4. Method

4.1. Participants

The first part of this section provides a description of the recruitment procedures employed in the present study. Secondly, sample size and rate of participation in all four waves of data collection are reported. Following this, participants are described on a number of sets of variables: (a) sociodemographic variables (i.e., gender, age, marital status, years of education, employment status, and residence), (b) general health status (i.e., self-reported chronic diseases, self-reported general health), and (c) relevant ophthalmic data (i.e., subjective visual impairment, best corrected distance visual acuity pre- and post-surgery, previous cataract surgery, minor post-surgical complications, form of anesthesia). Aside from description, also possible biases due to the drop-out of participants at different waves of the data collection are explored by means of univariate as well as multivariate analyses. Tests are performed for all demographic and medical variables mentioned above as well as for first measurement points of the major variables under study.

4.1.1. Recruitment Procedures

Recruitment of participants took place in two German hospitals, the Department of Ophthalmology at the Berlin Virchow Hospital as well as the Department of Ophthalmology at the Mainz University Hopsital. Means of recruitment did not vary between clinics, and the same instructor recruited patients in Berlin and Mainz. Participants recruited in Berlin and Mainz did not differ with respect to a range of demographic variables; however, patients in Berlin had a slightly higher number of chronic diseases ($t(51.21) = 2.63$, $p = .011$), reported less health satisfaction ($t(108) = -3.75$, $p < .001$), and had slightly better visual acuity pre-surgery in the eye operated on ($t(108) = 2.03$, $p = .045$). For detailed analyses of the differences between the Berlin and Mainz samples see Appendix A.

Participants were contacted in their hospital rooms by a female study investigator shortly after admission to the hospital. They were given the study brochure and a detailed description of the purpose of the study. Study materials and design were

explained. If a patient was interested in participation, he or she was given informed consent forms for (a) participation in the study and (b) authorization for access to medical data (Appendix E, Sections 8.5.1. and 8.5.2.). Patients were asked to sign both forms if they agreed with the conditions of participation. They were then handed the study material (information brochure, questionnaire, and a pen) along with an envelope and were instructed to leave the completed materials sealed in an envelope with the nurses at the front desk on the day of discharge. Hospital staff collected the study materials in file cabinets which the study investigator picked up on a daily basis.

4.1.2. Exclusion Criteria

For mainly test-economic reasons, the feasibility of assessment via questionnaire guided the selection of participants. Patients who could not read or answer the study questionnaires were not included. Conditions associated with the failure to read or write were mainly blindness and diagnosed dementia. Information concerning these conditions were provided by the hospital staff prior to the typical recruitment interview.
A second exclusion criterion pertained to the inpatient/outpatient status of the participant. Many cataract surgeries are now performed on an outpatient basis. To retain a high comparability of the situation among all participants, however, only inpatients were included in the study.

4.1.3. Sample Size and Rate of Participation

The full sample of the present study (t1) comprised 110 cataract patients (Table 2). Eight of these 110 participants failed to provide data for the second measurement point in time. One more patient did not provide data at the third measurement occasion. Even if participants failed to provide data at measurement points t2 and t3, they were contacted at measurement point t4. A total of 94 participants provided information at t4. However, only 86 of these patients had answered questionnaires at all four measurement occasions, which corresponds to 78.18% of the full sample. In all cases, non-continuing participants failed to either turn in or send back the completed study materials.

In order to gain insight into potential effects of attrition, selected sample characteristics (i.e., sociodemographic variables, general health status, and ophthalmologic data) for all participants at t1 (N = 110), continuers (n = 86), and non-continuers (n = 24) are presented separately.

Table 2
Information on Number of Participants Throughout the Study.

Sample	N (n)	(%)
Full Sample T1	110	100
T1 through T2	102	92.27
T1 through T3	101	91.81
Total T4 responses	94	85.45
T1 through T4	86	78.18

4.1.4. Chronological Age and Gender

The full sample at t1 comprised individuals aged between 43 and 89 years (M = 71.62; SD = 8.93), 48 of whom were men and 62 women. As can be seen in Table 3, the continuer sample was slightly younger (M = 71.00) than the non-continuer sample (M = 73.83); however, mean ages of both groups were not significantly different ($t(108)$ = 1.38 p = .17). Regarding gender distributions, continuers and non-continuers did not differ significantly (χ^2 = .06; p = .81).

Table 3
Age and Gender Distributions for the Full Sample, Contiuers, and Non-Continuers.

Characteristic	Full Sample T1 (N = 110)	Continuers T1 through T4 (n = 86)	Non-Continuers T1 through T4 (n = 24)	χ^2/ t	df	p
Age (years)						
Mean	71.62	71.00	73.83	1.38	108	.17
SD	8.93	9.04	8.31			
Range	43 yrs to 89 yrs	43 yrs to 89 yrs	56 yrs to 87 yrs			
Male						
n (%)	48 (43.6)	37 (43)	11 (45.8)	.06	1	.81
Female						
n (%)	62 (56.4)	49 (57)	13 (54.2)			

Note. T tests and χ^2 tests pertain to differences between continuers and non-continuers.

4.1.5. Sociodemographic Variables

Within the full sample at t1, about 57% of participants were married, and roughly 29% were widowed (see Table 4). Relatively few participants were divorced (5.5%) or single (7.3%). The overwhelming majority of participants (74.6%) reported 9 to 10 years of schooling, which corresponds to the German Haupt- and Realschulabschluß. A remaining 25% reported 12 to 13 years of school education, i.e., German Abitur and Fachhochschulreife. Most of the participants were living in their private homes (94%). Only about 5% were living at retirement facilities. The vast majority of cataract patients (91.8%) were retired at the time of data assessment and had been so for an average of 16.33 (*M*; *SD* = 12.70) years. On none of the reported sociodemographic variables did continuers and non-continuers differ significantly.

Table 4
Sociodemographic Characteristics for the Full Sample, Continuers, and Non-Continuers.

Characteristic	Full Sample T1 (N = 110)	Continuers T1 through T4 (n = 86)	Non-continuers T1 through T4 (n = 24)	χ^2/ t	df	p
Marital Status						
Married						
n (%)	63 (57.3)	50 (58.1)	13 (54.2)	.17	1	.68
Widowed						
n (%)	32 (29.1)	22 (25.6)	10 (41.7)	2.25	1	.13
Divorced						
n (%)	6 (5.5)	6 (7)	-	1.79	1	.18
Single						
n (%)	8 (7.3)	7 (8.1)	1 (4.2)	.46	1	.50
Missing						
n (%)	1(.9)	1 (.9)	-			
Number of Children						
M (SD)	1.63 (1.09)	1.59 (1.00)	1.76 (1.41)	.63	95	.53
Number of Grandchildren						
M (SD)	2.12 (2.44)	2.14 (2.58)	2.05 (1.93)	-.14	91	.88
Years of Education [a]						
up to 9 yrs						
n (%)	52 (47.3)	39 (45.3)	13 (54.2)	.91	1	.34
10 yrs						
n (%)	30 (27.3)	26 (30.2)	4 (16.7)	1.5	1	.22
12 to13 yrs						
n (%)	27 (24.6)	21 (24.4)	6 (25)	.27	1	.89
Missing						
n (%)	1 (.9)	-	1 (4.2)			

(Table continued)

Table 4 (continued)

Characteristic	Full Sample T1 (N=110)	Continuers T1 through T4 (n = 86)	Non-continuers T1 through T4 (n = 24)	χ^2/ t	df	p
Residence						
Private						
n (%)	102 (94.4)	80 (94.1)	22 (95.7)	.08	1	.78
Institutionalized						
n (%)	5 (4.6)	4 (4.7)	1 (4.2)	.01	1	.94
Else						
n (%)	1 (.9)	1 (1.2)	-	.27	1	.60
Missing						
n (%)	2 (1.8)	1 (1.2)	1 (4.2)			
Number of Co-inhabitants						
M (SD)	.75 (.81)	.74 (.76)	.77 (1.02)	.16	105	.87
Employment Status						
Retired						
n (%)	101 (91.8)	77 (89.5)	24 (100)			
Working				2.44	1	.12
n (%)	8 (7.3)	8 (9.3)	-			
Missing						
n (%)	1 (.9)	1 (1.2)	-			

Note. [a] Years of education was defined as including school education only, ranging from elementary school to high school. Indicators for years of education were different forms of graduation: up to 9 years (German "Hauptschulabschluß"), 10 years (German "Realschulabschluß"), and 12 to 13 years (German "Fachhoschulreife" and "Abitur"), respectively. T tests and χ^2 tests pertain to differences between Continuers and Non-Continuers.

