

## Supplementary Online Content

Hays RD, Tarver ME, Spritzer KL, et al. Assessment of the psychometric properties of a questionnaire assessing patient-reported outcomes with laser in situ keratomileusis (PROWL). *JAMA Ophthalmol*. Published online November 23, 2016. doi:10.1001/jamaophthalmol.2016.4597

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This supplementary material has been provided by the authors to give readers additional information about their work.

## **eMethods. Detailed Methodology**

### **Legacy Measures**

The National Eye Institute (NEI) Visual Function Questionnaire (VFQ) was designed to capture the effects on daily life of eye diseases representing the major causes of vision impairment and blindness in the United States, including macular degeneration, diabetic retinopathy, glaucoma, cataract, and cytomegalovirus retinitis (Mangione et al., 1998).<sup>1</sup> The NEI-VFQ was not designed to incorporate the impact of type of correction for refractive error on functioning and well-being. The NEI Refractive Error Quality of Life Instrument (NEI-RQL) is a self-administered assessment tool designed specifically for those who, through correction of refractive error, have normal visual acuity but, nevertheless, may be experiencing decrements in vision-related functioning and well-being (Hays et al., 2003).<sup>2</sup> The NEI-RQL is widely used as an outcome measure, including studies of laser refractive surgery (Nehls et al., 2014).<sup>3</sup>

We selected the NEI-RQL as the primary legacy measure, but also included the NEI-VFQ driving scale because driving may be affected by LASIK surgery but it is not assessed by the NEI-RQL. In addition, we included the widely-used Ocular Surface Disease Index (OSDI) to assess dry eye symptoms (Schiffman et al., 2000).<sup>4</sup> The items included in the PROWL studies are shown below.

### **Item-Scale Correlations and Correlations Among Scales**

Item correlations with the scales they measured generally exceeded correlations of the items with other scales, but an item about poor vision in the OSDI dry eye symptoms and environment triggers scale correlated as highly ( $r = -0.53$ ) with the clarity of vision scale as with the OSDI scale ( $r = 0.47$ ). A question about clarity of vision using habitual vision correction, including glasses, contact lenses, a magnifier, or nothing at all correlated only  $r = 0.12$  with the clarity of vision scale (see eTable 1 and eTable 2).

Product-moment correlations among the scales at baseline are provided in eTable 3.

## **Construct Validity**

We present correlations in eTable 4 between vision symptom scores and satisfaction with LASIK surgery (hypothesizing statistically significant, positive associations), and expectations about spectacle use and vision post-surgery, optimism, health proneness, depression/anxiety symptoms, and socially desirable responses (hypothesizing non-significant correlations).

We hypothesized that those with poorer post-operative visual acuity and/or needing to wear some form of vision correction will be less satisfied with surgery and have higher visual symptom scores.

## **Associations with Visual Acuity**

### **PROWL-1**

Product-moment correlations of PROWL-1 scales with measures of visual acuity are provided in eTable 5. Uncorrected distance binocular visual acuity was associated with satisfaction at 1-month ( $r=-0.19$ ,  $p=0.0034$ ), 3-months ( $r=-0.21$ ,  $p=0.0022$ ) and 6-months ( $r=-0.19$ ,  $p=0.0072$ ). Uncorrected near binocular visual acuity was associated with satisfaction at 1-month ( $r=-0.15$ ,  $p=0.0256$ ) and 3-months ( $r=-0.14$ ,  $p=0.0421$ ), but not at 6-months ( $r=-0.13$ ,  $p=0.0578$ ). Uncorrected distance binocular visual acuity was associated with double images at one-month ( $r=-0.27$ ,  $p<.0001$ ) and 3-months ( $r=-0.20$ ,  $p=0.0032$ ) while uncorrected near binocular visual acuity was associated with double images at one-month ( $r = -0.22$ ,  $p=0.0010$ ) and 3-months ( $r=-0.17$ ,  $p=0.0110$ ). In addition, best corrected visual acuity right-eye ( $r=-0.16$ ,  $p=0.0168$ ) and left-eye ( $r=-0.14$ ,  $p=0.0405$ ) were associated with double images at 3-months.

Myopia in the left eye at the 1-month follow-up was associated with starbursts ( $r = -0.18$ ,  $p = 0.0228$ ) and halos ( $r = -0.16$ ,  $p = 0.0450$ ). Myopia in the left eye at the 3-month follow-up was associated with double images ( $r = -0.16$ ,  $p = 0.0423$ ) and satisfaction with vision ( $r = -0.19$ ,  $p = 0.0161$ ). Myopia in the right eye at the 3-month follow-up was associated with satisfaction with vision ( $r = -0.20$ ,  $p = 0.0069$ ). Myopia in the right eye at the 6-month follow-up was associated with glare ( $r = -0.15$ ,  $p = 0.0387$ ) and halos ( $r = -0.15$ ,  $p = 0.0432$ ).

We also dichotomized the sample into myopic or not, and hyperopic at each timepoint (eTable 6). There were 13 eyes with hyperopia at baseline (6 left and 7 right), 466 eyes with myopia (233 left and right) and 1 had mixed astigmatism. At 1-month post-surgery, non-myopes (left eye) scored higher (better) on the starbursts vision scale (mean= 83.8 vs 75.8,  $t=2.2$ ,  $p=0.0291$ ). At 3-months, non-myopes (left eye) scored higher (better) on the double images scale (mean=98.6 vs 94.8,  $t=2.29$ ,  $p=.0233$ ). Also at 6-months, non-myopes (right eye) scored better than myopes on the halos scale (mean=90.9 vs 84.8,  $t=2.04$ ,  $p=.0432$ ) and glare scale (mean=94.7 vs 89.3,  $t=2.15$ ,  $p=0.0331$ ). At 6-months, all hyperopes (right-eye) scored higher (better) than non-hyperopes (mean=100 vs 97.4,  $t=-2.17$ ,  $p=0.0326$ ). In addition, all hyperopes (right-eye) scored higher (better) than non-hyperopes (mean=100 vs 94.7,  $t=-3.78$ ,  $p=0.0003$ ) on the glare scale at 6-months post-surgery.

## **PROWL-2**

Product-moment correlations of PROWL-2 scales with measures of visual acuity are provided in eTable 7. Uncorrected distance binocular visual acuity was associated with satisfaction at 1-month ( $r=-0.13$ ,  $p=0.0425$ ) and 3-months ( $r=-0.29$ ,  $p<0.0001$ ). Visual aberration scores were not significantly associated with visual acuity at 1-month, but at 3-months uncorrected distance binocular visual acuity was associated with both starbursts ( $r=-0.15$ ,  $p=0.0149$ ) and double images ( $r=-0.20$ ,  $p=0.0013$ ), while near binocular visual acuity was associated with double images ( $r=-0.13$ ,  $p=0.0473$ ). There were only three people at 1-month post-surgery and four people at 3-months post-surgery who reported needing to wear some form of vision correction.

We also dichotomized the sample into myopic or not, and hyperopic or not at each timepoint (eTable 8). There were 530 eyes with myopia (265 left and right) and 12 eyes with hyperopia at baseline (6 left and 6 right). There were no emmetropes. At one-month post-surgery, non-myopes (left eye) scored higher (better) on the double vision scale than myopes (mean= 98.0 vs 93.1,  $t=2.5$ ,  $p=0.0133$ ) while all 40 non-myopes (right-eye) at 3-months scored better as well (mean=100 vs 96.6,  $t=3.59$ ,  $p=0.0004$ ).

## **Interpretation of Scores**

All scales with the exception of OSDI are scored so that a higher score is more positive. Prior work indicates that the minimally important differences (MIDs) in HRQOL measures are often in the range of 0.20-0.30 effect size in magnitude (Revicki et al., 2008).<sup>5</sup> We estimated MIDs in the PROWL studies using the satisfaction with vision item as an anchor:

*SAT\_VIS*: In general, how satisfied or dissatisfied are you with your present vision?

Completely satisfied

Very satisfied

Somewhat satisfied

Somewhat dissatisfied

Very dissatisfied

Completely dissatisfied

We defined four change groups from baseline to the 3-month follow-up: 1) those who reported being less satisfied at the 3 month follow-up than at baseline (worse); 2) those who reported the same level of satisfaction at the 3 month follow-up as at baseline (stayed the same); 3) those who reported greater satisfaction by 1 response category at the 3-month follow-up compared to baseline (improved by a minimally important amount), and 4) those who reported greater satisfaction by 2 or more categories at the 3-month follow-up compared to baseline (much better). Changes on the PROWL scales by the change groups based on satisfaction with vision are shown in eTable 9. These results suggest that changes of about 0.30 of a SD or higher are important.

