1 THEORETICAL BACKGROUND

2.1. The Resilience Paradigm

Psychological literature from all decades entails a rich body of biographical data on „outstanding“ individuals who lead successful and fulfilling lives despite having been or being exposed to conditions that most people would describe as severely adverse or traumatic. Among the survivors of the Holocaust and other victims of systematic torture, for example, there are impressive reports of inner strength and resistance to give up hope, of continued faith and trust in the future, and the astounding ability to find meaning in life (e.g., Bettelheim, 1960; Frankl, 1992; Shantall, 1999). In nearly all research studying the negative effects of circumstances of varying degree of adversity and risk potential (e.g., victimization, social isolation, poverty, chronic illness, domestic violence, teenage pregnancy), there is always a proportion of people who do not fit into the average picture of emotional and behavioral maladjustment. Moreover, as researchers have started to conduct longitudinal studies assessing long-term effects of temporary or chronic risks, empirical evidence was collected showing that short term negative consequences were not always as lasting, irreversible, and generalized as assumed (e.g., McCord, 1983; cf. Holahan, Moos, & Schaefer, 1996; Masten, 2001; Rutter, 2002). In spite of their exposure to highly stressful life circumstances, many people withstand or bounce back psychologically without developing deficiencies or psychological problems.

It was not until the mid 1970s, however, that systematic research on phenomena of resilience began to emerge as a research paradigm that received widespread attention among social scientists and found its way into public discussions (cf. Masten, 2001). Pioneering researchers were psychologists and psychiatrists who were primarily interested in the development of children and adolescents at risk (e.g., Garmezy, 1974; Murphy & Moriarty, 1976; Rutter, 1979, 1985; Werner & Smith, 1982). They shifted the focus of scientific interest from the study of pathology, risk, deficit and temporary states of maladjustment to the study of personal traits, coping strategies, and environmental characteristics of those who managed to overcome diverse forms of childhood adversities, as they grew older. The idea was that learning from these examples of resilience would help to identify effective intervention strategies to prevent temporary psychopathology from turning into chronic and generalized adaptational problems (Cicchetti, 1984; Garmezy, 1974; Masten et al., 1990; Sroufe, 1990).

The concept of resilience thus has its origins in the field of child and adolescent psychopathology. More recently, however, researchers have begun to view developmental phenomena in all phases of life from this perspective, including old age (c.f., P.B. Baltes, & M.M. Baltes, 1990; Staudinger et al., 1995). They argue that resilience is not only a useful concept in understanding resistance to short- or long-term psychopathology that has its origins in childhood adversity, but should be applied to the study of developmental phenomena of all kinds across the entire life span. This approach is also incorporated in the recent call for a "Positive Psychology" as a new paradigm, focusing on positive human traits across the entire life span (Seligman, 2000).

2.1.1. Defining Resilience

In its broadest sense, the concept of resilience entails the ideas that individuals can (1) *avoid* negative outcomes despite the presence of negative internal-biological or environmental risk factors (Rutter, 1987, 1990; Staudinger et al., 1995), (2) *sustain competence* under stress, and (3) *regain* normal levels of functioning after temporary deviation from socially accepted behavior (e.g., aggressive behavior, quitting one's job), functional loss, or decline (Garmezy, 1974; Masten, Best, & Garmezy, 1990; Rutter, 1987). However, despite the fact that many researchers use the term resilience, there is no unified approach to define it and little agreement on how to measure it (Luthar, Cicchetti, & Becker, 2000). Two research traditions are distinguished: one that conceptualizes resilience as a stable feature of the individual, and one that stresses the relational nature of resilience with respect to time and context.

The "Invulnerable" Individual: Trait Conceptions

In early research, resilience has often been conceived of as a stable, generalized trait. The search was for the „invincible" individual, who was believed to show *general resistance* to damage. The term „invulnerability" was used as a synonym (Anthony, 1987).

A prominent example of trait-definitions of resilience is the construct of „Ego-Resiliency" (ER). ER refers to the ability to modify one's behavior according to contextual demands (J.H. Block & J. Block, 1980). It was derived as one of five personality types among men in the Berkley Guidance and Oakland Growth studies, and characterizes individuals who evidence „*an ego structure already well-formed but by no means foreclosed from new experiences and new values. They avoid the rashness of under-control without assuming the constriction of over-control, have inner direction and an acceptance of responsibility, and both respect for and respect from their parents and peers*" (J. Block, 1971, p. 149). ER combines several

attributes, such as active and meaningful engagement with the world, a positive and energetic approach to life, confidence, autonomy, competence, a sense of mastery in multiple domains, and good interpersonal skills (Klohnen, 1996). Empirical studies assessing ER from self-reports and observer ratings have demonstrated its positive impact on various indicators of positive adjustment in midlife (psychological distress, relationship satisfaction, work satisfaction, and self-rated health), both cross-sectionally as well as over time (e.g., Klohnen, Vandewater, & Young, 1996).

Parallel to the emerging interest in resilient features of individuals at risk for mental and behavioral maladjustment, research on psychosocial correlates of physical health went through a similar paradigmatic shift. The exclusive focus on factors associated with illness (pathogenic model) was replaced by the search for factors associated with how and why people stay well (salutogenic model). Prominent invulnerability concepts from this research tradition are "Hardiness" (Kobasa, 1979) and "Sense of Coherence" (Antonovski, 1987).

Kobasa (1979), examining high-stress individuals with a low incidence of illness, used the term "Cognitive Hardiness" to describe a pattern of cognitions that he believed was unique in these people. According to her, hardy individuals (1) believe that they can control or influence events, (2) have a commitment to activities, their interpersonal relationships and to self, and (3) view changes as a challenge rather than a threat.

Sense of Coherence (SoC) is conceptualized as a global personality disposition that affects how people appraise and manage life stressors, hence directly influencing coping behavior. It describes the feeling of confidence that (1) internal and external stimuli are "structured, predictable and explicable" (comprehensibility), (2) resources are available to cope with stressful situations (manageability), and (3) situational demands are perceived as challenges worthy of investment (meaningfulness) (Antonovsky, 1987, p. 19).

Both hardiness and SoC have a pivotal role in positive illness appraisals and have been shown to mitigate the negative effects of stress in relation to illness and depression (e.g., Kobasa, 1979; Nowack, 1989).

Resilience as a Relational Construct

Soon after they have been established, trait concepts of resilience and the notion of invulnerability have been criticized for their exclusive focus on internal-constitutional factors, and their static view of individual success across multiple domains of functioning (Liem, James, O`Toole, & Boudewyn, 1997; Mrazek & Mrazek, 1987). Rutter, in a series of highly

influential articles (1985, 1987, 1991), marked a turning point in resilience research with his call for a more dynamic conceptualization of resilience, based on the following arguments:

1. Susceptibility to stress is a graded phenomenon, and everyone has limits to stress resistance.
2. In addition to individual characteristics, characteristics of the social context may contribute to resilience, depending on the nature of the risk and the life context.
3. Resilience at any given point in the life course never applies to all possible risk factors: „*There is a range of mechanisms by which risk factors operate and it must be anticipated that the features that constitute resilience will vary according to the risk mechanism*“ (1991, p. 2).
4. Features that constitute resilience (protective factors) at one point in the life course may not be protective at another point, even when the same kind of risk is encountered (for example, being female is associated with better outcome under a number of adverse circumstances during childhood, but not in adulthood).

In essence, resilience, in this view, is neither an intrinsic feature of the individual, nor does it represent an unchanging characteristic, as any trait conception would suggest: „*Resilience cannot be seen as a fixed attribute of the individual ... If circumstances change, resilience alters*“ (Rutter, 1987, p. 317). It is thus an issue of empirical analysis which person characteristics, coping strategies, and external resources protect against the negative consequences of different adversities, and which contextual influences moderate these relationships (e.g., age, culture, gender, historical context).

Adaptation and Resilience: Process or Outcome

The terms „adaptation“ and resilience are often used interchangeably. Masten and Coatsworth (1995) propose that human adaptation includes *“homeostatic self-regulatory processes, effective transactions with the environment, and development”* (p. 715). Individuals’ interactions with the social and ecological environment constantly require modification, diversification, and differentiation of previous organizations and structures. This is essentially what constitutes human *development* (e.g., Ford, 1992; Werner, 1967).

In a similar vein, Foster (1997) defines adaptation as individual responses aimed at „*improving or maximizing environmental fit*“. Resilience, according to him covers „*positive changes in maintaining active or latent coping and adaptation capacities through various mechanisms (such as healing, restitution, refinement, and enhancement) that may not be immediately apparent but become evident over time*“ (p. 190). This definition characterizes resilience as an ongoing *process*.

In empirical research, however, although not always explicitly stated, resilience is most often conceptualized as an *outcome* of resource availability and adaptational efforts, or *manifested competence* in the context of sever stress or trauma (cf. Masten, 2001; Rutter, 1991). This conceptualization is adopted here, because it allows the clearest distinction between what empirical, societal or individual norms define as "successful", "acceptable" or "within normal range" developmental outcomes on the one hand, and the conditions, resources, and strategies that harm, prevent, maintain or promote these, on the other.

In the following, the term adaptation is used to refer broadly to both processes of self-regulation in dealing with perceived deviations from desired states, and also to the outcomes of these attempts. Resilience is considered a special kind of positive *outcome*, namely, under circumstances that have been empirically shown to increase the individual risk of maladaptive outcomes. If viewed from this angle, resilience has two defining elements: the simultaneous presence of risk and positive or "successful" adaptation.

Risk Factors

Risk factors comprise all external or internal events, conditions, and changes that have empirically been shown to increase the likelihood of negative outcomes (Rolf & Johnson, 1990). Usually, they are analyzed within members of a group who share one or more characteristics (Masten & Coatsworth, 1995). The list of potential risks comprises ecological, socio-economic, and relational factors, but also constitutional vulnerabilities, such as sensory-motor deficits, unusual sensitivities, genetic factors, and lowered impulse control (Murphy & Moriarty, 1976).

Importantly, there are differences in the extent to which individuals are susceptible to various forms of risk (Rutter, Champion, Quinton, Maughan, & Pickles, 1995). This is based on the assumptions that personal characteristics predispose individuals to select, construct and actively shape their environments that, in turn, reinforce and sustain individuals` active, outgoing dispositions, reward their competencies and exacerbate their risk behavior (Werner, 1993). Factors associated with susceptibility differences are, for example, personality, early attachment, socio-ecological conditions, and genetic predisposition. These may pose risk factors in themselves, and at the same time increase the likelihood of others. Egeland, Carlson, and Sroufe (1993) pointed out that risk factors may lay a foundation for a *negative chain* of events (e.g., poverty → poor education → unhealthy lifestyle → health problems → increased poverty) and protective factors may similarly result in a positive chain that leads to more favorable outcomes (see for example Radke-Yarrow & Brown, 1993). Thus, differences

in susceptibility to risks might become more pronounced over the life span. However, it is important to keep in mind that even a pronounced “history” of negative events in one’s past does not prevent resilience in later life, as every vicious cycle may be interrupted through external or internal events that result in turning points in people’s lives.

In the present study, the focus is on the sample case of chronic health stress and visual impairment that “qualify” as risk factors in that numerous studies have shown their negative impact on a various outcomes both in middle-aged and in older adults (see 2.4).

Criteria for Successful Adaptation

There is considerable variation as to what is considered a "successful", "positive", or "good" outcome, not only in psychopathology but also in the disciplines concerned with "normal" development (Kaufmann, Cook, Arny, Jones, & Pittinsky, 1994). This is most critical, since the identification of risks and protective factors and mechanisms is always *relative* to desired and undesired states of functioning and deviations from them. A clear distinction between criteria based on individual, statistical, or “value” norms on the one hand, and empirical findings concerning the correlates of these criteria on the other, is warranted.

Applying the notion that there is more to a fulfilling live than the absence of disease or functional difficulties, many studies assess indicators of subjective well-being (e.g., life satisfaction, positive affect, global well-being) or subjective distress (e.g., depressive symptoms, negative affect). A broader conceptualization of well-being entails such distinct dimensions as self-acceptance, environmental mastery, positive interpersonal relations, purpose in life, personal growth, and autonomy (Ryff & Singer, 1996). Such a conceptualization, however, fails to acknowledge that the relationship between these dimensions might be moderated by contextual factors such as age, sex, cultural background, and socio-economic status. In addition, each might have differential relations with external and internal resources (Sparrow, Carter, Racusin, & Morris, 1995). Furthermore, resilience is often studied in settings where at least one of these components is impaired, damaged, or restricted.

Well-being indicators seem obvious measures of positive adaptation, given that individuals’ self-perceptions and feelings are valued. Some researchers, however, have argued against using subjective well-being as the only indicator of successful adaptation (e.g., P.B. Baltes & M.M. Baltes, 1990). First of all, people obviously use a variety of internal mechanisms to maintain their global well-being and are often very successful in doing so across different life-situations. Thus, global indicators of subjective well-being (e.g., "to what

degree are you satisfied with your life?") might not be sensitive enough to reflect the impact of stressful events and developmental changes on people's lives. Furthermore, research on resilience in young people has shown that those who function well under high stress often show higher levels of emotional distress compared to their low stress peers (Luthar, 1993; Luthar, Doernberger, & Zigler, 1993). In times of (temporal) distress resilient individuals may show successful coping that helps them to maintain a competent level of functioning in everyday life (e.g., school, work, interpersonal relations; see Garmezy, 1991; Luthar, 1993). Also, the *duration* of negative, undesired outcomes is rarely ever addressed in empirical research, thus not accounting for intraindividual standards, and changes over time.

In gerontological research, the appropriateness of universal criteria for all age groups has been questioned. As M.M. Baltes (1996) pointed out, "*what is optimal will always be constrained by what is possible*" (p. 150). This surely applies to all domains of functioning that show an age-related decline, such as health, cognitive functioning and the independent mastery of everyday demands (see 2.2.3, 2.4.3). It does not apply, however, to the domain of emotional adaptation, since the reserve capacities of the "aging self" do not seem to decrease (e.g., Brandtstädter, 1998; Diener, 1999; Pinquart, 1997; Staudinger, 2000).

When choosing criteria based on behavioral performance (e.g., independence in mastering everyday tasks) or social adaptation (e.g., frequency of social contacts, social competence), a critical issue is that of differing functionality underlying overt behavior. M.M. Baltes (1996), for example, showed that behavioral dependency sometimes has positive adaptive functions (e.g., preserving energy for the pursuit of valued activities). In addition, Wolff (1995) pointed out that those definitions of resilience that rely exclusively on behavioral success fail to recognize that sometimes depression and anxiety are "the price of resilience". In sum, most ideally, a multi-dimensional approach should be favored over single criteria, taking into account their interrelatedness and short-term and long-term changes (Sparrow et al., 1995).