4.1.6. General Health Status

Regarding general health status, again, assessments relied on self-reports (for details, see Section 4.2.3.). Multimorbidity was construed as the number of unweighted medical diagnoses reported by patients. On average, about 2.5 medical diagnoses were indicated by participants. General health satisfaction comprised just one item asking patients on a scale of *bad* (0) to *very good* (4) how they would describe their present health status. General health satisfaction was rated on average as satisfactory. There were no differences between continuers and non-continuers regarding both variables (see Table 5).

Looking at age and gender differences, notably, the total number of reported diseases did not differ significantly between men (M = 2.31, SD = 2.06) and women (M = 2.70, SD = 2.11; $t(108)$ = -.98, p = .33). A zero-order correlation of chronological age with multimorbidity was also insignificant (r = .13, p = .17). Splitting participants into three

age-groups and following up with univariate analysis of variance yielded a marginally significant main effect of age-group on multimorbidity (F (2, 109) = 2.77, p = .07, η^2 = .05).

Table 5
Information on General Health for the Full Sample, Continuers, and Non-Continuers

Characteristic	Full Sample T1	Continuers T1 through T4	Non-continuers T1 through T4	t	df	p
	(N = 110)	(n = 86)	(n = 24)			
Multimorbidity						
M	2.53	2.65	2.10			
SD	2.09	2.24	1.34	-1.49	62.18[a]	.14
Range	0 to 9	0 to 9	0 to 6			
General Health Satisfaction						
M	2.02	2.01	2.06			
SD	.92	.93	.93	.26	108	.80
Range	0 to 4	0 to 4	0 to 4			

Note. T tests pertain to differences between Continuers and Non-Continuers. a: Equal variances not assumed (Levene F (108) = 7.47, p < .01).

Post-hoc tests (Scheffé) indicated one marginally significant difference between the youngest and oldest age group. Means indicated highest multimorbidity for members of the oldest (75 years and older; M = 3.08, SD = 2.07) age group, followed by 65- to 74-year-old patients (M = 2.50, SD = 2.10). The youngest group presented with the lowest mean multimorbidity (M = 1.87, SD = 1.95).

4.1.7. Ophthalmic Data

Concerning information about patients' ophthalmic history, a number of variables were looked at. Subjective visual impairment (t1), assessed with the help of one item asking participants how impaired they felt due to their vision problems (endorsed on a four-point scale ranging from *not at all* [1] to *extremely* [4]) was moderate (see Table 6) on average and did not yield significant differences between continuers and non-continuers. Best corrected distance visual acuity (see Section 4.2.3. for futher details) in the eye operated on was only marginally better among continuers than it was among non-contiuers (see Table 6) before the operation and significantly so after the operation.

For the eye not operated on, best corrected distance visual acuity was once again better in the continuer sample. With respect to change in visual acuity (pre- to post-surgery, eye operated on) however, no significant differences were found.

Table 6
Information about Subjective and Objective Visual Impairment for the Full Sample, Continuer, and Non-Continuer Sample

Characteristic	Full Sample T1 (N = 110)	Continuers T1 through T4 (n = 86)	Non-continuers T1 through T4 (n = 24)	t	df	p
Subjective Visual Impairment						
M	2.19	2.14	2.38			
SD	.67	.64	.77	1.53	108	.13
Range	1 to 4	1 to 4	1 to 4			
Distance visual acuity pre-surgery						
Eye (operated on)						
M	.43	.45	.36			
SD	.23	.23	.20	-1.79	108	.08
Range	0 to 1	0 to 1	0 to .7			
Eye (other)						
M	.65	.68	.55			
SD	.22	.20	.25	-2.47	108	.02
Range	.10 to 1	.10 to 1	.20 to 1			
Distance visual acuity post-surgery						
Eye (operated on)						
M	.75	.77	.66			
SD	.23	.19	.27	-2.14	108	.04
Range	.03 to 1	.30 to 1	.03 to 1			
Change in distance visual acuity post-surgery						
Eye (operated on)						
M	.32	.32	.31			
SD	.23	.24	.02	-.20	108	.84
Range	-.05. to .90	-.05 to .90	.00 to .75			

Note. T tests pertain to differences between continuers and non-continuers.

Looking at other factors pertaining to cataract patients' ophthalmologic history, such as previous experience with cataract surgery, the occurrence of minor complications post-surgery or the manner of anesthesia received (for further detail see Section 4.2.3.), no further differences were found between continuers and non-continuers.

Table 7
Information about Ophthalmologic History for the Full Sample, Continuer, and Non-Continuer Sample

Characteristic	Full Sample T1 (N = 110)	Continuers T1 through T4 (n = 86)	Non-Continuers T1 through T4 (n = 24)	χ^2	df	p
Previous Cataract Surgery						
No N (%)	60 (54.5)	44 (51.2)	16 (66.7)	1.82	1	.18
Yes n (%)	50 (45.5)	42 (48.8)	8 (33.34)			
Minor Post-Surgical Complications						
No n (%)	90 (81.81)	71 (82.56)	19 (79.16)	1.96	1	.16
Yes n (%)	16 (14.45)	15 (17.44)	1 (4.16)			
Missing n (%)	4 (3.63)	-	4 (16.66)			
Anesthesia						
Non-Invasive n (%)	47 (43.6)	40 (46.5)	7 (33.3)	2.31	1	.13
Invasive n (%)	63 (56.4)	46 (53.5)	17 (66.7)			

Note. Chi-square tests pertain to differences between Continuers and Non-Continuers.

4.1.8. Major Variables Under Study: Biases Due to Drop-Out?

A next set of analyses explored whether differences existed between continuers and non-continuers with respect to t1 assessments of major variables under study (operationalization and descriptive results are covered in detail in the following sections). Those variables included personality factors Neuroticism, Extraversion, and Openness to Experience, four situation-specific coping scales (Focus on Positive, Seeking Support, Acitve Coping, and Evasive Coping) and their content-free features (selective coping and total range of coping), as well as first-time measurements of state Positive and Negative Affect, life satisfaction, and vision-related functional status pre-surgery. Possible differences between groups were explored by means of multivariate

analyses of variance (MANOVA). Separate MANOVAs were conducted for personality variables, content, and content-free aspects of situation-specific coping, affect, and functional state measures. Only marginal to significant results are reported. Due to large differences in group sizes (non-continuers:continuers = 1:3.58), homogeneity of covariance and variance matrices were closely inspected in all cases (Box's M Test, Levene's test for equality of variances).

Examining situation-specific coping responses (content), a marginally significant multivariate main effect of full continuation emerged (*Wilk's* λ = .92, F (4, 105) = 2.43, p = .052, partial η^2 = .09). Both tests for equality of variance-covariance matrices were non-significant, suggesting reliability of F tests. Univariate F tests suggested marginally significant impacts of the continuation variable on Focus on Positive (F (1, 108) = 3.28, p = .073, partial η^2 = .03) as well as Evasive Coping (F (1, 108) = 3.19, p = .077, partial η^2 = .03). However, because of intercorrelations in excess of r = .30 between dependent variables, the impact of the independent variable on each dependent variable was re-evaluated, using MANOVA with sequential adjustment for nonorthogonality (Roy-Bargman stepdown analysis with univariate F-prioritization; Tabachnick & Fidell, 2001). In stepdown analysis, each dependent variable is analyzed in turn, with the higher-priority DVs tested as covariates and with the highest-priority DV tested in an univariate ANOVA (Tabachnick & Fidell, 2001). Homogeneity of regression was achieved for all components of the stepdown analysis. Since Focus on Positive coping was given highest priority (due to its highest univariate F in previous analysis), stepdown results for this dependent variable were again univariate F (1, 108) = 3.28, p = .073, partial η^2 = .03. Means indicated higher Focus on Positive coping for those who continued with the study (M = 2.31, SE = .06, n = 86) as opposed to non-continuers (M = 2.06, SE = .12, n = 24). A second difference was found on Evasive Coping, which had been entered next, with a stepdown F (1, 107) = 4.91, p = .03, partial η^2 = .04. Adjusted means indicated lower Evasive Coping for continuers (*adjusted* M = 1.31, SE = .04, n = 86) than for non-continuers (*adjusted* M = 1.50, SE = .07, n = 24). There are multiple problems with stepdown analyses, including the (here employed) sequencing of dependent variables that relied only on the statistical criteria of largest univariate F. However, since the overall and individual group differences were small, for the most part only marginally significant, and would not stand any adjustment for Type I error,

problems associated with this type of analysis should not cause great damage in this instance.
Continuers did not differ from non-continuers with respect to Support Seeking, Active Coping, higher-order personality variables (Neuroticism, Extraversion, Openness), content-free features of situation-specific coping (selective vs. total range of coping), nor affect at t1.

To sum up the differences discovered between patients who did versus did not continue to participate in the study, continuers were slightly better off regarding best corrected distance visual acuity in the eye not operated on. Also, there was a tendency for them to have higher visual acuity in the eye operated on (pre- and post-surgery). Finally, persons continuing in the study had a tendency to focus more on the positive aspects of the situation and use less Evasive Coping. Most of these effects did not by conservative means reach a sufficient level of significance. Moreover, differences were relatively small (many of them half of a respective variable's standard deviation). Accordingly, biases induced by drop-out from the study should be limited.

