CI -0.45 to -0.13 , $P < 0.001$) over a 6-month period.

CONCLUSIONS. Our findings showed that avoidant coping has a detrimental impact on VRQoL over time. Low vision specialists should be aware of their patients' coping strategies and encourage them to engage in active rather than avoidant coping to deal with the impact of their vision impairment.

Keywords: coping strategies, vision-related quality of life, longitudinal

Low vision (visual acuity that cannot be corrected to better than 6/12 in the better eye¹) is a global health problem, and the worldwide number of individuals who are blind is increasing due to an expanding and aging population.² The disability resulting from low vision³ means that these individuals often experience difficulties with functional and emotional well-being and commonly report diminished quality of life.⁴⁻⁷ Vision-related quality of life (VRQoL) represents the measurement of the impact of vision loss on emotional well-being, social relationships, and independence in daily functional activities.⁸ Factors found to be commonly associated with poor VRQoL include female sex, lower educational status, declining health status, poorer visual acuity,⁹ increased severity of eye disease,¹⁰ greater degree of visual field loss,¹¹ and difficulties in mobility.¹² However, much of the research in this area is cross-sectional, and longitudinal studies investigating change in VRQoL are scant. One longitudinal study found a decline in VRQoL over 4.4 years post engagement in vision rehabilitation,⁹ and another demonstrated that worsening visual acuity was

associated with poorer vision-related emotional and functional well-being over 4 years.¹³

No studies have directly examined the prospective relationship between VRQoL and coping strategies applied to problems of low vision; this is important, as low vision is a chronic stressor. The demands of living with low vision require those affected to continuously adapt to and cope with challenges on a daily basis.^{4,5} Coping strategies applied to help manage low vision can influence outcomes. For example, spending more time than usual alone because of the functional challenges associated with poor eyesight is likely to perpetuate negative feelings and isolation. Similarly, low vision can cause people to feel helpless and to stop seeking solutions to their problems, which can in turn cause them to feel worse, making it even more difficult to take action to change their situation (i.e., a downward spiral).

Evidence suggests that different coping styles are associated with better or worse adaptation to vision impairment, a concept that is different from VRQoL.¹⁴⁻¹⁸ Longitudinal research has indicated that active coping by acceptance and seeking family support is associated with improved adaptation

to vision loss, although these forms of coping did not have a strong significant effect at 6 months.¹⁹ Other research conducted over a 2-year time period indicated that instrumental coping (i.e., problem solving via taking action) was associated with improved adaptation to age-related vision loss, and dysfunctional escape/distraction strategies were used less in those who were engaged with a low vision specialist.¹⁵ To date, however, there have been no longitudinal studies examining the impact of coping with low vision and its relationship to VRQoL. Understanding how coping relates to VRQoL will help to identify targets for both prevention of worsening VRQoL and intervention to assist maintaining or improving VRQoL. In our study, we therefore examined whether coping strategies used specifically to address the challenges related to low vision are associated with VRQoL longitudinally over a 6-month period.

MATERIALS AND METHODS

Participants and Recruitment

Participants were recruited from Vision Australia, the main vision rehabilitation service provider in Australia, and the Royal Victorian Eye and Ear Hospital (RVEEH). The eligibility criteria were best-corrected visual acuity <6/12 in the better eye, age \geq 18 years, ability to converse in English, adequate hearing using a hearing aid if necessary, and no cognitive impairment determined by the six-item Cognitive Impairment Test (6CIT).²⁰

Ethical approval was provided by the Human Research and Ethics Committee of the RVEEH (09/923H). Informed written consent was obtained from all participants, which included permission to access ophthalmologists' reports. Our research adhered to the tenets of the Declaration of Helsinki.

Design

A repeated measures longitudinal design was used. Participants completed telephone-administered questionnaires at baseline and at 3- and 6-month follow-up.

Demographics

Participants' data on sex, age, country of birth, main language spoken, main cause of vision loss, and marital, employment, educational, and perceived general health status were collected. Participants were asked about their vision prognosis—that is, whether over the next year they expected their vision to stay the same, improve, deteriorate, or fluctuate or whether they didn't know what to expect. Participants were also asked about use of psychotropic medication and engagement with a mental health practitioner while participating in the study. Visual acuity was taken from ophthalmic records at the commencement of the study. Vision impairment was classified as mild (<6/12–6/18), moderate (<6/18–6/60), or severe (<6/60).