The adaptational criteria that were selected for the present study comprise (1) cognitive emotional indicators and (2) (subjective) functioning in everyday life. (1) A composite well-being score indicated by life-satisfaction, satisfaction with aging, and non-agitation (Lawton, 1975; see 4.4.7) was chosen because it is a common "outcome" criterion in studies on midlife and old age development, and to acknowledge the subjective perspective of individuals in judging whether or not they "successfully" adapt to the present stressors. Depressive symptoms were chosen as a second indicator of cognitive-emotional adaptation. It was reasoned that these reflect more sensitively the actual distress caused by the stressors at hand, and changes in these. (2) Average perceived difficulty with activities and overall activity

range were chosen as indicators of functional adaptation for two reasons. First of all, both activity range and the subjective evaluation of the difficulties encountered in mastering basic and extended living skills in everyday life, and in the pursuit and maintenance of leisure activities and social relations, are interwoven with both well-being / depressive symptoms and health (see 2.4.3). Secondly, there is indication that functional indicators are impacted by different resources and self-regulation strategies than well-being (see 2.5).

2.1.2. Vulnerability and Protection: Opposite Poles of one Dimension?

Both Garmezy (1991) and Rutter (1987, 1991), make a distinction between *compensatory factors* (which are directly related to competence) and *protective / vulnerability factors*. Compensatory factors are those that exert a main effect on any indicator(s) of positive adaptation in a selected sample at risk. Protective and vulnerability factors *interact* with stress and modify (either exacerbate or buffer) its impact on developmental outcomes: *"the essential defining feature … is a modification of the person's response to the risk situation. Thus, it requires some form of intensification (vulnerability) or amelioration (protection) of the reaction to a factor that in ordinary circumstances leads to a maladaptive outcome. … The essence of the concept is that the vulnerability or protective effect is evident only in combination with the risk variable"* (Rutter, 1987, p.317).

Despite this common feature of vulnerability and protective factors, many researchers proposed to take on separate looks at them, not assuming that the absence of risk equals the presence of protection (Masten, 1994; Noam, 1996; Rutter, 1987). This taps into the distinction between *necessary* and *sufficient* conditions. Importantly, the mechanisms involved in protection seem different from those involved in the risk process. For example, when poor health increases the likelihood of feelings of loss of personal control and helplessness, good health does not necessarily foster the experience of being in control (in this sense, good health may be necessary but not sufficient for a personal sense of control). Thus, research should consider *how* vulnerability factors modify the responses to stress, and how protective factors do so. Furthermore, the presence of a major life stressor sometimes brings new insight and the experience of efficacy in dealing with adversity (e.g., Noam, 1996). When a new, negative life event occurs, this chronic stressor (vulnerability) may thus, seemingly paradoxical, turn out to "develop" a protective function.

2.1.3. Resilience as a Life-Span Concept

From a life-span theoretical perspective, resilience is a special type of „reserve capacity", which is constituted by „*internal (e.g., cognitive capacity, physical health) and external (e.g., social network, financial status) resources available to the individual at any given time*" (Staudinger et al., 1995, p. 807). The fundamental concept underlying reserve capacity in general, and resilience in particular, is „plasticity". Plasticity denotes the manifest or latent *potential for change in transactional-adaptive capacity*, and as such is an index of individuals' flexibility in dealing with developmental challenges and demands.

It is one of the major propositions of life-span theory that individuals have reserve capacity and functional plasticity throughout their entire life, in varying degrees and expressions (P.B. Baltes & M.M. Baltes, 1990). Age-related changes in plasticity should be viewed separately for the domains of behavior, cognition, emotion, and health. For example, there is evidence that cognitive plasticity declines with age (e.g., Singer, 2001). Genetic factors determine age-related deterioration in health, but this does not happen in isolation from the environment. Continued "allostatic load" (i.e., the "wear and tear" on physiological functions through repeated restoration of inner-organismic homeostasis in response to internal and environmental stressors), leads to organ damage and decreased adaptivity of physiological responses to environmental (e.g., temperature changes) and cognitive stressors (McEwen, 1998). Cognitive-emotional adaptation to stressors, in contrast, seems to be remarkably unaffected by these and other age-related decrements: There is convergent evidence that far into old age, cognitive and affective components of well-being do not decline on average (e.g., Brandtstädter & Renner, 1990; Pinquart, 1997; Smith & Baltes, 1999; Staudinger et al., 1995). These findings, known as the "satisfaction paradox", have also been interpreted as the results of the remarkable resilience of the aging *self* in adapting to the manifold challenges of old age, with a seemingly unlimited potential (Staudinger et al., 1995).

Accepting the concept of plasticity, one must reject the "myths" of predetermination, irreparable damage from stressful or traumatic experiences, and unwillingness to defy seemingly uncontrollable adversity (Rockwell, 1998). Through both facilitating environments and internal adjustment processes, individuals have the capacity for positive change and for the development of at least some characteristics of resilience throughout their lives. That resilience is not static but dynamic, as is intra-individual plasticity in general, is expressed by Rutter's statement that „*developmental changes will influence resilience just as they influence any other characteristic*" (1991, p. 2).

A life-span approach to the study of resilience is concerned with two broad issues: (1) changes in the prevalence and nature of stressors encountered at different life stages, and (2) changes in the antecedents or correlates of resilience. In addition, exploring the changes and limits in plasticity provides an informational basis for what criteria of developmental adaptation are adequate at each life stage (M.M. Baltes, 1996; Sparrow et al., 1995).

Studying resilience at different life stages poses interpretational problems. It has often been stressed that the protective function of a single personal or environmental characteristic or combinations of these can change over contexts and time (e.g., Rutter, 1985, 1987). Sometimes, a protective factor in childhood (e.g., close family ties) can even turn into a risk and then regain a protective buffering function at some later points in life. Yet, one has to be careful with the interpretation of such findings from a developmental perspective. Not all observed changes in overt functioning and adaptation are purely "developmental" in nature, in the sense that they change in *quality*. Sometimes the observed changes are due to a difference in contextual factors instead That is, different types of adversities elicit different responses. One might argue that the change of life contexts is *inextricably* bound to development. Yet, there are life-events that are clearly tied to a certain life-period (e.g., motherhood), and others that are not (see 2.2). The present study attempts to study individuals at different life stages who find themselves exposed to similar contextual stressors.

If one intends to study life-span changes in antecedents and correlates of resilience, four categories of research questions have to be distinguished: (1) differences in the *level* of internal and external resources that are available to individuals at the different life stages (descriptive approach), (2) differences in the *adaptive quality* of existing resources (correlational studies, moderator approach), (3) differences in the ways that individuals at different life stages make use of existing resources, i.e. in the internal processes that mediate the relation between resources and outcomes (combined mediator and moderator approach), and (4) boundaries of reserve capacity and developmental plasticity (intervention studies, experimental approach). Examples of the first three are addressed throughout this chapter.

2.1.4. Analyzing Correlates of Resilience: Two Empirical Approaches

There are several ways to study resilience (cf. Masten, 2001). Analytical approaches can be divided into variable-centered and person-centered analyses. These two perspectives are applied in the present empirical study, with a focus on (1) the "buffering effect model" (variable-centered) and (2) direct comparisons of the resource level and self-regulation strategies of successfully adapted individuals at low vs. high risk (person-centered, see Figure

1). Risk status in this sample will be identified according to the degree of impairment in two selected chronic stressors: vision impairment and multimorbidity.

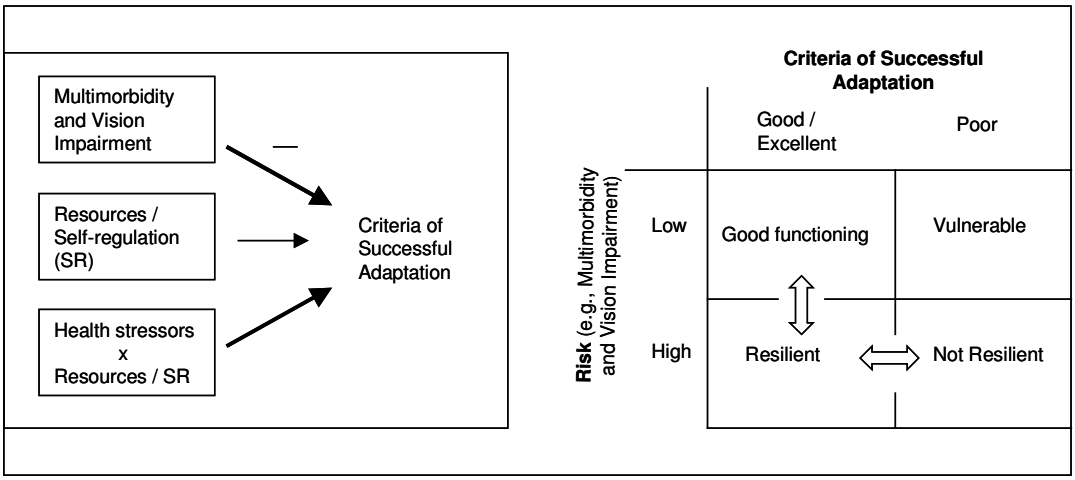

Figure 1 *Illustration of two approaches to the study of resilience in the context of chronic health stressors: (1) Variable-Centered Approach (left) and (2) Person-Centered Approach (right)*

(1) The first approach examines whether resources and self-regulation strategies *buffer* the negative impact of poor vision and health on the criteria of adaptation. This is usually done by testing the interaction of risk status and a specific resource in predicting a desirable outcome. The underlying assumption of the buffering effect model is that certain person and environment characteristics operate differentially depending on the level of stress individuals experience (e.g., Cobb, 1976; Cohen & Wills, 1985). Two effects must be differentiated: (a) resources are related to criteria of positive adaptation *only* in face of adversity (no main effect present), and (b) the resource-adaptation association is significantly stronger in individuals at risk compared to individuals currently not facing severe adversity (main effect of a resource on a criterion of adaptation is exacerbated under stress).

(2) The buffering effect model specifies assumptions about differential *relations* between resources and level of adaptation in different groups (high risk vs. low risk). Applying a life-span perspective to the study of resilience, it is also possible that individuals who show resiliency under risk have a higher *level* of resources not only in comparison to those individuals that fail to adapt to the identified risk, but also in comparison to individuals who face no such risk. This argument is in line with a dynamic understanding of development (e.g., Rutter, 1995; P.B. Baltes 1997), which includes the idea of growth under adversity, the notion that adverse events may invoke positive changes in both internal and external resources (e.g., Noam, 1996; Nolen-Hoeksema, 2000; Rutter, 1987). This is not restricted to

short-term experiences of receiving support and the more vaguely defined concepts of "internal growth" or "turning points" (see 2.2). Rather, some of the basic dimensions of personality and self-regulatory efforts, which shape and guide individual thinking, perception and behavior (e.g., optimism, goal regulation, coping behavior), may be positively influenced by the experience of mastering difficult situations. When risks persist chronically, both positive and negative effects may coexist: on the one hand, the controllability of the circumstances is mostly low, which increases the risk for feelings of helplessness, despair, and depression. Chronic health problems in particular are likely to have adverse effects on the range of individual opportunities to pursue individual goals and participate in social life. On the other hand, they provide opportunities to prove ones' ability to deal with hardship, explore alternative ways of coping, and "test" and refine ones assumptions about the world and the future. Resilient individuals – as a consequence of having lived with chronic illness for a long time – may have optimized their coping strategies, resulting in higher endorsement of some, and less endorsement of other strategies (e.g., Haan, 1982; Holahan, Moos, & Schaefer, 1996; Schaefer & Moos, 1992). Moreover, growth from crisis has often reported to occur when individuals start to seek positive aspects of the situation and find meaning in it (e.g., Affleck, Tennen, Crook, & Levine, 1987; Taylor, 1983).

The notion of *crisis growth* is analyzed in the present study by comparing individuals who show positive adaptation under high health stress to those who show positive adaptation under low health stress. Of special interest are the coping strategies that both groups employ in dealing with an acute stressor (cataract surgery), as well as their dispositional goal-regulation strategies (see 2.6.2).

2.2. Models of Development in Midlife and Old Age

To make predictions about the changing level and adaptivity of resources and self-regulation strategies underlying resilience over the life course, one has to understand the developmental contexts in which individuals are embedded (e.g., Chiriboga & Catron, 1991; Elder, 1994; Featherman & Lerner, 1985; Ford & Lerner, 1992; Moen & Wethington, 1999). "Midlife" and "old age", the two life stages that are focused here, each encompass a wide age range and are thus only broad categories, not sufficient for characterizing a single person's actual living context. However, they have become popular entities in the social sciences, each with its own research tradition (cf. Birren & Schroots, 2001; Lachmann, 2001; Willis & Reid, 1999). This section is presenting some theoretical considerations and empirical data on common experiences shared by most individuals in midlife and old age.

2.2.1. Age Boundaries of Midlife and Old Age

In industrial nations, today, midlife is typically conceived of as beginning somewhere around age 30 or 40 and ending around 60 to 65 (with the standard age for retirement). Still, there is no consensus about the exact boundaries of midlife and old age, neither regarding chronological age nor with respect to any particular transition[1] (Neugarten & Datan, 1996).

Individual perceptions about "being middle-aged and being old" vary according to one's own age, gender and cohort (for an overview see Filipp & Schmidt, 1995; Staudinger & Bluck, 2001). Typically, middle-aged persons rate their *subjective* age lower than their actual age, and this discrepancy increases as people get older. Gender plays an important role in assigning an age label: asked to indicate at what age someone should be considered "old", a consistent finding is that the transition into old age is perceived as beginning three to four years earlier for women than for men.

From a life-span perspective, "*midlife may be better defined by a pattern of characteristics than simply by chronological age*" (Staudinger & Bluck, 2001, p. 6). Based on patterns of life tasks, social roles, and common transitions (see 2.2.2), midlife has been divided into an early and late period (e.g., Erikson, 1950; Neugarten & Hagestad, 1986). Early midlife is marked by an accumulation of resources, consolidation of careers and the establishment of a family. In late midlife, most of these early midlife tasks have been accomplished and generative concerns, preparation for retirement and revision of internal values gain importance. However, due to common variations in the timing and sequencing of these events, there is even more uncertainty about how to define early and late midlife by age (Lachmann, 2001).

For old age, the differentiation between "young old" and "old old" (the "fourth age", beginning around age 80 to 85) is now widely accepted (e.g., M.M. Baltes, 1998). This differentiation is based on empirical evidence regarding the progression of biological aging processes and their consequences in very old age (see 2.2.3).

What makes midlife and old age distinct from one another and the early stages of life? What are the *specific* tasks and challenges middle-aged and elderly people encounter? In the following, unique characteristics of the two life stages are outlined. Many of them are not truly unique in the sense that they cannot and do not occur at all stages in life. Instead, they all are assumed to have a high age correlation, or occur as a unique constellation or sequence of transitions and changes. They thus represent what has been termed *age-graded* influences on development (P.B. Baltes, 1987). A summary is provided in Table 2.1 (page 36).