4.2. Materials and Measures

4.2.1. The Study Information Brochure

Patients who consented to participate in the study were handed an approximately three-page information brochure about the cataract study by the instructor.
The brochure contained general information about the goals of the study. Specifically, it emphasized the importance of insight into problems and benefits of living with the cataract as well as recovering from it by means of surgery. Subsequently, participants were informed about the study procedure and design. They were also provided with a simplified graphic overview about the different measurement points as they were related to the scheduled surgery date. In sections following, information was provided concerning enrollment in the study and protection of personal data.
All information was printed in 15-point Arial typeface with additional one-point distance between characters (recommendation by the Berliner Blindenverein e.V.) to accomodate the needs of individuals with impaired vision.

4.2.2. Demographic Variables

A number of demographic variables were assessed at the first measurement point by means of a self-report questionnaire. Included were information about the respondent's sex, year of birth, marital status, and number of children and grandchildren.
To assess further information about the current life circumstances of the participant, questions were asked about (number of) co-inhabitants, such as husband/wife, life-companions, parents, children, friends, or others. Additionally, manner of housing was inquired in form of one multiple choice item comprising the following categories: private, institutionalized, or others. Number of years of schooling and current/former job status were also inquired.

4.2.3. Control Variables

To ensure meaningful analyses and interpretation of the data, several potentially confounding variables were considered as control variables at different points of the analyses process.
Among the medically relevant control variables were previous experience with cataract surgery, objective state of visual impairment, means of anesthesia during surgery, as well as overall health status. Information about prior experience with cataract surgery was obtained from the participant's hospital records and medical history. Visual acuity was measured in Snellen decimal units for distance vision only and gathered from hospital records as well as from participants' private ophthalmologists. Distance visual acuity was measured monocularly and with best available correction prior to surgery, at discharge, and within six weeks of discharge. For the purpose of this study, information on participants' visual acuity was treated separately for the eye operated on and the eye not operated on. Also, visual acuity at discharge was not further analyzed as it is not a good indicator of surgical outcome due to a temporary irritation of the eye. Change in visual acuity in the eye operated on was determined by computing a difference score, subtracting pre-surgical visual acuity in the eye operated on from the six-weeks post-surgical repeated measurement.

At the time of data collection, a number of different local-anesthetic procedures were employed by the surgeons included in the study. These procedures varied with respect to invasiveness, i.e., an anesthetic gel applied to the surface of the eye and surrounding tissue versus an anesthetic administered via injection. Different anesthetic procedures were controlled for. Many of these pieces of information were obtained from the participants' hospital records.

Minor post-surgical complications, in the form of an increase in the operated eye's tension immediately post-surgery, were again gathered from patients' hospital records. Sixteen patients experienced this form of minor complication following the operation. They were treated with eye drops, which led to a decrease of tension to normal range.

4.2.4. Personality Traits -The German Adaptation of the NEO-FFI

The use of a German version of the NEO started during the late 1980s (e.g., Borkenau & Ostendorf, 1989). At this time, authors used the earlier and longer (more items) NEO-PI version. A first step in evaluating the shorter NEO-FFI (60 items) was to retest the earlier validation data on the NEO-PI with re-sampled items. Borkenau and Ostendorf found in these first analyses, based on a sample of 300 participants, very high internal consistencies for the scales Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness, along with a clear factorial structure revealing the expected distribution of loadings.

In later validation studies, Borkenau and Ostendorf (1993) reported findings for a total of N = 2,112 participants (966 men, 1,076 women). The mean age of participants was M = 28.74 years (SD = 11, 31 years). The authors reported a share of 10% of participants being 46 years of age and older. Of all subjects, 25% ranged between ages 16 and 21 years, 22 and 24 years, 25 and 31 years and older than 31 years.

The total sample comprised 6 subsamples from different projects around the Bielefeld research group. Reliabilities for the total sample were reported for each of the five factors and ranged from Cronbach's α = .71 (Openness, Agreeableness) to Cronbach's α = .85 (Neuroticism and Conscientiousness).

In four of five factors, women differed significantly from men with respect to their factor means. Women scored higher than men on factors Neuroticism, Extraversion, Openness, and Agreeableness. Means for Conscientiousness were equal for both sexes.

Aside from sex differences, Borkenau and Ostendorf also found correlations of the Big Five factors with age. Within the total sample, Neuroticism correlated with age at r = -.10, Extraversion at r = -.13, Openness at r = -.21, Agreeableness at r = .09, and Conscientiousness at r = .27. All cross-sectional correlations with age were highly significant at the p <= .001 level.

As for retest stability, a subsample of N = 146 participants was tested twice, with the retest interval spanning two years. Retest stabilities were high for all factors, with Neuroticism at r_{tt} = .80, Extraversion at r_{tt} = .81, Openness at r_{tt} = .76, Agreeableness at r_{tt} = .65, and Conscientiousness at r_{tt} = .81 (Borkenau & Ostendorf, 1991).

Within the total sample, factors showed considerable intercorrelations. Especially Extraversion and Neuroticism correlated at r = -.33, and Conscientiousness was associated with Neuroticism at r = -.31. Factor analyses revealed a somewhat clear factor structure, with a total of 36% of explained variance (63.4% with error variance included). Not surprisingly, considering the construction of the NEO, all 12 Neuroticism items showed highest loadings on the first factor, and the same was true for most other items with three of their respective factors. Only one item that conceptually belongs to the factor Agreeableness did not have its highest loading on the respective factor, but on Extraversion. Findings thus revealed a fairly high correspondence between the expected and empirical factor structures.

Construct validity was tested via informant ratings of a subsample of participants. Informants rated their relatives and close friends on adjective scales proposed by Norman (1963) as marker variables for the "Big Five." Correlations of informant data with participants' self-report on the NEO-FFI were moderate, but significant, ranging from r = .23 for Openness ("Culture" in Norman's nomenclature) and r = .45 for Conscientiousness.

In sum, at least for a younger sample, test-statistical findings for the German adaptation of the NEO-FFI were rather promising.

4.2.5. The 'Big Three' in the Present Study

The version of the NEO-FFI applied in this study comprised three scales assessing Neuroticism, Extraversion, and Openness to Experience. This selection of three of the Big Five traits represents constructs that have repeatedly been found to be meaningful predictors of different aspects of the stress- and coping process (see Section 2.2.4.). Participants answered on a 5-point scale, rating the resemblance of each item to their own *usual* thoughts and actions. The response scale ranged from -2 (*has nothing to do with my thoughts or actions*) to 2 (*describes my thoughts or actions very well*). Each scale was represented by 12 items.

Internal consistencies for Neuroticism (Cronbach's α = .69) and Extraversion (Cronbach's α = .71) were acceptable. Openness to Experience, however, exhibited very low internal consistency (Cronbach's α = .51). Interscale correlations revealed a substantial negative assocation between Extraversion and Neuroticism at r = -.27 (p = .005), as well as a negative association between Openness to Experience and Neuroticism (r = -.18, p = .05). While a negative association between Neuroticism and Extraversion is commonly reported with the German version of the NEO-FFI (Amelang & Zielinski, 1994; Borkenau & Ostendorf, 1993), associations between Openness and Neuroticism are uncommon. It was thus decided to alter the Openness scale as little as possible to achieve better reliability along with an improvement of the internal structure of the NEO. Inspection of corrected item-total correlations as well as principal component analysis of the Openness scale led to the exclusion of three reversed items that were either not at all or even negatively associated with the remainder of the scale. Excluded items were: O_1, O_7, O_8[1]. Exclusion of these three items led to an improved internal consistency of Cronbach's α = .60. Furthermore, Openness and Neuroticism were no longer significantly intercorrelated (r = -.14, p = .14).

To test the proposed mediator hypotheses, Neuroticism and Extraversion scales were employed as full scales as well as in abbreviated versions without facets positive and negative affectivity. One common criticism concerning the study of Neuroticism and Extraversion in the stress process is the degree of redundancy they share with outcome

[1] Items translated back into English: O_1: *I don't want to waste my time with daydreams.* O_7: *I hardly notice moods and feelings that are elicited by different contexts.* O_8: *I think that when we have to decide*

criteria for well-being. To tap this issue, two sets of analyses were performed, one including the full-scale versions and one including the abbreviated versions lacking the affectivity component.