Vision-Related Quality of Life

The Impact of Vision Impairment (IVI) Questionnaire is a 28-item questionnaire developed to assess VRQoL and has undergone extensive psychometric validation.^{1,21,22} The IVI has three subscales: Mobility and Independence (11 items), Reading and Accessing Information (nine items), and Emotional Well-Being (eight items).²² Recent studies using Rasch analysis have also reported that the IVI has two valid scales, namely, Vision-Related Functioning (items 1–20) and Vision-Related Emotional Well-Being (items 21–28).^{7,23} The Vision-Related Functioning scale examines to what degree partici-

pants' vision impairment has interfered with participation in common daily activities in the last month (e.g., shopping, opening packaging, and visiting friends). The Vision-Related Emotional Well-Being scale asks participants to indicate how they have been feeling because of their vision impairment over the past month. Items refer to embarrassment, frustration, annoyance, isolation, loneliness, sadness, and worry about change in vision, coping with daily life, and feeling like a burden. Items are rated on a 4- or 5-point Likert-type scale, ranging from "Not at all" to "A lot of the time." We conducted Rasch analysis on our data, and our results supported the use of the Vision-Related Functional and Emotional Well-Being scales. In our study, lower scores reflect poorer vision-related functioning and emotional well-being.

Coping Strategies

The Coping Strategy Indicator (CSI)^{24,25} is a 33-item self-report measure of the degree to which three coping strategies—problem solving, seeking social support, and avoidance—have been used in response to a specific problem. For the purposes of this study, we asked participants to focus on problems related to their vision impairment. The Problem-Solving scale assesses use of goal setting, generating solutions, and thinking about the pros and cons of solutions (e.g., "set some goals for yourself to deal with the problem"). Seeking Social Support includes items about talking to meaningful others about negative feelings (e.g., fears and worries) and seeking advice on how to improve feelings (e.g., "went to a friend for advice about how to change the situation"). The Avoidance scale explores use of distraction, concealing the severity of problems, avoiding being with meaningful others, and/or reminiscing about better times (e.g., "tried to distract yourself from the problem"). Items are rated on a 3-point Likert-type scale: "A lot," "A little," and "Not at all." The higher the CSI score on each scale, the greater use of the specified coping strategy. The CSI has demonstrated high test-retest and internal reliability and acceptable construct validity.^{24,25}

Psychometric Assessment of the Outcome Measures

Rasch analysis was used to assess the psychometric properties of the IVI and the three CSI coping scales in this sample using the Andrich rating scale model²⁶ with Winsteps software (version 3.75; Chicago, IL, USA).^{27,28} Rasch analysis is a form of item response theory in which the ordinal ratings of the questionnaire are transformed into estimates of interval measures (expressed in log of the odds units, or logits). Rasch analysis also provides significant insight into the psychometric properties of the scale, including (1) appropriate use of response categories; (2) measurement precision; (3) how well items "fit" the underlying trait; (4) unidimensionality; (5) targeting of item difficulty to patients' ability; and (6) differential item functioning (DIF).²⁹ To generate valid pre-post person measures, the data were anchored to item measures and structure calibrations at baseline for the subsequent analyses, which is standard in pre-post Rasch analyses.^{30,31} This approach reduces distortion of the estimated person measures by anchoring the IVI and CSI questionnaires to baseline, thus ascertaining that the same instrument with identical measurement properties is used to repeatedly test participants over time.³¹ Baseline and follow-up data were also stacked to establish that differences between the scores for all outcome measures at baseline and follow-up were valid indicators of changes over time.²¹ The absence of DIF was used to establish invariance over time. Differential item functioning occurs when groups of scores within the sample (e.g., baseline

and follow-up), despite equal levels of the underlying characteristic being measured, respond in a different manner to an individual item. This technique has been successfully implemented by our group previously.^{32,33}

The Vision-Related Functional and Emotional Well-Being scales of the IVI and the Problem-Solving and Seeking Social Support scales of the CSI demonstrated excellent fit to the Rasch model, with good precision and targeting and no evidence of multidimensionality, item misfit, or DIF. The Avoidance scale initially demonstrated poor precision; however, this improved to adequate levels following removal of extreme minimum responses from the analyses ($n = 8$).

Statistical Analysis

Descriptive analyses were performed on all variables. Continuous variables are presented as mean and standard deviation (SD) for the normally distributed data, whereas categorical variables are presented as absolute (n) and relative frequencies (%) with a 95% confidence interval (CI). Differences in categorical data between the groups (i.e., participants in the study versus participants lost to follow-up at 6 months) were compared with χ^2 or Fisher exact tests where appropriate. Differences in continuous variables between groups were evaluated by the Mann-Whitney-Wilcoxon test for skewed distributed data, and t -tests or analysis of variance (ANOVA) were used for normally distributed data.

