6 DISCUSSION

The present study was designed to compare criteria of cognitive-emotional and functional adaptation and their correlates in middle-aged (40-65 years), young old (66-75 years), and old (> 75 years) adults who face comparable health stressors: vision impairment due to cataract and the simultaneous presence of multiple chronic diseases (multimorbidity). Given the incidence rates of these stressors, they were considered *normative* in the elderly, and *non-normative* in the middle-aged. In line with previous research and theoretical considerations (Dohrenwend & Dohrenwend, 1974; Heckhausen & Brim, 1997; Wrosch, Heckhausen & Lachman, 2000), it was reasoned that these kinds of non-normative stressors in midlife are more difficult to deal with, possibly because they lack predictability and the opportunity for self-favorable social downgrading of peers, because they interfere with high societal expectations regarding midlife-functioning (e.g., in the domains of work and family life), and because deviations from these expectations are less tolerated. Thus, it was hypothesized that middle-aged cataract patients, prior to experiencing substantial improvement in vision through surgery, should show more negative cognitive-emotional adaptation (as indicated by lower well-being and more depressive symptoms), and report higher subjective impairment through their vision problems in comparison to young old and old adults. Moreover, they were expected to report higher levels of difficulties with activities in the domains of work, leisure, and social activities.

Secondly, because the stressors investigated upon were physical in nature, it was assumed that adaptation was also a function of individual's biological reserve capacities. Reserve capacities for adaptive functioning in the pursuit of basic everyday life tasks that require motor skills and physical and sensory functioning (e.g., bathing, preparing food, cleaning) are decreasing in old age. Thus, in the present study context, age-related changes in functional reserve capacities were expected to become most apparent in the pursuit of Activities of Daily Living and Instrumental Activities of Daily Living (ADL/IADL).

In a second part of the empirical study, the focus was on resilience, defined here as the maintenance of well-being despite high health constraints. Level and adaptivity of personal and social resources and self-regulation strategies in *resilient* individuals, non-resilient individuals, and well-adapted individuals who faced comparably low health stress were compared. Interactions between psychosocial resources and self-regulation strategies and the degree of multimorbidity / vision impairment were analyzed in order to test the assumption that the resources and strategies have are more strongly associated with criteria of adaptation

under high health stress than under low stress (*buffering* hypotheses). Furthermore, group comparisons were performed with a focus on differences between resilient and well-adapted low-stress individuals. In line with the notion that the successful mastery of chronic stress elicits (positive) changes in self-regulation and coping strategies, it was assumed that the resilient patients would report higher levels of flexibility in goal adjustment, and more acceptance and positive reframing in coping with pre-surgical stress due to cataract surgery.

In the following, the setting of the study is evaluated with respect to the basic assumptions about the distributions of the stressors (multimorbidity and vision impairment), their validity, and generalizability of results. From this background, the findings pertaining to age-group differences and resiliency are discussed. The chapter closes with a general conclusion and outlook.

6.1. Evaluation of the Study Setting

6.1.1. Multimorbidity and Vision Impairment in the Present Sample

Consistent with previous findings suggesting that cataract in midlife is associated with increased risk of morbidity and mortality (e.g., Meddings et al., 1999; McKibbin et al., 2001), in the present sample, average multimorbidity (i.e., the total number of chronic diseases) in middle-aged patients did not differ from average multimorbidity in young old and old patients. Old patients had a slightly higher average multimorbidity score, however, this difference was not significant here ($p > .20$)[52]. It should be noted that the diagnoses included in the multimorbidity score comprised mostly *chronic* diseases with an age-related increase in prevalence and incidence rates in the general population (e.g., heart disease, osteoporosis, diabetes). Young old and old patients did not differ with respect to multimorbidity either.

The prevalence of additional chronic diseases in the midlife sample also points to the fact that multimorbidity was present at a higher than expected level: over 90 percent had at least one chronic condition other than cataract, and 44% had more than 2. In comparison, the Dutch general population study (van den Akker et al., 1998) reported that 33.6% of middle-aged men and 35.9% of middle-aged woman suffered from multimorbidity (at least two concurrent

health problems). Their multimorbidity score was based on more possible diagnoses than in the present study (for example, cataract was counted as one diagnosis). Thus, this study supports the notions that the onset of cataract in midlife (1) can be viewed as a marker for biological aging, and (2) is associated with non-normative chronic health stress. In addition, given the low prevalence rate of cataract in midlife (Adams & Benson, 1992), this condition itself is likely to be perceived as non-normative.

Prior to surgery, visual acuity in the better eye was slightly lower in the oldest as opposed to the young old and middle-aged cataract patients; however, age groups did not differ with respect to visual acuity in the eye operated on. In addition, old patients had lower gain in visual acuity from surgery than the two other age groups, resulting in even more pronounced differences in better eye vision after surgery. This again has been previously reported in the ophthalmologic literature (e.g., Jay, Mammo, & Allan, 1987). Age-related declines in post-surgical visual acuity reportedly exist independent of coexisting ocular abnormalities and general health status. This has been explained by a marked age-related decline of retinal neural function (e.g., Morrison & Jay, 1993), and represents an example of increasing constraints of biological aging processes on adaptive capacities in various domains of functioning in old age. Overall, 78% of patients had improved vision one week after surgery, and 89% after six weeks; 16% (7% after six weeks) had negative changes in vision.

To conclude, age group-comparisons supported the notion that middle-aged cataract patients face chronic health stressors other than visual impairment that are non-normative at this life stage, and comparable to health stressors of young old and old patients. Visual acuity was lowest in the oldest patients, with no differences between the young old and middle-aged.

All of these comparisons pertain to *average* level of the stressors within age groups. Nevertheless, there was still considerable variability *within* the three age groups with respect to both the degree of visual impairment and the degree of multimorbidity. This allowed for a comparison of the impact of variation in the degree of overall stress, and the moderating function of selected person variables.

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[52] A post-hoc power analysis (Cohen, 1988) was conducted for the "omnibus" f-test (comparison of all three age groups with respect to level of multimorbidity). Based on the group means, an effect size of f = 0.25 was calculated, which is a medium effect according to Cohen (1988). Accordingly, the power (i.e., the ability to detect a significant effect with the present sample size) was 0.74. This is slightly lower than what is conventionally accepted (.80). Thus, in a larger sample, the difference between old patients in contrast to young old and middle-aged participants might be significant. This does not, however, speak against the argument of cataract as a marker for biological aging, since multimorbidity in this midlife sample was greater than in the general midlife population (see van den Akker et al., 1998).

6.1.2. Validity of the Stressors

The data supports the notion that multimorbidity is a continuously stressful condition: there were moderate negative correlations with well-being (r between -.22 and -.36) and positive correlations with depressive symptoms (r between .25 and .32) at all occasions around surgery. Somewhat unexpected, visual acuity (both better eye and operative eye) was not significantly related to cognitive-emotional adaptation prior to surgery. One week after surgery, patients with better visual acuity in the *operative eye* had significantly lower levels of depressive symptoms after one week (r = -.23), but not after six weeks, and there were no significant associations with well-being. This can be attributed to the fact that the objective degree of impairment in visual *acuity* was indeed not very severe in this sample: according to the WHO classification (WHO, 1980), most participants had only mild impairment (0,3 - 0,8 Snellen-Decimals) prior to surgery. These findings also correspond with the results of Fagerström (1994), who reported that depressive symptoms were related to visual acuity only after cataract surgery. However, almost 40% of participants reported that they felt very much or extremely impaired by their vision problems, and only 2% reported no problems. At least a part of these subjective problems probably resulted from other symptoms of cataract such as blurred vision and distorted images, which were not assessed here.

Accordingly, the *subjective impairment associated with vision problems* explained unique variance in cognitive-emotional adaptation beyond objective health and vision indicators at all occasions. These unique contributions were low at baseline (2% explained variance in both depressive symptoms and well-being), and relatively high after one and six weeks (14-20% explained variance). Prior to surgery, the *subjective distress due to chronic health problems* other than cataract explained the highest proportion of unique variance in well-being and depressive symptoms (10 and 11%), with no unique variance post-surgery.