## **Rasch Modeling**

As a sensitivity analysis we examined alternative scoring of the new visual symptom items using a Rasch (1960) model—that is, slopes were constrained to be equal across items within a scale. We evaluated the Rasch assumptions of unidimensionality and local independence using Mplus version 7.0 (Muthén & Muthén, 2012).<sup>6</sup> We estimated Rasch location parameters and scores using IRTPRO 2.1 (Cai et al., 2011).<sup>7</sup>

Factor analyses provided support for separating items by whether they referred to use of corrective lenses. We fixed item slopes and estimated item location parameters to estimate Rasch model scores (three-item scales assessing symptoms when not wearing best vision correction, and four-item scales assessing symptoms when wearing best vision correction) using only respondents who reported having the symptom. These item parameters were used to obtain eight scale scores (latent trait estimates) for all study participants. We transformed the Rasch scores to a T-score metric (mean = 50, SD = 10) for a pooled sample that included all assessments in PROWL-1 and PROWL-2. As shown in eTables 10 and 11, these analyses indicated significant improvements in all eight scores from baseline to each follow-up time point (one-month, three-months, and six-months) except for the one-month follow-up for halos (both for not wearing best vision correction and for best vision correction) and for starbursts (for not wearing best vision correction). The median effect size for significant change over time for the eight scale scores was 0.32 (SD on the latent trait metric).

## eReferences

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7. Cai L, Thissen D, & du Toit, S. *IRTPRO 2.1 for Windows*. SSI Scientific Software International. Skokie, Illinois, 2011.

## Items included in the PROWL Questionnaire

**Please note that the list of items only shows the item content and not the formatting nor the instructions that accompanied each item. Response options are listed in brackets.**

**Ocular Surface Disease Index (OSDI) Version 1 (dry eye symptoms and environmental triggers scales (8 items)) Copyright, 1995 Allergan Inc., Irvine, CA, USA, All Rights Reserved.** (scales abstracted from: Schiffman RM, Christianson MD, Jacobsen G et al. Reliability and validity of the Ocular Surface Disease Index. *Arch Ophthalmol* 2000;118:615-21).

During the last 7 days, how often have you experienced ...  
eyes that are sensitive to light?  
eyes that feel gritty?  
painful or sore eyes?  
blurred vision?  
poor vision?

[None of the time; Some of the time; Half of the time; Most of the time; All of the time]

During the last 7 days, how often have your eyes felt uncomfortable in ...  
windy conditions?  
places or areas with low humidity (very dry)?  
areas that are air conditioned?

[None of the time; Some of the time; Half of the time; Most of the time; All of the time]

**NEI-RQL-42** (scales abstracted from: Hays RD, Mangione CM, Ellwein L, et al. Psychometric properties of the National Eye Institute – Refractive Error Quality of Life Instrument. *Ophthalmology* 2003;110:2292-2301).

### ***Clarity of vision (4 items)***

At this time, how clear is your vision using the correction you normally use, including glasses, contact lenses, a magnifier, or nothing at all?

[Perfectly clear; Pretty clear; Somewhat clear; Not clear at all]

Have you experienced distorted vision in the last 7 days? [Yes; No]

How bothersome has it been?

[Very; Somewhat; A little; Not at all]

Have you experienced blurry vision in the last 7 days? [Yes; No]  
How bothersome has it been?  
[Very; Somewhat; A little; Not at all]

Have you experienced trouble seeing in the last 7 days? [Yes; No]  
How bothersome has it been?  
[Very; Somewhat; A little; Not at all]

***Near vision (4 items)***

Because of your vision, how much difficulty do you have with your daily activities?

[No difficulty at all; A little difficulty; Moderate difficulty; A lot of difficulty]

How much difficulty do you have doing work or hobbies that require you to see well up close, such as cooking, fixing things around the house, sewing, using hand tools, or working with a computer?

[No difficulty at all; A little difficulty; Moderate difficulty; A lot of difficulty; Never try to do these activities because of vision; Never do these activities for other reasons]

How much difficulty do you have reading ordinary print in newspapers?

[No difficulty at all; A little difficulty; Moderate difficulty; A lot of difficulty; Never try to do this because of vision; Never do this for other reasons]

How much difficulty do you have reading the small print in a telephone book, on a medicine bottle, or on legal forms?

[No difficulty at all; A little difficulty; Moderate difficulty; A lot of difficulty; Never try to do this because of vision; Never do these activities for other reasons]

***Far vision (5 items)***

Because of your vision, how much difficulty do you have driving at night?

[No difficulty at all; A little difficulty; Moderate difficulty; A lot of difficulty; Never drive at night because of vision; Never drive at night for other reasons]

Because of your vision, how much difficulty do you have driving in difficult conditions, such as bad weather, during rush hour, on the freeway, or in city traffic?

[No difficulty at all; A little difficulty; Moderate difficulty; A lot of difficulty;  
Never drive in these conditions because of vision; Never drive in these conditions  
for other reasons]

How much difficulty do you have seeing things off to the side, like cars coming  
out of the driveways or side streets or people coming out of doorways?

[No difficulty at all; A little difficulty; Moderate difficulty; A lot of difficulty]

How much difficulty do you have judging distances, like walking down stairs or  
parking a car?

[No difficulty at all; A little difficulty; Moderate difficulty; A lot of difficulty]

How much difficulty do you have getting used to the dark when you move from a  
lighted area into a dark place, like walking into a dark movie theater?

[No difficulty at all; A little difficulty; Moderate difficulty; A lot of difficulty]

***Diurnal vision (2 items)***

How much difficulty do you have seeing because of changes in the clarity of your  
vision during the course of the day?

[Don't have changes in the clarity of my vision; No difficulty at all; A little  
difficulty; Moderate difficulty; A lot of difficulty]

How often are you bothered by changes in the clarity of your vision over the  
course of the day?

[Never; Rarely; Occasionally; Sometimes; All of the time]

***Glare (2 items)***

How often when you are around bright lights at night do you see starbursts or  
halos that bother you or make it difficult to see?

[All of the time; Most of the time; Some of the time; A little of the time; None of  
the time]

Have you experienced glare in the last 7 days? [Yes; No]

How bothersome has it been?

[Very; Somewhat; A little; Not at all]

***Activity limitations (4 items)***

Because of your vision, how much difficulty do you have taking part in active  
sports or other outdoor activities that you enjoy (like hiking, swimming, aerobics,  
team sports, or jogging)?

[No difficulty at all; A little difficulty; Moderate difficulty; A lot of difficulty; Never try to do these activities because of vision; Never do these activities for other reasons]

Because of your vision, do you take part less than you would like in active sports or other outdoor activities (like hiking, swimming, aerobics, team sports, or jogging)?  
[Yes; No]

Are there any recreational or sports activities that you don't do because of your vision or the type of vision correction you have?  
[Yes, many; Yes, one or a few; No]

Are there daily activities that you would like to do, but don't do, because of your vision or the type of vision correction you have?  
[Yes, many; Yes, one or a few; No]

***Worry (2 items)***

How often do you worry about your eyesight or vision?

How often do you notice or think about your eyesight or vision?

[Never; Rarely; Occasionally; Sometimes; All the time]

**NEI-VFQ-25** (scales abstracted from: Mangione CM, Lee PP, Pitts J, et al. Psychometric properties of the National Eye Institute Visual Function Questionnaire, the NEI-VFQ. Arch Ophthalmol 1998;116, 1496-1504).

***Driving Scale (4 items)***

Have you ever driven a car? [Yes; No]

Do you currently drive? [Yes; No]

If you gave up driving, was that mainly because of your vision, mainly for some other reason, or because of both your vision and other reasons? [Mainly vision; Mainly other reasons; Both vision and other reasons]

Because of your vision, how much difficulty do you have driving during the daytime in familiar places? Would you say you have:  
[No difficulty at all; A little difficulty; Moderate difficulty; A lot of difficulty; Never drive during the daytime because of vision; Never drive during the daytime for other reasons]

**Work Productivity and Activity Impairment (6 items)** (items abstracted from: Reily MC, Zbrozek AS, Dukes EM. The validity and reproducibility of a Work Productivity and Activity Impairment Instrument. *Pharmacoeconomics* 1993;4:353-65).

Are you currently employed (working for pay)? [yes, no]

During the past seven days, how many hours did you miss from work because of any eye problems? Include hours you missed on sick days, times you went in late, left early, etc., because of your EYE PROBLEM. Do not include time you missed to participate in this study.

\_\_\_ HOURS

During the past seven days, how many hours did you miss from work because of any other reason, such as vacation, holidays, or time off to participate in this study?

\_\_\_ HOURS

During the past seven days, how many hours did you actually work?

\_\_\_ HOURS

During the past seven days, how much did eye problems affect your productivity while you were working?

Eye problem(s)	Eye problem(s)
0 = had no effect on my work	10 = completely prevented me from working

During the past seven days, how much did eye problems affect your ability to do your regular daily activities, other than work at a job?

Eye problem(s)	Eye problem(s)
0 = had no effect on my daily activities	10 = completely prevented me from doing my regular activities

## New Items

### Visual symptoms

#### *Double images (8 items)*

In the last 7 days, have you seen any double images?

[Yes, without glasses or contact lenses; Yes, even wearing glasses or contact lenses; No, not at all]

In the last 7 days, how often have you seen double images when you are wearing your best vision correction (glasses or contact lenses)?

[Never; Rarely; Sometimes; Often; Always; I do not use any vision correction]

In the last 7 days, how often have you seen double images when you are NOT wearing any vision correction?

[Never; Rarely; Sometimes; Often; Always; I always use vision correction]

In the last 7 days, how bothersome have the double images been when you are wearing your best vision correction (glasses or contact lenses)?