With the short form of Neuroticism ('Neuroticism/S'), six items were deleted, N1, N4, N5, N7, N8, N10 (for item wording, see Borkenau & Ostendorf, 1993). All of these items included one or more adjectives describing one facet of negative affect (i.e., anxiety, depression, or anger). The remaining six items were still internally cosistent (with Cronbach's α = .74). For Extraversion ('Extraversion/S'), five items were excluded from the positive affectivity-free version: E2, E3, E8, E9, and E6 (for item wording, see Borkenau & Ostendorf, 1993). While the first four items measured positive affectivity, the last one mentioned, E6 assessed gregariousness. However, inspecting item-total correlations, Item 6 failed to be substantially associated with the remainder of the scale and thus was discarded to improve internal consistency of the short Extraversion scale. Cronbach's α for the short Extraversion scale was .69. Looking at scale intercorrelations revealed that the association between Neuroticism and Extraversion was substantially reduced with the exclusion of the affectivity items (r = -.19, p = .05).

4.2.6. Coping

Coping was assessed twice at t1 (admission to the hospital, situation-specific) and t4 (6 weeks post-surgery, coping-dispositional). An abbreviated form of the COPE inventory by Carver, Scheier, and Weintraub (1989), the Brief COPE (Carver, 1997), was employed to measure coping. The COPE instruments were developed on the basis of theoretical considerations and are construct oriented. Due to a theory-based approach, the COPE instruments are currently viewed as the best coping inventories available (Krohne, 1996; Schwarzer, 1993; Schwarzer & Schwarzer, 1996). The Brief COPE consists of 14 scales, each scale represented by two items. The 2-item subscales of the Brief COPE are outlined in Table 8 (for item wording, see Appendix E, Section 8.5.5.).

At t1, participants were instructed according to a situation-specific version of the instrument. They were asked to indicate their actions and thoughts in instances when

---

on ethical issues we should consult our religious authorities (see Borkenau & Ostendorf, 1993; Costa &

they had thought about the upcoming surgery. The time frame given in the instruction included the week prior to surgery up to the present day (t1). For a total of 28 items, participants were asked to give ratings of resemblance between their thoughts and actions and the COPE statements. Participants indicated their answers on a 4-point scale, rating the resemblance of each item to coping efforts pursued. The response scale ranged from *not at all* (1) to *very much* (4). At t4, a more decontextualized dispositional version of the instruction of the Brief COPE was provided. Participants were asked to think of their usual thoughts and actions while faced with a difficult situation. Aside from the instruction, item wording was left unchanged.

Table 8
The Brief COPE: Subscales

1. Self-Distraction
2. Denial
3. Emotional Support
4. Behavioral Disengagement
5. Positive Reframing
6. Humor
7. Active Coping
8. Substance Use
9. Instrumental Support
10. Venting
11. Planning
12. Acceptance
13. Self-Blame
14. Religion

Note. Participants were asked to endorse items on a four-point scale ranging from "*not at all*" to "*very much*".

Brief COPE: Situation-Specific. Initial inspection of the situation-specific Brief COPE two-item subscales revealed several problems that are common within coping literature using microanalytic state and trait instruments (Bolger, 1990; Carver et al., 1989; Carver et al., 1993; McCrae, & Costa, 1986). These methodological problems mainly deal with low reliabilities of short subscales and sometimes considerable intercorrelations of the same. Especially for testing mediator hypotheses with small samples, low reliability and high collinearity of subscales may compromise hypothesis testing considerably (Baron & Kenny, 1986). With subscales Venting, Humor, and Denial, although significant, inter-item correlations fell below $r = .30$ (Appendix C, Table C1). Behavioral Disengagement items correlated negatively with each other. In an

McCrae, 1989 for original item wording).

effort to avoid negative formulation of items, one of the Behavioral Disengagement items was phrased positive and later recoded. Interestingly, recoding of the item led to a negative association with its counterpart, casting doubt also on how this item was perceived and endorsed by participants. The items in question were:

1. I 've been giving up trying to deal with it.
2. I 've tried to get the situation under control. (r)

They were excluded from further analyses. Inter-item correlations of scales Positive Reframing, Active Coping, Planning, Acceptance, and Self-Blame ranged between r = .40 and r = .47, resulting in low internal consistencies for these strategies. Only items of subscales Self-Distraction, Emotional Support, Instrumental Support, Substance Use, and Religion correlated beyond r = .50. In the case of Substance Use, only six participants reported to use substances, such as, alcohol or other drugs to calm themselves down "a little bit" which led to low variance on this subscale. Like Behavioral Disengagement, Substance Use was also excluded from further analyses.

In a second step, subscale intercorrelations were inspected (see Appendix C, Table C1). Substantial associations emerged, some of them higher than inter-item correlations of their respective subscales. As explicitly recommended by Carver (1989, 1999), and to avoid further problems resulting from low internal consistency as well as high collinearity of subscales of the Brief COPE, it was decided to further summarize the remaining 12 subscales by means of both exploratory principal components analysis (PCA) with oblique rotation and confirmatory factor analyses (CFA). One common use of factor analysis is for data reduction, in which a set of measured variables is to be combined in summary indices (Floyd & Widaman, 1995). The goal is to discover optimal weightings of the measured variables so that a fairly large set of associated variables can be reduced to a smaller set of general summary scores that have maximal variability and reliability. To enhance the "subjects-to-variables ratio" (Gorsuch, 1983; Streiner, 1994), variables entered into the analysis were sum scores of the remaining Brief COPE subscales. Following a procedure employed by McCrae and Costa (1986) as well as Carver and co-workers (1989) with the full version of the COPE, the 12 remaining subscales were subjected to an exploratory principal component analysis with subsequent oblique rotation. Four factors were extracted, explaining a total of 60.80% of the variance. Communalities were high ranging from .43 (Religion) to .79 (Active

Coping). With a cutoff of .35 for the inclusion of a variable in the interpretation of a component, all of the 12 subscales loaded on components. The first component, accounting for roughly 28% of variance, consisted of the subscales Active Coping and Planning and was interpreted as "Active Coping." The second component, explaining about 14% of variance consisted of Acceptance, Humor, and Positive Reframing and was labeled "Focus on Positive." A third component accounting for another 10% of the variance subsumed subscales Emotional Support, Religion, and Instrumental Support. For this component the label "Seeking Support" was deemed acceptable. The fourth and last component explaining another 8% of variance subsumed strategies Denial, Self-Blame, and Venting, representing a constellation which is often found in the coping literature (McCrae & Costa, 1986) and is many times labeled immature, or neurotic coping. To avoid evaluative labeling, the label "Evasive Coping" was chosen for the present study. One of the Brief COPE subscales, Self-Distraction, turned out to be complex, loading on two of the extracted factors, Support Seeking, and Active Coping. Self-Distraction was thus not further considered. It is noteworthy that this factor solution nicely corresponds to the one obtained by Carver and colleagues (1989) with the full version of the COPE and using the same methodology. In Carver et al.'s solution, four factors also emerged. One factor was composed of COPE subscales Active Coping, Planning, and Suppression of Competing Activities, a subscale not included in the Brief COPE version. Another factor consisted of both support scales and Venting. The third factor incorporated Denial and Disengagement. The last factor subsumed Acceptance, Restraint Coping, Growth (not present in the Brief COPE version), and Positive Reframing. In this solution Religion failed to load substantially on one of these factors.

Guided by the preliminary results of the exploratory principal component analysis with oblique rotation, a confirmatory factor analysis was performed through AMOS, on the situation-specific version of the now remaining 11 subscales of the Brief COPE. The hypothesized models included four latent factors of coping, Focus on Positive, Seeking Support, Active Coping, and Evasive Coping. Subscales Acceptance, Positive Reframing, and Humor served as indicators of Focus on Positive. Active Coping and Planning served as indicators of Active Coping. Instrumental Support, Emotional Support, and Religion were hypothesized to be indicators of Seeking Support. Finally,

Self-Blame, Denial, and Venting served as indicators for Evasive Coping. The four factors were hypothesized to covary with one another.

Structural equation modeling (SEM) analyses were performed using data from 110 cataract patients. Maximum likelihood estimation was employed to estimate all models. An independence model that tests the hypothesis that all variables are independent of one another was rejected, χ^2 (55, N = 110) = 246.41, p = .00. The hypothesized model was tested in a second step. Associated statistics yielded support for it: χ^2 (38, N = 110) = 51.11, p = .08, with a comparative fit index (*CFI*) = .93, *GFI* = .93, *RMSEA* = .06.

Post-hoc model modifications were performed to develop a better fitting model. On the basis of modification indices, one additional covariation between measurement errors of Emotional Support and Positive Reframing was added (δ = .30*). Both subscales contained items following one another towards the end of the questionnaire, so endorsements of both of them may have been influenced by growing fatigue. Adding the covariance improved the model to a χ^2 (37, N = 110) = 44.82, p = .18, *CFI* = .96, *GFI* = .94, and *RMSEA* = .04. A chi-square difference test indicated that the model was significantly improved by the addition, χ^2_{diff} (1, N = 110) = 6.29, p = .01 (Appendix C, Table C3).