Following descriptive statistics derived from each time point, we used a modern, sophisticated approach to analyzing change over time.³⁴ First, a mixed linear regression model was used to identify those variables independently associated with VRQoL with a first-order autoregressive covariance structure and restricted maximum likelihood estimation. These models take into account the correlation within observations on the same participant and allow for inclusion of data on participants who have only partial follow-up without imputing missing data. Univariate mixed linear regression was used to identify significant ($P < 0.10$) risk factors that predict VRQoL. Second, we conducted multivariable linear regression models controlling for the significant risk factors identified in the univariate analysis. To confirm that our results were robust, the model controlled for the variables significant in the univariate mixed linear model plus age, sex, patient prognosis regarding visual acuity, and use of psychotropic medication and engagement with a mental health practitioner while participating in the study. All statistical analyses were conducted with Stata version 12.1.0 (Stata Corp., College Station, TX, USA). A two-tailed P value < 0.05 was considered statistically significant.

RESULTS

Two hundred fifty-two participants were invited to take part in the study. Forty-seven participants (18.7%) were excluded because they did not have low vision (i.e., best-corrected visual acuity $< 6/12$ - $6/18$ in the better eye); 35 (13.9%) declined to take part, two (0.8%) were excluded due to cognitive impairment, and six (2.4%) because of missing data on the variables of interest. Of the remaining participants ($n = 162$), 61 (37.7%) dropped out by 6 months.

Participant Characteristics

The sample at baseline included 162 participants, 107 (66%) females, mean age 69.8 years (SD = 15.9). Thirty-seven percent ($n = 60$) of participants had mild vision impairment (best-corrected visual acuity [VA] $< 6/12$); 41.4% ($n = 67$) had moderate vision impairment (VA $< 6/18$ - $6/60$), and 21.6% ($n = 35$) had severe

vision impairment (VA $< 6/60$). Self-reported patient prognosis regarding VA was stable and did not significantly differ over time, $\chi^2(8) = 5.52$, $P = 0.701$. Those lost to follow-up at 6 months ($n = 61$, Table 1) were more likely to speak English as a second language and to use fewer coping strategies than those who remained in the study ($P < 0.05$). Supplementary Table S1 displays the multivariable association between coping and VRQoL for patients who remained in the study (i.e., the associations between the variables of interest and change scores for VRQoL only for those who remained in the study). Caution must be taken when interpreting these findings, which suggest a significant change in vision-related functioning from baseline to 3-month follow-up as a result of coping via social support and problem solving. This method of analysis is limited psychometrically in its ability to predict change because the sample size reduces significantly impacting on statistical power. This is why we used our sophisticated analysis to assess change.

Longitudinal Association Between Coping and VRQoL

The univariate mixed linear regression model (i.e., with time acting as a covariate combining all of the data and including time as an independent variable in the mixed linear model) indicated that greater use of social support, avoidant and problem-solving coping, severe vision impairment, and poor self-reported health status were significant determinants of decline in vision-related functioning over the course of the study (Table 2). Decline in vision-related emotional well-being was associated with greater use of problem-solving and avoidant coping, female sex, living with a son/daughter, and poor self-reported health status.

In the final multivariable mixed linear regression model, greater use of avoidant coping ($\beta = -0.11$, 95% CI -0.22 to -0.01 , $P = 0.036$) and severe vision impairment ($\beta = -0.63$, 95% CI -1.25 to -0.01 , $P = 0.046$) significantly determined decline in vision-related functioning (Table 3). Decline in vision-related emotional well-being was associated with greater use of avoidant coping ($\beta = -0.29$, 95% CI -0.45 to -0.13 , $P < 0.001$) and moderate vision impairment ($\beta = -0.86$, 95% CI -1.50 to -0.21 , $P = 0.009$).

DISCUSSION

Our novel study shows that avoidant coping has a detrimental impact on VRQoL. This association was independent of age, sex, use of psychotropic medication, patient prognosis regarding visual acuity, and engagement with a mental health practitioner during the course of our study, and was seen for both vision-related functioning and vision-related emotional well-being over 6 months.