[Extremely bothersome; Very bothersome; Somewhat bothersome; A little bothersome; Not at all bothersome; I do not use any vision correction]

In the last 7 days, how bothersome have the double images been when you are NOT wearing any vision correction?

Extremely bothersome; Very bothersome; Somewhat bothersome; A little bothersome; Not at all bothersome; I always use vision correction]

In the last 7 days, how much difficulty have you had doing your usual activities because you see double images when you are wearing your best vision correction (glasses or contact lenses)?

[No difficulty at all; Very little difficulty; Moderate difficulty; A lot of difficulty; So much difficulty that I can no longer do some of my usual activities; I do not use any vision correction]

In the last 7 days, how much difficulty have you had doing your usual activities because you see double images when you are NOT wearing any vision correction?

[No difficulty at all; Very little difficulty; Moderate difficulty; A lot of difficulty; So much difficulty that I can no longer do some of my usual activities; I always use vision correction]

When you use your best vision correction (glasses or contact lenses) do the double images you see:

[Go away completely; Go away mostly; Go away a little; Not change; Get a little worse; Get a lot worse; I do not use any vision correction (glasses or contact lenses)]

***Glare (8 items)***

In the last 7 days, have you noticed any glare?

[Yes, without glasses or contact lenses; Yes, even wearing glasses or contact lenses; No, not at all]

In the last 7 days, how often have you noticed glare when you are wearing your best vision correction (glasses or contact lenses)?

[Never; Rarely; Sometimes; Often; Always; I do not use any vision correction]

In the last 7 days, how often have you noticed glare when you are NOT wearing any vision correction?

[Never; Rarely; Sometimes; Often; Always; I always use vision correction]

In the last 7 days, how bothersome has the glare been when you are wearing your best vision correction (glasses or contact lenses)?

[Extremely bothersome; Very bothersome; Somewhat bothersome; A little bothersome; Not at all bothersome; I do not use any vision correction]

In the last 7 days, how bothersome has the glare been when you are NOT wearing any vision correction?

[Extremely bothersome; Very bothersome; Somewhat bothersome; A little bothersome; Not at all bothersome; I always use vision correction]

In the last 7 days, how much difficulty have you had doing your usual activities because you noticed glare when you are wearing your best vision correction (glasses or contact lenses)?

[No difficulty at all; Very little difficulty; Moderate difficulty; A lot of difficulty; So much difficulty that I can no longer do some of my usual activities; I do not use any vision correction]

In the last 7 days, how much difficulty have you had doing your usual activities because you notice glare when you are NOT wearing any vision correction?

[No difficulty at all; Very little difficulty; Moderate difficulty; A lot of difficulty; So much difficulty that I can no longer do some of my usual activities; I always use vision correction]

When you use your best vision correction (glasses or contact lenses) does the glare you notice:

[Go away completely; Go away mostly; Go away a little; Not change; Get a little worse; Get a lot worse; I do not use any vision correction (glasses or contact lenses)]

***Halos (8 items)***

In the last 7 days, have you seen any halos?

[Yes, without glasses or contact lenses; Yes, even wearing glasses or contact lenses; No, not at all]

In the last 7 days, how often have you seen halos when you are wearing your best vision correction (glasses or contact lenses)?

[Never; Rarely; Sometimes; Often; Always; I do not use any vision correction]

In the last 7 days, how often have you seen halos when you are NOT wearing any vision correction?

[Never; Rarely; Sometimes; Often; Always; I always use vision correction]

In the last 7 days, how bothersome have the halos been when you are wearing your best vision correction (glasses or contact lenses)?

[Extremely bothersome; Very bothersome; Somewhat bothersome; A little bothersome; Not at all bothersome; I do not use any vision correction]

In the last 7 days, how bothersome have the halos been when you are NOT wearing any vision correction?

[Extremely bothersome; Very bothersome; Somewhat bothersome; A little bothersome; Not at all bothersome; I always use vision correction]

In the last 7 days, how much difficulty have you had doing your usual activities because you see halos when you are wearing your best vision correction (glasses or contact lenses)?

[No difficulty at all; Very little difficulty; Moderate difficulty; A lot of difficulty; So much difficulty that I can no longer do some of my usual activities; I do not use any vision correction]

In the last 7 days, how much difficulty have you had doing your usual activities because you see halos when you are NOT wearing any vision correction?  
[No difficulty at all; Very little difficulty; Moderate difficulty; A lot of difficulty; So much difficulty that I can no longer do some of my usual activities; I always use vision correction]

When you use your best vision correction (glasses or contact lenses) do the double images you see:  
[Go away completely; Go away mostly; Go away a little; Not change; Get a little worse; Get a lot worse; I do not use any vision correction (glasses or contact lenses)]

***Starburst (8 items)***

In the last 7 days, have you seen any starbursts?  
[Yes, without glasses or contact lenses; Yes, even wearing glasses or contact lenses; No, not at all]

In the last 7 days, how often have you seen starbursts when you are wearing your best vision correction (glasses or contact lenses)?  
[Never; Rarely; Sometimes; Often; Always; I do not use any vision correction]

In the last 7 days, how often have you seen starbursts images when you are NOT wearing any vision correction?  
[Never; Rarely; Sometimes; Often; Always; I always use vision correction]

In the last 7 days, how bothersome have the starbursts been when you are wearing your best vision correction (glasses or contact lenses)?  
[Extremely bothersome; Very bothersome; Somewhat bothersome; A little bothersome; Not at all bothersome; I do not use any vision correction]

In the last 7 days, how bothersome have the starbursts been when you are NOT wearing any vision correction?  
[Extremely bothersome; Very bothersome; Somewhat bothersome; A little bothersome; Not at all bothersome; I always use vision correction]

In the last 7 days, how much difficulty have you had doing your usual activities because you see starbursts when you are wearing your best vision correction (glasses or contact lenses)?

[No difficulty at all; Very little difficulty; Moderate difficulty; A lot of difficulty; So much difficulty that I can no longer do some of my usual activities; I do not use any vision correction]

In the last 7 days, how much difficulty have you had doing your usual activities because you see starbursts when you are NOT wearing any vision correction?  
[No difficulty at all; Very little difficulty; Moderate difficulty; A lot of difficulty; So much difficulty that I can no longer do some of my usual activities; I always use vision correction]

When you use your best vision correction (glasses or contact lenses) do the double images you see:  
[Go away completely; Go away mostly; Go away a little; Not change; Get a little worse; Get a lot worse; I do not use any vision correction (glasses or contact lenses)]

**Satisfaction with current vision (1 item)**

In general, how satisfied or dissatisfied are you with your present vision?  
[Completely satisfied; Very satisfied; Somewhat satisfied; Somewhat dissatisfied; Very dissatisfied; Completely dissatisfied]

**Satisfaction with LASIK surgery (8 items)**

Currently, how satisfied or dissatisfied are you with the result of your LASIK surgery?  
[Completely satisfied; Very satisfied; Somewhat satisfied; Somewhat dissatisfied; Very dissatisfied; Completely dissatisfied]

Currently, how satisfied or dissatisfied are you with how long it took to see improvement in your vision after LASIK surgery?  
[Completely satisfied; Very satisfied; Somewhat satisfied; Somewhat dissatisfied; Very dissatisfied; Completely dissatisfied, Never had any post-operative symptoms of discomfort after LASIK surgery]

Currently, how satisfied or dissatisfied are you with how long it took to see improvement in your post-operative symptoms of discomfort after LASIK surgery?  
[Completely satisfied; Very satisfied; Somewhat satisfied; Somewhat dissatisfied; Very dissatisfied; Completely dissatisfied, Never had any post-operative symptoms of discomfort after LASIK surgery]

When you are not wearing glasses or contact lenses, is your distance vision now as good as you anticipated it would be after LASIK surgery?

[Yes definitely, Yes somewhat, No]

Did you achieve the goals you had for LASIK surgery?

[Yes fully achieved, Yes partially achieved, No]

How happy or unhappy are you that you had LASIK surgery?

[Completely happy, Very happy, Somewhat happy, Somewhat unhappy, Very unhappy, Completely unhappy]

If you could do it all over again, would you decide to have LASIK performed?

[Yes, I would decide to have it again, because of my result; Yes, I would decide to have it again, despite my result; No, I would not decide to have it again, because of my result; No, I would not decide to have it again, despite my result]

Would you recommend LASIK surgery to a friend or family member?

[Yes, I would recommend it because of my result; Yes, I would recommend it despite my result; No, I would not recommend it because of my result; No, I would not recommend it despite my result]

### **Expectations about spectacle independence/vision clarity post-surgery (6 items)**

As long as I could see well enough to drive without wearing glasses or contact lenses, I wouldn't mind having vision that was less than perfect:

[Definitely true; Mostly true; Don't know; Mostly false; Definitely false]

How much of the time do you expect to use glasses or contact lenses to see things in the distance after healing from LASIK surgery?

[All of the time; Most of the time; Some of the time; Hardly ever; Never]

How much of the time do you expect to use glasses or contact lenses to see things up close after healing from LASIK surgery?

[All of the time; Most of the time; Some of the time; Hardly ever; Never]

After healing from LASIK surgery, I expect that I will have clear vision:

[With the aid of glasses to see in the distance; With the aid of glasses for reading; With the aid of contact lenses to see in the distance; With the aid of contact lenses for reading; Without glasses or contact lenses]

After healing from LASIK surgery, I expect my vision to be perfect.