Brief COPE: Dispositional. With the dispositional version of the Brief COPE many of the same problems arose as with the situation-specific version. Again, Behavioral Disengagement/D items correlated negatively with one another. Indicating the same problem as with the situation-specific version of this subscale, again it was discarded from further analysis. Moreover, the subscale Substance Use/D failed to have variance on it, with only 5 participants indicating to use substances "a little bit" while having to cope with difficult situations. Substance Use/D, also was excluded from further analyses.

Subscale item-intercorrelations were higher with the dispositional instruction than they were implementing the situation-specific instruction prior to surgery. With one exception, item-intercorrelations were well beyond .30, ranging from .41 for Denial/D to .70 for Religion/D. Venting/D-items correlated only at .12 (Appendix C, Table C2). On a structural level, again, confirmatory factor analysis was performed, using data

from the remaining 94 cataract patients who participated in Wave 4 of the data collection.

As it is frequently encountered especially with small sample sizes (Rindskopf, 1983; Wothke, 1994), the first model fitted yielded a so-called Heywood case. In factor analysis a Heywood case means that one or more estimates of error variances turn out negative. Usually, parameterization of structural models fixes coefficients for residuals and unique variances (usually at 1.0), and allows their variances to be estimated, as it was done so far. Rindskopf (1983) points out that this procedure may result in negative variance estimates. He suggests an alternative parameterization, subsequently referred to as the "Rindskopf parameterization," on the basis of the work by Bentler and Weeks (1980). Here, variances of the residuals or unique variables are fixed at one, and linear coefficients are estimated. Since so constrained and unconstrained (with usual parameterization) models are not acutally nested, that is, they have the same number of degrees of freedom, they cannot be compared statistically. However, as Rindskopf (1983) asserts and proves, models with the restrictions described above are equivalent to models with no restrictions. Accordingly, using Rindskopf parameterization, the initial independence model was rejected at $\chi^2(55, n = 94) = 316.40$, $p = .00$. The hypothesized model was tested in a next step and yielded acceptable fit statistics, $\chi^2(38, n = 94) = 51.90$, $p = .07$; *CFI* = .95, *GFI* = .91, *RMSEA* = .06. Post-hoc, one additional covariance between measurement errors of Instrumental Support/D and Positive Reframing/D was allowed to improve model fit (δ = -.44**). Adding the covariance improved the model to a $\chi^2(37, n = 94) = 42.16$, $p = .26$, *CFI* = .98, *GFI* = .93, *RMSEA* = .04. A chi-square difference test yielded that the model was significantly improved by the addition, $\chi^2_{diff}(1, n = 94) = 9.74$, $p = .00$ (Appendix C, Table C3).

Building New Coping Scales. Informed by the results of both exploratory and confirmatory factor analyses, four new coping scales were built using items from the situation-specific as well as the dispositional version of the Brief COPE. Focus on Positive coping (situation-specific/dispositional) consisted of six items from the former Positive Reframing, Humor, and Acceptance subscales. Active Coping (situation-specific/dispositional) was represented by four items of the Active Coping and Planning subscales. Seeking Support (situation-specific/dispositional) comprised six items from

subscales Instrumental Support, Emotional Support and Religion. Finally, Evasive Coping (situation-specific/dispositional) was built including items from the former Denial, Self-Blame, and Venting subscales of the Brief COPE situation-specific and dispositional versions. To aggregate, scale means were computed. Values ranged from 1 (*not at all*) to 4 (*very much*).

Table 9
Internal Consistencies for Situation-Specific and Dispositional Coping Scales

Cronbach's α	Focus on Positive	Support Seeking	Active Coping	Evasive Coping
1. Situation-Specific (N=110)	.70	.73	.74	.61
2. Dispositional (n=94)	.76	.76	.81	.70

Note. Coefficients are Cronbach's α. Missing values were imputed using the SPSS-MVA Regression procedure, see Section 4.4.1. for details on handling of missing values.

Table 9 presents internal consistencies of the newly built scales. Internal consistencies mostly ranged around Cronbach's $\alpha = .70$ and were thus within an acceptable range. The situation-specific version of Evasive Coping was one exception with an alpha coefficient of .61. Notably, dispositional scales showed somewhat higher internal consistencies than situation-specific scales.

Table 10
Situation-Specific and Dispositional Coping: Scale-Intercorrelations

		Dispositional			
		Focus on Positive/D	Support Seeking/D	Active Coping/D	Evasive Coping/D
Situation-Specific	Focus on Positive	.44***	.18†	.09	.20†
	Support Seeking	.22*	.34**	.44***	.40***
	Active Coping	.13	.32***	.48***	.43***
	Evasive Coping	.19*	.39***	.40***	.59***

Note. † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$. Diagonal: Situation-specific-dispositional correlations. Below diagonal: Intercorrelations of situation-specific scales (N = 110). Above diagonal: Intercorrelations of dipsositional scales (n = 94).

Within the situation-specific measures of coping, scales were moderately intercorrelated. Only Active Coping and Focus on Positive were not significantly associated (Table 10, below diagonal). With the dispositional measure, a similar picture emerged. Aside from Active Coping/D (dispositional) and Focus on Positive/D (dispositional) all scales were significantly and positively intercorrelated (Table 10,

above diagonal). With both measures, however, scale intercorrelations were still much lower than their respective internal consistencies (Cronbach's α). Between measurement correlations of the situation-specific-dispositional scales (Table 10, diagonal) yielded coefficients ranging from $r_{sit\text{-}spec\text{-}dispo}$ = .34 (Evasive Coping) to $r_{sit\text{-}spec\text{-}dispo}$ = .59 (Seeking Support) that resembled common state-dispositional relationships typically varying around r = .50. Similar coefficients for situation-specific and dispositional measures of the full version of the COPE have been reported by Carver and Scheier (1994).

4.2.7. Two Content-Free Aspects of Coping

With the two content-free aspects of coping examined in the present study, a different approach to aggregation was taken. In accordance with the work by Staudinger and Fleeson (1996), *selective coping* was operationalized by computing the intraindividual variance of coping responses over the four newly built coping scales. A high score on this measure refers to a pronounced endorsement pattern of coping. Here, some coping responses are strongly endorsed while others are not.

Total range of coping, on the other hand, was operationalized, using a method similar to the one reported by Carver and colleagues (1993). Mean scores of the four coping scales (ranging from 1 or *not at all* to 4 or *very much*) were recoded. Participants with mean scores ranging from 1 to 1.49 were assigned a new score 0, representing that they had reported *not to* or *just barely* using this coping response. Participants with higher mean values on the four coping scales were assigned the new value 1, indicating that they had made use of this particular coping response. The newly dichotomized scales were then summed up. A high value (e.g., 4) on this measure indicates the use of many or all four coping responses, or a high *total range*.

4.2.8. Situation-Specific Outcomes: Positive and Negative Affect

For the assessment of state Positive (PA) and Negative Affect (NA), a translated version of the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) was used. In the PANAS state affect is represented by two largely uncorrelated dimensions, PA and NA. Watson and Tellegen (1985) have discussed evidence on the

structure of affect and suggested these two varimax-rotated factors as being highly distinctive dimensions.

In short, PA reflects the extent to which a person feels active, alert, full of energy, concentrated, and pleasurably engaged. Low Positive Affect is characterized by low energy, sadness, and lethargy.

Negative Affect, on the other hand, can be characterized as a general dimension of subjective distress that includes a variety of unpleasant mood states such as, anger, disgust, guilt, fear, and nervousness. Low Negative Affect comprises calmness and serenety. In the present study, PA and NA are conceptualized as mood states as opposed to stable personality traits.

In the original validation study of the PANAS, Watson and colleages tested their condensed list of 20 adjectives on large populations of primarily undergraduate students. Within these populations the authors made use of different time frames of referral. The varying time frame instructions included (a) right now, (b) today, (c) during the past few days, (d) during the past week, (e) during the past few weeks, (f) during the past year, and (g) in general. Answering options were continuous 5-point scales, expressing the extent to which a certain mood was felt during one of the respective time frames. Answering choices were *very slightly or not at all*, *a little*, *moderately*, *quite a bit*, and *extremely*.

The original PANAS data revealed no mentionable sex differences within the student population. Generally, more positive than negative mood states were reported in all reference groups.

PA and NA intercorrelations were small in all groups, ranging from r = -.12 to r = -.23, and therefore sharing common variance of roughly 1% to 5%. Internal consistencies reported by Watson and coworkers ranged between Cronbach's α = .86 and α = .90 for PA and Cronbach's α = .84 to α = .87 for NA, proving sufficiently reliable.

Test-retest reliability was established, using eight-week retest intervals. Retest stability tended to increase as rated time frames lengthened. Stability coefficients of the general ratings shared satisfactory values for use as trait measures of affect. Stability within each time frame ranged between r_{tt} = .47 and r_{tt} = .68 for PA and r_{tt} = .39 and r_{tt} = .71 for NA, speaking for a strong trait component of affect overall.