2.2.2. Challenges and Developmental Tasks in Midlife

The conceptual ideas on specific characteristics of life stages that are reviewed here come from two theoretical backgrounds: (1) psychodynamic and psychosocial theories that have proposed sequences of universal stages in human development, and (2) the integration of psychological and sociological perspectives on life-span development that acknowledge the coexistence of complex and pluralistic contextual influences contributing to both interindividual similarity and variability in development (P.B. Baltes, 1987, 1997; Staudinger et al., 1995). Additionally, contributions from life event research regarding the type and frequency of common critical life events in midlife are presented.

Midlife from the Perspective of Stage Models of Development

Stage models of personality development such as the ones developed by Freud (e.g., 1938), Jung (e.g., 1995a), Bühler (1933), Erikson (1950, 1982) are prominent theories in developmental psychology. They all focus on internal maturation processes that are assumed to be sequential, universal, and unidirectional. Whereas Freud concentrated on psychosexual development in the first years of life, Jung and others have proposed extended theories on processes of personality development that they regard as continuing throughout adulthood. Major attributes of the midlife transition have been defined by Jung (1931), Erikson (1982), and Levinson (1978); suffice it here to present the influential ideas of the first two authors.

Jung‘s conception of individual development (the process of “Individuation”) is based on the synthesis of conscious and subconscious elements within the individual, and at the same time the social integration of an individual by means of generating collective relationships (Jung, 1995a; GW 6, §§ 825-828). He distinguished two phases of life, with a distinct transition phase in middle adulthood (“Lebenswende”; Jung, 1995b, GW 8)[2]. In adolescence and young adulthood, major psychological processes include separation from primary objects, the development of a strong ego, and the transition from the status of childhood to adult life. This is represented in the development of continuous relations, the founding of a family, and attachment to work and a social group within society. Towards the second phase of life, a transition process occurs that is determined by a shift from more ego-centered, transactional and social development towards a development of introspection, self-regulation, and an emphasis on internal values and sense and purpose in life. The conscious development of a

[1] *Transitions* are defined as objective changes in social roles and relationships (Moen & Wethington, 1999).
[2] The transition phase, although subject to individual differences, has been defined by Jung as occurring around age 35 to 40 (Jung, 1994, p. 299).

self, meaning the introspective integration of sense and purpose in life, including the realization of mortality and the acceptance of approaching death, are central to the understanding of development in the second life phase (Jung, 1995b, GW 8, § 772). Thus, while the first phase of life is characterized by ego development succeeded by building relations with others, the second phase of life is characterized by introspection, development of a sense of self, and striving towards conscious reflection and wisdom. This basic distinction of the life phases is reflected in many other conceptions of personality development, such as the notion of generativity in Erikson's model, or the notion of conscious reflection in the second life phase, that can be found in conceptions of wisdom or creative work (see Heckhausen, Dixon, & P.B. Baltes, 1989).

Erikson (e.g., 1950; 1982) conceived of personality development (or "ego"-development) as a universal sequence of psychosocial crises in the life cycle. Crises, according to Erikson, denote "turning points" with inevitable change towards either good or bad outcomes (growth or stagnation). They are conceptualized as experiences of discrepancy between what one wants to have, do or be, and what is possible and adequate according to biological maturity, social relations and cultural expectations. Erikson thus explicitly focused on the interplay between innate maturation processes and the social world (1982). He divided the life course[3] into eight stages that are each characterized by an unsolvable dichotomy (conflict or crisis; see Erikson, 1950). The crises are postulated to be sequential ("epigenetic principle") and functionally interdependent: incomplete solutions at one stage prevent complete solutions at later stages in life.

Adulthood is divided into three stages: early adulthood, adulthood, and mature adulthood (old age). Early adulthood is characterized by the need to make decisions in career development and intimate relationships (intimacy). The core conflict lies in the danger of social isolation. Adulthood is assumed to begin somewhere in the middle twentieth and last until the end of the sixth decade of life and thus spans the broad category of midlife that is of interest here. It is characterized by the conflict of generativity vs. self-absorption.

Generativity denotes a "*configuration of psychosocial features constellated around the goal of providing for the next generation*" (McAdams, de St.Aubin, & Logan, 1993). It can be experienced and expressed in many ways that change from early midlife (the focus then is on

[3] The term „life course" is traditionally used in sociological literature focusing on the social creation and recognition of age-related transitions (e.g., Hagestad & Neugarten, 1984). Psychologists have adopted the term „life span" for their theoretical perspectives on human development. Today, however, „contextualism" is one of the leading orientations in developmental psychology (P.B. Baltes, 1987; Lerner, 1983), acknowledging the interplay of social-normative, biological and intrapsychic factors in shaping individual development. In line with this approach, both terms (life course and life span) will be used interchangeably here.

starting a family, anticipating a common future, accumulating resources to secure the family) to late midlife (when generative concern is expressed for example through sharing expertise and experiences, and providing care for aging parents). McAdams and colleagues (1993) have identified seven features of generativity: generative concern, demands, desires, beliefs, commitments, actions, and narration. Although Erikson (1982) predicted a peak of generativity in midlife and decline thereafter, an empirical investigation of four aspects revealed that generative commitments and narration showed high scores for both middle-aged and old adults (McAdams et al., 1993).

Another prominent stage model is the concept of "developmental tasks" introduced by Havighurst (1953). Developmental tasks are demands that result from the joint consideration of biological processes, current socio-cultural demands and individual values and aspirations. Like the crises in Erikson's model, they occur in a sequential order and the successful mastery of each task is a prerequisite for better mastery of succeeding tasks in the life course. However, they are not assumed to be organismic and universal, but tied to historical and cultural contexts. For every age period from childhood to old age, Havighurst has proposed a catalogue of life tasks. In midlife, important life tasks include developing leisure interests and accepting and mastering physical impairments. Of course, the cultural-normative context of these tasks is obvious and makes it clear that Havighurst provided no more than a frame for optimal development in western democratic cultures of his time.

Midlife from the Perspective of Life-Span Developmental Psychology

Stage models of development have been criticized for their uncompromising views on psychosocial development as being driven by *universal* processes and following *a predetermined sequential order* (cf., Dannefer, 1999; Whitbourne, Zuschlag, Elliott, & Waterman, 1992). Another criticism pertains to the normative criteria for successful development (ego-integrity) and developmental tasks that have been developed in the context of the values of western democratic cultures (Gilligan, 1982). As Levenson, Aldwin & Cupertino (in press) point out, ego development is largely determined by culture and as a consequence, all developmental theories based upon ego processes are culturally limited.

Life-span developmental psychology has offered different, less deterministic and normative views on development. P.B. Baltes and his colleagues (P.B. Baltes, 1987, 1997; Staudinger et al., 1995; P.B. Baltes, Staudinger, & Lindenberger, 1998) have integrated the basic propositions of this theoretical orientation incorporating both a holistic approach to lifespan ontogenesis as well as a function-centered approach (focusing on the development

and interdependence of functional systems such as memory, information processing, personality etc.). The fundamental notions of this orientation are that development is never completed, and that there is no single and universal ideal state of maturity to be achieved. Instead of separately viewing development as growth and the process of aging as decline (as a function of unidirectional loss in adaptive capacity), development is conceptualized as involving *any* kind of change in adaptive capacity. This approach, in strong contrast to stage models of development, acknowledges the simultaneous existence of growth, stability and decline processes across and within human functional systems, at any point in the life course (multidimensionality and multidirectionality). As a consequence, no life stages holds supremacy over others. Such a conceptualization calls for a dynamic definition of what constitutes successful development since no "endpoint" is identified. P.B. Baltes & M.M. Baltes (1990) have provided such a definition by suggesting to characterize successful development in broad terms as the "*maximization of gains and minimization of losses*". The importance of this definition lies in the notion that development *always* comprises both gains and losses and that thus, no life stage should exclusively be characterized by growth or loss aspects, but rather the *ratio* of the two.

In line with this perspective, three goals of ontogenetic development have been distinguished: *growth* (defined as higher levels of functioning or adaptive capacity), *maintenance* (including recovery from temporary decline in functioning to previous levels) and the *regulation of loss* (accepting inevitable loss and finding a good way to live with lowered functional capacity; P.B. Baltes, et al., 1998). As people grow older, the relative allocation of available resources to these goals shifts from predominantly growth-oriented resource allocation in childhood, adolescence and young adulthood towards increasingly more investment in maintenance and loss-regulation (Staudinger et al., 1995). This differential allocation of resources is not seen as a function of time, nor as an inherent part of the aging process. Rather, it is assumed to reflect individuals` reactions to age-related changes that result from biological and societal opportunities, expectations and constraints.

From this perspective, what characterizes the situation of middle-aged adults? Heckhausen (2001) mentions two overarching characteristics of midlife challenges that result from the middle-aged adult's position in the life course: the *unique composition of gains and losses* and the *growing salience of the finitude of lifetime*.

It is a major assumption in life-span developmental psychology that in adulthood, chances for developmental gains or growth decrease, whereas risks and losses (decline) increase (P.B.

Baltes, 1987). This notion is reflected in individuals` subjective perceptions of changes in gains and losses, as Heckhausen and colleagues (1989) have shown. They found that loss-related changes are rated by laypersons to occur much more frequently in midlife (the 40`s, 50`s and 60`s) and old age as compared to younger ages. At the same time, the number of gains peaks at in midlife. Thus, the specific composition of gains and losses in midlife lies in their conjoint occurrence at maximum frequency. This transition is not abrupt, but rather a gradual process that affects different domains of functioning at different times. Gradually, in some domains of functioning (physical, fertility), decline and irreversible loss are experienced for the first time. On the other hand, there are opportunities for positive experiences that are also made for the first time (e.g., social acknowledgement of achievements, generativity, acquisition of powerful social roles). Available resources are thus still allocated to growth aspects, and at the same time (preventive) efforts mostly in the domain of health-related behaviour (physical exercise, diet, regular medical checkups) gain importance that are aimed at the short- and especially longer term maintenance of functions.

The second characteristic of midlife, the growing salience of the finitude of life, is usually regarded as a characteristic of old age, when death becomes frequent in the peer environment and the end of ones own life gets closer. However, the existential process of becoming aware of the finitude of ones own life already starts in the middle years of adulthood. Carstensen's socio-emotional selectivity theory (Carstensen, 1993), for example, proposes that this increased awareness is associated with a major shift in social interactions from knowledge and information-gathering motives to a focus on optimizing socio-emotional experiences. In other words: as a consequence of perceived constraints in future time perspective, a reorientation of social behavior and perception takes place. Empirical support for this notion comes from a study by Carstensen and Turk-Charles (1994) who compared young adults, early and late midlife adults and old adults on the recall of emotional and non-emotional information after reading a story. Results indicated that there was a major increase in recall of emotional information between the early and the late midlife adults.

Heckhausen (2001) argues that it is not the awareness of a limited time perspective that brings about these changes people's behavior and emotions, but the changes in *perceived control* over important life domains and goals that are associated with this awareness. Time, in her view, is an important prerequisite for many things people strive to achieve, and the awareness that some things are irreversible or unattainable (i.e., beyond personal control) because of a lack of time might be critical in motivating people to concentrate on emotionally

meaningful experiences. She thus characterizes the midlife challenges as "*focusing around a growing awareness about the limitations of personal control over one's life course*" (p. 356).

Whatever the explanation for its psychological impact, it is generally agreed upon that middle-aged adults experience fundamental changes in time perspective. Time is no longer perceived in terms of "*time since birth, but as time left to live*" (Staudinger & Bluck, 2001, p. 9). According to Heckhausen, this restriction in time perspective leads to the experience of regret in midlife, when resources for the attainment of personal goals are usually higher than in younger ages, but certain illusions or dreams about long-term goals in life are no longer realistic. Important life decisions in the domains of job, family, and overall life style have already been taken and exclude other possible pathways through life. Empirical studies have shown that regret about past life course decisions is a common phenomenon in midlife women (Stewart & Ostrove, 1998). It leads to impaired well-being, depression, and rumination when paired with current inactivity. However, once the regretted decisions are revised by active regulatory attempts, such negative outcomes are not observed.

There is yet another aspect of time that is important in midlife, which is the *timing* of major life events and transitions. This notion has been introduced by Neugarten (e.g., 1996), who argues that development in adulthood differs from development in childhood in that a sense of time and timing develops that gains increasingly more importance for developmental regulation and outcomes. In midlife, this is accompanied by a sense of one's life cycle, i.e., expectations about a normal sequence of events and transitions in life. Neugarten uses the term "social clock" to describe the impact of these expectations on individual choices, evaluations, and comparisons. The idea is that individuals have culturally shaped ideas about normative events and the "on time" sequencing of these events that guide their individual life decisions, and that critical times in midlife are those when deviations from these expectations occur. Such "off time" events are, for example, the early onset of chronic diseases, unexpected career interruptions, early retirement, early grandparenthood, late mother- or fatherhood. Their impact will be further discussed in section 2.3.

Besides norms and expectations about the ideal timing of events, there are age-graded "developmental deadlines" for some events and transitions, such as motherhood and certain career options (Heckhausen, 1999). Most of these deadlines fall into the midlife period, imposing the experience of time pressure in the pursuit of goals on the individual. Having passed one of the deadlines is another experience of new quality to the middle-aged person, who has to learn to disengage from futile goals and accept the reality of his or her life choices.

Midlife has also been characterized as the time of multiple roles and simultaneous challenges, when individuals are "squeezed" between two generations they have to take care of (children and aging parents). This position has been labeled "sandwich generation". Stress related to multiple roles (e.g., worker, caregiver, and partner) has been observed in women, and seems to have generalized effects across various indicators of well-being. In contrast, the rewarding experiences of these roles have been shown to be related to positive affect only (Parris Stephens, Franks, & Townsend, 1994). Moreover, as Brim (1992) has noted, managing multiple roles in early adulthood successfully (e.g., marriage, occupation, parenthood) is associated with better psychological adjustment in later midlife.

Important transitions in midlife include the "empty nest" situation, when children leave their home, transitions in employment and grandparenthood. An increasing amount of middle-aged adults retire from work during their late fifties, others take on new job responsibilities or start new careers by that time. Health is generally good in midlife, and physical changes that are often associated with chronic illnesses in later life only gradually occur, mostly with little functional consequences in everyday life (see 2.4).

All of these changes and transitions potentially qualify to become "turning points" in people's lives. A turning point is marked by a *"profound reinterpretation or reorientation (attitudinal or behavioral) directed at the self, a relationship with a significant other, or activities in a major life role"* (Moen & Wethington, 1999, p. 14). Research has shown that such turning points are most frequently associated with negative rather than positive life events or transitions, that women report more turning points than men, and that they are most prevalent before age 55 (Wethington, Cooper, & Holmes, 1997).

Apart from the burdens of midlife, most researchers stress both the resource potential as well as the powerful social position of the middle-aged adult in society. Neugarten (1996), for example, emphasized the role of the middle-aged as the "socializers", not the socialized, *"no longer the driven, but now the drivers"* (p. 98). They represent the core agents of societal changes. Over the entire life span, the individual resource status is usually highest in midlife, when considering jointly the domains of social networks, financial resources, physical health, and functional ability.