[Definitely true; Mostly true; Don't know; Mostly false; Definitely false]

I could accept less than perfect vision if I did not need glasses or contact lenses any more after healing from LASIK surgery.

[Definitely true; Mostly true; Don't know; Mostly false; Definitely false]

## Potential Confounders

**Life Orientation Test-Revised (LOT-R (6 items)) Copyright © 1994 by the American Psychological Association. Adapted with permission. No further reproduction or distribution is permitted without written permission from the American Psychological Association.** (scale abstracted from: Scheier MF, Carver CS, Bridges MW. Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self esteem): A reevaluation of the Life Orientation Test. *Journal of Personality and Social Psychology*. 1994;67:1063-78.)

### *Dispositional Optimism*

In uncertain times, I usually expect the best.

[I agree a lot; I agree a little; I neither agree nor disagree; I disagree a little; I disagree a lot]

If something can go wrong for me, it will.

[I agree a lot; I agree a little; I neither agree nor disagree; I disagree a little; I disagree a lot]

I'm always optimistic about my future.

[I agree a lot; I agree a little; I neither agree nor disagree; I disagree a little; I disagree a lot]

I hardly ever expect things to go my way.

[I agree a lot; I agree a little; I neither agree nor disagree; I disagree a little; I disagree a lot]

I rarely count on good things happening to me.

[I agree a lot; I agree a little; I neither agree nor disagree; I disagree a little; I disagree a lot]

Overall, I expect more good things to happen to me than bad.

[I agree a lot; I agree a little; I neither agree nor disagree; I disagree a little; I disagree a lot]

**Brien Holden Vision Institute Quality of Life Scale for Myopia Health Proneness Scale (10 items)** (scale abstracted from: Erickson DB, Stapleton F, Erickson P, et al. Development and validation of a multidimensional quality-of-life scale for myopia. *Optom Vis Sci* 2004;81 70-81.)

If I don't master a task right away, I keep trying until I get it right.  
[Never; Sometimes; Often; Constantly]

I can adapt to new situations.  
[Never; Sometimes; Often; Constantly]

I am happy and content.  
[Never; Sometimes; Often; Constantly]

I am willing to take risks.  
[Never; Sometimes; Often; Constantly]

I look forward to trying a new task.  
[Never; Sometimes; Often; Constantly]

I feel self-assured and self-confident.  
[Never; Sometimes; Often; Constantly]

I like to try new places, activities, and situations.  
[Never; Sometimes; Often; Constantly]

I sleep well at night.  
[Never; Sometimes; Often; Constantly]

I am sure I can accomplish the tasks before me.  
[Never; Sometimes; Often; Constantly]

I can usually master a task even if I can't master it right away.  
[Never; Sometimes; Often; Constantly]

**Patient Health Questionnaire (PHQ-4) (4 items)** (scale abstracted from: Kroenke K, Spitzer RL, Williams JB, Lowe B. An ultra-brief screening scale for anxiety and depression: The PHQ-4. *Psychosomatics* 2009;50:613-21).

Over the last 2 weeks, how often have you been bothered by having little interest or pleasure in doing things?

[Not at all; Several days; More than half the days; Nearly every day]

Over the last 2 weeks, how often have you been bothered by feeling down, depressed, or hopeless?

[Not at all; Several days; More than half the days; Nearly every day]

Over the last 2 weeks, how often have you been bothered by feeling nervous, anxious, or on edge?

[Not at all; Several days; More than half the days; Nearly every day]

Over the last 2 weeks, how often have you been bothered by not being able to stop or control worrying?

[Not at all; Several days; More than half the days; Nearly every day]

**Socially Desirable Response Set (SDRS) (2 items)** (items abstracted from: Hays RD, Hayashi T, Stewart AL. A five-item measure of socially desirable response set. *Educ Psychol Meas* 1989;49:629-36).

I am always courteous even to people who are disagreeable.

[Definitely true; Mostly true; Don't know; Mostly false; Definitely false]

No matter whom I'm talking to, I'm always a good listener.

[Definitely true; Mostly true; Don't know; Mostly false; Definitely false]

**eTable 1. Item-Scale Correlations for Hypothesized Scales—PROWL-1 Preoperative (n = 240)**

item	osdi	rql_cv4	rql_nv4	rql_fv5	rql_dv2	rql_gs2	rql_al4	rql_w2	dimage	glare	halos	starbrst
q65	0.38*	-.28	-.21	-.25	-.24	-.27	-.12	-.14	-.05	-.27	-.23	-.13
q66	0.32*	-.20	-.14	-.20	-.30	-.11	-.00	-.14	-.01	-.18	-.11	-.02
q67	0.32*	-.15	-.26	-.23	-.27	-.24	-.13	-.19	-.14	-.32	-.22	-.20
q68	0.46*	-.57	-.40	-.36	-.31	-.26	-.08	-.17	-.29	-.27	-.31	-.32
q69	0.47*	-.53	-.37	-.43	-.31	-.26	-.19	-.28	-.25	-.23	-.28	-.28
q70	0.44*	-.15	-.16	-.21	-.25	-.17	-.07	-.16	-.24	-.24	-.33	-.25
q71	0.45*	-.15	-.24	-.31	-.31	-.09	-.11	-.05	-.16	-.16	-.14	-.17
q72	0.31*	-.15	-.10	-.15	-.16	-.07	-.06	-.06	-.09	-.08	-.12	-.10
q5_rev	-.21	0.12*	0.22	0.27	0.28	0.19	0.14	0.25	0.13	0.27	0.22	0.15
q34a	-.35	0.52*	0.39	0.37	0.30	0.42	0.14	0.11	0.30	0.32	0.32	0.32
q35a	-.45	0.65*	0.30	0.31	0.25	0.38	-.03	0.20	0.25	0.28	0.26	0.32
q36a	-.48	0.62*	0.36	0.40	0.26	0.34	0.04	0.25	0.25	0.23	0.32	0.30
q24_rev	-.36	0.31	0.58*	0.44	0.31	0.23	0.35	0.26	0.22	0.19	0.27	0.21
q25_rev	-.34	0.38	0.67*	0.42	0.28	0.31	0.15	0.25	0.18	0.26	0.32	0.21
q26_rev	-.35	0.32	0.60*	0.46	0.41	0.29	0.14	0.25	0.21	0.28	0.30	0.20
q19_rev	-.27	0.30	0.35*	0.43	0.35	0.17	0.41	0.32	0.12	0.13	0.19	0.20
q28_rev	-.40	0.40	0.48	0.49*	0.44	0.13	0.25	0.26	0.29	0.20	0.26	0.27
q18_rev	-.18	0.33	0.37	0.47*	0.34	0.23	0.33	0.26	0.15	0.24	0.19	0.20
q29_rev	-.42	0.24	0.50	0.51*	0.60	0.23	0.25	0.23	0.22	0.34	0.33	0.30
q16_rev	-.41	0.39	0.39	0.69*	0.41	0.30	0.12	0.32	0.26	0.27	0.37	0.36
q17_rev	-.40	0.36	0.44	0.75*	0.38	0.30	0.20	0.25	0.27	0.25	0.33	0.32
q30_rev	-.45	0.36	0.46	0.55	0.80*	0.17	0.21	0.27	0.22	0.32	0.27	0.29
q31_rev	-.41	0.33	0.40	0.53	0.80*	0.21	0.20	0.27	0.24	0.33	0.33	0.30
q32	-.30	0.37	0.30	0.35	0.23	0.37*	0.14	0.17	0.26	0.43	0.52	0.51
q33a	-.26	0.39	0.24	0.19	0.11	0.37*	0.11	0.11	0.24	0.56	0.40	0.40
q20_rev	-.12	0.08	0.40	0.23	0.12	0.05	0.53*	0.31	0.11	0.11	0.14	0.14
q21	-.11	0.06	0.27	0.25	0.18	0.13	0.61*	0.19	0.19	0.13	0.18	0.16
q22	-.14	0.03	0.25	0.22	0.16	0.14	0.73*	0.20	0.12	0.15	0.16	0.21
q27	-.22	0.06	0.26	0.27	0.21	0.14	0.53*	0.22	0.03	0.14	0.22	0.19
q3_rev	-.27	0.28	0.38	0.37	0.29	0.15	0.27	0.71*	0.06	0.21	0.14	0.14
q4_rev	-.23	0.24	0.29	0.31	0.24	0.16	0.24	0.71*	0.02	0.16	0.13	0.20
q45_rec	-.25	0.32	0.21	0.29	0.26	0.29	0.14	0.05	0.92*	0.34	0.39	0.37