Test statistics for non-student samples, inclucing a psychiatric inpatient sample and a non-student adult sample, were reported to be satisfactory by the authors.

Scale validity proved sufficient, with scale-regression based factor score correlations ranging from r = .89 to r = .95 for the convergent pattern and r = -.02 to r = -.08 for divergent patterns. Furthermore, item validity was shown to be satisfactory, with common item scale variances between 87.4% and 96.1%.

Measures of external validity including correlations with self-reported distress and psychopathology (e.g., depression), pointed to the expected directions.

In the present study, a German adaptation of the PANAS was employed. In a study by Krohne, Egloff, Kohlmann, and Tausch (1996), equally promising test-statistical results were reported for the German version of the PANAS. The authors replicated a clear two-dimensional factor structure for all 6 differing time frame instructions previously tested by Watson, Clark, and Tellegen (1988). PA and NA intercorrelated only slightly and non-significantly in most conditions. Internal consistencies were high, with Cronbach's α >= .84 in the varying time frame instructions. External validity of the scales could be shown by means of a one-week assessment of typical symptoms and emotions (use of an established inventory, adaptation of a symptom/emotion checklist) and concurrent assessment of PA and NA. The authors found that NA correlated substantially with negative symptoms and emotions, and PA was associated with positive emotions.

4.2.9. Positive and Negative Affect in the Present Study

In the present setting, participants were asked to rate their own mood *on the respective day* by indicating answers on a four-point scale for each adjective (see Table 11; for the German adaptation, see Appendix E, Section 8.5.6.). Answering choices included: *not at all*, *a little*, *quite a lot*, and *very much*.

Positive and Negative Affect were assessed at four points in time in the present study. The first measurement point took place on the day of admission to the hospital, the second on the day of surgery, immediately prior to surgery. The third assessment was done on the day of discharge from the hospital, and the fourth six weeks post-surgery. Internal consistencies were satisfactory (ranging from α = .70 to α = .91) for the

subscales Positive and Negative Affect, with one exception: Negative Affect assessed at discharge from the hospital (t3) fell at the lower end of the acceptable range, with Cronbach's α = .50 (see Table 12). At this measurement occasion as well as at t2 (surgery), two NA items (hostile, guilty) failed to show variance; none of the participants reported feeling hostile or guilty before they left the hospital. Nevertheless, to retain comparability between repeated assessments, the zero-variance items were kept in the analyses. The possibility should not be discounted that a failure of this variable to be involved in important relationships in the study would be attributable to a low reliability.

Table 11
The PANAS: Positive and Negative Affect, Subfacettes

Positive Affect (Subfacettes)		Negative Affect (Subfacettes)	
active	(Low Fatigue)	distressed	(Sadness)
alert	(Low Fatigue)	ashamed	(Guilt)
inspired	(Joviality)	guilty	(Guilt)
excited	(Joviality)	upset	(Anger)
enthusiastic	(Joviality)	hostile	(Anger)
strong	(Assurance)	irritable	(Anger)
proud	(Assurance)	scared	(Anxiety)
determined	(Assurance)	nervous	(Anxiety)
attentive	(Attentiveness)	jittery	(Anxiety)
interested	(Attentiveness)	afraid	(Anxiety)

Note. Subfacettes are in parentheses.

Mainly for descriptive purposes, proposed subfacettes of Positive and Negative Affect as described by Watson, Wiese, Vaidya, and Tellegen (1999) for the PANAS-X (Watson & Clark, 1990) were looked at. Although the present 20-item version of the PANAS was explicitly constructed to tap the higher-order affect dimensions (PA and NA; Watson & Clark, 1992a) and thus does actually not lend itself to subfacet analyses (e.g., too few items result in low reliabilities of subfacets, see Table 12), it was still considered both safe and informative to use subfacets only for descriptional purposes in data analyses. With this version of the PANAS, PA includes markers for facettes PA-Joviality (3 items, see Table 11), PA-Self-Assurance (3 items), PA-Attentiveness (2 items), and PA-Low Fatigue (2 items). NA includes facettes NA-Anxiety (4 items), NA-Sadness (1 item), NA-Anger (3 items), NA-Guilt (2 items). Reliabilities (Cronbach's α)

for PA subfacettes were higher (ranging from α = .50 to α = .86) than for NA subfacets (α = .15 to α = .78; see Table 12).

Table 12
Internal Consistencies (Cronbach's α) of PANAS Subscales and Facets

	t1 Admission (N=110)	t2 Surgery (n=102)	t3 Discharge (n=101)	t4 6 Weeks Post (n=94)
Positive Affect	.86	.88	.92	.91
PA-Joviality	.79	.73	.76	.83
PA-Assurance	.50	.60	.76	.73
PA-Attentiveness	.74	.80	.80	.74
PA-Low Fatigue	.78	.86	.79	.73
Negative Affect	.72	.82	.50	.70
NA-Anxiety	.69	.78	.53	.61
NA-Sadness	-	-	-	-
NA-Anger	.24	.33	.15	.28
NA-Guilt	.20	-	-	.50

Note. PA = Positive Affect; NA = Negative Affect. Dashes indicate either one-item assessment (NA-Sadness) or zero-variance among items of 2-item scales (NA-Guilt).

Subscales Positive and Negative Affect were aggregated by computing means of the ten items each. PA and NA were largely independent of each other at measurement occasions t1 (r = -.020, N = 110), t3 (r = -.062, n = 101), and t4 (r = -.10, n = 94). Only at t2 which was the day of surgery immediately prior to surgery, did NA and PA correlate moderately at r = .23 (p = .020, n = 102), hinting at a phenomenon recently described by Zautra, Reich, Davis, Potter, and Nicolson (2000). Authors cite a number of findings, pointing to increases in dependence of Positive and Negative Affect in times of increasing stress. They explain this transient structural change with stress-related changes in information processing. Zautra and colleagues contend that sources of relevant affective information are multifarious, including internal states as well as environment characteristics, and require many cognitive resources when processed. Especially when Positive and Negative Affects are processed independently of one another, maximum information is obtained, since uncertainty about level of one affect is not lessened by level of the other affect. Authors cite a number of possible circumstances where benefits of fuller information are outweighted by the costs arising to the person, among these situations of high stress. Stress is commonly associated with increased uncertainty and lack of control resulting from undesirable life changes (Ursin & Olff, 1993). Uncertainty increases information demands, possibly resulting in an

individual's failure to process and respond to differentiated aspects of affect. Also, Linville (1985) proposes that attentional focus narrows under stressful circumstances, eventually leading to a reduced capacity to form complex judgements, which in turn results in more unified responses. This explanation is backed by Linville's finding that normally unrelated cognitive processes are substantially intercorrelated under stress, which indicates a shrinkage of informational space.

Table 13 shows intercorrelations between measurement points in time. Notably, relations among different assessments of Positive and Negative Affect respectively are fairly high with measurements immediately pre- to post-surgery (ranging around r_{PAtt} = .70, r_{NAtt} = .50), however, considerably lower (around r_{PAtt} = .40, r_{NAtt} = .17) when t4 (six weeks post) is included.

Table 13
Intercorrelations between State PANAS-Scales

	1.	2.	3.	4.	5.	6.	7.	8.
1. PA t1	1	.71***	.52***	.39***	-.02			
2. PA t2		1	.74***	.46***		-.23*		
3. PA t3			1	.40***			-.06	
4. PA t4				1				-.10
5. NA t1					1	.65***	.42***	.18†
6. NA t2						1	.47***	.15
7. NA t3							1	.17
8. NA t4								1

Note. † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$. N t1=110, n t2=102, n t3=101, n t4=94. PA = Positive Affect. NA= Negative Affect.

4.2.10 Situation-Specific Outcomes: Coping Satisfaction

As an alternative situation-specific outcome variable, satisfaction with coping pre-surgery was assessed in the present study. Coping satisfaction pertains to participants own evalutaion of their coping efforts during times of stress. For this study, patients were asked to generally evaluate the outcome of their coping efforts prior to surgery. The short scale comprised two items (German versions in parentheses):

1. All in all, I managed pretty well before surgery.
   [Im großen und ganzen habe ich die Zeit vor der Operation gut überstanden.]
2. I am content with the way I handled the time before surgery.
   [Ich bin zufrieden damit, wie ich die Zeit vor der Operation gemeistert habe.]

Coping satisfaction was assessed once retrospectively six weeks post-surgery. Participants indicated their assent to the above statements on a 4-point scale ranging from *not true* to *exactly*. Both items correlated at $r = .65$ ($p < .001$), with Cronbach's $\alpha = .79$. Items were aggregated by computing a mean score for each participant.