Functional adaptation as indicated by average activity difficulties was negatively related to better eye vision, subjective impairment, multimorbidity, and health strain at all occasions (r between -.15 and -.31 for the vision indicators and .32 and .43 for multimorbidty). Prior to surgery, multimorbidity, subjective health strain, and better eye vision were independent predictors of both ADL/IADL activity difficulty and difficulty with other activities. One and six weeks after surgery, the subjective health strain and impairment through vision problems were independent predictors for both indicators, with multimorbidity explaining a significant proportion of variance in ADL/IADL difficulty beyond these predictors. Overall, health and vision explained a greater amount of variance in functional indicators than in the cognitive-emotional indicators (23%-26% prior to surgery, and 28%–35% after surgery).

To conclude, findings supported the notion that multimorbidity is a major risk factor for poor well-being and high depressive symptoms, and problems with functional adaptation in everyday life. Because of relatively intact vision in cataract patients scheduled for surgery, visual acuity was less predictive of adaptational indicators. Moreover, perceived as well as objective stressors were both valid constructs of stress (Hobfoll, Schwarzer, & Chon, 1998), with perceived stress explaining part of – but not all – unique variance of the objective health stressors.

The event of cataract surgery was a (mildly) stressful event, as indicated by positive changes in state positive affect (Eta^2 = 8%) and negative changes in state negative affect from pre- to post-surgery (Eta^2 = 14%; also see Knoll, 2002, for a more detailed description of pre-surgical stress indicators and positive affect changes after surgery).

6.1.3. Cumulative Stress Effects of Multimorbidity and Vision Problems

As expected, multimorbidity and low visual acuity were associated with subjective impairment and strain in the respective domains (r between .17 and .40 for visual acuity indicators and subjective impairment; r between .29 and .47 for multimorbidity and health strain). Moreover, it appeared that multimorbidity was associated with higher subjective impairment from vision problems after surgery (r = .30 after one week and .17 after six weeks), regardless of the *actual level* of visual acuity. Lower visual acuity in the operative eye was associated with the experience of more health strain prior to surgery, independent of the actual level of multimorbidity (r = -.23), and visual acuity in both the better and operative eye were related to more health strain after six weeks (r = -.15 / -.25). Thus, both vision impairments and chronic health problems appeared to enhance feelings of subjective impairment in the other domain, with an impact of the operative eye prior to surgery, and multimorbidity and better eye after surgery. This points out that the experience of stress depended on contextual factors, which is to say the differential *salience* of either health vision problems at the different occasions.

Furthermore, patients suffering from both high multimorbidity and low vision at baseline (high-risk group) were at the highest risk for negative adaptation. They had lower well-being, more depressive symptoms, and more activity difficulties than patients suffering from low impairments in both health domains, and those who were highly impaired in one domain

only[53]. Half of these high-risk patients belonged to the group of the oldest old, as opposed to each 30 % in the two single risk groups, and in the low risk group. This again illustrates that health constraints accumulate in old age (see M.M. Baltes, 1998).

These results are in line with existing literature showing the deleterious effects of suffering from multiple health constraints at the same time (e.g., Tinetti et al., 1995). Moreover, they illustrate the importance preventing the onset and progression of even relatively minor medical conditions, as in this case, visual impairment through cataract, since they may intensify preexisting subjective strain from other conditions. Since cataract is a fairly low-risk, highly standardized procedure, people may benefit from *early* detection and surgery. This especially applies to the very old, since their biological reserve capacities are lowest, and negative functional cascades might be more easily triggered by vision problems. Future research might examine this more closely by looking at cumulative stress effects in different age groups, which was not possible here due to the small sample size.

6.1.4. Generalizability

Given the population-based prevalence of the chronic and acute stressors, young old and old cataract patients can be viewed as representative for their respective age groups. The gender distribution in these two groups in the present sample suggests that it is approximately representative of the population of cataract patients (about two thirds women and one third men, Prevent Blindness America, 1998), although it has to be kept in mind that these patients probably represent the "sicker" proportion of cataract patients, given that their surgery was performed in hospital as opposed to in an outpatient clinic.

In contrast, the middle-aged participants represent a highly selective proportion of their age group with respect to their health status. This is of course a limitation to the generalizability of the results for this group. On the other hand, it represents a major strength of the present study setting. Some researchers have pointed out that with respect to the immensely diverse stressors that are encountered and have to be negotiated in midlife, and the many background factors (e.g., socio-economic status, ethnicity, social networks) that interact with and shape the subjective experience of these stressors, research on midlife will greatly profit from the study of relatively homogeneous samples (Bumpass & Aquilino, 1995; Rossi,

[53] Post-hoc comparisons were not significant for the comparisons between the high-risk group and the high-multimorbidity only group. However, all differences were in the expected directions (with the high-risk group showing poorer adaptation in all indicators).

1980)[54]. In the present study, the midlife sample was not entirely homogeneous with respect to the degree of the selected health stressors (vision impairment and multimorbidity), but all suffered from visual impairment that made them choose to undergo cataract surgery. This allowed for an analysis of age-group and interindividual differences in the "negotiation" of the demands of a comparable context.

This study did not make an attempt to consider *all* aspects of the life context of the participants as possible stressors (e.g., socio-economic status, social network). Also, the selected health indicator (multimorbidity) is quite rough, and more homogeneous subgroups could have been selected on the basis of important qualifiers of the stress experience, such as the differential degree of pain, threat, or duration of the diseases. It is possible that the reported main effects and interaction effects of the psychosocial resources and coping strategies might be even more pronounced in more strictly homogeneous subgroups of the population, and might be even absent when considering other critical life events (e.g., death of a loved one, loss of job) that differ from the selected health stressors with respect to chronicity, controllability, and the degree to which they restrict other life domains.

Another potentially limiting factor to generalizability is that no information on the "refusers" of study participation was collected. It might be that these were sicker on average, and the administration of questionnaires clearly excluded patients with very severe vision impairment. As Wahl and Oswald (1996) have shown, adaptation to severe vision impairment is possibly a different process than adaptation to milder impairment. Accordingly, the results of the present study should not be generalized to individuals suffering from irreversible vision impairment. Although the functional manifestations of vision impairment prior to surgery are supposedly not very different from patients with irreversible vision impairment at the same level, the prospect of recovery is likely an important moderator in adjustment processes in general.

6.2. Age-Group Differences in Resources and Self-Regulation Strategies

It has been proposed that biological and contextual changes related to the process of aging are associated with shift in some self-regulation strategies (e.g, Brandtstädter, 1992, 1998; Freund & Baltes, 1998; Heckhausen, 1999). Previous studies have shown that most *global* personality dispositions stay fairly stable, although in the very old negative profiles become more

[54] As Klohnen and colleagues (1996) have pointed out, this argument of course holds for the entire life span, since the specificity of life stressors for a given life stage is based on the higher prevalence of a particular stressor or combination of stressors on a *group mean level*, but does not account for the individual diversity of experiences.

frequent (e.g., Lachman, 1986; Smith & Baltes, 1997). No study so far has looked at what happens when middle-aged people prematurely face some of the constraints that are typical in old age.

With respect to social resources, as expected here, significantly more old patients were widowed (64%) than young old (29%) and middle-aged patients (17%). Despite these differences, age was *unrelated* to the perceived availability of support, to support seeking in dealing with pre-surgical stress, and the perception of received support in the week prior to surgery (r = -.05 / -.08 / -.04). There were also no age*gender interactions. Women, and especially those without a partner, were *seeking* more support than men. This may have been a function of their subjective impairment from their vision problems, which was also higher than in the male patients (although their were no gender differences in visual acuity). Otherwise, there were no gender differences, which is surprising, given that most studies consistently find that women have higher perceptions of available support (see Schwarzer & Leppin, 1989). However, *perceived availability of support* was assessed here during the week prior to surgery, which was a somewhat stressful situation. This stressful experience may have resulted in a decrease of perceived support, as other studies in the context of stress have reported (Dean & Ensel, 1982; Lin & Ensel, 1984), thus eliminating gender differences.