item	osdi	rql_cv4	rql_nv4	rql_fv5	rql_dv2	rql_gs2	rql_al4	rql_w2	dimage	glare	halos	starbrst
q46a_rev	-.30	0.31	0.21	0.30	0.24	0.26	0.15	0.04	0.90*	0.35	0.37	0.36
q46b_rev	-.27	0.26	0.23	0.26	0.22	0.26	0.15	0.02	0.93*	0.32	0.38	0.38
q47a	-.25	0.31	0.21	0.33	0.22	0.26	0.10	0.04	0.84*	0.28	0.35	0.29
q47b	-.30	0.32	0.23	0.28	0.21	0.30	0.17	0.05	0.92*	0.32	0.41	0.40
q48a_rev	-.30	0.33	0.24	0.37	0.26	0.31	0.11	0.04	0.85*	0.31	0.36	0.34
q48b_rev	-.28	0.28	0.22	0.28	0.20	0.27	0.17	0.01	0.95*	0.32	0.39	0.38
q49_rev	-.25	0.32	0.22	0.29	0.20	0.29	0.13	0.08	0.88*	0.31	0.33	0.31
q50_rec	-.28	0.30	0.21	0.25	0.28	0.56	0.16	0.16	0.29	0.88*	0.55	0.47
q51a_rev	-.36	0.36	0.26	0.29	0.32	0.63	0.14	0.21	0.28	0.93*	0.58	0.52
q51b_rev	-.32	0.29	0.25	0.33	0.33	0.50	0.14	0.16	0.36	0.89*	0.60	0.50
q52a	-.37	0.42	0.26	0.30	0.30	0.64	0.16	0.20	0.27	0.91*	0.56	0.49
q52b	-.37	0.34	0.29	0.36	0.35	0.53	0.15	0.16	0.38	0.92*	0.62	0.53
q53a_rev	-.38	0.35	0.30	0.36	0.34	0.56	0.21	0.21	0.28	0.92*	0.58	0.48
q53b_rev	-.37	0.31	0.26	0.33	0.33	0.50	0.18	0.17	0.39	0.92*	0.61	0.54
q54_rev	-.35	0.34	0.24	0.28	0.28	0.59	0.14	0.23	0.26	0.88*	0.52	0.46
55_rec	-.34	0.34	0.31	0.29	0.26	0.46	0.19	0.09	0.37	0.55	0.86*	0.56
q56a_rev	-.37	0.35	0.30	0.32	0.28	0.53	0.21	0.13	0.35	0.58	0.92*	0.61
q56b_rev	-.37	0.34	0.31	0.37	0.27	0.46	0.15	0.15	0.39	0.55	0.90*	0.59
q57a	-.35	0.39	0.32	0.34	0.31	0.59	0.22	0.15	0.36	0.61	0.91*	0.58
q57b	-.40	0.35	0.35	0.41	0.32	0.50	0.18	0.16	0.41	0.56	0.87*	0.61
q58a_rev	-.38	0.35	0.35	0.40	0.32	0.52	0.29	0.13	0.37	0.59	0.88*	0.57
q58b_rev	-.37	0.35	0.34	0.42	0.33	0.47	0.23	0.14	0.42	0.56	0.90*	0.61
q59_rev	-.33	0.33	0.29	0.29	0.25	0.50	0.23	0.10	0.29	0.58	0.86*	0.54
q60_rec	-.23	0.33	0.22	0.29	0.25	0.44	0.16	0.10	0.35	0.44	0.52	0.86*
q61a_rev	-.25	0.31	0.19	0.32	0.23	0.51	0.19	0.16	0.32	0.49	0.56	0.90*
q61b_rev	-.33	0.33	0.22	0.33	0.29	0.48	0.18	0.17	0.35	0.47	0.61	0.91*
q62a	-.32	0.41	0.29	0.37	0.29	0.58	0.23	0.21	0.36	0.50	0.58	0.89*
q62b	-.40	0.38	0.29	0.40	0.33	0.51	0.23	0.20	0.42	0.52	0.66	0.89*
q63a_rev	-.39	0.42	0.35	0.45	0.33	0.56	0.21	0.20	0.36	0.56	0.63	0.89*
q63b_rev	-.35	0.31	0.27	0.37	0.30	0.43	0.21	0.16	0.40	0.47	0.61	0.88*
q64_rev	-.28	0.35	0.21	0.33	0.25	0.52	0.21	0.16	0.28	0.49	0.51	0.85*

Note: We use questionnaire numbers from the PROWL-2 pre-op survey to refer to items. Asterisk indicates item-scale correlation, corrected for item overlap with total scale score. osdi = OSDI; rql\_cv4 = RQL-clarity of vision; rql\_nv4 = RQL-near vision; rql\_fv5 = RQL-far vision; rql\_dv2 = RQL-diurnal vision; rql\_gs2 = RQL- glare scale; rql\_al4 = RQL-activity limitations; rql\_w2 = worry; dimage = double images; glare = glare; halos = halos; starbrst = starbursts. Blue highlighting indicates item-scale correlation problems.

**eTable 2. Item-Scale Correlations for Hypothesized Scales—PROWL-2 Preoperative (n = 271)**

item	osdi	rql_cv4	rql_nv4	rql_fv5	rql_dv2	rql_gs2	rql_al4	rql_w2	dimage	glare	halos	starbrst
q65	0.47*	-0.36	-0.21	-0.37	-0.33	-0.47	-0.15	-0.28	-0.36	-0.38	-0.36	-0.33
q66	0.47*	-0.32	-0.22	-0.19	-0.33	-0.24	-0.07	-0.25	-0.24	-0.23	-0.19	-0.20
q67	0.55*	-0.37	-0.34	-0.28	-0.40	-0.36	-0.12	-0.27	-0.32	-0.28	-0.34	-0.31
q68	0.51*	-0.62	-0.33	-0.37	-0.32	-0.34	-0.18	-0.28	-0.47	-0.30	-0.36	-0.34
q69	0.47*	-0.50	-0.34	-0.44	-0.22	-0.38	-0.19	-0.37	-0.39	-0.30	-0.35	-0.35
q70	0.53*	□ L K	-0.22	-0.35	-0.39	-0.29	-0.07	-0.21	-0.27	-0.29	-0.37	-0.30
q71	0.48*	-0.24	-0.07	-0.16	-0.30	-0.19	0.04	-0.19	-0.20	-0.22	-0.28	-0.26
q72	0.49*	-0.26	-0.10	-0.21	-0.24	-0.23	-0.01	-0.16	-0.20	-0.25	-0.22	-0.21
q5_rev	-0.27	0.26*	0.27	0.35	0.29	0.15	0.08	0.21	0.20	0.14	0.15	0.13
q34a	-0.39	0.51*	0.14	0.33	0.27	0.23	0.06	0.13	0.34	0.24	0.21	0.23
q35a	-0.51	0.66*	0.33	0.34	0.41	0.33	0.14	0.26	0.40	0.34	0.26	0.25
q36a	-0.57	0.63*	0.31	0.42	0.35	0.44	0.16	0.29	0.44	0.31	0.37	0.36
q24_rev	-0.30	0.27	0.64*	0.36	0.27	0.21	0.28	0.24	0.15	0.22	0.18	0.15
q25_rev	-0.25	0.25	0.67*	0.37	0.30	0.16	0.19	0.27	0.18	0.11	0.17	0.16
q26_rev	-0.18	0.24	0.62*	0.35	0.27	0.21	0.14	0.21	0.15	0.13	0.16	0.17
q19_rev	-0.36	0.34	0.38*	0.37	0.28	0.31	0.24	0.33	0.26	0.20	0.25	0.21
q28_rev	-0.32	0.34	0.46	0.59*	0.31	0.33	0.25	0.30	0.32	0.25	0.34	0.30
q18_rev	-0.25	0.25	0.25	0.41*	0.18	0.20	0.20	0.16	0.21	0.24	0.21	0.21
q29_rev	-0.37	0.31	0.24	0.49*	0.28	0.38	0.14	0.23	0.26	0.33	0.28	0.27
q16_rev	-0.34	0.36	0.35	0.63*	0.28	0.42	0.14	0.23	0.29	0.28	0.37	0.35
q17_rev	-0.42	0.44	0.38	0.71*	0.33	0.46	0.20	0.22	0.34	0.41	0.39	0.40
q30_rev	-0.42	0.39	0.37	0.36	0.77*	0.32	0.04	0.18	0.39	0.23	0.33	0.27
q31_rev	-0.48	0.46	0.32	0.37	0.77*	0.32	0.01	0.26	0.36	0.27	0.32	0.32
q32	-0.43	0.34	0.29	0.48	0.27	0.48*	0.13	0.23	0.38	0.43	0.64	0.59
q33a	-0.43	0.37	0.23	0.36	0.31	0.48*	0.09	0.12	0.24	0.56	0.43	0.46
q20_rev	-0.19	0.21	0.38	0.30	0.10	0.22	0.46*	0.19	0.15	0.18	0.18	0.16
q21	-0.05	0.05	0.14	0.11	-0.06	0.06	0.61*	0.11	-0.00	0.09	-0.01	0.03
q22	-0.13	0.10	0.21	0.24	0.07	0.11	0.65*	0.19	0.12	0.15	0.16	0.17
q27	-0.20	0.22	0.24	0.27	0.05	0.06	0.49*	0.26	0.08	0.12	0.14	0.12
q3_rev	-0.37	0.31	0.29	0.33	0.24	0.16	0.20	0.70*	0.27	0.16	0.24	0.24
q4_rev	-0.38	0.26	0.36	0.25	0.20	0.23	0.22	0.70*	0.21	0.14	0.23	0.22
q45_rec	-0.43	0.46	0.26	0.34	0.35	0.28	0.05	0.24	0.83*	0.25	0.36	0.31