4.2.11. Longer-Term Outcomes: Depressive Symptoms

As a longer-term, less situation-specific outcome, depressive symptoms were assessed 6 weeks post-surgery. Depressive symptoms were measured by means of the German version of the Center for Epidemiological Studies Depression scale (CES-D; Hautzinger, 1988; Radloff, 1977). The CES-D is a 20-item instrument. Respondents are asked to indicate how they felt during the past week. Items are endorsed on a 4-point scale indicating temporal duration of a particular state or feeling ranging from *a little bit or not at all (less than one day)* to *most of the time (5 to 7 days)*, possible values ranged from 0 to 60 points. In a number of studies, the CES-D exhibited satisfactory internal consistencies for respondents of various age ranges (e.g., Riediger, Linden, & Wilms, 1998). It is typically administered as a screening instrument for clinically relevant depression. Generally, the cut-off for clinical relevance is set at a score of 16 points; however, the sensitivity of this threshold is controversially discussed in many studies that take into account different age-ranges of respondents (e.g., Riediger et al., 1998; Weyerer, Geiger-Kabisch, Denzinger, & Pfeifer-Kurda, 1992). Since distinguishing between clinically relevant versus non-relevant cases was not the goal of the present study, the recommendet cut-off was largely ignored and scores were kept in their continuous form. Internal consistency (Cronbach's α) for the CES-D was satisfactory with $\alpha = .82$.

4.2.12. Longer-Term Outcomes: Life-Satisfaction

General satisfaction with one's life was assessed twice (t1 and t4) by means of one item. The item was worded (German in parentheses):

How satisfied are you with your life at this time?

[Wie zufrieden sind Sie zur Zeit mit Ihrem Leben?]

Participants endorsed the item on a 5-point scale featuring options: *not at all satisfied, not really satisfied, undecided, rather satisfied, very much satisfied*.

4.2.13. Another Long-Term Outcome: Vision-Related Functional Status

Vision-related functional status as a more behaviorally oriented long-term outcome was assessed using a translated and modified version of the The Cataract TyPE Specification by Javitt, Wang, Trentacost, Rowe, and Tarantino (1997). Employing a total of 11 items, respondents were asked to (a) indicate whether or not they were currently pursuing one or more of a total of eleven heavily vision-dependent activities, and (b) rate the perceived intensity of limitations with these near vision, distance vision, and social activities. Originally, this scale was constructed to evaluate and compare self-reported outcomes of different types of intraocular lenses in cataract patients. Javitt and colleagues (1997) noted good to excellent internal consistency (Cronbach's α = .94) for the full scale. However, they failed to provide information on the factorial structure of the instrument or internal consistencies for the proposed subscales (i.e., near vision, distance vision, and social activities). The authors also reported a fairly low, but well-replicated correlation with Snellen visual acuity around r = .30.

Table 14
Items After the Cataract TyPE Specification by Javitt and Colleagues (1997)

1. Shaving or putting on make-up
2. Usual daily activities (grocery shopping, cleaning)
3. Hobbies
4. Going to the movies or theater
5. Visiting friends or family
6. Sports
7. Reading (newspapers, books)
8. Watching TV
9. Reading street signs
10. Daytime driving
11. Nighttime driving

In the present study, vision-related functional status with best correction was assessed twice, once before the operation (t1) and again six weeks after (t4). Participants were asked to indicate the degree of vision-related difficulties while engaging in any of eleven listed activities (see Table 14) on five-point scales ranging from 0 (*very easy*) to 5 (*very difficult*). If one or more activities were not pursued at all, respondents indicated

this in an extra column titled *I am not at all pursuing this activity* ('0' was assigned to *I don't pursue this activity*, '1' indicated that the person engaged in this activity).

Since exploratory principal component analyses yielded single-factor structures only, all items were aggregated into a single score. Limitation scales were aggregated by building the mean of all endorsed items. Accordingly, mean values ranged between 0 (*very easy*) and 4 (*very difficult*). As for total number of activities pursued, a sumscore was computed over all activities (possible values ranging from 0 to 11). Internal consistencies for *total number of activities* at both measurement occasions were acceptable, with Cronbach's α_{t1} = .71 and α_{t2} = .76. Reliability for *degree of limitation* while carrying out activities were high with α_{t1} = .94 and α_{t2} = .96. Stability of rank order as indicated by correlations between measurements was higher for number of activities (r_{t1t2} = .69, p<.001) when compared to intensity of limitation (r_{t1t2} = .44, p<.001).

4.3. Data Assessment and Design

Table 15 gives an overview of the design of the present research. The main situation-specific outcome variables, Positive and Negative Affect were assessed at four time points surrounding surgery. Depressive symptoms and life-satisfaction were measured once, six weeks post-surgery. Vision-related functional status was assessed twice, once upon admission to the hospital (t1) and again six weeks post-surgery (t4). Coping was also measured twice, at t1 and t4. Personality factors Neuroticism, Extraversion, and Openness to Experience along with socioeconomic data and a number of control variables were assessed once upon admission to the hospital. Coping satisfaction was measured retrospectively at t4, six weeks post-surgery. Medical information was gathered from patients' hospital records and medical histories on the days of admission and discharge by the study investigator and via questionnaire at six weeks post-surgery.

Assessment periods for each participant ranged between 6 and 7 weeks around the scheduled time of surgery (one day pre-event to six weeks post-event).

While formal data assessment started upon admission to the hospital and was initiated by a personal recruitment interview with the patient, all data were assessed by means of questionnaires. The questionnaires, the information brochure, and all other materials

given and sent to the study participants were printed in 15-point Arial typeface with additional one-point distance between characters (recommendation by the Berliner Blindenverein e.V.) to accomodate the needs of individuals with impaired vision. Patients were instructed to complete the main questionnaire (including affect t1, personality, coping/situation-specific measures, etc.) on the same day (t1, admission to the hospital), questionnaires assessing t2 (day of surgery), and t3 (discharge) affect were left with the patient, together with instructions for completion on the respective days at specified time points. Instruction for the completion of all study materials were provided orally by the investigator as well as in written form as a header on each questionnaire. On the last measurement occasion (t4), questionnaires were sent to participants' home addresses via mail. Respondents were asked to complete the questionnaire within one week of receipt and send it back to study headquarters as soon as possible. For an overview of the study design, see Table 15.

Table 15
Design of the Present Study

Variables	Admission (t1)	Surgery (t2)	Discharge (t3)	Six Weeks Post (t4)
Situation-Specific Outcomes				
Positive and Negative Affect	X	X	X	X
Coping Satisfaction				X
Longer-Term Outcomes (Well-Being)				
Depressive Symptoms				X
Life Satisfaction	X			X
Longer-Term Outcomes (Functional Status)				
Number of Activities	X			X
Intensity of Limitations	X			X
Predictors				
NEO-Personality Traits	X			
Situation-Specific Coping	X			
Dispositional Coping				X
Miscellaneous				
Medical Data	X		X	X
Socio-Economic Data	X			

4.4. Analyses

The following paragraphs give a very general overview of the statistical methods employed to test the central hypotheses of the present study. The first part describes the treatment of missing values and outliers. Following this, central methods of data-analyses are reported. The statistical programs chosen for analyses were SPSS 10.0, and AMOS 4.0 (Arbuckle, 1999).

4.4.1. Treatment of Missing Values and Outliers

Averaged over all assessments, roughly 13% of the participants produced one or more missing values. According to Little and Rubin (1987), there are a number of possible ways to handle missing data which are more or less appropriate, considering their underlying assumptions as well as the amount and pattern of data missing. Among the many choices available, such as Maximum Likelihood procedures (e.g., Expectation Maximization [EM], Full Information Maximum Likelihood [FIML], or Multiple Imputation [MI]), or listwise or pairwise deletion that assume data missing completely at random (MCAR; Little & Rubin, 1987), estimation by means of *regression* (via SPSS missing value analyses, MVA) was chosen.

With this method, a regression equation based on complete case data for a given variable is created, treating it as the outcome and using all other relevant variables as predictors. Then, for cases where Y is missing, the available data are plugged into the regression equation as predictors, and the equation's predicted Y value is substituted into the database for use in other analyses. For the present study, missing data were estimated at the *item level*. For one-item scales, chronological age and sex served as predictors. For multi-item scales, beyond age and sex, all remaining items of the respective scale were entered as predictors. Data were imputed within waves only, i.e., when participants failed to respond to one wave, missings due to unit non-response were not imputed. Possible biases induced due to this drop-out were analyzed and discussed at length in previous sections (4.1.1. to 4.1.8.). For the present data set, the regression approach was deemed most appropriate for a number of reasons. According to Roth (1994) and Little and Schenker (1995), the assumption underlying this method is that data can be missing at random (MAR vs. missing completely at random with list-

or pair-wise deletion, MCAR; Little & Rubin, 1987). This assumption allows for missing data to be associated with other variables in a given data set, e.g., level of education. Compared to MCAR, MAR is thus a weaker assumption and is more likely to be met in reality. Some features of the regression method often criticized are: (a) a risk of imputing values too close to the mean when there is a lack of adequate predictors, thus artificially producing truncated variance, or (b) even with good predictors at hand, diminishing variance, for predicted values are positioned directly on the regression line. The same criticisms apply for the often recommended ML-based EM technique (Little & Rubin, 1987). Imputation on item-level with multi-item scales however, should secure appropriate predictors, while at the same time making use of the maximum amount of information available and also leaving the greatest possible amount of natural variance intact.