While our work is the first to investigate the impact of change in coping over time on change in VRQoL, our findings are analogous to those in previous studies exploring coping strategies and their association with better or worse adaptation to vision loss.^{14-16,18,19,35} For example, acceptance coping (an opposing concept to avoidance) displayed a positive relationship with better adaptation to vision loss.¹⁹ However, we did not find significant associations between seeking support, problem-solving coping, and better VRQoL^{15,19}; this may be because these strategies have been demonstrated to preserve rather than negatively impact adaptation to low vision.^{15,19,35} Our findings may suggest that VRQoL deteriorates over time and that patients' repertoire of active coping strategies is not adequate to maintain VRQoL. Alternatively, patients may believe that problems related to their vision impairment are

TABLE 1. Sociodemographic and Psychosocial Characteristics of Patients in the Study and Those Lost to Follow-Up at 6 Months (*N* = 162)

	Patients Lost to Follow-Up at 6 Months, <i>n</i> = 61, No. (%) or Mean ± SD	Patients in Study, <i>n</i> = 101, No. (%) or Mean ± SD	<i>P</i> Value
Categorical variable			
Sex			
Male	25 (41.0)	30 (29.7)	0.142
Female	36 (59.0)	71 (71.3)	
Country of birth			
Non-Australia	16 (26.2)	17 (16.8)	0.150
Australia	45 (73.8)	84 (83.2)	
Main language			
Non-English	6 (9.8)	2 (2.0)	0.029
English	55 (90.2)	96 (98.0)	
Marital status			
Married/de facto/partnered	5 (8.2)	14 (13.9)	0.268
Single/widowed	15 (24.6)	35 (34.6)	
Single/never married	9 (14.7)	12 (11.9)	
Single/divorced/separated	32 (52.5)	40 (39.6)	
Employment status			
Medical disability/pension	32 (50.0)	46 (45.4)	0.947
Retired	18 (30.0)	37 (36.6)	
Unemployed	6 (10.0)	10 (9.9)	
Part-time employed	3 (5.0)	3 (3.0)	
Home duties	2 (3.3)	3 (3.0)	
Full-time employed	1 (1.7)	2 (2.0)	
Educational status			
Primary school or less	16 (26.2)	16 (15.8)	0.592
Some secondary/technical	28 (45.9)	50 (49.5)	
Secondary education	6 (9.8)	13 (12.9)	
Trade/apprenticeship	7 (11.5)	13 (12.9)	
University degree or above	4 (6.5)	9 (8.9)	
Vision impairment*			
Mild (<6/12)	24 (39.3)	36 (36.0)	0.685
Moderate (<6/18–6/60)	26 (42.6)	41 (40.6)	
Severe (<6/60)	11 (18.0)	24 (23.8)	
Eye condition			
AMD	20 (32.8)	42 (41.6)	0.546
Diabetic retinopathy	8 (13.1)	9 (8.9)	
Glaucoma	12 (19.7)	13 (12.9)	
Cataract	2 (3.3)	5 (5.0)	
Other†	18 (29.5)	27 (26.7)	
Health status			
Poor	14 (23.3)	23 (23.0)	0.714
Good	23 (38.3)	29 (29.0)	
Excellent	23 (38.3)	39 (39.0)	
Continuous variable			
Age, y	67.11 (16.97)	71.53 (15.01)	0.089
IVI functional, Person measure (logits)	4.15 (1.44)	4.10 (1.19)	0.896
IVI emotional, Person measure (logits)	5.23 (2.03)	5.00 (2.06)	0.127
CSI Avoidant, Person measure (logits)	2.38 (1.93)	3.69 (2.83)	0.001
CSI Problem Solving, Person measure (logits)	3.64 (2.17)	4.38 (2.31)	0.049
CSI Social Support, Person measure (logits)	3.55 (1.72)	4.51 (2.10)	0.002

AMD, age related macular degeneration; DR, diabetic retinopathy.

* Better eye.

† For example, retinal detachment, blood spurting, anterior ischemic optic neuropathy, bilateral optic atrophy, giant cell arteritis.

out of their control—unsolvable—and thus engage predominantly in avoidant coping.