item	osdi	rql_cv4	rql_nv4	rql_fv5	rql_dv2	rql_gs2	rql_al4	rql_w2	dimage	glare	halos	starbrst
q46a_rev	-.47	0.45	0.24	0.43	0.40	0.35	0.08	0.25	0.89*	0.33	0.42	0.37
q46b_rev	-.43	0.41	0.19	0.34	0.33	0.33	0.08	0.25	0.91*	0.25	0.42	0.37
q47a	-.43	0.49	0.26	0.39	0.38	0.36	0.09	0.24	0.82*	0.24	0.40	0.36
q47b	-.46	0.46	0.21	0.32	0.37	0.30	0.10	0.23	0.91*	0.20	0.36	0.33
q48a_rev	-.48	0.49	0.30	0.41	0.40	0.40	0.14	0.22	0.88*	0.26	0.46	0.41
q48b_rev	-.45	0.38	0.20	0.32	0.34	0.33	0.07	0.24	0.90*	0.23	0.40	0.38
q49_rev	-.45	0.46	0.23	0.38	0.37	0.35	0.06	0.25	0.83*	0.34	0.40	0.37
q50_rec	-.36	0.28	0.17	0.36	0.20	0.54	0.13	0.16	0.21	0.87*	0.48	0.43
q51a_rev	-.41	0.36	0.22	0.42	0.26	0.56	0.18	0.15	0.23	0.94*	0.52	0.46
q51b_rev	-.47	0.38	0.20	0.42	0.28	0.52	0.12	0.17	0.34	0.87*	0.59	0.52
q52a	-.42	0.34	0.21	0.39	0.25	0.54	0.18	0.15	0.22	0.93*	0.52	0.46
q52b	-.47	0.39	0.21	0.39	0.29	0.51	0.14	0.16	0.33	0.86*	0.56	0.52
q53a_rev	-.43	0.34	0.23	0.41	0.28	0.54	0.17	0.12	0.26	0.94*	0.53	0.50
q53b_rev	-.42	0.38	0.23	0.39	0.29	0.52	0.15	0.13	0.31	0.90*	0.56	0.52
q54_rev	-.30	0.25	0.18	0.30	0.16	0.48	0.18	0.12	0.12	0.82*	0.43	0.36
55_rec	-.40	0.29	0.22	0.37	0.28	0.52	0.11	0.25	0.33	0.46	0.87*	0.62
q56a_rev	-.45	0.31	0.24	0.40	0.30	0.62	0.09	0.26	0.35	0.49	0.93*	0.63
q56b_rev	-.50	0.34	0.23	0.40	0.29	0.57	0.08	0.26	0.49	0.52	0.87*	0.64
q57a	-.48	0.34	0.26	0.45	0.34	0.65	0.11	0.22	0.38	0.58	0.92*	0.66
q57b	-.45	0.34	0.25	0.39	0.32	0.54	0.11	0.21	0.48	0.52	0.86*	0.65
q58a_rev	-.48	0.36	0.30	0.48	0.37	0.61	0.17	0.25	0.43	0.57	0.91*	0.68
q58b_rev	-.48	0.36	0.25	0.42	0.41	0.54	0.13	0.20	0.51	0.57	0.85*	0.68
q59_rev	-.32	0.21	0.15	0.30	0.25	0.51	0.12	0.17	0.20	0.46	0.81*	0.55
q60_rec	-.38	0.26	0.21	0.34	0.24	0.54	0.14	0.25	0.31	0.41	0.62	0.85*
q61a_rev	-.42	0.29	0.19	0.36	0.29	0.60	0.10	0.25	0.31	0.45	0.68	0.90*
q61b_rev	-.49	0.33	0.21	0.39	0.29	0.56	0.09	0.24	0.46	0.47	0.66	0.87*
q62a	-.41	0.32	0.22	0.44	0.31	0.60	0.15	0.22	0.30	0.49	0.66	0.93*
q62b	-.43	0.37	0.22	0.37	0.33	0.50	0.10	0.22	0.44	0.45	0.60	0.83*
q63a_rev	-.41	0.30	0.22	0.38	0.29	0.58	0.16	0.18	0.34	0.50	0.64	0.88*
q63b_rev	-.46	0.39	0.22	0.40	0.31	0.51	0.09	0.21	0.48	0.49	0.60	0.83*
q64_rev	-.29	0.20	0.17	0.28	0.23	0.50	0.12	0.17	0.20	0.41	0.57	0.78*

Note: We use questionnaire numbers from the PROWL-2 pre-op survey to refer to items. Asterisk indicates item-scale correlation, corrected for item overlap with total scale score. osdi = OSDI; rql\_cv4 = RQL-clarity of vision; rql\_nv4 = RQL-near vision; rql\_fv5 = RQL-far vision; rql\_dv2 = RQL-diurnal vision; rql\_gs2 = RQL- glare scale; rql\_al4 = RQL-activity limitations; rql\_w2 = worry; dimage = double images; glare = glare; halos = halos; starbrst = starbursts. Blue highlighting indicates item-scale correlation problems.

**eTable 3. Correlation Coefficients (x100) Among Scales at Baseline (Patient-Reported Outcomes With LASIK (PROWL-1 / PROWL-2)).**

	NEI-RQL-42 clarity of vision	NEI-RQL-42 near vision	NEI-RQL-42 far vision	NEI-RQL-42 glare scale	NEI-RQL-42 diurnal vision	NEI-RQL-42 activity limitations	NEI-RQL-42 worry	NEI-VFQ-25 driving	Hours Worked	OSDI	OSDI Symptoms	OSDI Environment
1	-											
2	43/ 37	-										
3	46/ 47	60/ 45	-									
4	46/ 41	32/ 30	32/ 49	-								
5	36/ 45	45/ 36	58/ 37	20/ 34	-							
6	07/ 17	36/ 28	31/ 25	15/ 13	21/ 03	-						
7	28/ 31	36/ 35	35/ 30	17/ 21	28/ 24	27/ 22	-					
8	39/ 48	44/ 41	81/ 85	31/ 48	41/ 33	18/ 20	31/ 24	-				
9	-08/ -03	-12/ 00	-10/ 08	-13/ -03	-09/ 10	-10/ -02	-18/ -01	-09/ 04	-			
10	-54/ -61	-43/ -36	-48/ -47	-34/ -50	-45/ -48	-18/ -16	-27/ -40	-43/ -44	15/ -07	-		
11	-61/ -64	-45/ -41	-48/ -48	-36/ -52	-42/ -43	-18/ -21	-29/ -42	-43/ -47	15/ -04	91/ 92	-	
12	-19/ -36	-21/ -16	-27/ -30	-16/ -29	-31/ -38	-10/ -01	-12/ -24	-23/ -23	08/ -11	72/ 78	35/ 47	-
13	36/ 36	28/ 22	35/ 41	60/ 57	34/ 26	17/ 17	20/ 16	25/ 37	-12/ 08	-38/ -43	38/ -42	-21/ -30
14	39/ 31	28/ 23	38/ 39	55/ 61	31/ 29	21/ 13	19/ 25	34/ 37	-07/ 06	-35/ -44	32/ -43	-23/ -31
15	38/ 33	35/ 26	40/ 42	55/ 62	32/ 33	22/ 12	15/ 26	34/ 41	-12/ 06	-40/ -47	37/ -45	-27/ -35
16	33/ 49	25/ 27	33/ 39	30/ 37	25/ 40	16/ 09	04/ 26	27/ 35	-15/ 08	-31/ -50	27/ -53	-22/ -28
17	31/ 42	39/ 31	31/ 42	19/ 30	26/ 20	26/ 21	43/ 43	28/ 38	-08/ -04	-34/ -40	36/ -44	-16/ -20
18	00/ -10	05/ 16	04/ 00	05/ -04	08/ -01	-05/ 04	08/ -04	-02/ 03	00/ -01	-03/ 10	-01/ 08	-05/ 10
19	12/ 10	21/ 15	12/ 22	23/ 15	12/ 10	19/ 14	15/ 07	11/ 17	-11/ 03	-16/ -13	14/ -13	-13/ -09
20	01/ 03	14/ 07	17/ 18	12/ 01	09/ 05	17/ 02	08/ -09	15/ 18	01/ 09	-12/ -07	10/ -06	-10/ -06
21	-25/ -24	-25/ -30	-24/ -30	-14/ -32	-24/ -23	-11/ -23	-13/ -21	-15/ -26	12/ -03	24/ 34	21/ 36	18/ 19
22	04/ 01	05/ 01	02/ -16	01/ 00	00/ -08	-02/ -12	09/ -01	01/ -13	01/ -06	01/ 03	06/ 05	-07/ 00

	Glare (new)	Starbursts (new)	Halos (new)	Double Images (new)	Satis- faction	Expec- tations	LOT-R	BHVI-QOL	PHQ-4	SDRS
13	-									
14	53/ 49	-								
15	62/ 55	63/ 70	-							
16	35/ 28	39/ 36	41/ 41	-						
17	20/ 20	15/ 32	19/ 28	14/ 25	-					
18	02/ -09	05/ -09	06/ -12	-01/ -04	-09/ -08	-				
19	18/ 24	15/ 10	21/ 06	19/ 15	19/ 00	08/ -05	-			
20	08/ 09	12/ 00	19/ -07	09/ 04	08/ 01	19/ 02	45/ 51	-		
21	-19/ -17	-20/ -22	17/ -18	-20/ -27	-19/ -17	08/ 00	-41/ -31	-30/ -25	-	
22	-05/ 03	04/ 00	-02/ -05	01/ 01	09/ -01	07/ -05	05/ 08	26/ 17	-01/ 03	-