Common Life Events in Midlife

Life event research is a third research tradition that has contributed to the contemporary understanding of contextual influences in midlife and old age. In contrast to stage theories and life-span theoretical propositions, this research focuses on the specific characteristics of single

life events (e.g., divorce, specific types of diseases, loss of a significant other) and their consequences for physical and mental health, less on particular age-related sequences of these events. Life events comprise normative as well as non-normative events and are characterized as "critical" according to their disruptiveness and the amount of change they bring about in people's lives (see Filipp, 1990). Here, the focus shall be on three critical life events that are normative events in midlife, in the sense that they frequently occur during this age period: parental bereavement, death of a spouse, and divorce (Aldwin & Levenson, 2001).

Most men and women in the United States (85%) enter their middle years with at least one living parent, by the mid-50s half of all adults have lost both parents and by the early 60s this number increases to 75% (Marshall, Matthews, & Rosenthal, 1993). Parental bereavement seems to be a less stressful event than other types of bereavement (Moss & Moss, 1989). At the same time it is conceived of as one of the major turning points in midlife, because it confronts adults with their own mortality and, after the death of the second parent, finally makes them "orphans".

The death of a spouse is also a far more common life event in midlife than typically thought of, especially for women. One third of all women are currently widowed by the age of 65, for men, this proportion is not reached until the age of 75. Divorce happens mostly between the 30s and 40s, and is less common in late midlfe (Chiriboga, 1989). Research suggests that widowhood and divorce have different meanings for men and women, as indicated by differences in adjustment and following life decisions. For example, bereaved men have a decreased life expectancy and greater health problems in comparison to married men, whereas this association is much weaker in women (Tucker, Schwartz, Clark, & Friedman, 1999). Men are also more likely to remarry than women (Parkes & Weiss, 1983).

Do middle-aged adults experience more critical life events than younger and older adults? Early cross-sectional research has suggested that the total number of stressful life events decreases with age. However, in these studies, inventories were weighted toward events with a greater likelihood in younger individuals (Aldwin & Levenson, 2001). Recent studies using more balanced inventories report mixed results regarding changes in major life events over time, and stress the influence of both cohort and period effects that make it hard to interpret the data in favor of any "real" age difference (Chiriboga, 1997; Aldwin & Levenson, 2001).

Life event researchers have shown that there are diverse patterns of adjustment following various kinds of critical life event. They may constitute the beginning of serious crisis for the individual, but also a new challenge rather than lasting threat. Negative life events may be accompanied by maturation and growth, not necessarily as an immediate outcome but

resulting from a longer-term adaptational process. They may also provide a basis for the development of better coping resources and refined coping strategies that prepare middle-aged adults to more successfully deal with adverse events in old age. In this vein, Aldwin (1994) states that *stress* in general should be conceived of as a context for development in adulthood. She argues that stress creates uncertainty, which is *the* important trigger of any developmental process. Furthermore, stress is the only real "testing ground" for the effectiveness of existing coping resources and strategies, and the acquisition of new ones.

In contrast to this view, Elder and Caspi (1990) have proposed that stressful or challenging experiences *emphasize* and *strengthen* pre-existing characteristics, rather than bringing about significant changes in them. They call this the "accentuation principle". The idea behind this is that in dealing with novelty, uncertainty and unpredictability – three characteristic features of critical life events – individuals` reactions most strongly reflect dispositional traits and habitual ways of thinking. Repeated elicitation of pre-existing traits and cognitions by stressful encounters, as well as individual attempts to incorporate the new experiences into one's pre-existing schemas in order to restore predictability (assimilation), lead to their accentuation through habit strengthening (Caspi & Moffitt, 1993). According to Rutter (1994), this is one important mechanism that contributes to stabilization and consistency in development.

Taken together, most researchers agree that midlife is a time of multiple challenges, when social expectations are highest and significant changes occur in many life domains. In early midlife, raising of families, the accumulation of personal property and social and occupational mobility are core commitments of adults living in industrial nations. In late midlife, once major goals have been accomplished, internal values gain importance and often, a re-evaluation of previous decisions takes place. Significant turning points are associated with negative life events, with the experience of the finitude of lifetime, the experience of generativity, with having reached some major long-term goals and also with the experience of having passed opportunities for others. Middle-aged adults are bound in a net of expectations, responsibilities and norms, and at the same time provide education for the next generations and care for frail elderly. Apart from the increased diversity of socially accepted lifestyles, role pressure is highest in midlife as compared to other life stages.

Still, most middle-aged adults do not experience midlife as a time of crisis (Lachman, 2001). They have acquired substantial resources for mastering these challenges, refined strategies to deal with adverse situations and prior experience makes them less vulnerable than younger adults. The common notion of a universal "midlife crisis", a variation of

developmental stage theories that has originally been linked to the fundamental experience of the finitude of lifetime (Jacques, 1965), has found no empirical support, neither for men nor for women (Whitbourne, 1986; Chiriboga, 1989). Common life events and transitions in midlife reflect norms that are part of individuals` subjective conceptions about their own life course. However, one cannot infer whether midlife is a more or less stressful life stage than early adulthood or old age.

2.2.3. Challenges and Developmental Tasks in Old Age

Like any other life period, getting old is not merely marked by reaching a certain age, but associated with significant contextual changes. Job retirement is often seen as the key transition that marks the beginning of old age. However, historical changes and the increased fragmentation of social norms render socially structured transitions less useful as markers of entering old age (Moen & Wethington, 1999). Still, it is a distinct life period in people's individual life course conceptions across all cultures.

Old Age from the Perspective of Stage Models of Development

It has taken a while until the successors of Sigmund Freud who built upon his psychoanalytic framework have come to pay attention to the specific developmental aspects of old age. Moreover, from this tradition is was almost revolutionary to acknowledge that development is still taking place beyond adolescence. Jung, in contrast, was very interested in adult development, but did not view old age in terms of entering a new phase in life. He conceived of it as a period of increased introspection and preoccupation with self-evaluation, a continuing process already begun in midlife (see above).

According to Erikson (1982), the aging individual faces a last challenge to his or her identity: the positive acceptance of one's individual biography and the reconciliation with death. The experience of one's life as fulfilling and meaningful denotes an experience of identity that Erikson describes as the modus of (ego-) integrity. The core conflict centers around the theme of satisfaction vs. non-acceptance of the life cycle (despair). Once old age has been reached, there is no time left for new projects and aspirations, and no time to correct previous mistakes and decisions. Opportunity structures are cut down by time rather than social norms and expectations; this is indeed a universal feature of old age across all cultures.

The crisis in old age lies in the inability to accept one's biography and achievements. Individuals who fail to do so are still looking for a good way to lead their lives, without a sense of having reached important things. *Wisdom* is the ego-quality to be achieved, defined

as knowing about the relativity of one's own biography and historical context and at the same time preserving a sense of continuity in one's life experiences and their enduring principles. This is the generative contribution at the end of life.

Old Age from the Perspective of Life-Span Developmental Psychology

Empirical research has provided converging evidence for the notion that aging is a heterogeneous process far into old age. For example, summarizing the vast amount of multidisciplinary findings from the Berlin Aging Study, a population-based study of older adults aged 70 to 101 (P.B. Baltes & Mayer, 1999), Mayer and colleagues (1999) stated that *"age groups differ in their means, but not in their distribution"* (p. 508). The following considerations on mean level contextual changes should be viewed in light of this important notion of interindividual variability.

Whatever the individual pathway through the last stage in life, losses in the domains of physical health, functional ability in everyday life, cognitive functioning and social network are inevitable, eventually leading to a negative shift in the ratio of gains or growth aspects on the one side, and losses and decline on the other. This shift is again reflected in people's subjective conceptions of old age (Heckhausen, et al., 1989) and represents in broad terms a major challenge to successful adaptation – whatever its definition – in old age.

According to life span theory, maintenance of functions and loss-regulation are the two predominant developmental goals in old age (Staudinger et al., 1995), and available resources are used for these goals primarily. This does not imply that resources are not invested into growth aspects (such as the acquisition of new skills, or the refinement of existing ones) any more, but with the increase in functional losses, existing resources have to be preserved. This is in line with motivational theories that propose an innate human desire to preserve what has once been acquired and achieved (e.g., Conservation of Resources Theory, Hobfoll, 1998). A careful selection of the domains that are worth to be maintained and those that can be given up or maintained at a lower standard without threatening a positive sense of the self belongs to the core mechanisms that enable "successful aging" (P.B. Baltes & M.M. Baltes, 1990).

The "Fourth Age"

The more recent differentiation of two distinct phases of old age has already been mentioned. It is based on empirical evidence from various disciplines that speak for a general decline in most domains of functioning beyond the eighth decade, as for example impressively illustrated by the multidisciplinary findings from the Berlin Aging Study (Mayer et al., 1999;

Smith & Baltes, 1996; cf. P.B. Baltes, 1997). Whereas there seem to be substantial reserve capacities to lead an autonomous life and compensate for specific and isolated losses such as decline in cognitive abilities and increasing physical problems until the age of 80 to 85, biological-organismic impairments become predominant thereafter, substantially reducing these reserve capacities (P.B. Baltes, 1997; Smith & Baltes, 1996). The uniqueness in these biological changes is that most of them are likely to have a genetic basis that exerts its influence independent of previous life conditions. That means, for example, that in very old age, the protective functions of higher education, economic security and social networks are no longer effective in maintaining functions at a level that corresponds to the individual norm. It does not mean, however, that this results in a decline in interindividual *variability* (Rowe & Katzman, 1992). Existing psychosocial resources are ineffective in stopping the process of general decline, they do, however, affect its overt manifestations in intellectual performance, personality, social relations, and everyday life competence.

In this line, it has been argued that with decreasing biological potential the "need for culture" increases in old age whereas its efficiency decreases (P.B. Baltes, 1997). Culture in this sense refers to all available resources (material, psychological, social and symbolic) in the environment. These are not (yet) designed to modify the cellular organismic changes that are genetically driven, nor are they sufficient to compensate for the detrimental effects of organismic changes on levels of sensor-motor and cognitive abilities. As a consequence, the regulation of losses becomes the predominant focus in this life stage, with the aim to accept lower levels of functioning and increased dependency on external aids in everyday life, and to find ways to still lead an autonomous and meaningful life.

Thus, from this perspective there are two fundamental characteristics of very old age: irreversible decline and losses in functional domains on the one hand, and a substantial lack of cultural assistance to modify these changes and prevent severe consequences for the individuals` independence. These changes from the third to the fourth age reveal in the most radical form what is meant when development is defined as "*selective age-related change in capacity*" (P.B. Baltes et al., 1998, p. 479). P.B. Baltes and M.M. Baltes (1990) have called this a *"kind of testing-the-limits situation for psychological resilience"*, where *"previously effective strategies of adaptation and life management begin to fail"*.

On the other hand, cognitive-emotional reserve capacity seems preserved far into old age. For example, numerous studies have failed to show age-related declines in general well-being and an increase in depressive symptoms (Diener, 1999; Pinquart, 1997; Staudinger, 2000). Interestingly, although prevalence rates for chronic illnesses increase (see 2.4.2), the Mac

Arthur Studies of Aging and the Berlin Aging Study showed that most elderly rated their health as superior to that of their peers (Baltes, & Mayer, 1999; Ware, 1993).

Disengagement vs. Activity

While there is not much debate that the process of getting old is generally associated with a growing salience of biological decline and its negative functional consequences, the dynamic of changes in elderly adults` interactions with the social world is far less clear. Old people have been assigned a lack of role in society (Rosow, 1967), as a consequence of retirement, grown up children, widowhood and functional decline. On the other hand, new roles in the context of grandparenthood and care giving emerge, and, as Rosenmayr (1983) has pointed out, there are positive aspects to the retirement transition, such as an increased liberation from responsibilities.

Data from the Berlin Aging Study provides evidence that with increasing age, the network size and number of social contacts and social roles decrease (Wagner, Schütze & Lang, 1999). This was mostly due to loss of relatives from one's own generation, and loss of close friends, whereas the wider network of less close interaction partners (acquaintances, neighbors) seemed to remain fairly stable. Childless elderly had fewer role relationships than parents and institutionalized elderly had the fewest social relationships and were the loneliest.

Based on the observation of decreasing social interactions in old age, a question that has given rise to strong debate in early gerontology is, in how far older people actively contribute to the changes in their social interactions by reducing the number of social contacts and retreating from social activities. "Activity theory" states that life satisfaction is dependent upon the extent to which people remain actively engaged in social roles and activities (e.g., Maddox, 1987). In that context, disengagement, if it emerges, is imposed, not chosen, and results from lack of opportunity or resources. In contrast, "disengagement theory", posits that in old age, processes of voluntary withdrawal from social roles are common (Cummings & Henry, 1961). The mutual disengagement from active social participation is regarded as a symbolic preparation for death. Those activities that are maintained by the individual are less instrumental than in midlife, and the function of "socio-emotionality" gains predominance (Henry, 1965). Disengagement from this perspective reflects intrinsic processes that are not sufficiently predicted by the changes in the social environment.

An integrative approach has been offered by socio-emotional selectivity theory (Carstensen, 1993). According to this framework, a narrowing of social contacts occurs progressively over the lifespan as a function of closeness to death. However, this narrowing

down is seen as a selective, adaptive process in the sense that those social contacts are maintained that offer the largest socio-emotional value to an individual.

The more recently proposed "liberative model" focuses on processes by which individuals develop the capacity to detach from social and biological constraints (Levenson & Crumpler, 1996). The model proposes a somewhat different view on the role of *loss* in adult development than the one implicit in the life span theoretical considerations presented above. According to this model, loss in adulthood should not be only be viewed as an inherent, but negative part of development that triggers compensatory efforts and is overcome when sufficient resources are available. Rather, loss is *necessary* (but not sufficient) for obtaining *"relative freedom from biosocial determinism"* (Levenson et al., in press) and especially the development of wisdom. Wisdom is seen as a function of "ego-transcendence" rather than ego-strength, evolving from transcending complicated thinking and conflicting emotions through the practice of patience, generosity, self-discipline and commitment. The liberative model explicitly stands in the tradition of older conceptions of adult development embedded in religious contexts such as Buddhism, and contemplative Christianity, that have a long dealt with the question of how to achieve complete internal liberation from external conditions. Development in this sense is not additive and multiplicative, not increasing complexity or differentiation, but rather simplifying and clarifying: *"Development here emerges as a process of integration at a higher level that reveals radical simplicity in the midst of apparent complexity. With age, those persons who can accept loss and look beyond it to what loss uncovers, may be said to be on the same path as contemplatives who cultivate loss intentionally"*.

According to this approach, the process of aging can be accompanied by psychological liberation from specific contexts, expectations, social roles, and egocentrism. This is possible *because* of the inevitable losses experienced that – although not always chosen deliberately - provide a perfect setting for looking beyond the temporary importance of these states and realizing their impermanence and lack of significance. Tornstam (1994) used the term "gero-transcendence" for this shift in viewing the world, which involves a redefinition of reality creating *"a new opening rather than closing"* (Levenson et al., in press).