Consistent with other studies, we found that severe vision impairment was associated with poorer vision-related func-

tioning.^{36,37} Severity of vision impairment was not associated with worse vision-related emotional well-being; this finding is contrary to previous studies showing that individuals with vision impairment had increasing levels of depression and/or

TABLE 2. Univariate Association Between Coping and VRQoL

	IVI Functional		IVI Emotional	
	β (95% CI)	<i>P</i>	β (95% CI)	<i>P</i>
CSI Avoidant	-0.080 (-0.138, -0.022)	0.007	-0.122 (-0.204, -0.041)	0.003
CSI Social Support	-0.082 (-0.153, -0.011)	0.023	-0.055 (-0.158, 0.048)	0.294
CSI Problem Solving	-0.080 (-0.138, -0.022)	0.007	-0.124 (-0.212, -0.036)	0.006
Age	0.002 (-0.009, 0.014)	0.684	0.006 (-0.011, 0.023)	0.481
Female sex	-0.076 (-0.467, 0.314)	0.701	-0.599 (-1.152, -0.046)	0.034
Visual acuity				
Mild (<6/12)	0		0	
Moderate (<6/18-6/60)	-0.138 (-0.552, 0.275)	0.512	-0.062 (-0.666, 0.542)	0.841
Severe (<6/60)	-0.558 (-1.04, -0.02)	0.025	0.006 (-0.714, 0.726)	0.987
Language				
Non-English	0		0	
English	0.043 (-0.884, 0.969)	0.928	-0.583 (-1.889, 0.723)	0.381
Eye condition				
AMD	0		0	
DR	0.174 (-0.461, 0.809)	0.592	0.097 (-0.824, 1.201)	0.835
Glaucoma	-0.015 (-0.570, 0.539)	0.956	-0.207 (-1.014, 0.601)	0.615
Cataract	0.347 (-0.540, 1.235)	0.443	1.071 (-0.228, 2.370)	0.106
Other	-0.003 (-0.451, 0.444)	0.987	-0.208 (-0.865, 0.449)	0.534
Other physical health conditions				
No	0		0	
Yes	-0.335 (-0.794, 0.124)	0.153	-0.348 (-1.003, 0.307)	0.298
Health rating				
Excellent	0		0	
Good	0.009 (-0.402, 0.421)	0.963	-0.158 (-0.741, 0.426)	0.596
Poor	-0.679 (-1.154, -0.204)	0.005	-1.128 (-1.805, -0.451)	0.001
Employment				
Full/part employment	0		0	
Retired	-0.616 (-1.477, 0.234)	0.160	-0.615 (-1.831, 0.601)	0.321
Unemployed/home duties	-0.853 (-1.802, 0.962)	0.078	-0.773 (2.125, 0.579)	0.262
Medical disability pension	-0.643 (-1.488, 0.203)	0.137	-0.980 (-2.178, 0.218)	0.109
Residential status				
Living alone	0		0	
Husband/wife/partner	0.172 (-0.221, 0.565)	0.391	0.040 (-0.522, 0.603)	0.888
Son/daughter	-0.091 (-0.793, 0.612)	0.801	-1.136 (-2.136, -0.135)	0.026
Other	0.640 (-0.211, 1.491)	0.141	0.134 (-1.075, 1.345)	0.827

Estimated mean change (slope), estimated by a linear mixed model, and its 95% CI.

TABLE 3. Multivariable Association Between Coping and VRQoL

	IVI Functional*		IVI Emotional*	
	β (95% CI)	<i>P</i>	β (95% CI)	<i>P</i>
CSI Avoidant	-0.112 (-0.217, -0.007)	0.036	-0.294 (-0.454, -0.134)	<0.001
CSI Social Support	-0.004 (-0.146, 0.139)	0.958	0.145 (-0.054, 0.344)	0.152
CSI Problem Solving	0.011 (-0.107, 0.129)	0.859	0.056 (-0.106, 0.217)	0.499
Health rating				
Excellent	0		0	
Good	-0.310 (-0.805, 0.185)	0.220	-0.172 (-0.838, 0.494)	0.613
Poor	-0.579 (-1.243, -0.084)	0.087	-0.620 (-1.512, 0.271)	0.173
Visual acuity				
Mild (<6/12)	0		0	
Moderate (<6/18-6/60)	-0.448 (-0.929, 0.033)	0.068	-0.857 (-1.503, -0.212)	0.009
Severe (<6/60)	-0.630 (-1.250, -0.010)	0.046	-0.086 (-0.932, 0.760)	0.842

Estimated mean change (slope), estimated by a linear mixed model, and its 95% CI.

* Model included the variables significant in the univariate mixed linear model plus the control variables age, sex, use of psychotropic medication, patient prognosis regarding visual acuity, and engagement with a mental health practitioner.

emotional distress.^{38,39} Yet our finding is consistent with other research demonstrating a nonsignificant association between severity of vision impairment and poorer vision-related emotional well-being.^{40,41} Moderate (not severe) vision impairment was associated with decline in vision-related well-being. The latter finding might suggest that patients with moderate vision impairment worry that their vision loss will get worse and/or that they may not yet have accepted their diagnosis when compared to those with severe vision impairment.