Dispositional optimism and *self-efficacy* were unrelated to age in this sample. This is in line with nearly all previous research demonstrating that *global* measures of generalized expectations pertaining to an optimistic outlook and self-efficacy do not decline with age (Brandtstädter & Rothermund, 1994; Lachman & Baltes, 1994; Scholz et al., 2002).

In contrast, there was a linear increase in "*belief in powerful others*" (r = .25). Thus, with increasing age, patients had a higher belief in the benefit of following their physicians' advice for their health. This might be a reflection of older adults' experience that personal lifestyle factors (e.g., nutrition, exercise) are increasingly ineffective in maintaining good health. Also, the delegation of control for one's health to professional people might be a way of "freeing" oneself from the responsibility for it, which is a good example of elderly adults' selectivity, or increasing desire to focus on emotionally rewarding experiences (Carstensen, 1993), and not bother about things that appear unchangeable. Furthermore, the health-related beliefs in powerful others have been shown to be sensitive to health-related events, such as a chronic disease or a hospital stay. For example, Robinson-Whelen and Storandt (1992) showed that diabetic patients had a higher level of health-related belief in powerful others than non-diabetic patients, and that this was independent of age. Halfens (1995) found that the belief in powerful others increased after admission to hospital in patients scheduled for surgery.

Internal control beliefs, however, were unaffected, which is in line with Lachman's (1986) proposition that older adults – as a result of increasing constraints mostly in the health domain – may become increasingly aware of external sources of control, without loosing their sense of internal control. Although in the present study there were no differences in multimorbidity between age groups, it is likely that older adults had more hospital stays and more previous encounters with physicians.

In the Berlin Aging Study (Staudinger et al., 1999 *average life investment* decreased with age (r = -.17). In this sample, with a broader age range and less variability in health and vision, average life investment, as well as investment variability and selectivity were unrelated to age prior to and one week after surgery. However, there was a negative age-correlation with life-investment after six weeks (r = -.17), and at the same time, older patients were more variable in their investment (r = .17)[55]. Interestingly, average life investment decreased, and accordingly, investment selectivity increased one week after surgery, and decreased again after six weeks. This points to the impact of either the surgical outcome (improvement in vision) or the relief of being past surgery. Furthermore, young old adults were more selective after one week than the two other age groups. Since investment selectivity was unrelated to any of the adaptational criteria, however, it cannot be concluded that this greater selectivity contributed to higher well-being or lower depressive symptoms in this age group. Follow-up analyses on the specific investment patterns (e.g., which domains increased, which decreased) will yield more insight into the question of what domains people at different ages concentrate on most in times of stress (prior to surgery and after one week), and under normal conditions (after six weeks).

No age differences were found with respect to the dispositional tendencies for flexible goal adjustment and tenacious goal pursuit. There was a slight tendency towards more flexible goal adjustment through positive reframing in the oldest patients, however at a non-significant level. This is in line with previous findings from representative samples that the most significant age-related shifts towards more accommodative and less assimilative coping styles already occur in midlife (Brandtstädter, 1992; Brandtstädter & Renner, 1990). Generally, the dispositional tendency for flexible goal adjustment was higher than that for tenacious goal pursuit.

With respect to coping strategies in dealing with stressful events, previous studies have reported age-related increases, decreases, and stability (Aldwin, 1994). The uniqueness of the present study is that situational coping strategies were assessed with respect to a well-defined,

highly standardized stressful event, which was the same for all age groups (i.e., cataract surgery), thus, contextual differences in the acute stressor were controlled for at a maximum level. Of course, contextual differences with respect to other life circumstances were not completely controlled for, since more older adults had to deal with this situation without a partner, and their vision was slightly worse. However, there were no significant differences in overall number of diseases between age groups, which is not the case in previous studies on coping. Thus, age differences in coping were not a function of differential objective features of the present stressors at hand.

Generally, emotion-focused strategies (acceptance, positive reframing) were used to a greater extent than problem-focused strategies (active coping, support seeking). This is in accordance with the nature of the acute stressor here: there is not much to do in altering the situation (surgery). However, patients endorsing in positive reframing also tended to report higher levels of active coping (r = .29). Two significant age-group differences were found (Eta^2 = 6% and 7%): middle-aged adults, in comparison to young old adults reported lower levels of *positive reframing*, and higher levels of *distraction*. Old adults had levels in between. One might conclude that when health is prematurely deteriorated in midlife (as was the case in this sample), "mature" coping (Vaillant, 1977) is less pronounced, and "immature", evasive coping" (Pfeiffer, 1977) is more pronounced. However, these differences were only significant for the comparison between middle-aged and young old adults. In the oldest group, a slight "decrease" in positive reframing and "increase" in distraction in comparison to the young old was found. The latter finding is consistent with the Berlin Aging Study, where an increase in distraction as a general coping style across age groups (70 – 95+ years) was reported (Staudinger et al., 1999).

To conclude, age-group differences in coping strategies were small (age explained only 6% – 7% variance) and absent in most strategies (humor, acceptance, religious coping, active coping, and denial). The findings that middle-aged adults endorsed less in positive reframing and more in distraction is in line with the notion that cataract surgery is a non-normative event in this life stage (which makes it harder to find some positive aspects in it). On the other hand, *acceptance* of the event was equally high in all age groups. Life investment in the three age groups was comparable during the two weeks surrounding surgery, pointing to the impact of contextual factors on this indicator of self-regulation.

The positive age trend for "belief in powerful others" is remarkable, since it was not associated with decreases in optimism and self-efficacy. This may be a reflection of older

[55] Because of the small effect sizes, the F-tests for age-group comparisons were not significant.

adults ability to integrate the delegation of control of some aspects of their lives to others into their self-concepts, without loosing their sense of efficacy and optimism (Lachman, 1986).

6.3. Adapting to Cataract-Related Vision Impairment and Multimorbidity: The Role of Normativity of the Stressors and Functional Reserve Capacities

It was one of the main hypotheses of this thesis that due to the normativity of the stressors vision impairment and multiple chronic health problems, middle-aged cataract patients would report poorer cognitive-emotional adaptation than young old and old adults. This was partly confirmed. With respect to general well-being, no significant age differences were found at any of the three occasions. However, there were slight trends towards higher well-being with increasing age, which were more pronounced in the analyses that controlled for visual acuity in the better eye (r. between .11 and .15). Depressive symptoms were lower in the young old than in the middle-aged and old patients at all occasions. Old patients reported similar levels of depressive symptoms as middle-aged adults, even when controlling for differences in visual acuity. One week after surgery, differences in depression between the young old and the two other age groups vanished when controlling for visual acuity in the operative eye, pointing to situational variance that "overrides" age group differences. There were no age-differential changes in either cognitive-emotional indicator.

Although middle-aged patients had slightly better vision, prior to surgery, they reported to feel more *impaired* by their vision problems than both young old and old adults (age-group accounted for 11% variance in this criterion). This was specific to vision problems, there were no age-differences in average subjective strain related to other chronic diseases.

Furthermore, middle-aged patients reported the highest level of difficulties with activities other than ADL/IADL (i.e., leisure, and work activities). This could be partially attributed to age-group differences in work status: when excluding the few employed middle-aged participants from the analyses, the age-group difference was not significant any more. However, the average difficulty mean was still higher in the middle-aged group, and this was also the case when looking at activities that were not work-related. Thus, it can be concluded that prior to cataract surgery, middle-aged patients experienced more difficulties with activities in the domains of social life, work, and leisure. This was not due to the overall *range* of activities that they pursued, as this did not differ from the activity range in the young old. Furthermore, being *selective* with respect to the pursuit of activities other than ADL/IADL

was equally associated with *more* difficulties rather than less in all age groups (r between .32 and .37). Thus, activity selectivity was not the mechanism by which elderly adults experienced less difficulties than middle-aged adults. Another possible interpretation is that these differences in perceived difficulties reflect the greater environmental expectations that middle-aged adults face with respect to their "normative" functioning in these domains (e.g., Heckhausen, 2001; Neugarten & Datan, 1996).