2.2.4. Summary

The aim of this section was to review some theoretical considerations and empirical data on important contextual influences in midlife and old age. Context, here, was understood as the normative, age-related socio-cultural and biological factors, current states and changes that

provide opportunity structures and set constraints for developmental growth. The focus was on *age-graded, normative* contextual influences (P.B. Baltes, 1987). These *history-graded* influences that have lead to cohort differences in the ways that people have perceived and experienced adulthood during the past century (e.g., Neugarten, 1990; Helson & Wink, 1992).

All of the reported transitions, life events and even some of the changes on the biological level underlie enormous variation with respect to *whether* or not they occur at all (as a consequence of environmental pressure, genetic predisposition or individual choices), *when* they occur, in what *sequence*, and surely, in how they are evaluated and dealt with by the individual. Beside all the variability in individual pathways, however, two overarching characteristics serve to distinguish midlife and old age.

The first fundamental difference is the degree to which both life periods are socially and biologically structured (e.g., Staudinger, 2001). From a life span theoretical point of view, both middle-aged and older adults are actively involved in shaping their own development, primarily through the pursuit of individual goals (Brandtstädter, 1998; Ford & Lerner, 1992). In that, they are bound to the opportunities and constraints of their bodily functions and social environments, which they can shape and influence to a greater or lesser degree. In midlife, organismic functions are generally at a level where they do not interfere with individual plans, goals and preferences, optimal functioning in occupations and social engagements.

Table 2.1

Unique characteristics, challenges and life tasks in midlife and old age

Theoretical Background	Midlife	Old Age
Models of universal developmental stages		
Jung (1931)	Second half of life („Lebenswende“): Conscious development of a self, including emphasis on internal values, development of self-regulation, introspective integration of sense and purpose in life, realization of mortality and the acceptance of approaching death	
Erikson (1950; 1988)	Conflict: Intimacy vs. Isolation Generativity vs. self-absorption	Conflict: Ego-integrity vs. despair
		Disengagement as an intrinsic process (“disengagement theory”; Cumming & Henry, 1961)
Sociogenic models of development		vs.
Neugarten (e.g., Neugarten, 1965; Neugarten & Datan, 1996)	Important developmental influences: Timing of major events (marriage, childbearing, retirement) Major theme: Self as the socializer, not the socialized Major transitions: Increasing responsibility for aging parents Awareness of self as bridge between generations Grandparenthood	Disengagement as a consequence of the retreat of the social world from the aging person (“activity theory”)
	Late midlife and old age: finding ways to lead a fulfilling life despite inevitable losses	
Integration of theoretical propositions from life-span developmental psychology		
(e.g., Baltes, 1987; Heckhausen, 2001)	Coexisting peak of gains and peak of losses; gains outweigh losses Growth and optimization processes are highly prevalent, maintenance and regulation of loss become increasingly important	Decreasing opportunities for gains (growth), gain-loss ratio becomes increasingly negative Focus on maintenance and loss regulation "***Third age***": sufficient reserve capacities for compensation of losses in isolated domains "***Fourth age***": Increasing predominance of biological-organismic impairments that result in general functional decline and are less controllable and independent of previous conditions => need for culture increases, while at the same time its efficacy decreases

With respect to social norms, a general process of fragmentation or deregulation is observed (Moen & Wethington, 1999; Wrosch & Freund, 2001), widening opportunities for socially accepted lifestyles for contemporary middle-aged men and women, in contrast to previous cohorts. It remains unclear, however, whether this also results in a greater range and frequency of activities, plans and decisions that do *not* serve instrumental functions with respect to the "outer world", indicating a greater freedom from social norms and expectations.

While in early midlife, adults are typically involved with *acquiring* roles, already in late midlife the process of *relinquishing* roles begins, due to retirement, children leaving home, or death of a spouse (Hughes, Blazer, & George, 1988). In old age, decisions are increasingly less governed by normative considerations and hierarchically structured social relations. As Henry (1965) pointed out, the aging individual becomes more "like himself", relieved from the pressure of adjusting to changing norms and expectations. Social commitments loose the instrumental roles that they fulfilled in midlife and gain that of "socio-emotionality". Physiological changes followed by an increased susceptibility to illness and disability are characteristic of old age, and much of the existing resources are invested in the maintenance of functions, and the regulation of irreversible losses.

The shift from instrumentality towards socio-emotionality in elderly adults' social relations can also be attributed to the second objective difference between midlife and old age, the nearness to death. This is associated with an objective loss of opportunities, changes in subjective time perspective and social engagements, and feelings of regret, and poses probably the most significant challenge to the maintenance of personal well-being, the integration of one's life story, and a sense of meaning in old age (Carstensen, 1993; Erikson, 1982; Wrosch & Heckhausen, 2002). Empirical research has shown that already in midlife, adults report an increasing awareness of the finitude of their life (cf. Heckhausen, 2001). However, unless seriously ill, they are still a good 20 to 30 years away from it, leaving more time for adaptive changes to overcome and / or replace missed opportunities.

This section has reviewed some contextual regularities in contemporary middle adulthood and old age. These are by no means sufficient to explain how individuals at these life stages feel, think, and act. There are vast individual differences in how transitions such as career entry, parenthood, retirement, and divorce are traversed (e.g, Belsky & Rovine, 1990; Bossé, Levenson, Spiro, Aldwin, & Mroczek, 1992; Chiriboga & Catron, 1991). Adaptation and resilience in face of the multiple changes and challenges that occur during adulthood depend on a variety of personal factors that interact with the biosocial context. Before some of these

are discussed, the nature and impact of *non-normative* events in the life course is outlined in more detail, and a closer look is taken at specific health constraints in midlife and old age.

2.3. Non-Normative Events in the Life Course

All societies have conceptions about age-differentiated sequences of transitions over the life course (e.g., Hagestad & Neugarten, 1984; Heckhausen, 1999). These comprise a set of norms about when and in what sequence important transitions should take place, and what status and roles individuals occupy who have or have not traversed these transitions or simply have reached a certain age (Riley, Kahn, & Foner, 1994). Such age norms influence how people relate to one another, and how they organize and interpret their lives. They fulfill several functions: regulate status and role occupancy within a community, serve as frames that enhance the predictability and controllability of events and thus prepare individuals for important transitions well in advance, and provide guidelines for individual life planning and goal setting. Some of them are directly related to age-graded biological changes (motherhood), others stem from culturally shared expectations about type and timing of desirable engagements with the social world.

In face of such regulatory age norms, one has to consider (age) *non-normative* events as important influences on individual development (P.B. Baltes, Reese, & Lipsitt, 1980; P.B. Baltes, 1987). These can be positive or negative and come from biological or environmental sources. They include the *unexpected occurrence* of an unusual event (rare illness, loss of job), the *absence* of expected transitions (e.g., acquisition of language at age 2-3, parenthood in midlife) and the "*off time" occurrence* or *sequencing* of transitions and events (e.g., suffering from dementia at age 40; having a child before finishing one's education). To the degree to which they are not tied to biological processes, the normativity of these events underlies historical changes (Neugarten, 1990).

Generally, people seem to have more problems in adapting to events and changes when these are "off time", or follow a non-normative sequence (Dohrenwend & Dohrenwend, 1974; Filipp, 1990). This has been demonstrated in studies comparing younger and older adults in their reactions to the same life events. For example, divorce (considered normative in midlife and non-normative in old age) has been shown to have more negative effects for older than younger individuals (Chiriboga, 1982). In contrast, widowhood, which is more prevalent in old age, was associated with a higher level of psychiatric symptoms in a sample of young widows as opposed to older ones (Glick, Weiss, & Parkes, 1974). In one study (Palmore,

Burchett, Fillenbaum, George, & Wallmann, 1985), "on-time" retirees showed better psychosocial adjustment than early retirees. Other retirement studies, however, have suggested no difference in mental health and well-being between these groups, and even improved health in early retirees, whose reasons for retirement were not health-related (see McGoldrick, 1989). This points to the possibility that (non-)normativity per se may not be a sufficient indicator of adjustment problems, and that beneficial effects might at least co-occur with negative ones when a transition is predictable and self-chosen.

When controllability is weak, however, non-normative events are associated with poorer adjustment (Dohrenwend & Dohrenwend, 1974). Heckhausen and Brim (1997) offer a possible explanation for why this is the case, by pointing out that the availability of age norms is particularly important in protecting one's self-esteem when critical events occur in one's own life: *"…experiencing moderate problems in an area of functioning that one perceives as a trouble spot for one's age group in general might feel less threatening. In this way, age-normative conceptions about problem proneness of certain domains can serve as reference frameworks for social downgrading and thereby allow self-protection"* (pp. 616-617). They showed empirically that people at all ages use social downgrading as a strategy to cope with own problems, and that they use their own age groups as standards for these comparisons. Fillip, Ferring, Mayer and Schmidt (1997) reported a higher frequency of temporal comparisons as opposed to social comparisons among old and very old adults. Yet, the social (downward) comparisons were associated with more favorable self-evaluations. Moreover, unfavorable self-evaluations resulting from temporal comparisons were accompanied by self-enhancing comparisons to others.

Following the notion that the regulation of one's self-esteem and well-being through means of social downgrading and comparison is an important coping strategy, the occurrence of a critical event that is perceived to *not* be shared by the majority of one's age group might constrain the opportunity for such downgrading or reduce its effectiveness. Heckhausen and Brim (1997) found that social downgrading in a sample of older adults was especially pronounced in domains with a low incidence of problems in that age group (marriage, stress, job, and leisure). They propose that these kinds of problems pose particularly great personal threats and thus provoke accordingly stronger efforts in terms of social downgrading. This study, however, did not assess the success or failure of such downgrading attempts in terms of external adaptational criteria, such as self-esteem or well-being.

The findings suggest that because of a lack of individual and social scripts for dealing with non-normative events, self-regulatory skills may become more crucial for separating

those who adapt successfully vs. those who don't (Wrosch & Freund, 2001). Although a theoretically plausible notion, empirical evidence is sparse. In one study, Wrosch, Heckhausen & Lachman (2000) demonstrated that the predictive power of using internal control strategies (persistence, positive reappraisals, and lowering aspirations) in face of high health stress (a proxy for normative stress in old age and non-normative stress in youth and midlife) was almost twice as large in young and middle-aged adults as in older adults (60 years and older).

2.4. Multimorbidity and Vision Impairment as Threats and Challenges to Adaptation and Resilience in Midlife and Old Age

Health is one of the most valued resources in peoples' lives (Hooker & Kaus, 1994). The salience of health issues increases with age, but the subjective threat potential of illness and functional limitations seems to be equally high at all stages in life (Filipp, Ahammer, Angleitner, & Olbrich, 1980). However, the psychological impact of manifest health changes across the life span varies according to societal conceptions of "normative" vs. "non-normative" health changes, and as a function of individuals' own age (Westerhof, Kuin, & Dittmann-Kohli, 1999). Following this notion, some empirical findings of sensory and health-related changes in midlife and old age are presented. For the purposes of the present study, a specific focus is on vision impairment[4] and the co-occurrence of any two or more diseases, which is termed "multimorbidity"[5].

2.4.1. Health Changes and Vision Impairment in Midlife

Already in midlife, many of the processes underlying chronic diseases in old age begin to manifest. Most of them occur gradually and do not necessarily lead to disability and impairment at early stages (Spiro, 2001). Among the most prevalent chronic conditions in people aged 45 to 64 are arthritis, hypertension, hearing impairments, cardiac diseases, and visual impairment (Adams & Benson, 1992).

Multimorbidity in midlife is not perceived as a typical condition, but its prevalence and incidence continuously rises from early childhood (Verbrugge et al., 1989). In a study with 60.857 people from the Dutch general practice population, the prevalence of multimorbidity

[4] Cataract, the specific cause of vision impairment investigated upon in this study, is described in more detail in 12.7.1. Suffice it here to note that today, it is generally associated with mild to moderate vision impairment, and is temporary for most people since a standardized treatment (surgery) is available.

[5] This term is favored over the term "comorbidity", which is reserved for a *specific* combination of diseases, or the statistical association of diseases to an index disease of interest (van den Akker, Buntinx, Metsemakers, Roos, & Knottnerus, 1998). Multimorbidity here refers to *medical* conditions only.

was 16% (men) and 18.8% (women) in the 20 – 39 year olds (mean number of diseases: 0.68 / 0.78), 33.6% (men) and 35.9% (women) in the 40 – 59 year olds (mean: 1.27 / 1.35), and 60.9% (men) and 64.9% (women) in the 60 – 79 year olds (mean: 2.42 / 2.61; van den Akker et al., 1998). The one-year incidence ranged from 0.6% in the young middle-aged men to 3.7% in the old men. The multimorbidity index included all *permanent* (no recovery expected), *chronic* (duration longer than 6 months), and *recurrent* (more than 3 recurrences within the last 6 months) health problems, as well as those with lasting consequences for functional status or prognosis of patients. Besides women and the elderly, individuals with a low educational level and those with public health insurance were at higher risk for multimorbidity. Age, education and type of insurance were even more strongly related to multimorbidity than to morbidity in general. Some other studies reported lower prevalence rates of multimorbidity across all ages, but included fewer health conditions; higher incidence rates were found when looking only at people who actively seek treatment. (Verbrugge et al., 1989; Schellevies, van der Velden, van de Lisdonk, van Eijk, & van Weel, 1993).

In 1991, cataract, the second specific condition investigated upon in this study, had an estimated prevalence of 16.1% in men and 23.9% in women in the US population (Adams & Benson, 1992). Estimated prevalence rates for middle-aged adults over forty were 16,8% for women and 9,7% for men, rising to 50% beyond age 65 and 70% beyond age 75 (Prevent Blindness America, 1998). According to self-reports, 15% of Americans ages 45-64 years suffer from vision impairment of any kind (The Lighthouse Inc., 1995). However, most of these impairments can be corrected with visual aids (e.g., presbyopia), such as glasses, and only marginally induce impairment and disability.

Cataract in Midlife: A Marker for Biological Aging

Most health problems emerging in midlife are chronic but nonfatal (Spiro, 2001). Thus, they pose specific, longstanding stressors and may lead to chronic impairment in late midlife or old age. However, although these conditions per se are considered nonfatal, from a biological perspective, many chronic illnesses are conceived of as *markers for biological aging*, and, consequently, as markers for an increased risk of mortality (Kaplan, Haan, & Wallace, 1999). This presupposition applies to cataract. Cataract is associated with higher prevalence of other chronic conditions that represent mostly metabolic disorders, such as diabetes, and autoimmune and endocrine disorders (Pschyrembel, 1990). In a recent retrospective study (McKibbin, Mohammed, James, & Atkinson, 2001), the 5-10 year mortality of middle-aged patients undergoing cataract surgery was determined. Observed mortality was significantly

greater than expected. Factors associated with early mortality were ethnic minority and male sex. This study suggests that, for middle-aged patients, cataract is associated with a reduced life expectancy. A recent study has shown that cataract is associated with higher mortality in women but not in men, when excluding diabetic patients (Reidy et al., 2002). Strong evidence comes from a study showing that in two cohorts of cataract patients (1985 and 1989), hazard ratios for dying during a follow-up *decreased* with age (Meddings et al., 1999), indicating that in midlife, cataract patients are at particularly high risk, but not in older age. Relative risks for dying over 9 years particularly increased for individuals who had developed cataract requiring operation between the ages of 50-65. In addition, the association between cataract and generalized aging remained constant despite a large increase in the use of cataract surgery in 1989. Multimorbidity indices have not been reported in these studies.