The strengths of our study are its longitudinal design, use of Rasch analysis to validate our measures, and utilization of a sophisticated mixed model for longitudinal data confirming that our results are robust. There are, however, some limitations. First, the results may not be generalizable, as patients were a treatment-seeking group, indicating that they may cope more adaptively (e.g., by seeking support) than those not engaged in vision rehabilitation services. Second, we were unable to gather data on change in visual acuity at follow-up and, as a result, had to rely on patients' self-reported prognosis regarding visual acuity. Last, our data may be impacted by attrition, as we observed that those patients lost to follow-up were more likely to use fewer coping strategies than those who remained in the study. As a result, our findings may be attenuated. While attrition is a ubiquitous problem in longitudinal studies, we lost greater than one-third of our sample at 6-month follow-up, which is substantial. Because we used a method of analysis that allows for inclusion of data on participants who have only partial follow-up without imputing missing data, the internal and external validity of the study should not be compromised due to loss to follow-up. In addition, we compared the characteristics of those in the study and those lost to follow-up and found that there were no significant differences in the demographic factors (excluding main language spoken). In order to retain study participants, we followed recommended strategies, including contact and scheduling methods (i.e., recording preferences for time and day to make contact), reminders (i.e., using the participants referred mode—phone, mail, text message, e-mail), and study personnel characteristics (i.e., developing rapport and providing encouragement).⁴² Some potential reasons for our loss to follow-up are the aging sample, follow-up intensity and duration (which was likely to be burdensome for the nearly 10% of participants who were lost to follow-up and spoke English as a second language), and/or avoidance (e.g., isolating oneself to keep others from learning just how difficult one's life can be).

Future research should examine predictors of change in VRQoL over a longer time frame (e.g., 2–4 years) to determine those at greatest risk of decline and/or identify protective factors. Research attention is needed to explore what factors specifically reduce dysfunctional coping and maintain or improve VRQoL outcomes; only then can efficacious skills-based low vision rehabilitation interventions be adequately developed. Further research is required to explicitly assess whether active coping strategies improve VRQoL. For example, a three-arm randomized controlled trial, exploring the effectiveness of a social/peer support group, a problem-solving treatment group,⁴³ and control group in improving VRQoL, could be designed for patients with low vision as an adjunct to vision rehabilitation services. Indeed, our group has found that problem-solving treatment, which is a type of active coping, was effective in a two-arm randomized controlled trial design in improving VRQoL (Holloway EE, Sturrock BA, Lamoureux E, et al., manuscript in preparation, 2015). In addition, future research should include participants with low vision who are living in the community and who are not linked in with vision rehabilitation centers, as it has been estimated that only 5% to 10% of individuals with vision impairment access vision

rehabilitation services.⁴⁴ Finally, our study focused on only a limited range of coping strategies, and a prior study found a link between acceptance coping and better adaptation to vision loss (we were unable to explore this in our study as the CSI questionnaire did not contain items relating to this coping strategy).¹⁹ Thus, future studies may include a general measure of coping, such as the Coping Orientations to Problems Experienced Scale,⁴⁵ to help to identify adaptive, maladaptive, and action-oriented coping strategies for individuals with low vision on a broader level based on sound theoretical frameworks of coping (e.g., acceptance, mental disengagement, denial, humor, substance use, planning).

Our findings have potential clinical implications. We recommend that vision specialists educate patients about the role of coping, as well as the potential negative impact of avoidant coping, and motivate or refer their patients to seek support to engage in action-oriented coping or acceptance strategies to enhance VRQoL.^{15,19} Because the current aim of low vision services is to improve adaptation to low vision and VRQoL outcomes,⁹ it is our tentative recommendation that patients with low vision be assessed at least annually in low vision services for changes in VRQoL in order to detect and address change and to ensure that their chances of living an ongoing meaningful life are maximized. Previous researchers have suggested that former patients of vision rehabilitation services be monitored and, at the very least, leave with the understanding that they can revisit centers if their emotional or functional difficulties become exacerbated.⁹

In conclusion, we found that avoidant coping has a detrimental impact on VRQoL over time. Low vision specialists should be aware of their patients' coping strategies and encourage them to engage in active rather than avoidant coping to deal with the impact of their vision impairment.

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