1= National Eye Institute Refractive Error Quality of Life Instrument Refractive Quality of Life (NEI-RQL)-clarity of vision;

2 = RQL-near vision;

3 = RQL-far vision;

4 = RQL- glare scale;

5 = RQL- diurnal vision;

6 = RQL-activity limitations;

7 = RQL-worry;

8 = National Eye Institute (NEI)-Visual Function Questionnaire (VFQ) driving;

9 = Hours worked;

10 = Ocular Surface Disease Index (OSDI);

11 = OSDI-symptoms;

12 = OSDI-environment;

13 = Glare;

14 = Starburst;

15= Halos;

16 = Double images;

17 = Satisfaction with current vision;

18 = Expectations about surgery;

19 = Life Orientation Test-Revised (LOT-R) ;

20 = Brien Holden Vision Institute Quality of Life Scale for Myopia (BHVI-QOL) ;

21 = Patient Health Questionnaire (PHQ-4) ;

22 = Socially Desirable Response Set (SDRS).

**eTable 4. Product-Moment Correlations of PROWL Scales With Satisfaction With Surgery and Validity Variables (PROWL-1/PROWL-2)**

	Satisfaction with surgery scale at:		
	1 month	3 months	6 months <sup>§</sup>
<b>PROWL scale</b>			
Glare	0.34 / 0.40	0.36 / 0.33	0.43
Starbursts	0.27 / 0.36	0.24 / 0.36	0.32
Halos	0.37 / 0.38	0.34 / 0.33	0.49
Double Image	0.43 / 0.29	0.37 / 0.48	0.39
Validity variable:			
Baseline expectations about spectacle use and vision	0.01/-0.01	-0.05/0.10	-0.04
Baseline Brien Holden Vision Institute Quality of Life Scale for Myopia (BHVI-QOL)	0.12/0.09	0.14**/0.13**	0.13
Baseline Life Orientation Test-Revised (LOT-R)	-0.03/0.08	0.04/0.10	0.06/
Baseline Patient Health Questionnaire (PHQ-4)	-0.08/-0.05	-0.11/-0.08	-0.19*
Baseline Socially Desirable Response Set (SDRS)	0.13**/0.08	0.15**/0.05	0.07

§ 6-month data available for PROWL-1 only.

\*p<.01, \*\* p<.05

**eTable 5. Product-Moment Correlations of PROWL-1 Scales With Visual Acuity**

Visual acuity measure	PROWL Scale				Satisfaction with surgery composite
	Glare	Starbursts	Halos	Double Image	
<b>Uncorrected distance binocular visual acuity</b>					
- at 1 month	-0.0670	0.0730	-0.0720	-0.2650*	-0.1930*
- at 3 months	0.0040	-0.1150	-0.0520	-0.1990*	-0.2076*
- at 6 months	-0.1010	-0.0830	-0.1150	-0.0790	-0.1884*
<b>Uncorrected near binocular visual acuity</b>					
- at 1 month	-0.0040	0.0520	0.0030	-0.2190*	-0.1485**
- at 3 months	0.0220	-0.0170	-0.0520	-0.1720**	-0.1384**
- at 6 months	-0.0560	-0.0900	-0.0910	0.0320	-0.1337
<b>Best correction visual acuity Oculus Dexter</b>					
- at 1 month	-0.0320	0.0790	-0.0430	-0.0560	-0.0814
- at 3 months	-0.0390	-0.0140	-0.0490	-0.1620**	-0.1166
- at 6 months	-0.0680	-0.0360	-0.0290	0.0030	-0.0300
<b>Best correction visual acuity Oculus Sinister</b>					
- at 1 month	0.0080	0.1260	0.0070	0.0930	-0.0713
- at 3 months	0.0590	0.0040	-0.0280	-0.1390**	-0.0837
- at 6 months	0.0790	0.0220	-0.0010	-0.0190	-0.0346
<b>Myopia Oculus Dexter</b>					
- at 1 month	-0.0390	-0.1270	-0.0270	-0.1340	-0.1231
- at 3 months	-0.0800	-0.0320	-0.0990	-0.0790	-0.1981*
- at 6 months	-0.1520**	-0.1170	-0.1480**	-0.0440	-0.1417
<b>Myopia Oculus Sinister</b>					
- at 1 month	-0.0660	-0.1770**	-0.1560**	-0.1100	-0.0547
- at 3 months	-0.0550	0.0060	-0.0510	-0.1570**	-0.1861**
- at 6 months	-0.0810	-0.0380	-0.0830	-0.0940	-0.1290
<b>Hyperopia Oculus Dexter</b>					
- at 1 month	0.0520	-0.0920	0.0150	0.0300	-0.0283
- at 3 months	0.0990	0.0600	-0.0600	0.1240	-0.0273
- at 6 months	0.1600	-0.1220	0.1020	0.0930	0.1590
<b>Hyperopia Oculus Sinister</b>					
- at 1 month	0.0100	-0.1430	-0.1260	0.0100	0.0644
- at 3 months	0.1300	0.1250	0.0850	0.1160	-0.0097
- at 6 months	0.0400	0.0110	0.0170	0.0010	0.0539

\*p<.01, \*\* p<.05

**eTable 6. Mean Differences on PROWL-1 Scales by Myopia and Hyperopia**

	Glare		Starbursts		Halos		Double Images	
	No	Yes	No	Yes	No	Yes	No	Yes
<b>Myopic Oculus Sinister at:</b>								
-1 month	84.8	82.2	83.8	75.8 **	80.9	73.8	97.7	94.6
-3 months	89.0	87.9	83.5	83.3	84.1	82.1	98.6	94.8**
-6 months	93.5	90.6	87.5	86.3	89.7	86.2	98.0	95.8
<b>Myopic Oculus Dexter</b>								
-1 month	84.0	82.6	82.1	76.3	76.7	75.8	98.0	94.2
-3 months	91.0	88.0	85.2	83.3	86.5	82.4	97.7	95.9
-6 months	94.7	89.3**	89.8	84.9	90.9	84.8**	97.4	96.3
<b>Hyperopic Oculus Sinister</b>								
-1 month	84.8	85.3	83.8	77.0	80.9	75.1	97.7	97.9
-3 months	90.0	94.5	83.5	88.5	84.1	87.9	98.6	100.0
-6 months	93.5	94.9	87.5	87.9	89.7	90.4	98.0	98.1
<b>Hyperopic Oculus Dexter</b>								
-1 month	84.0	86.4	82.1	77.7	76.7	77.4	98.0	98.5
-3 months	91.0	95.0	85.2	87.7	86.5	83.8	97.7	100
-6 months	94.7	100*	89.8	85.8	90.9	95.6	97.4	100**

\*p<.01, \*\* p<.05

**eTable 7. Product-Moment Correlations and Tests of PROWL-2 Scales With Visual Acuity**

Visual acuity measure	Symptom Scales				Satisfaction with surgery scale
	Glare	Starbursts	Halos	Double Images	
<b>Uncorrected distance binocular visual acuity</b>					
- at 1 month	-0.0380	-0.1030	-0.0190	0.0590	-0.1257**
- at 3 months	0.0190	-0.1540**	-0.0890	-0.2020*	-0.2878*
<b>Uncorrected near binocular visual acuity</b>					
- at 1 month	0.0560	-0.0480	0.0560	-0.0360	-0.0305
- at 3 months	-0.0110	-0.1040	-0.0450	-0.1260**	-0.0172
<b>Best correction visual acuity binocular</b>					
- at 1 month	0.0430	-0.1010	-0.0140	0.0740	-0.0992
- at 3 months	0.0210	-0.0960	-0.0250	-0.1040	-0.1969*
<b>Myopia Oculus Dexter</b>					
- at 1 month	-0.0390	-0.0080	-0.0480	-0.1120	-0.2350*
- at 3 months	-0.1020	-0.0970	-0.1070	-0.1290	-0.0824
<b>Myopia Oculus Sinister</b>					
- at 1 month	-0.0520	-0.0330	-0.0470	-0.1600**	-0.0676
- at 3 months	-0.0330	-0.0610	-0.1070	-0.0160	-0.0499
<b>Hyperopia Oculus Dexter</b>					
- at 1 month	0.0300	-0.1050	-0.0630	-0.0180	-0.1143
- at 3 months	0.0539	-0.0763	0.0418	-0.1259	0.0661
<b>Hyperopia Oculus Sinister</b>					
- at 1 month	0.0240	0.0570	0.0230	-0.0830	0.0263
- at 3 months	0.1130	0.0230	0.0910	0.0190	0.0961