The prevalence of risk factors for chronic diseases in midlife may characterize a special population of middle-aged adults. Risk factors can be biological predispositions, but many risk factors prevalent on a population level are behavioral and thus modifiable for an individual through behavioral adaptation. Examples of behavioral risk factors are smoking, alcohol consumption, dietary factors, and a decrease in physical activity (Bartecchi, MacKenzie, & Schrier, 1994; Cooper, 1991; Torgerson, Garton, & Reid, 1993). Specific dispositions that may lead to risky behavior could thus characterize individuals with chronic conditions in midlife (see Merrill & Verbrugge, 1999). Cataract, however, has not yet been systematically linked to behavioral risk factors, neither for early nor late onset. This is yet another argument that cataract may indeed be a marker for biological aging.

2.4.2. Health Changes and Vision Impairment in Old Age

Biological aging is generally reflected in substantial changes in important physiological variables, such as cardiovascular, immune, endocrine, renal and pulmonary functions (Rowe & Katzman, 1992). These data, however, show substantial variability. In fact, the interindividual variance seems to increase with age. Also, not all of the age-related physiological changes necessarily lead to the manifestation of a disease in late life, and factors such as environmental exposures and individual health behavior modify or aggravate the effects of these inherent processes. Yet, despite the large variability and the preserved potential for modifiability, health-related reserve capacity (i.e. the ability of the organism to maintain and restore an adequate balance in response to inner-organismic or environmental changes) is generally reduced. For example, the hypothalamic-pituitary-adrenal (HPA) axis, that plays a major role in regulating stress responses, shows increasing signs of dysregulation,

reflected in increased evening plasma cortisol concentrations in older adults. These and other age-related physiological changes lead to an overall increased vulnerability to morbidity (e.g., cardiovascular and metabolic diseases) and mortality (Chrousos and Gold, 1998)[6].

As a consequence of the age-related physiological changes, there is a substantial increase in multimorbidity and sensory impairments in old age that is widely demonstrated across studies regardless of the selected diagnostic criteria for morbidity (cf. Renteln-Kruse, 2001; Schellevis et al., 1993). The most prevalent disorders in old age are cardiac disorders, stroke, diabetes, hip fractures, and cataract (Schellevis et al., 1993). Furthermore, sensori-motor changes (alterations in the brain structures related to motor function, changes in muscle composition, and reorganization of motor units) lead to slowed and discoordinated movements, limited motion ranges and flexibility (see Ketcham & Stelmach, 2001, for an overview). These changes are associated with disabilities in everyday life functioning (e.g., M.M. Baltes et al., 1999).

In the Dutch general practice population (van den Akker et al., 1998), the prevalence of multimorbidity increased from 60.9% in the 60 – 79 year old men to 74.2% in those over 80 years (mean: 3.24), and from 64.9% to 79.9% (mean: 3.75) in the respective female age groups. In the Berlin Aging study, 99.6% of the participants (> 70 years) had at least one medical diagnosis, and 94% had more than five diagnoses. Among the most prevalent conditions were cardiac disorders (64.7%), cerebral arteriosclerosis (65%), arthritis (60.4%), and hypertension (58.9%; Steinhagen-Thiessen & Borchelt, 1999).

The point prevalence of cataract in the Berlin Aging Study was estimated around 13%. Other studies report up to 70% cataract prevalence over the age of 75 (e.g., Prevent Blindness America, 1998), including all previously treated and untreated cases[7].

Subjective reports of vision impairment also increase with age, from 17% among the elderly between age 65-74 years to 26% among those aged 75 years and older (The Lighthouse Inc., 1995).

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[6] A recurring discussion in gerontology is focusing on the distinction between normal and pathological aging, i.e. the organismic changes that are "normal" in the sense that they affect every individual if only he or she reaches a certain age vs. the changes and conditions that affect only a certain proportion of older adults and differ qualitatively from normal age-related changes. Among the many attempts to distinguish normal aging from disease, Kohn (1985) offers a useful distinction between illnesses that are universal, progressive and irreversible with age (e.g., arteriosclerosis), those that are common but not universal or inevitable (e.g., cancer), and those that show no age-relation but have a more negative impact in old age (e.g., pneumonia, flu). Only the first category of health-related changes qualifies as normal aging.

[7] Today, there is a specific curative treatment option for cataract that has been optimized and standardized over the past ten to fifteen years and is now widely applied, leading to successful improvement in vision in most patients (see 12.7.1).

Given the high prevalence of multimorbidity in old age, gerontologists increasingly focus on functional limitations rather than the number of diseases, thus accounting for differential impact of a given disease on the need for help in everyday activities. In a model proposed by Verbrugge and Jette (1994), the development of disability is characterized by an *impairment* (morbidity), which leads to *functional limitations* (e.g., in the domains of hearing, vision, balance / gait, pursuit of everyday activities), and subsequent *handicap* (disability, need for help). Moderating factors in this cascade are biological and behavioral risk factors, interventions, and intraindividual factors such as personal resources. The same behavioral factors that apply in midlife are also relevant in old age. In contrast to middle-aged adults, however, biological risk factors, which are considered normative, have a higher impact than behavioral factors for the development of multimorbidity in old adults (see Nagi, 1991). Overall, the number of risk factors for functional disability increases with age. Specifically, cognitive impairment, depression, overweight, decreased social contacts, low level of physical activity, smoking, and visual impairment have been reported as risk factors for disability in older adults (Stuck, Walthert, Nikolaus, Büla, Hohmann, & Beck, 1999).

2.4.3. Consequences of Multimorbidity and Vision Impairment in Midlife and Old Age

In the empirical study that was designed here, not the antecedents of chronic conditions in midlife and old age, but the *consequences* of positive adaptation to health constraints and the psychosocial correlates (resources and mechanisms) of differences in these consequences are of interest. The empirical basis for specific age-group comparisons on these consequences is scarce. In the following, the focus is on two broad domains of outcomes: (1) cognitive-emotional adaptation as operationalized by measures of well-being and depression, and (2) behavioral adaptation as indicated by functional status in everyday life.

Vision Impairment and Cognitive-Emotional / Functional Adaptation

A number of studies have shown that poor vision is independently associated with a lower level of psychological well-being (e.g., Bazargan, Baker, & Bazargan, 2001), depression (e.g., Blazer, 1989), and activities of daily living functional dependency (e.g., Horowitz, 1994) in both middle-aged and elderly adults. These associations remained even after adjusting for socio-demographic characteristics, perceived health status, and cognition, suggesting a strong independent impact of visual impairment. In contrast, Wahl and Oswald (1996), who studied irreversibly and severely visually impaired elderly people, found that the degree of objective

visual impairment was not associated with concurrent depressive symptoms when the number of medical diagnoses were controlled for. This points to the importance of differentiating between moderate and severe impairment, which may represent psychologically different states. Mild to moderate impairment might be associated with the hope for improvement, unpredictable progression, and a permanent struggle with everyday demands. Once a chronic condition of considerable impairment has been reached, individuals may be more ready to accept the situation, more prepared to accept external help, and develop coping strategies to maintain their autonomy. Also, they simply may have had more time to adapt to the situation. The simultaneous presence of other chronic medical conditions, however, leads to an accumulation of daily stressors resulting in depressive symptoms.

In old age, vision impairment has also been related to poor intellectual functioning, less desirable personality characteristics, and reductions in social activities (Marsiske, Delius, Maas, Lindenberger, Scherer, & Tesch-Römer, 1999), everyday competencies (M.M. Baltes, Maas, Wilms, Borchelt & Little, 1999), and basic functions such as activity radius outside the living environment (Wahl, Schilling, Oswald, & Heyl, 1999). Rudberg, Furner, Dunn, and Cassel (1993) found an increased risk to develop functional disability in visually impaired adults (> 70 years), but not in adults suffering from hearing impairment.

Interestingly, a restoration of visual acuity in the case of cataract through means of surgery does not in all cases lead to a restoration of the initial level of functioning in everyday life. Assessing the subjective competence in everyday life prior to and 1 year after cataract surgery, Elam, Graney, Applegate and Meller (1988) found that changes in perceived competence were positive in the average sample. However, negative changes were found in the oldest adults, and in those with low mental status and very low visual acuity prior to surgery. This suggests a depletion of reserve capacity that is needed to achieve the individual level of functioning prior to impairment with advancing age and higher impairment.

Comparative data for middle-aged adults, controlling for the duration of vision impairment and medical comorbidity, is not available. Theoretically, due to an overall decrease in health and other important resource domains, even moderate vision impairment might lead to an accelerated cascade of losses in older adults as opposed to middle-aged adults. However, due to a lack of systematic studies, the specific role of age in these relationships remains unclear.

Multimorbidity and Cognitive-Emotional / Functional Adaptation

A number of studies have shown that the degree of physical and social disability increases with the number of medial conditions (e.g., BASE, Guralnik, LaCroix, Everett, & Kovar, 1989; Verbrugge, Lepkowski, & Imanaka, 1989). One possible explanation for the greater deleterious effects of multiple deficits over a single deficit could be that the ability of one relatively intact modality to compensate for a declining one is decreased (Tinetti, Inouye, Gill, Doucette, 1995).

In old age, physical illness has persistently been linked to depressive symptoms, with the prevalence of clinical depression being approximately twice as high as in healthy old adults (see Katona & Livingston, 1997, for a review). This relationship might not in all cases be due to the negative psychosocial consequences of chronic illness (e.g., pain, restriction in social activities, fear of death), but at least partly result from a common biological pathogenesis for both morbidity and depression. The vascular depression hypothesis for example states that cerebrovascular risk factors (CVRFs) such as diabetes, hypertension, or heart disease can lead to symptoms of depression beyond individual disease burden. Mast (2001) found that individual CVRFs were not related to depression, but the cumulative burden of more than one CVRF led to significantly higher rates of depression. This, however, does not exclude the possibility that the relationship between depression and multimorbidity was mediated through the cumulative psychosocial burdens resulting from multimorbidity as opposed to a single disease.

As in the case of sensory impairment, the notion that the impact of (multiple) chronic diseases on cognitive-emotional adaptation (well-being, depression) varies as a function of age, has not yet received sufficient empirical support. In fact, consistent findings that satisfaction with life and other well-being indicators are preserved well into old age, often related to as the "satisfaction paradox" (e.g., Brandtstädter, & Greve, 1994; Staudinger, Marsiske, & P.B. Baltes, 1995), suggest that old people are quite resilient in dealing with the negative health changes in their lives. Whether this applies to middle-aged people, who suffer from similar disease burden as the elderly, has not yet been studied and is one of the major objectives of the present empirical study.

When looking at functional status in everyday life, both chronicity and severity of single illnesses seem to be important predictors (e.g., Duke, Leventhal, Brownlee, & Leventhal, 2002). The impact of the joint occurrence of chronic illnesses in midlife has not been systematically studied, however, it is likely that this causes even greater disruptions in the

pursuit of everyday activities due to additive disease-related burdens (pain, hospitalization, treatment complications).

In old age, given the general decline in overall reserve capacity to perform complex motor activities, multiple chronic medical conditions should be associated with an age-related increase in major functional impairment. This is somewhat supported by data showing that approximately 5% of individuals aged 65 to 74 require assistance in basic activities, as opposed to nearly 35% to 40% by age 85 (Rowe & Katzman, 1992; Rubenstein & Rubenstein, 1992). In a community dwelling sample of 2046 adults older than 55, self-reported medical reasons for activity limitations increased with age (Satariano, Haight, & Tager, 2000). However, this might be due to an age-related increase in chronic conditions per se, and as such mirror the additive burden of multiple diseases. There is yet no data on age-related increases in functional impairment that controls for the level of multimorbidity. Overall, the specific interactions between the development of diseases and the subsequent development of disability yet are far from clear.

Some have focused on socio-economic status as a risk factor for chronic disease in midlife (cf. Spiro, 2001) and the impact of specific social roles (i.e., motherhood and work involvement; see Knaub, Eversoll, & Voss, 1983). Besides their possible role as antecedents in a particular disease process, these contextual and psychosocial factors may in turn be negatively impacted by the occurrence of chronic conditions. Quite clearly, chronic conditions leading to disability and impairment may affect almost all social roles of an individual. In midlife, this impact can be considered critical, especially when it comes to roles of workplace and parenthood. Distinct losses in socioeconomic resources may occur as a consequence of chronic disease (i.e., loss of a job, early retirement). This pattern may reverse in old age, since socioeconomic consequences of disease, at least in industrialized countries with a general retirement scheme, should not play a distinct role. Rather, older adults` socioeconomic status should serve as moderator of adaptation to a disease condition, while in midlife, the condition itself might considerably alter the socioeconomic situation and other social resources.

Functional Status as a Mediator Between Health Problems and Well-Being / Depressive Symptoms

Limitations in functional status have been hypothesized to mediate the relationship between physical illness and sensory impairment and cognitive-emotional adaptation (Williamson & Dooley, 2001). Indeed, a number of studies have found that activity restrictions following chronic disease are positively related to depressive symptoms even after controlling for

disease severity and psychosocial factors (cf. Williamson, 1998). Duke, Leventhal, Brownlee, & Leventhal, (2002) conducted a longitudinal study with 250 older adults, suffering from an important illness episode. They found that reductions in activities, which followed the onset of chronic or severe illnesses, were related to less positive affect after one year in patients who had not replaced these lost activities. In comparison, patients who had engaged in compensatory activities for the lost ones reported higher positive affect. Thus, activity restrictions seem to be important mediators of chronic diseases in their impact on well-being. However, activity restrictions are not necessarily irreversible, and non-medical factors are important moderators of the impact of chronic health stress on activities (Satariano, Haight, Tager, 2000; see 2.5). Also, in old age, limiting one's activities (in order to concentrate on the most important domains of interest) can be an adaptive, proactive rather than reactive strategy in light of an overall depletion of resources (cf. M.M. Baltes, 1996). Thus, self-reports of functional impairments in everyday life (e.g., difficulty in pursuing activities) should be considered as adaptive indicators in old age, rather than the observed activity range.