Regarding outliers, special attention was devoted to multivariate extreme responses because they may contribute to more or less severe distortion of findings from major types of analyses used in this study (e.g., multiple regression, analyses of variance; Tabachnick & Fidell, 2001). Preceding analyses, data were routinely screened for multivariate outliers by means of residual plots and a $p<.001$ criterion for Mahalonobis distance provided by SPSS Regression. The few cases that met this criterion were described and subsequently excluded from respective analyses (see Results chapter). Since major analytical techniques used in this study are not as vulnerable to simple univariate outliers, in most cases, they were neither altered nor removed (Tabachnick & Fidell, 2001).

4.4.2. General Analytic Procedures

As a starting point for all data analyses, bivariate associations were screened, employing methods such as Pearson correlations, partial correlations, t tests (for dependent and independent samples), and chi-square tests. Also, concerning age as a predictor/covariate, routinely quadratic models were tested, using curve estimation via SPSS Regression; only significant results are reported though. Beyond bivariate relationships, the two main types of analyses employed were multiple regression (stand-

alone and as part of path analyses) and repeated-measures analyses of variance (ANOVA).

Multiple Regression. As for the regression approach, hierarchical (or sequential) regression was chosen. With this method, independent variables enter the equation in a sequence specified by the researcher. This makes it possible to determine the amount of explained outcome variance that each set (block) of predictors contributes to the equation. In most cases, various control variables were entered first as a set of rival predictors to the ones hypothesized, which were entered last. Hence, "controlling for *variable xy*" in the case of regression analyses simply meant setting it up as a rival predictor and entering it in the first block of the equation. When changes between measurement points were of interest as outcomes, many times the so-called 'residualized-change' approach was chosen by controlling for the respective previous assessment of the variable of interest first while predicting the later outcome. Employing this method, the dependent measure becomes algebraically identical to change while controlling for the initial level (Cohen & Cohen, 1983). Although frequently criticized (Bandura, 1997), this method represents a conservative approach to longitudinal analysis.

Testing Interactions Using Multiple Regression Analyses. According to Aiken and West (1991), to avoid problems with heightened collinearity in regression analyses with interaction terms, both components of each interaction term were first centered around their sample mean and then multiplied. Subsequently, hierarchical regression analyses were computed, entering respective control variables into a first step, both centered single predictors in a next step, and finally, the interaction term into the last step. Follow-up analyses to significant interaction terms were generally carried out by (a) examining regression coefficients for defined subgroups, as well as (b) using simple slope analyses as recommended by Aiken and West (1991). With this method, first a new variable Z_{cv} is created, which is the original (centered) variable *c_Z* minus a conditional value of interest, e.g., + 1 *SD* of *c_Z*, for one *SD* above the mean of *c_Z*. Secondly, the cross product of the new variable with the other predictor of interest, for instance, *c_X* is formed. Finally, the criterion is regressed on the predictors *c_X*, Z_{cv}, and

their cross product. The resulting regression coefficient for *c_X* is then the desired 'simple regression coefficient'. For reasons of clarity and since both approaches yielded highly comparable findings in all instances, results of method (a) were given higher priority and are thus presented in the text. Also for matters of clarity, plotting of interaction-terms by solving the regression equation at chosen levels of *c_Z* (typically high, medium, and low levels) was generally refrained from. Instead, usually simple means of designated subgroups are presented.

Path Analyses and Control Issues. Since some of the central hypotheses of the present study are concerned with possible mediation, path analyses were the method of choice. Thus, many of the results presented in the following sections are part of a sequence of multiple regression analyses that eventually form path models designed to test mediational effects. According to Baron and Kenny (1986) to test mediation, it is necessary to examine all direct and indirect relationships among a set of variables that they term independent variable, mediator, and outcome. Figure 1 depicts the set of relations proposed by the authors.

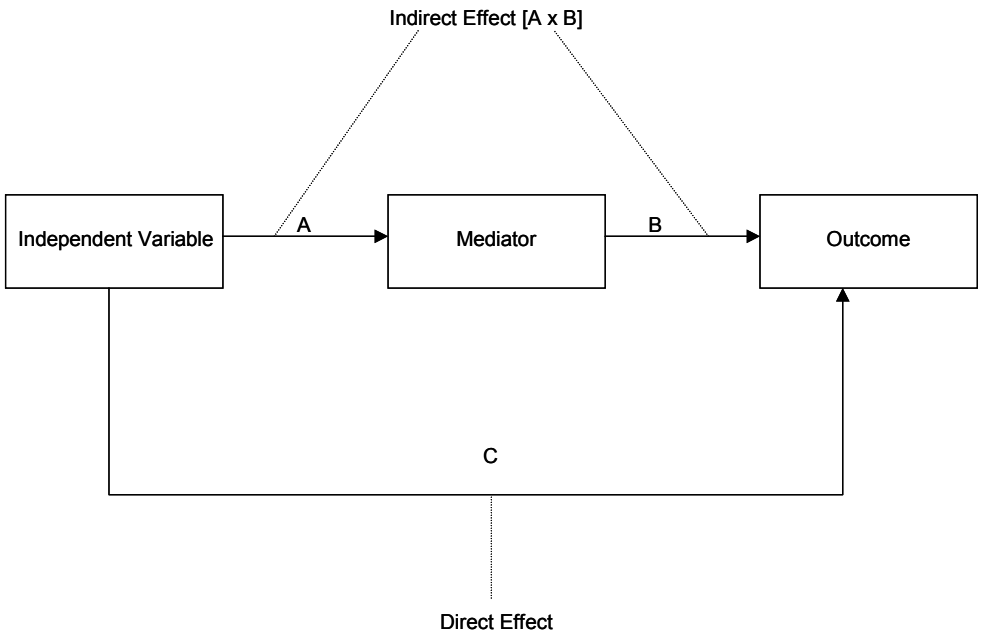

Figure 1 *Mediator model.*

According to Baron and Kenny (1986), the independent variable-outcome relationship is divided into two parts: a mediated part (the indirect effect of the independent variable on the outcome via the mediator) and a part unrelated to the mediator (which would be the direct effect of the independent variable on the outcome). To demonstrate mediation, the indirect effect must be relatively large. Accordingly, a number of assumptions have to be met first: (a) the independent variable needs to predict the outcome directly, (b) the proposed mediator also needs to be related to the outcome, (c) there needs to be an association between the independent variable and the proposed mediator. Should the need for control of additional factors (predicting the outcome) arise, all of them need to be accounted for in all sub-analyses leading up to the eventual path model.

Repeated-Measures ANOVAs. The second major analytical procedure used in the present study were repeated-measures ANOVAs. Especially testing the first set of hypotheses concerned with the change of Positive and Negative Affect over the entire time frame of the study, as well as different factors associated with this change, repeated measures ANOVAs, were deemed appropriate. The emphasis in repeated measures ANOVA is on the analysis of the mean values for each level of a within-subject variable (Weinfurt, 2000). To test a-priori hypotheses about changes between any set of consecutive measurement points, repeated contrasts were employed. Repeated contrasts compare each level of the within-subject variable with the adjacent level. In few instances (Sections 5.1.3. and 5.1.4., Results chapter), simple contrasts were used. With simple contrasts, all (remaining) levels of the Within-Subject variable are contrasted with one level of reference.

In addition to screening data for multivariate outliers prior to analyses and examining cell sizes created by the introduction of between-person variables, it was also necessary to monitor possible departure from equality of covariance matrices across groups (as indicated by *Box's M* tests) as well as departure from sphericity (*Mauchly's* test for sphericity). Since most cell sizes for different between-subjects factors were largely equal, departure from equality of covariance matrices was generally not expected. Due to the unequal spacing of time points in repeated assessments conducted in this study, departure from sphericity was of great concern. Where it was encountered, the conservative *Greenhouse-Geisser* correction was applied to adjust degrees of freedom

for the analyses in question. Greenhouse-Geisser-corrected degrees of freedom as well as results of Box's M tests for all repeated measures analyses were reported in footnotes throughout the first part of the Results chapter.

Apart from multiple regression and repeated measures ANOVA, both exploratory and confirmatory factor analyses as well as multivariate analyses of variance were also conducted. The specific procedures are described at length in Sections 4.2.6. and 4.1.8.