\*p<.01, \*\*p<.05

**eTable 8. Mean Differences on PROWL-2 Scales by Myopia and Hyperopia**

	Glare		Starbursts		Halos		Double Images	
	No	Yes	No	Yes	No	Yes	No	Yes
<b>Myopic Oculus Sinister at:</b>								
-1 month	87.0	84.6	72.5	70.8	70.7	68.3	98.0	93.1**
-3 months	88.9	87.4	81.4	78.0	82.3	76.6	97.5	97.1
<b>Myopic Oculus Dexter:</b>								
-1 month	86.8	85.0	74.0	73.5	71.8	69.4	97.0	93.5
-3 months	91.8	86.7	84.1	78.2	83.4	77.2	100.0	96.6*
<b>Hyperopic Oculus Sinister:</b>								
-1 month	86.9	88.0	72.5	75.3	70.7	71.7	98.0	95.9
-3 months	88.9	93.0	81.4	82.4	82.3	86.2	97.5	97.9
<b>Hyperopic Oculus Dexter:</b>								
-1 month	86.8	88.1	74.0	68.8	71.8	69.0	97.0	96.6
-3 months	91.8	93.5	84.1	80.6	83.4	85.2	100.0	97.8

\*p<.01, \*\* p<.05

**eTable 9. Estimates of MID Based on Change in Satisfaction With Vision Item (3-months – baseline)**

**Change in Satisfaction with Vision**

<b>Scale</b>	<b>Better+</b>	<b>MID</b>	<b>Same</b>	<b>Worse</b>
NEI-RQL-42				
Clarity vision (SD $\Delta$ = 25, 25)				
PROWL-2 (r = 0.38)	17	4 (.2)	-12	-15
PROWL-1 (r = 0.26)	10	-1	-12	3
Near vision (SD $\Delta$ = 14 & 16)				
PROWL-2 (r = 0.36)	12	4 (.3)	-1	1
PROWL-1 (r = 0.14)	17	17 (>1)	5	5
Far vision (SD $\Delta$ = 16 & 18)				
PROWL-2 (r = 0.37)	13	5 (.3)	-4	-5
PROWL-1 (r = 0.26)	17	11 (.6)	0	9
Glare (SD $\Delta$ = 31 & 29)				
PROWL-2 (r = 0.38)	8	-7 (.2)	-25	-28
PROWL-1 (r = 0.24)	5	-3 (.1)	-28	-29
Diurnal vision (SD $\Delta$ = 24 & 25)				
PROWL-2 (r = 0.30)	14	2 (.1)	-9	-3
PROWL-1 (r = 0.11)	9	7 (.3)	-4	6
Activity limitations (SD $\Delta$ = 25 & 28)				
PROWL-2 (r = 0.09)	27	23 (.8)	15	35
PROWL-1 (r = 0.05)	36	38 (>1)	24	40
Worry (SD $\Delta$ = 30 & 32)				
PROWL-2 (r = 0.42)	41	21 (.7)	13	-2
PROWL-1 (r = 0.25)	36	20 (.6)	4	25
NEI-VFQ-25 Driving (SD $\Delta$ = 17 & 23)				
PROWL-2 (r = 0.36)	11	4 (.2)	-8	-10
PROWL-1 (r = 0.27)	17	6 (.3)	-1	3
OSDI-Symptoms (SD $\Delta$ = 17 & 16)				
PROWL-2 (r = -0.41)	-14	-4 (.2)	5	8
PROWL-1 (r = -0.29)	-7	1	1	2
<b>Visual symptoms</b>				
Glare (SD $\Delta$ = 28 & 29)				
PROWL-2 (r = 0.24)	12	4 (.1)	-9	-12
PROWL-1 (r = 0.19)	11	12 (.4)	-18	-2
Starbursts (SD $\Delta$ = 33 & 32)				
PROWL-2 (r = 0.29)	17	6 (.2)	-20	-4
PROWL-1 (r = 0.14)	11	12 (.4)	-16	-14
Halos (SD $\Delta$ = 33 & 30)				
PROWL-2 (r = 0.25)	12	7 (.2)	-20	-20
PROWL-1 (r = 0.22)	8	4 (.1)	-28	-13
Double images (SD $\Delta$ = 21 & 22)				
PROWL-2 (r = 0.23)	16	7 (.3)	5	-13
PROWL-1 (r = 0.14)	11	9 (.4)	9	1

Note: NEI RQL-42 scales, NEI-VFQ-25 driving scale, visual aberrations and satisfaction with vision are scored with a higher score being better. OSDI is scored such that a higher score is worse. Spearman correlation between change in HRQOL scale and the four categories of change in satisfaction with vision (better+, MID, same, worse) are shown. Entries within parentheses are mean/SD (effect size).

NEI-RQL-42 = National Eye Institute Refractive Error Quality of Life Instrument; NEI-VFQ-25 = National Eye Institute Visual Functioning Questionnaire; OSDI = Ocular Surface Disease Index.

*Better+*: >1 category better (n's=164 and 182 in PROWL-2 and PROWL-1)

*MID*: 1 category better (n's=58 and 23 in PROWL-2 and PROWL-1)

*Same*: (n's=26 and 14 in PROWL-2 and PROWL-1)

*Worse*: (n's=8 and 3 in PROWL-2 and PROWL-1)

**eTable 10. Change in Rasch Scores for “Not Wearing Best Vision Correction” in Pooled Patient-Reported Outcomes With LASIK (PROWL-1 and PROWL-2 Data).<sup>§</sup>**

<b>Scale</b>	<b>Pre-operative mean</b>	<b>1-month post-operative mean</b>	<b>Mean Difference</b>	<b>SD of difference</b>	<b>t-statistics (p-value)</b>
Double images (3)	65.6	71.3	5.7	12.4	10.06 (<.001)
Glare (3)	61.7	63.0	1.4	12.0	2.48 (.01)
Starbursts (3)	60.6	61.4	0.8	13.3	1.19 (.23)
Halos (3)	60.6	59.6	-0.9	13.2	-1.54 (.13)
<b>Scale</b>	<b>Pre-operative mean</b>	<b>3-month post-operative mean</b>	<b>Mean Difference</b>	<b>SD of difference</b>	<b>t-statistics (p-value)</b>
Double images (3)	65.7	71.8	6.1	11.9	11.13 (<.001)
Glare (3)	61.7	64.6	2.9	11.2	5.59 (<.001)
Starbursts (3)	60.5	63.5	3.0	12.9	4.78 (<.001)
Halos (3)	60.6	62.7	2.1	12.3	3.59 (<.001)
<b>Scale</b>	<b>Pre-operative mean</b>	<b>6-month post-operative mean</b>	<b>Mean Difference</b>	<b>SD of difference</b>	<b>t-statistics (p-value)</b>
Double images (3)	66.3	71.7	5.4	11.8	6.72 (<.001)
Glare (3)	60.7	65.8	5.1	12.1	6.14 (<.001)
Starbursts (3)	60.0	64.8	4.8	13.4	4.95 (<.001)
Halos (3)	60.8	64.5	3.7	12.2	4.36 (<.001)

<sup>§</sup> Scores were computed using the items about the frequency, amount of bother and difficulty performing activities due to the symptom.

SD = standard deviation

Note: The 6-month means were calculated using only PROWL-1 data.

**eTable 11. Change in Rasch Scores for “Wearing Best Vision Correction” in Pooled Patient-Reported Outcomes With LASIK (PROWL-1 and PROWL-2 Data).<sup>§§</sup>**

<b>Scale</b>	<b>Pre-operative mean</b>	<b>1-month post-operative mean</b>	<b>Mean Difference</b>	<b>SD of difference</b>	<b>t-statistics (p-value)</b>
Double images (4)	56.4	58.5	2.1	7.3	6.18 (<.001)
Glare (4)	62.7	65.0	2.3	12.1	3.91 (<.001)
Starbursts (4)	59.1	61.6	2.4	12.2	3.60 (<.001)
Halos (4)	60.6	59.9	-0.8	13.8	-1.03 (.30)
<b>Scale</b>	<b>Pre-operative mean</b>	<b>3-month post-operative mean</b>	<b>Mean Difference</b>	<b>SD of difference</b>	<b>t-statistics (p-value)</b>
Double images (4)	56.7	58.9	2.2	6.9	7.02 (<.001)
Glare (4)	62.7	66.8	4.1	12.1	6.86 (<.001)
Starbursts (4)	59.2	63.6	4.4	11.6	7.10 (<.001)
Halos (4)	60.7	64.3	3.6	12.4	5.40 (<.001)
<b>Scale</b>	<b>Pre-operative mean</b>	<b>6-month post-operative mean</b>	<b>Mean Difference</b>	<b>SD of difference</b>	<b>t-statistics (p-value)</b>
Double images (4)	56.9	58.9	1.9	7.1	3.97 (<.001)
Glare (4)	62.4	67.8	5.5	12.4	6.15 (<.001)
Starbursts (4)	59.6	64.2	4.6	11.1	5.49 (<.001)
Halos (4)	60.8	65.3	4.5	12.3	4.92 (<.001)

<sup>§§</sup>scores were computed using the items about the frequency, amount of bother, difficulty performing activities due to the symptom, and if symptom goes away when using best vision correction.

SD = standard deviation.

Note: The 6-month means were calculated using only PROWL-1 data.

eFigure. Patient-Reported Outcomes With LASIK (PROWL) Flow Diagram.