A Note on the Role of Depressive Symptoms in Disease Processes and Functional Adaptation

There is strong evidence that the role of depressive symptoms in disease processes is complex and goes beyond the simple status of outcomes of the burdens associated with severe illness. A number of recent studies in middle-aged as well as elderly adults have shown that depression is an *independent* risk factor for the onset of physical diseases and their progression especially in cardiac patients (e.g., recurring cardiac events, hospitalization, and mortality; c.f. Charlson & Peterson, 2002). A variety of behavioral, cognitive, immunological and physiological mechanisms, are likely to be involved in these associations (Cohen & Rodriguez, 1995). Recent studies have also suggested that depression and even the presence of depressive symptoms not fulfilling standard criteria for a clinical diagnosis (subthreshold depression) are independently associated with decreased functional status, beyond medical co-morbidity (Wells & Stewart, 1989; Hays & Wells, 1995; Geerlings & Beekman, 2001). Ormel and colleagues (1098) reported that the effects of depressive symptoms and medical conditions on ADL / IADL performance in a sample of 5279 non-institutionalized middle-aged and older persons were largely additive. Furthermore, the pattern of unique risks and contributions was similar across all ages (57-64, 65-74, 75+). This increased risk could be due to inherent characteristics of depressive symptomatology on the one hand, such as anhedonia, depressed mood, insomnia, and agitation, that are directly associated with reduced motivation and deficits in goal striving, interfering with the successful pursuit of everyday demands. In

addition, cognitive distortions commonly co-occur with depressive symptoms (e.g., lowered sense of control, pessimistic attributional style) and these may lead to decreased self-efficacy in fulfilling everyday tasks.

To conclude, there is evidence that depressive symptoms are closely linked to medical co-morbidity, especially chronic conditions (Wells & Stewart, 1989). It is likely that there is a reciprocal relationship in such that depressive symptoms occur as outcomes of disease-related burdens (e.g., functional limitations) and at the same time have adverse impact on the progression of existing medical problems and the onset of new ones. Furthermore, both co-morbidity and depressive symptoms have unique adverse impact on functional status.

Do Older Adults Experience Greater Levels of Stress when Facing Health Problems than Middle-Aged Adults?

Do older adults experience greater levels of stress in face of health problems than middle-aged adults? It is difficult to answer this question. First, comparative studies that directly compare early and late midlife adults with older adults are rare. Second, it is not easy to disentangle whether differences in the level of stress experienced by middle-aged and elderly adults are due to differences in available psychological and social resources, differences in coping strategies, or objective differences in overall health status.

It has been argued that the level of stress experienced in the domain of health is higher for older adults than for middle-aged adults (Martin, Grünendahl, & Martin, 2001). Martin and colleagues conclude that "*with respect to the health domain, age might punish older adults twice: They have to cope with higher levels of stress while having fewer resources to cope with them*" (p. 220). While this might be true on average, it should not mislead to the assumption that older adults are more *prone* to stress caused by health problems than younger people. First of all, they simply have more of them. Secondly, their coping efforts seem to be remarkably successful considering the average level of overall satisfaction with life (see Pinquart, 1997). Finally, it should again be stressed that it is not age per se that causes the level of stress experienced.

It has been shown that an initial lack of resources in domains other than health - especially when it sums up across a wide range of life-domains (financial, social, cognitive) - sets people with health problems at higher risk for more subjective strain, depression, prolonged hospitalization, chronification and death. On the other hand, it has also been shown that the impact of availability or lack of resources is at least somewhat dependent on the use that people make of them (e.g., Lang, Rieckmann, & M.M. Baltes, 2002). Though middle-aged

adults - on average - have more resources available than older adults, it is not yet clear whether they adequately use them when facing health problems comparable to those of older adults (e.g., multimorbidity, sensory loss, chronic diseases).

2.4.4. Summary and Conclusions for the Present Research

In sum, despite common stereotypes, there is no monolithic experience in the domain of health, neither in midlife nor in old age (Riley, 1987). For the purpose of the study reported below, it can be concluded that cataract is a somewhat prevalent disorder in both midlife and older adults. The incidence, however, increases with age. While the development of cataract can be considered a normative event in older adults, as specified by a prevalence rate of about 70%, in midlife, cataract can be considered non-normative. Moreover, there is strong evidence for the argument that cataract is a feature of premature ageing, reflecting systemic ill health that increases the risk of mortality in middle-aged cataract patients and most likely increases multimorbidity.

Multimorbidity is also very common in old age and less common in midlife. For the empirical study of this thesis, the important implication is that health-related negative changes in general are frequent changes in old age, and, moreover, they are *expected* to occur and accumulate as reflected in peoples' subjective conceptions about old age (Neugarten, 1990). Although the onset of many late life chronic illnesses and impairments often traces back to middle adulthood, when first signs and symptoms occur, manifestations of these illnesses and functional impairments in midlife are less common. Consequently, they are not at the core of peoples' conceptions about midlife, and are more likely to be perceived as critical, "off time" events rather than normative, inevitable consequences of getting older.

Vision impairment and chronic diseases have been shown to be negatively associated with a number of cognitive-emotional and functional outcomes, thus representing important and prevalent risk factors for positive developmental regulation. The strength of these associations varies considerably across studies, depending on the type and degree of impairment, the assessment of chronic diseases and criteria for multimorbidity.

It has not yet been studied whether the same kind of health stressors affect older adults and middle-aged adults' cognitive-emotional reactions in the same way. Additive effects of multiple diseases and sensory impairments on functional status are common, and may be more detrimental in elderly adults because of an overall reduction in physiological adaptation, complex motor skills, and social resources. Visual impairment induced by cataract may exert its influence on daily life and well-being in middle adulthood due to interference with work

and leisure activities, whereas more direct consequences to a range of cognitive, motor and emotional functions can be expected in old age. However, there is great variation in the individual response to health stressors and resulting impairments. The next section deals with individual and social factors that may serve as buffers in the reported disease-outcome relationships.

2.5. Correlates of Adaptation and Resilience in Midlife and Old Age I: The Resource Perspective

The previous sections have dealt with contextual factors in midlife and old age development. Now, the focus is shifted towards individual factors that, in an ongoing transactional process, are shaped by and influence the occurrence of major life events, transitions, norms and roles in midlife and old age, and mediate or modify their impact on developmental adaptation (for a thorough discussion of conceptual issues in the study of individual "forces" in development see Engfer, Walper, & Rutter, 1994).

A distinction is made here between more generalized, stable characteristics, attitudes, expectations, and perceptions on the one hand (*resources*), and indicators of *self-regulatory processes* underlying resilience on the other[8]. Specifically, on the resource side, generalized expectations and social support factors are discussed. On the process / self-regulation side, aspects of goal regulation and situational coping in dealing with adverse events are outlined.

In the present study, health indicators (visual functioning, change in visual functioning and multimorbidity) as well as psychosocial resources are analyzed as predictors of cognitive-emotional and functional adaptation. It is, however, important to keep in mind that the two domains of predictors are not generally independent of one another. A bi-directional influence is theoretically plausible, and there exists a vast body of research for both directions (cf. Anderson & Armstead, 1998; Friedman, 1990; Smith & Spiro, 2002).

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[8] Two things should be noted. First, this distinction is by no means precise and serves heuristic purposes only. For example, there is no doubt that all stable characteristics, such as control beliefs, exert their protective function via a number of cognitive, emotional, and behavioral processes in response to specific situation. On the other hand, assimilative and accommodative coping, that are considered processes underlying resilience, are assessed as dispositional tendencies here and as such represent quite stable characteristics. Yet, these tendencies more directly assess self-regulatory processes (i.e., how people regulate their goals in dealing with adverse circumstances) than the other dispositional factors discussed below.

Second, the term "resources" shall not imply that the respective characteristics are viewed as protective factors *per se*. As noted earlier, whether, how, under which conditions and to what extent an individual characteristic serves a protective function is clearly an empirical issue (Engfer, Walper, & Rutter, 1994). However, all of the selected characteristics have been related to positive adaptation and resilience in a number of studies before.

For the comparison of midlife and older age, empirical evidence is organized around two developmental aspects: (1) age differences in the *level* of resources and self-regulation tendencies, and (2) age differences in the *adaptivity* of those characteristics[9]. With regard to the setting of the empirical study, a special emphasis is on evidence for the protective (buffering) functions of these characteristics when (health) stressors are present. Where available, their relations with well-being, depressive symptoms, and functional status in everyday life are reported.

2.5.1. Generalized Expectations

People hold stable and often generalized beliefs about the occurrence of good and bad future outcomes in their lives, and their own ability to influence what is happening to them in the present and the future. These beliefs are commonly termed “generalized expectations”. In numerous studies, they have been shown to be related to well-being and depression, functional status, physical morbidity and mortality (e.g., Bandura, 1997; Chipperfield, 1993; Scheier & Carver, 1992; Rowe & Kahn, 1987). They also serve as protective buffers under a variety of adverse conditions (e.g., Bandura, 1981; Kempen, Sanderman, Miedema, Meyboom-de-Jong, & Ormel, 2000; Scheier & Carver, 1992).

This section explores age differences in level and adaptivity of three prominent expectancy constructs in the literature: “general self-efficacy ” (GSE), “dispositional optimism”, and “sense of control”. (1) The concept of GSE refers to generalized expectancies about one’s competency to attain specific goals even when conditions to achieve that goal are considered difficult. It is characterized by the subjective certainty to be able to effectively cope with various barriers to successful goal pursuit (Schwarzer, 1992). (2) In contrast, dispositional optimism denotes the stable expectation that good things will occur, regardless of one’s own action, competence or effectiveness (Scheier & Carver, 1992). (3) Perceived control is defined as *“the belief that one can determine one's own internal states and behavior, influence one's environment, and / or bring about desired outcomes*" (Wallston, Wallston, Smith & Dobbins, 1987). Commonly, three dimensions as sources of control are distinguished: internal factors, chance, and “powerful others”.

The three constructs are often conceptualized as stable personality characteristics that influence peoples’ behavior and thoughts across time and a variety of domains. They are

[9] Conceptually, it would be more ideal to speak of age-related "changes" rather than age "differences". However, most of the existing studies are cross sectional, and data on within-subject changes across a longer time period is rare. Since empirical data on cross-sectional age differences is generally sparse also, studies including middle-aged or elderly adults only are occasionally cited as well.

highly interrelated (with correlations typically ranging between .30 and .75), still, they accounted for unique proportions of outcome variance in previous studies. Domain-specific expectations (e.g., health-related control beliefs, job-related self-efficacy) are also frequently studied.

Age Differences in Self-Efficacy, Sense of Control, and Dispositional Optimism

Researchers have assumed that due to the increase in uncontrollable, negative events and irreversible losses in old age, accompanied by social stereotypes about the aging process and a restricted time perspective, optimism and a general sense of self-efficacy and personal control should decline with age (e.g., Heckhausen & P.B. Baltes, 1991; Rodin, 1987; Weisz, 1983). Empirical studies addressing these assumptions, however, have yielded mixed results. These were in part due to differences in dimensionality, context, and specifity of measurements (see Lachman, 1986). With more systematic research available today, the emerging picture is that changes in generalized expectations occur mainly with respect to selected domains. Most studies report no decline in the *general* sense of control, efficacy, and optimistic outlook (Lachman & P.B. Baltes, 1994; Scholz, Gutiérrez-Doña, Sud, & Schwarzer, 2002).

Woodward and Wallston (1987) studied health-related and day-to-day living control-beliefs and self-efficacy in non-institutionalized adults aged 20 to 99. They found that individuals over 60 years desired less health-related control, less control in general day-to-day living and less health-related information than did younger adults. In addition, older adults reported a stronger preference for health professionals to make decisions for them ("powerful others"), and had lower self-efficacy. Furthermore, the age-associated decline in health-related desire for control was partially mediated by self-efficacy beliefs. This finding supports the notion that a decrease in self-efficacy beliefs is based on domain-specific evaluations, and that readjustments in the desire for control in a any life domain (e.g., health) are a consequence of “realistic” evaluations of one’s (in)ability to maintain or restore a desired level of functioning in this domain without external help. More evidence for this general notion comes from research on subjective memory and intellectual performance. This has shown that intellectual self-efficacy remains constant during midlife but declines in old age, and that older adults rate themselves to have less personal control over memory than middle-aged or younger adults (Cornelius and Caspi, 1986; Lineweaver, Hertzog, & Christopher, 1998). Lachman (1991) confirmed these results by showing that young old and old adults, in contrast to middle-aged and young adults, believe that they are less in control over their health and intellectual functioning (“internal control”), and that other people in their lives have a greater impact for

maintaining adequate functioning in these domains ("powerful others"). A decline in these domain-specific control beliefs beyond the age of 65 has also been found in a 5-year longitudinal study (Lachman & Leff, 1989). Moreover, these changes remained after controlling for education and number of reported illnesses. No age differences were found in the *general* internal and external control scales.

Schieman (2001), in contrast, found an inverted U-shaped association between age and general sense of control in 1421 participants of the US General Social Survey (18 – 89 years), suggesting a peak of control in midlife and steady decline thereafter. Further analyses revealed that the basis for the negative trend from midlife to old age lies in differences in socio-economic variables: much of the variance (67%) could be accounted for by controlling for education, marital status (widowhood) and employment status (retirement).

Adaptivity of Self-Efficacy, Sense of Control, and Dispositional Optimism in Midlife and Old Age

"Feeling in control", being optimistic and having a strong sense of self-efficacy have consistently been associated with high well-being, low depression and better health (e.g., Bandura, 1997, Lachman & P.B. Baltes, 1994; Peterson, Seligman, & Vaillant, 1988, Scheier & Carver, 1992). This is partly because these expectations motivate active engagement in everyday tasks, the encounter with challenging situations, and perseverance in the pursuit of personal goals. In addition, they may affect health and depression more directly through physiological and immunological mechanisms (e.g., Rodin & Timko, 1992).

As reported above, despite many changes that are infinitely beyond individual control, there is surprisingly little support for a general decline in optimism and subjective perceptions of control and efficacy as people age. Is it still adaptive, under these circumstances, to be optimistic and hold strong expectations about one's ability to be in control?

Studies have shown beneficial effects of a *general sense* of internal control, for the maintenance of both well-being and health, and a detrimental effect on these outcomes related to a strong belief in "chance" (Lachman & P.B. Baltes, 1994). No age-differential effects were reported in these studies. The role of a "belief in powerful others" is less clear. A recent study by Kunzmann, Little and Smith (2000) suggests that perceived others' control over desirable and undesirable outcomes has a negative impact on positive affect and also result in higher negative affect in older adults. However, their items measured *dependency on* other people, and they point out that *confidence in* other people (i.e., believing in the benefit of delegating

certain aspects of one's life to other people) may be a different facet of "belief in powerful others" which might have more positive effects.

More *specific* internal control beliefs are not equally beneficial for subjective well-being at all ages and across all situations. In the presence of regretted life events, for example, young people experienced *fewer* negative emotions when they felt in control (i.e., responsible for the regretted event). In contrast, older adults experienced *more* negative feelings when they felt in control over the regretted event (Wrosch & Heckhausen, 2002).

Lang and Heckhausen (2001) hypothesized that different facets of well-being (positive and negative affect and subjective well-being) are differentially affected by control beliefs in young, middle-aged and old adults. In a series of studies they found that in young and middle-aged but not in older adults, perceived control was related to fewer negative emotional experiences. All age groups, however, benefited from a sense of control with respect to positive emotional experiences and life satisfaction. They conclude from this that in young adulthood and midlife, perceived control may be a motivating force for compensating for failures and (re)gaining control over important aspects in one's life (primary control). In late adulthood, the same attempts might lead to an overestimation of one's actual control potential, thus increasing the likelihood of disappointing experiences.