Post-surgery, the overall picture pointed towards the limits of functional reserve capacities in the oldest patients. After six weeks, the oldest patient group reported highest impairment and work- and leisure-related activity difficulties. In contrast, middle-aged and young old adults reported significant *decreases* in impairment and difficulty on these indicators both after one and six weeks, and did not differ from each other. Average difficulties with *ADL/IADL* activities, assumed to be the closest proxies for functional reserve capacity, were indeed highest in the oldest patients at all occasions. Moreover, they experienced a steady *increase* in ADL/IADL activity difficulties over time, with a significantly higher difficulty level after six weeks as opposed to baseline. In contrast, middle-aged and young old adults did not differ from each other, and experienced no significant changes in this indicator over time. However, scores were slightly higher for middle-aged adults than for young old adults, and these differences might be significant with larger samples.

Another indicator of lowered functional reserve capacities in old age was the *overall range of activities* that patients reported to pursue. This was markedly lower in the old group, than in the young old and the middle-aged, who did not differ from each other. This is in line with previous research showing lower levels of activity engagement in the oldest-old (e.g., Horgas, Wilms, & Baltes, 1998). Overall, effect sizes for age-group differences in functional criteria ranged between 6 and 13%.

To conclude, changes in functional adaptation across occasions illustrated the limits of functional reserve capacities in older adults (cf. M.M. Baltes, 1998; P.B. Baltes, 1987, 1997). Given the short time frame, however, it is unclear whether the reported difficulties persisted over time, or whether the old adults just needed more time to adjust to the new situation. Also, the present research did not assess if and how instrumental support provided by others changed after surgery. It might be, for example, that after a successful surgery, instrumental support providers retreat, or there was a greater hesitance to ask for support in the old adults.

In line with the general picture from the aging literature (Pinquart, 1997; Staudinger, 2000), there was no decline in general well-being, and even a slight positive age trend. Depressive symptoms, however, were higher in the old than in the young old, indicating that

these are more sensitive to actual constraints in functioning. Furthermore, the present results provide converging evidence that young old adults (up to the age of 75) have well-preserved reserve capacities in all domains, whereas for middle-aged adults who "prematurely" face typical health constraints of the elderly, cognitive-emotional adaptation is more difficult, and they experience more constraints in the pursuit of work and leisure activities.

In the following, the results pertaining to four hypotheses that were further derived from the idea that non-normative events pose greater threats to cognitive-emotional adaptation are discussed: (1) in middle-aged adults, health and vision problems should be more *strongly* related to the subjective experience of these problems, (2) not having a partner is also a non-normative event in midlife which is associated with worse cognitive-emotional adaptation, (3) when non-normative losses are experienced, self-regulatory efforts are more important in maintaining a sense of well-being, and (4) lower *change* in visual acuity due to surgery should be associated with poorer cognitive-emotional adaptation in middle-aged as opposed to young old and old patients.

6.3.1. Were Objective Vision and Health Indicators more Closely Related to Cognitive-emotional and Functional Adaptation in the Middle-Aged?

Contrary to the expectation that in middle-aged adults, objective vision and health problems should be more closely related to subjective impairment and strain, age did not moderate the relationship between objective indicators of health and vision, and subjective impairments. The only exception was that one week after surgery, subjective impairment due to vision problems was somewhat less associated with visual acuity in the operative eye in the middle-aged ($r = -.14$) than in the two other age groups ($r = -.34$ / $-.39$). At the same time, middle-aged adults had reported the greatest reduction in subjective vision impairment. A possible interpretation is that even minimal changes in visual acuity were associated with greater relief in this age group. Another explanation is that visual improvements were not only restricted to visual *acuity*, but that other symptoms such as distorted images, and extreme sensitivity to light had also improved as a result of surgery, and this might have been independent of visual acuity improvement in middle-aged patients only. However, other symptoms were not assessed here, and thus this remains speculative.

Visual acuity and multimorbidity were also not more closely associated with well-being, depressive symptoms, and activity difficulties in the middle-aged as opposed to young old and old patients. However, there were *trends* in that direction with both ADL/IADL difficulties and difficulties with other activities being highest in middle-aged adults with high

multimorbidity at all occasions. Due to the small group sizes, power was not sufficient to reject the hypothesis that multimorbidity and vision impairment are more strongly associated with negative cognitive-emotional and functional adaptation in midlife.

6.3.2. Greater Risk of not Having a Partner in Midlife than in Young Old and Old Age?

Not having a partner was associated with less well-being and more depressive symptoms in the middle-aged patients, but not in the young old and old. This result could not be accounted for by differences in the gender distribution between age groups. It underscores the detrimental effects of non-normative events on cognitive-emotional adaptation (as living alone is normative in the elderly but not in midlife).

6.3.3. Flexible Goal Adjustment: An Important Self-Regulatory Disposition in Face of Non-Normative Events?

Wrosch and Freund (2001) have argued that non-normative events in the life-course require greater individual self-regulatory competence to be successfully overcome or dealt with than normative events. On the basis of this notion it was hypothesized that in middle-aged adults – who were assumed to face a non-normative situation prior to cataract surgery – the dispositional tendency to flexibly adjust ones goals should be *more strongly* related to general well-being and depressive symptoms than in young old and old adults. This hypothesis could not be confirmed, no age differences in the adaptive function of this disposition was found, neither for the subscale *Reframing* nor for the subscale *Orientation towards new things*.

One might conclude, thus, that a general disposition to flexibly adjust one's goals is possibly protective at any age, and regardless of whether one faces adverse events that are normative or non-normative. It may be that non-normative events are more stressful, as this study indicates. However, as Brandtstädter and colleagues have pointed out (e.g., Brandtstädter, 1998, Brandstaedter & Greve, 1994) accommodative processes only occur when there is a *perceived* discrepancy between individual progress towards important goal and the desired goal state, and this could equally apply to normative and non-normative events, or not apply given each individual situation.

Still, from the sample at hand it seems inadequate to reject the hypothesis even for the population under study. As has been discussed earlier, the middle-aged patients were a rather heterogeneous sample, and due to the small sample size it was impossible to further partition this group into more homogeneous subgroups, as would be desirable for a more stringent test

of the hypothesis. For example, not all middle-aged patients suffered from one or more chronic diseases, which were assumed to primarily constitute the non-normative "event" here. Thus, it might be that flexible goal adjustment was a particularly important strategy in middle-aged adults suffering from high multimorbidity, but not in those with low multimorbidity.

6.3.4. Was Low Change in Visual Acuity Related to Greater Post-Surgical Problems in Middle-Aged Adults?

Given that vision impairment due to cataract is perceived as a non-normative event, it was expected that low or no changes following cataract surgery should have more negative impact on post-surgical cognitive-emotional adaptation in middle-aged adults, than in young old and old adults. Although no significant occasion*vision change*age group interaction was found, it was shown that post-surgery, middle-aged patients with high change in vision had higher well-being than middle-aged patients with low visual acuity change (and that these differences were highest after six weeks), whereas there were no differences in well-being between the high- and low change groups in young old and old adults. Indeed, middle-aged adults with high change in vision had the steepest increase in well-being after surgery. This does not support the initial hypothesis that less change is more detrimental in middle-aged adults, but rather shows a trend towards higher gain from positive vision changes in this age group, possibly because of the increased aversiveness of sensory impairment prior to surgery.

6.3.5. Was Multimorbidity associated with a Post-Surgical Increase in Activity Difficulties in the Oldest Adults?

Diminished reserve capacities in old age were hypothesized to become especially salient in old patients with high multimorbidity. Post-surgery, old adults indeed reported an increase in activity difficulties (in both ADL/IADL and other; Eta^2 = 5% / 9%). These increases, however, were not significantly exacerbated for older adults with high multimorbidity as opposed to older adults with low multimorbidity, although a slight trend in that direction was observed. This speaks for an overall effect of age on diminished reserve capacities.

6.4. Correlates of Cognitive-Emotional and Functional Adaptation

As discussed above, the subjective and objective health and vision indicators explained significant proportions of variance in the criteria of adaptation both prior to and post-surgery (between 18 and 42%). It was hypothesized that beyond these indicators, personal and social resources as well as self-regulation strategies would contribute to cognitive-emotional and

functional adaptation. An important finding was that here most resources, as well as the dispositional coping strategies were *unrelated* to vision and health indicators. That speaks for the argument that the here assessed personal resources and goal adjustment tendencies are fairly unaffected by the present stressors, which might have been different had the focus here been on *terminal* illness, such as cancer (e.g., Filipp, 1992). In contrast, *perceived availability of social support* was lower when high multimorbidity was present (r = -.16) and when patients felt more impaired by their vision problems (r = -.19 (T1) / -.27 (T3) / -.19 (T4)), pointing to contextual influences on the subjective perception of social support, rather than a stable personality disposition (e.g., Sarason et al., 1990). Post-surgery, but not prior to it, patients with better vision reported higher levels of life-investment, underscoring the importance of constraints in sensory functioning for how much energy people invest into different domains of life. Selectivity and investment variability, however, were unrelated to vision and multimorbidity, speaking for a general decrease in energy investment when facing sensory constraints rather than a more variable or selected focus on few domains here.

6.4.1. Predictors of Cognitive-Emotional Adaptation

At baseline and after six weeks, despite moderate intercorrelations between the psychosocial predictors (see Table B4, Appendix B), *unique* contributions to well-being beyond vision and health were found for the flexible goal adjustment subscale *orientation towards new things* (FGA-N), optimism, and perceived availability of support. After one week, the unique contribution of social support dropped below significance (β = .09), FGA-N and optimism remained significant. Although flexible goal adjustment through positive reframing (FGA-R) was uniquely associated with well-being when jointly considering FGA-N, it lost predictor status when jointly considering the generalized expectations, pointing to the fact that its unique impact on these indicators was entailed in the shared variance with optimism (r between optimism and FGA-R = .37). Thus, orientation towards new things when goals are blocked seems to be the feature of flexible goal adjustment, which uniquely contributes to both depressive symptoms and well-being beyond optimism, whereas the beneficial effects of positive reframing are possibly associated with higher dispositional optimism, which has been previously discussed by Brandtstädter and Renner (1990).

FGA-N and optimism independently contributed to *depressive symptoms* prior to surgery, FGA-N was the only significant predictor after one week, and after six weeks, FGA-N and perceived availability of support. Average life-investment, although significantly associated with higher well-being and lower depressive symptoms beyond vision and health, had no

independent variance contribution when jointly considered with the other predictors. Overall, the explained variance of the resources and self-regulation variables beyond all vision and health indicators ranged between 6% and 22%, and was lowest in depressive symptoms after surgery. Optimism, FGA-N and social support seemed to be the most powerful predictors with *unique* variance to well-being, and FGA-N for the prediction of depressive symptoms.

Other studies have previously reported that optimism was a significant contributor to well-being and depression beyond the impact of neuroticism, trait anxiety, and self mastery or self-efficacy (e.g., Aspinwall & Taylor, 1992; Scheier, Carver, & Bridges, 1994). However, no study before has assessed the predictive validity of the present set of predictor variables when considered jointly. It is quite remarkable that social support and optimism were *independent* predictors of well-being, despite their high intercorrelations (.42). This indicates that although parts of the beneficial effects of optimism on well-being may be mediated through the greater availability of social support that optimists report (e.g., Brisette, Carver, & Scheier, 2002), there are beneficial aspects of social support availability that are unrelated to optimism. A flexible disposition to "turn to new things" when barriers to the pursuit of goals are perceived was positively related to optimism (r = .31), but only slightly related to support availability (r = .12, n.s.). Interestingly, this aspect of accommodative coping seems to have some unique predictive value not only for well-being but also consistently for depressive symptoms. This shows also that positive reframing and turning towards new things are indeed different aspects of accommodative dispositions, with differential predictive validity. One mechanism through which a dispositional tendency towards turning to new things may operate is that it should decrease maladaptive coping strategies such as rumination (Billings & Moos, 1984; Nolen-Hoeksema, Larson, & Grayson, 1999).

6.4.2. Predictors of Functional Adaptation

The joint variance contributions of the resources and self-regulation variables to the *functional status indicators* were much lower (between 2 and 5%). Prior to surgery, patients who had higher levels of support availability and trusted more in the benefit of following their physicians' advice ("belief in powerful others") reported lower levels of ADL/IADL difficulties. One week after surgery, having a partner was uniquely associated with less ADL/IADL difficulty, and after six weeks, it was higher life investment. Patients with higher levels of self-efficacy had lower difficulties with work- and leisure-related activities after one week, and after six weeks it was those with higher levels of social support. These findings underscore the importance of partner support after a surgical procedure (e.g., Kulik & Mahler,

1989, 1993; Schwarzer & Schroeder, 1997), and show that persistence (self-efficacy) and life investment in this context were generally associated with *lower* levels of activity difficulties.

Unique predictors of the overall range of activities (other than ADL/IADL) at baseline were tenacious goal pursuit (β = .19), life investment (β = .17), and belief in powerful others (β = -.16), which provides evidence for the convergent validity for the assessed personal resources. Importantly, these findings show that reported tenacity and life investment actually transform into behavioral action, and that a belief in powerful others may be associated with a general tendency to be selective in one's activities.

6.4.3. Predictors of Change in Adaptational Criteria

Unique contributions of the resources to *changes* in the adaptational criteria were small (ranging from 1 to 6% explained variance). Here, flexible goal adjustment through *reframing* was associated with an increase in well-being over time, regardless of the level of health and vision problems, and change in the operative eye (and this was also independent of dispositional optimism). This illustrates the power of focusing on positive aspects in times of stress and resource changes (e.g., Brandtstädter, 1992; Folkman & Moskowitz, 2000; Frederickson, 1998; Seligman, & Csikszentmihalyi, 2000). Other predictors for positive change were self-efficacy and optimism. This is remarkable, given the high intercorrelation of these constructs (r = .55). Thus, for *changes* in well-being, both an optimistic outlook with respect to the future and with respect to one's own abilities seem important.

Patients with higher levels of availability of support and those with a stronger belief in powerful others reported a slight decrease in depressive symptoms after six weeks, and also decreases in work- or leisure-related activity difficulties. This points to the protective functions of relying on others, when it comes to a successful engagement with meaningful activities and personal distress.

In sum, the findings underscore the beneficial (main) effects of individual forces or cognitive mediators, i.e., social resources and stable personality characteristics, as well as life investment, in the maintenance of well-being beyond actual and perceived health and sensory constraints (cf. Bandura, 1997; Scheier, Carver, & Bridges, 2001; Schwarzer & Jerusalem, 1995). The direct effects of these indicators on functional adaptation were rather small, which is not surprising given the relative heterogeneity of the sample with respect to the types of diseases other than cataract.

6.4.4. Did the Duration of Vision Problems Moderate the Associations between Vision, Health, and Resources and the Criteria of Adaptation?

The subjective *duration* of visual impairment was not associated with the criteria of adaptation. However, it was shown that it moderated the impact of self-efficacy beliefs and flexible goal adjustment (FGA) on cognitive-emotional adaptation prior to surgery. Specifically, the FGA-dimension o*rientation towards new things* (FGA-N), as well as self-efficacy were positively related to well-being ($r_{partial}$[56] = .46 / .42), and negatively related to depressive symptoms ($r_{partial}$ = -.40 / -.42) in those patients who reported to suffer from visual impairment for *less* than a year. In contrast, they were *unrelated* to these indicators in those patients who reported a *longer* duration of impairment (except for the association between FGA-N and depressive symptoms, which was $r_{partial}$ = -.25, which was a significantly lower association than in the recent impaired patients). Importantly, these effects could not be attributed to differences in visual acuity and, multimorbidity between these two groups. Thus, FGA-N and self-efficacy appeared to be more protective when people were still in the initial phase of their vision impairment, and less protective or even have no effect at all when the vision impairment had existed for a longer period of time.

There were no duration-dependent differential relations between any of the resources or self-regulation strategies and criteria of *functional* adaptation.

Moreover, duration of vision problems did not moderate the relation between actual visual acuity status and criteria of adaptation Only multimorbidity was slightly more negatively related to activity difficulty (other than ADL/IADL) in the patients who had a longer duration of vision impairment ($r_{partial}$ = .54 in the long duration / .20 in the recent impairment group). This adds to the picture of cumulative negative effects of vision problems and multimorbidity (see 6.1.3).

[56] Controlling for age, sex, vision, and health.

To conclude, these findings provide evidence that accommodative strategies as well as self-efficacy might be of particular importance during onset of slowly progressing sensory impairments. This might be because the experience of sensory impairment is new for most people, and it directly interferes with the pursuit of frequent activities, such as reading, and watching television. The willingness to look for other things to pursue, as well as the subjective certainty that one can overcome such difficulties may help during the initial phase of such experiences, and they might lose their protective power as people adapt to the new situation. It has to be kept in mind, however, that these are cross-sectional results, and longitudinal studies on adaptation to sensory impairments examining shifts in the adaptivity of personal resources and self-regulation strategies have to be conducted.

6.5. Activity Indicators as Mediators in the Relationship between Health Stressors and Well-Being

The cross-sectional findings of the present study support the hypothesis that decline in basic everyday competence partially serves as a mediator in the relationship between physical health and well-being (e.g., Willis, 1991). More specifically, it was found that average ADL/IADL difficulty partially mediated the negative relationship between multimorbidity and well-being. Furthermore, higher multimorbidity at baseline was associated with more negative *change* in well-being from pre- to one week post-surgery, and this was partially accounted for by ADL/IADL difficulties.

Moreover, six weeks post-surgery, *both* ADL/IADL difficulty and difficulty with other activities were found to mediate the relation between multimorbidity and well-being. One possible explanation is that in the face of peri-operative stress, difficulties in basic activities of daily are more salient and thus have a higher impact on well-being, whereas once this acute stress is removed and patients return to their ordinary day schedules, discretionary activities become more important and disruptions or difficulties in them become more salient.

Other studies have found that basic everyday competence limitations also had *indirect* effects on well-being, via their negative impact on social and leisure activities (cf. Lawton, 1986). This supports the assumption that activity limitations are predictive of psychological well-being to the extent to which they interfere with personal goals which are closely linked to social and leisure domains (e.g., Brandtstädter, 1992).

Willis, Jay, Diehl, and Marsiske (1992) showed that elderly adult's ability to solve cognitive everyday tasks had a negative impact on self-efficacy beliefs seven years later (there

was no effect from self-efficacy beliefs on later problem solving ability). Although not tested in this study, reduced self-efficacy might yet be another mediator between physical illness, subsequent limitations in everyday competence, and cognitive-emotional consequences.

Further specifying the processes through which activities come to be restricted / difficult, as well as the processes by which these restrictions impact the cognitive-emotional adaptation, should not only provide clues about points of intervention but also aid in early identification of individuals at risk for poor adaptation.

As objective visual impairment proved to be only a mild stressor with no or little impact on well-being, no mediator hypothesis was tested with respect to this variable.

What was not analyzed here was the role of depressive symptoms in these relations. It was reasoned that the present design would not allow for an adequate representation of the complex interactions between depressive symptoms, the onset and maintenance of chronic diseases, and functional status (e.g., Wells & Stewart, 1989). In a longitudinal design involving more measurement occasions over a prolonged period of time, for example, one could have analyzed more closely if depressive symptoms "drive" functional decline over time, or vice versa.

Furthermore, it would have been interesting to analyze the mediational status of functional difficulties in the three age groups separately. However, the sample size of the present study was too small for separate multiple regression analyses in the age groups.

6.6. Gain in Visual Acuity Following Cataract Surgery

It was reasoned that positive changes in visual acuity after surgery represent a subjective *gain* in an important resource, which should be associated with well-being and depressive symptoms *beyond* actual visual and health status. This was partly confirmed.

Change in operative eye acuity was moderately associated with higher well-being and lower depressive symptoms at both one (r = .14 for well-being and -.29 for depressive symptoms) and six weeks (r = .19 / -.18) after surgery. For well-being after one week , these associations dropped below significance when controlling for multimorbidity and vision in operative eye or vision in better eye. However, they remained stable after six weeks, when controlling for these objective health and vision indicators.

The associations between depressive symptoms and changes in visual acuity remained unchanged when controlling for these variables after one week, but significantly dropped after six weeks. These results replicate findings by Fagerström (1994). In her study cataract

patients with low change in visual acuity reported more depressive symptoms after six weeks than those with high change in visual acuity. In addition, she also reported that the effects of changes in visual acuity on depressive symptoms were considerably weaker when controlling for multimorbidity. However, here, it was shown, that well-being after six weeks was higher when more change had resulted from surgery, suggesting that the basis for judging aging satisfaction, life satisfaction, and non-agitation, the three indicators underlying the general well-being score here, might be different.

Importantly, in the present study, change in operative eye acuity was associated with *changes* in depressive symptoms: one week after surgery, more change in the operative eye was associated with a decline in depressive symptoms. This was beyond all other health and vision indicators, including the subjective ones, and change in vision accounted for 8% of variance in change in depressive symptoms.

These results confirm that *changes* in resources sometimes are sometimes more important for cognitive-emotional adaptation than the actual resources *status* (see Freund & Riediger, 2001). It is not clear, however, whether there are long-term benefits from single gain experiences, and how these affect future reactions in encounters with adverse situations and losses. This certainly is a question of great interest especially in the study of aging.

A very important finding of the present study is that patients with high baseline multimorbidity and high changes in visual acuity experienced positive changes in well-being after one and six weeks. This is in line with the notion that gains are more salient when losses have occurred (Wells, Hobfoll, & Lavin, 1999). Again, here, the longer-term implications of this resource gain are not clear, however, the positive effect continued beyond the immediate experience of vision gain after one week, to become even greater after six weeks (see figure 5.28).

6.7. Buffering Effects of Resources and Self-Regulation Strategies in Face of More Severe Health Stressors?

It has been proposed that resilience in face of adversities does result not so much from special kinds of resources that people have, but rather the efficacy of personal and social resources and self-regulation strategies that help people to maintain positive functions under normal circumstances (cf. Masten, 2001). Moreover, it has been proposed that adaptational differences between people with high and those with low levels of these resources are

especially pronounced in face of stress, and less pronounced or not apparent under normal circumstances (buffering hypothesis; cf. Cobb, 1976; Cohen & Wills, 1985).

The results did not support buffering functions of the personal and social resources and dispositional coping for the negative impact of multimorbidity or visual impairment. Contrary to what had been expected, *selectivity* in life investment and the range of activities (other than ADL/IADL) that people pursued was not a protective factor under high visual impairment or multimorbidity. In fact, the reverse was the case: in patients with poorer vision, a *higher* range of activities was associated with higher well-being, and less ADL/IADL difficulty. Importantly, this was independent of the amount of additional chronic diseases that patients had. Furthermore, higher life investment and average range of activities were associated with higher well-being and lower activity difficulties and depressive symptoms in both patients with high and low multimorbidity, and also in patients with relatively highest health risks as indicated by the conjoint occurrence of high multimorbidity and poor vision. This indicates that a *higher* engagement with work, social, and other leisure activities, rather than a selective focus, was indeed protective for both cognitive-emotional and functional adaptation, and even more when poor vision was present.

These findings somewhat contradict previous findings from the Berlin Aging Study (BASE), where the negative impact on increased somatic risk was alleviated through more selectivity in life investment (Staudinger et al., 1999). However, somatic risk in the BASE were indicated by a composite score of vision, hearing, weighted medical diagnoses, and an ADL/IADL score, and thus high somatic risks were more severe than in the present sample. Thus, it may be concluded that the health stressors here were not so severely drawing on people's resources that a selective focus would have been protective, and that those who disengaged from activities were slightly worse off because they did so prematurely. This underscores the importance of finding the right balance between staying engaged with meaningful activities on the one hand, and "timing" partial disengagements (and "re"-engagements) on the other. This also illustrates that selective processes are not adaptive per se, just as optimization and compensation for losses without adequate resources are not, and that a realistic evaluation of one's available resources is a key component in the successful "orchestration" of selection, optimization and compensation (e.g., Baltes & Baltes, 1990; Freund & Riediger, 2001).

Buffering effects for the resources and accommodative coping styles were also not found when taking into account the duration of vision problems. When dichotomizing the sample according to their health stress along the two stressors multimorbidity and vision impairment,

one predictor showed a buffering function: a stronger belief in powerful others was associated with less difficulties in activities other than ADL/IADL in the high risk group (r = -.24), but not in the low risk group. It may be that believing in the benefits of delegating control (or responsibility) over health outcomes to others may reflect a general tendency to be prepared to rely on others, thus decreasing the amount of difficulties experienced across many domains. However, this buffering effect was not found for ADL/IADL activities and cognitive-emotional adaptation.

Self-efficacy and tenacious goal pursuit (TGP) were associated with higher well-being in the *low* risk group (r = .45 / .34), and had weaker (r = .20 for self-efficacy) or no associations (r = -.02 for TGP) with well-being in the high risk group. Self-efficacy, flexible goal adjustment through orientation towards new things (FGA-N), and optimism were associated with less difficulties in work- and leisure-related activities, but only in the *low* risk group, and there were even slight trends towards *more* difficulties when optimism and FGA-N were high in the high risk group (r = .18 / .14). Thus, under high health constraints (mostly defined by high multimorbidity), there seem to be boundaries of an optimistic outlook and accommodative tendencies when it comes to the successful pursuit of those activities that reflect social, leisure, and work-related engagement. In other words, people who face multiple health problems and are very optimistic or very focused towards taking up new activities and goals when facing obstacles, may face more difficulties in the activities that they chose to pursue. This points to the fact that accommodative coping per se is also not adaptive in all situations, and that the successful pursuit of new goals may be constraint by same obstacles as the pursuit of old ones.

Importantly, having a partner and high levels of social support availability were protective factors in all patients, with no extra buffering function in the high-risk group.

Although these findings lend support to the main-effect rather than the buffering-effect model (e.g., Cobb, 1976; Cohen, & Wills, 1985), it has to be kept in mind that the health stressors were not very severe. The prospect of positive outcomes of cataract surgery may also have confounded buffering effects that might have been present if resources and adaptational criteria had been measured before the decision for cataract surgery had been made.

Moreover, due to the small sample size, it was not possible to look at the interactions between risk status and resources in the three age groups separately. This might have yielded different results, for example, it might be that in the middle-aged and in the oldest old, buffering effects might be present due to greater personal distress because of the non-

normativity of the stressors (in midlife), and limitations in functional reserve capacities (in old age).

6.8. Person-Centered Analyses: Was Resilience associated with Shifts in Self-Regulation Strategies?

Variable centered analyses showed that resilience, defined as high well-being under high health stress, was not associated with a greater "effectiveness" of the resources and self-regulation strategies under high health stress, but rather with a high level of social resources (having a partner and perceived availability of support), generalized expectations, accommodative coping, and life investment (speaking for main effects or equal adaptivity of these predictors under both low and high health risks). The person-centered analyses, comparing "resilient" individuals with high multimorbidity and high well-being at both baseline and after six weeks, to "non-resilient" individuals with equally high multimorbidity and low well-being at these occasions, accordingly yielded consistent differences on these variables between the two groups.

The main focus of the person-centered analyses, however, was to compare the resource and self-regulation *levels* of resilient individuals to those who showed positive adaptation (i.e., well-being) under low health stress. It was reasoned that resilient individuals, as a consequence of having successfully dealt with chronic health and vision problems for some time, would report higher levels of self-regulatory strategies. This is consistent with the notion of "growth under crisis" (e.g., Haan, 1982; Rutter, 1985; Schaefer & Moos, 1992).

Results showed that, as expected, resilient patients did not differ to well-adapted patients with low health stress with respect to their personal and social resources. They did, however, report slightly higher levels of dispositional accommodative coping (both reframing and orientation towards new things), and significantly higher levels of the situation coping strategies *positive reframing* and *denial* in dealing wit the event of surgery, and their reported levels of *acceptance* and *active coping* were also slightly higher. Moreover, resilient individuals showed higher *variability* in their life investment at all occasions around surgery (although this difference was significant only one week after surgery). Importantly, these differences could not be attributed to differences in the stressor that patients coped with, as it was the same for all patients (cataract surgery in hospital).

Although these results are cross-sectional, they provide evidence that the maintenance of well-being despite a significant life stressor may be associated with shifts in dispositional self-

regulatory strategies, as well as in the ways that people deal with temporary acute stressors. On both a dispositional and situational level, accommodative tendencies seemed to increase, reflecting a willingness to accept the situational and chronic constraints, and "make the best of them". Other research has consistently suggested that these strategies are associated with better adjustment not only on a dispositional level (e.g., Brandtstädter & Renner, 1990), but also on a situational level (cf. Folkman & Moskowitz, 2001) One could also view greater variability in life investment as an accommodative strategy, as it reflects greater *flexibility* in adjusting energy levels, without giving up entirely on a life domain. In this sense, it might also be an indicator of a more refined or differentiated goal system, where as a reaction to resource losses in the domain of health, resilient people do not make "either or" choices (which would have resulted in higher selectivity scores here), but rather "more or less" choices. Accordingly, domain-specific investment did not differ between resilient patients and well-adapted low risk patients. In comparison to the non-resilient (high-risk, poor well-being) patients, the resilient group reported higher investment in hobbies, and lower thoughts about death, indicating a higher level of engagement with leisure and possibly social activities.

That resilient individuals also reported the highest level of *denial* in dealing with cataract surgery ("I've been saying to myself "this isn't real" and "I've been refusing to believe that it has happened"), which is usually considered an "evasive" form of coping, was not expected. Obviously, this strategy had nothing to do with not being able to accept the situation, as resilient people scored high on acceptance, and both strategies were generally uncorrelated (r = .02). Thus, denial in this context may have been indicative of a refusal to ruminate about the situation, which is appropriate given the nature of the stressor at hand, which was – from an objective point of view – not very threatening, and subjectively only mildly stressful, but at the same time had low controllability.

Looking at changes in the adaptation criteria over time, it was observed that resilient individuals, but not non-resilient and well-adapted low-risk patients, reported a temporary *decrease* in well-being and *increase* in depressive symptoms one week after surgery. This finding is most important, as it first of all adds validity to the definition of resilience adopted here, in that resilient individuals did not just score high on any "desirable" characteristics, and low on any "undesirable" characteristic at all times. Secondly, it underscores that adaptation to changing resource situations require time, especially when resources are low, and that resilience does not mean to feel well and not distressed at *all* times (e.g., Garmezy, 1991; Luthar, 1993). In fact, it may be a special quality of being resilient to "allow" oneself a certain

amount of distressed feelings when circumstances are bad, and / or to be able to admit to these feelings.

6.9. Conclusions, Limitations of the Present Study, and Outlook

The present study provides evidence that health stressors that are typically encountered in young old and old adults are likely to be perceived as more impairing, pose greater threats to well-being and interfere more severely with the successful pursuit of work and leisure activities when they are faced in midlife. Furthermore, boundaries of some facets of cognitive-emotional adaptation (i.e., depressive symptoms) and functional adaptation in basic activities of daily living in very old age were observed, whereas in young old age, adaptation in all selected domains of adaptation was best. This points to the importance of "timing" of adverse events in the life course (see Neugarten, 1984). It was reasoned that the observed age-group differences can be explained by differences in the *normativity* of the stressors, as well as limits to functional (sensori-motor) reserve capacities in old age.

Both these explanations were derived from previous empirical data and theoretical considerations (e.g., M.M. Baltes, 1990; P.B. Baltes, 1987, 1997; Heckhausen, 2001; Ketcham & Stelmach, 2001; Wrosch & Freund, 2001). A more straightforward approach would have been to directly assess the *perceived* normativity of the stressors. For example, one might ask patients, if they think that their health problems are "typical" for their age, as opposed to "too early", and whether they perceive their health status as better, equal, or worse than that of their peers. An interesting group to study might be elderly adults who are surrounded by highly functioning other elderly, as in these cases, the normativity of experienced losses might not be as salient as in elderly adults surrounded by poor functioning peers. Moreover, future studies should conduct age group comparisons with adults who are even more closely matched with respect to the most dominant source of stress here, which was multimorbidity.

With respect to functional reserve capacities, other proximal measures of sensori-motor functioning could be assessed, such as balance and gait (e.g., M.M. Baltes et al., 1999; Ketcham & Stelmach, 2001).

As P.B. Baltes (1987; 1997) has pointed out, the marked decrease in functional reserve capacities has a biological (genetic) basis, and cultural interventions are restricted to the genetic boundaries of human aging. Whether future advances in preventive and interventional medicine will lead to a "compression of morbidity" (Fries, 1983) in old age will have to be

determined. The early detection and care of even minor, but reversible health problems (such as cataract) might importantly contribute to this goal. This may be for two reasons: (1) the stress experienced by health constraints and sensory impairments is *cumulative*, and (2) improvements in health status or sensory functioning are likely to impact people's well-being independent of objective functional status. They might foster self-perceptions of regaining control (Schulz, Heckhausen, O'Brien, 2000), decrease feelings of hopelessness and "giving up" on oneself, and decrease depression and other negative affect states. Reducing subjective distress and enhancing positive emotions are increasingly the focus of prevention and intervention research, because there is accumulating evidence of the detrimental health effects of persistent negative emotions (e.g., Uchino, Cacioppo, & Kiecolt-Glaser, 1996). This research has shown that in people with serious resource losses to begin with (i.e., multimorbidity), the gain in visual acuity is especially beneficial for their well-being. Thus, one should not consider corrections of even minor vision impairments or other sensory deficits in patients with severe chronic health constraints as superfluous, as they might greatly enhance quality of life. Studies with longer follow-ups are needed to determine whether these benefits persist.

If perceived normativity of stress is indeed a powerful predictor of people's reactions to it, as this research suggests, future interventions with both middle-aged and elderly adults should take this aspect into account. First of all, it is important to identify "at risk" individuals, such as those without a partner, or with low spousal support. Furthermore, whilst in many cases it is impossible to change the reality of "off time" negative events, it seems important to acknowledge that these are more difficult to deal with as they are not shared by the primary reference group in one's social network (i.e., people from one's own generation), and that it requires a lot of "premature" wisdom and self-regulation (e.g., lowering one's standards, letting go important life goals, setting new priorities, restructuring one's sense of "meaning") to maintain a sense of well-being and purpose in life. This is no isolated individual task, as the social network as well as the society would likewise have to accept lower levels of functioning, a shift towards greater socio-emotionality, generative concerns, and selective disengagement in a young or middle-aged adult who is affected by serious constraints in functioning.

Lessons from looking at resilience in the present study setting are, first of all, that resiliency should not be considered as high level of functioning at *all* times, but that stressors (such as cataract surgery) require time for adaptation, and that temporary decreases in well-being and increases in depressive symptoms may occur. Higher variability in life investment

in the resilient individuals in this context might be a reflection of self-regulatory attempts to deal with adverse situations, by balancing the amount of energy that they invested into selected domains. This is an aspect that should be analyzed in more detail in future, as it might be indicative of the *interplay,* or *orchestration* of processes of selection, compensation, and optimization, which is assumed to be crucial for successful aging (P. B. Baltes, & M.M. Baltes, 1990; Freund & Baltes, 1998).

Secondly, personal and social resources that were unaffected by objective health and visual acuity (optimism, self-efficacy, control believes, social support) distinguished those who were resilient vs. those who were not, without being extraordinarily elevated. In contrast, accommodative coping strategies (both dispositional and situational) were slightly higher in resilient as opposed to the well-adapted patients with low health risks, emphasizing the key role that these strategies (e.g., positive reframing in face of stress and blocked goals, lowering of personal standards) play in successful adaptation under high stress. Brandtstädter and colleagues (1998, p. 382) quote Seneca, the ancient philosopher, who summarized the human capacity for accommodative adaptation as follows:

"*No man can have what he will, but he may choose whether he will desire what he has*".

These results furthermore underscore that stressful conditions may trigger *changes* in the evaluation of losses (e.g., Brandtstädter, 1998; Aldwin & Sutton, 1998; Levenson, & Crumpler, 1996), i.e., a growing tendency towards viewing some positive things in adverse conditions and events. This is in line with the notion that successful engagement with adversities may "steel" individuals rather than making them more sensitive towards the negative consequences (Rutter, 1985). Failure to successfully engage with adverse situations, on the other hand, may have the opposite effect.

An intriguing new approach to the study of resilience is the "broaden-and-build model" of the functions of positive emotions (Frederickson, 1998). This model is built on the assumption that positive emotions *broaden* the individual's attentional focus and behavioral repertoire. As a consequence, social, intellectual, and physical resources are refined and accumulated – resources that can become depleted under chronically stressful conditions. This is an interesting approach to studying resilience, as it goes beyond looking at positive emotions as mere outcomes of adaptation, to viewing them as resources in themselves, which contribute to a positive cascade of processes enhancing resiliency-fostering resources (e.g., better immune-functions, higher motivation for physical exercise and medical adherence, better communication skills and more positive reactions from one's social environment, etc. …). Whilst the present research has shown that a general focus on positive aspects in adverse

situations is likely one of the protective factors involved, future research should focus on this aspect in more detail, e.g., by looking at the contextual determinants of general positive reframing strategies (e.g., when, and how often are they employed), how they are intertwined with other aspects of personality (e.g., optimism, self-efficacy), and which mechanisms *mediate* their impact on health outcomes and well-being (e.g., affect, social relations, endocrine and immune responses). As Rutter (1987) put the general agenda for research on resilience:

"*.... we need to focus on protective mechanisms and processes.... to ask why and how some individuals manage to maintain high self-esteem and self-efficacy in spite of facing the same adversities that lead other people to give up and lose hope.... The search is not for broadly defined protective factors, but rather, for the developmental and situational mechanisms involved in protective processes*" (pp. 316-317).

Although this statement was made more than a decade ago, there is still a paucity of empirical research directly addressing these issues from a developmental perspective. As Engfer and colleagues (Enger, Walper, & Rutter, 1994) have pointed out, most research on how inter-individual differences interact with situational determinants has been on "here-and-now interactions" in specific situations. The carry-forward effects from early to later stages in life have been less studied, but resilience can only be fully understood if viewed in a broader developmental frame.