Isaacowitz and Seligman (2002) showed that optimism, too, has different facets, not all of which may be equally adaptive in all age groups, especially in the presence of stress. They examined the longitudinal relationship between negative life events, optimistic *explanatory style* (i.e., how people habitually explain the causes of events that occur to them), dispositional optimism, and affective states in 93 adults (60 – 99 years). Dispositional optimism was negatively associated with depressive symptoms at a six-month follow up, regardless of negative life events that occurred during that period. In contrast, an optimistic *explanatory style* for health and cognitive events was associated with *more* depressive symptoms over time when negative life events had been present, but only in older adults.
Generally, adult optimists show to be better adjusted than adult pessimists across a variety of adjustment indicators (Scheier & Carver, 1992)[10]. Optimism is furthermore associated with better psychosocial adaptation to chronic diseases, such as rheumatoid arthritis (Brenner,

[10] In some studies, the negatively worded items of the Life Orientation Test (LOT-R; Scheier, Carver, & Bridges, 1994), a standard measure assessing optimism-pessimism, were more strongly related to adverse health outcomes than the positively-worded items (Scheier, Carver & Bridges, 2001). However, this has not been shown for criteria of positive aspects of well-being, and points to the need to derive more precise theoretical predictions about the differential effects of pessimism and optimism. One important task is to empirically disentangle whether the benefits of being an optimist are due to the *presence* of optimism or to the *absence* of pessimistic expectations, and vice versa.

Melamed, & Panush, 1994), multiple sclerosis Barnwell & Kavanagh, 1997), or HIV infection (Taylor, Kemeny, Reed, & Aspinwall, 1991).

In the presence of perceived stress, pessimists were more vulnerable to the negative effects of stress on psychological symptoms (as assessed by general distress and depressive symptoms) and life satisfaction than optimists in a sample of college students (Chang, 2002). In the same study, pessimistic middle-aged adults were *not* more vulnerable to the negative effects of life stress on life satisfaction than their optimistic peers, indicating that the psychological processes underlying the judgment of life satisfaction might have a different basis as people grow older. In a study with 460 middle-aged women aged 40 – 52 years, however, Bromberger & Matthews (1996) found that pessimistic women were more vulnerable to the negative impact of ongoing problems and stressful events on change in depressive symptoms over a period of three years than optimistic women. Conceptually, the results can be viewed from two different angles: (1) pessimism *exacerbates* the negative impact of life stress, or (2) optimism serves as a *buffer* to the negative impact of stress.

Scheier and colleagues (2001) have pointed out that the effects of optimism and pessimism when stress is perceived are partially mediated by differential coping efforts (e.g., active engagement vs. avoidance, withdrawal; see 2.6.3). Whether these are the same in all stages in life has yet to be determined.

A recent study examined the effects of optimism, generalized self-efficacy, and unrealistic thinking on physical activity, anxiety and depression in middle-aged patients with one of three types of chronic diseases (Fournier, de Ridder, & Bensing, 2002). Interestingly, and in line with theoretical predictions (e.g., Bandura, 1997), the effects of self-efficacy on physical functioning were moderated by the degree of self-care *controllability* in the diseases. GSE was positively related to mobility range and activity level only in Type I diabetes patients (high controllability), unrelated to these indicators in rheumatoid arthritis, and negatively related to physical functioning in MS patients, in whom task-oriented coping was not possible (low controllability). In contrast, the impact of optimism and self-efficacy on anxiety and depression was unrelated to the degree of controllability, indicating that generalized expectations may have differential effects on cognitive-emotional vs. functional adaptation.

The role of self-efficacy expectations in adapting to specific situations of loss or strain in older adults has been sparsely investigated. A study on the effect of self-efficacy on cognitive performance showed that participants who reported higher levels of self-efficacy outperformed participants who reported lower levels of self-efficacy. This effect was mainly due to higher levels of motivation and persistence over time in participants who reported

higher levels of self-efficacy (Berry, 1987). Although empirical evidence regarding buffering effects of self-efficacy on well-being in older adults is still lacking, studies with middle-aged and younger adults suggested positive effects of self-efficacy on the evaluation of critical life-events and the persistence and success in adaptational processes, which in turn impact well-being and satisfaction (Schwarzer & Schroeder, 1997; Schwarzer, & Jerusalem, 1995; Schroeder, Schwarzer, & Konertz, 1998).

Functioning in everyday life seems to be unrelated to generalized expectations when people have no disabilities. However, they appear to play an important role in the course of functional decline when chronic diseases are present and / or biological aging processes start to impair basic sensor-motor functions. Rejeski, Miller, Foy, Messier, and Rapp (2001) demonstrated this when they examined the relationship between self-efficacy beliefs and functional decline in older adults (> 65 years) who were affected by muscular weakness in the lower extremities and knee pain. Using a prospective design, they found that low baseline self-efficacy exacerbated the negative effects of baseline weakness in knee strength, leading to significantly greater decline in both self-reported disability in everyday life and stair-climb performance across a period of 30 month.

In the longitudinal study of Duke and colleagues (2002, see 2.1.3), the buffering role of optimism and social support for activity loss as a consequence illness was investigated. Multiple regression analyses revealed that both optimism and social support were important predictors of the replacement of lost activities caused by chronic and severe illnesses. This also led to higher positive affect 1 year after illness onset.

Summary

Initial theoretical considerations, predicting a decline of optimism, self-efficacy and control-related expectations in old age as a reflection of fundamental changes in resources and adaptive capacity, have found no consistent support. Rather, evidence is mixed, indicating that age-related changes in these expectations are best understood if viewed separately for various important life domains. Those domains in which adults experience the greatest amount of objective change seem most likely to decrease optimistic outlook and self-efficacy, and trigger shifts from predominantly internal to external control beliefs for that particular domain. In addition, holding on to strong self-efficacy expectations and internal control beliefs might lead to decreased well-being, when positive experiences and objective *control* potential are decreased (Lang & Heckhausen, 2001). Interestingly, this has also been shown in middle-aged

adults who experience an objective decrease in control potential due to circumstances such as chronic illness (Fournier, de Ridder, & Bensing, 2002).

Overall, the absence of marked changes in action-outcome related expectations is striking, and has led researchers to concentrate on the internal self-regulatory mechanisms by which older adults counteract the negative impact of age-related threats to autonomy, and maintain a general sense of being in control (Brandtstädter & Rothermund, 1994; see 2.6.2).

Buffering effects of generalized expectations on cognitive-emotional adaptation have been found in some studies, others report main effects only, and so far, no consistent pattern has emerged. It is likely that these expectations buffer the negative impact of health constraints on well-being and depression, and may turn into vulnerabilities when they are characterized by highly unrealistic expectations regarding one's functional status.

In contrast, there is convergent evidence that generalized expectations have a highly protective potential for buffering adverse effects of ill health on functional adaptation. Theoretically, this protective function should be independent of age, once the objective degree of health constraints experienced is the same across age groups.

2.5.2. Social Support and Partnership

Social interactions and intimate relationships help individuals to obtain and maintain needed resources (e.g., love, services, goods, money, information), and are as such important resources themselves, especially in times of increased adversity that affects basic personal resources, such as health, economic status, and well-being (Hobfoll, 1998; Schwarzer & Leppin, 1991). Conceptually, a distinction is made between "social integration" and "social support" (e.g., Veiel & Baumann, 1992). The former entails mostly structural-quantitative aspects of the social network in which a person is embedded (e.g., network size, and density, frequency of interactions). The latter term comprises functional-qualitative aspects of social relationships, such as instrumental support (e.g., assist with a problem), informational support (e.g., give advice), and emotional support (e.g., give reassurance). Social support is considered an important resource in coping with stress, and is also linked to personality characteristics such as optimism and self-efficacy (Brissette, Scheier, & Carver, 2002). Some have even defined (perceived) social support as a stable person variable, characterized by a generalized "sense of acceptance" (B.R. Sarason, I.G. Sarason, & Pierce, 1990). This view, however, is challenged by studies that reported a decrease in perceived support and support satisfaction following stressful experiences (Dean & Ensel, 1982; Lin & Ensel, 1984).

The following section focuses on the role of *perceived* instrumental and emotional support in midlife and old age. This comprises both the support that individuals' perceive as generally *available* and what they report to have *received* in a given situation. These functional aspects are among the most widely studied and have consistently been shown to to buffer the effects of adverse health events (e.g., Schwarzer & Leppin, 1991; Taylor & Seeman, 1999). In addition, evidence for the protective functions of *partnership* is outlined, since there are important gender and age differences in the adaptive function of this resource, which reflect differences in normative and non-normative developmental influences.

Age Differences in Social Support

Having lost or loosing a partner through either divorce or death is common in both midlife and old age, and happens to women about a decade earlier than men (Atchley, 1997). Yet, the incidence of the death of a spouse is higher in old age, and represents a *normative* event in people's expectations about old age (Stroebe, Stroebe, & Hansson, 2000). There is an overall age-related decrease in the social network that is due to loss of close friends and relatives from one's own generation (Wagner, Schütze & Lang, 1999). In line with the socio-emotional selectivity theory (Carstensen, 1993, Lang & Carstensen, 1994), the number of contacts with family members increases with age (Field & Minkler, 1988), and the most frequently reported source of emotional and instrumental support in old age is the family (Depner & Ingersoll-Dayton, 1988). In addition, there is evidence that in non-institutionalized older people, satisfaction with support networks increases with age (Antonucci & Akiyama, 1987).

A number of studies have found higher perceptions of social support in women than in men (see Schwarzer & Leppin, 1989). In a study on East-German migrants, Knoll & Schwarzer (2002) found that middle-aged women (> 45 years) reported less social support than younger women. In contrast, in men there was an increase in reported support with age. Generally, adult women have a greater number of close relationships and more extensive social networks than men. Additionally, women provide more emotional support to others, and they get more help in return (Laireiter & Baumann, 1992).

With increasing age, the ratio between helping others and being helped by people shifts towards a higher proportion of the latter. Still, even into very old age, people report that they help others (Wagner et al., 1999).

Adaptivity of Perceived Social Support in Midlife and Old Age

The notion that social networks and the emotional and instrumental support provided by these networks are important *buffers* to individuals during times of stress or crisis has a long tradition in health psychology and stress research (cf. Robinson & Garber, 1995). Recent advances in psychobiological research have linked the buffering effects with respect to health outcomes to more effective regulation of physiological parameters, which in turn result in a decreased susceptibility to environmental diseases agents, and accelerated recovery in individuals with higher levels of support (for a review see Uchino, Cacioppo und Kiecolt-Glaser, 1996). Stroebe and Stroebe (1996) proposed that buffering effects of social support on both health and well-being can be due to more positive *appraisals* of potentially stressful situations, and / or the provision of more effective *coping* strategies. Antonucci and Jackson (1987) hypothesized that self-efficacy is the cognitive mechanism through which social relations affect health and well-being. They suggested that the beneficial effect of social support is based on the cumulative experience that other individuals perceive oneself as able, worthy and capable. Evidence has been accumulated which is consistent with this model (e.g., Lang, Featherman & Nesselroade, 1997). Finally, Kulik & Mahler (1993) found empirical evidence that patients with high social support showed better medication-adherence than patients with low social support.

Convergent evidence documents higher well-being and lower risk for depression and psychological distress for those who enjoy greater social support (see George, 1989; Pinquart & Soerensen, 2000). With respect to functional status, the effects are generally positive for emotional support, and more mixed for instrumental support, which has also been shown to be associated with a decreased level of functioning (however, no causal relationship has been established so far). *Perceived* support is only mildly correlated with *received* support (e.g., Dunkel-Schetter & Bennett, 1990), and has greater predictive value for well-being (e.g., Barrera, 1986; B.R. Sarason, et al., 1990).

Again, there are consistent gender differences. Social support seems to be more closely related to health outcomes in women than in men (see Schwarzer & Leppin, 1989). In their study on East-German migrants, Knoll and Schwarzer (2002) found a negative association between social support and health complaints as well as depression in women, but not in men.

Looking at functional status, perceived social support (like optimism, see above) was an independent predictor of the replacement of lost activities caused by chronic and severe illnesses in a sample of patients suffering from any kind of chronic disease (Duke, et al., 2002). Also, it was associated with higher changes in positive affect across 1 year.

Studies that address the question of differences in middle-aged and older adults as to the beneficiary effects of social support on well-being or indicators of distress are rare. Knoll and Schwarzer (2002) reported an interaction between age and social support, which was due to the fact that depression rates were higher among the middle-aged women (>45 years) who reported low social support, than among young woman with low support. An elderly sample was not included in this study. Pinquart and Soerensen (2000) concluded from a meta-analysis that the quality of social support is more strongly related to happiness and life-satisfaction in samples with a mean age of 70 and above, than in younger samples. However, the age range of the younger samples was large, and this meta analysis did not consider moderating factors such as the presence, frequency, and types of stressors.

Partner Status in Midlife and Old Age

Research has consistently shown that individuals who have a partner are at lower risk for morbidity, depression, functional disability, and even mortality (Coyne & Smith, 1991; Tucker et al., 1999). These effects, however, are moderated by age and gender. Although we are far from a complete understanding of the gender differences in the protective effects of partnership and the negative impact of partner loss, prevalence rates indicate that spousal bereavement is a common and thus more normative event in young old (for females) and old age (for both sexes), and less common in midlife (see Stroebe, Stroebe, & Hansson, 2000).

Having an intimate partner is regarded as the best source of support. Does this change as people get older? A recent study with cancer patients (Schwarzer et al., 2001; cited in Schwarzer, Knoll, & Rieckmann, in press) has shown that living without a partner was associated with receiving less emotional support in middle-aged patients, but not in the elderly (> 66 years). Thus, being single, divorced, or widowed appears to be particularly unfortunate for younger patients who do not receive as much support as the older patients, who may develop successful strategies to seek satisfactory support from other people.

This notion is supported by studies linking partner status to mortality. Being married has been connected with a lower mortality risk for individuals under 60 years of age (Seeman, Kaplan, Knudsen, Cohen, & Guralnik, 1987). In contrast, Shye, Mullooly, Freeborn, and Pope (1995) showed that amongst the elderly (aged 70-90), network size was more predictive of mortality than marriage across a 15-year period. Tucker and colleagues (1999) found that men who were consistently married had a significantly lower mortality risk compared to those who were separated, divorced, widowed or remarried. Age further moderated these relationships:

as they passed the age of 70, remarried men no longer had a higher risk of dying than those who were consistently married. For women, in contrast, marital status had no effect.

Even though the association between partner status and mortality seems to get weaker with age, it is not clear whether this applies to other outcomes, such as well-being and functional status. In the Berlin Aging Study (Wagner et al., 1999), married people were less lonely than the widowed, who were as lonely as the divorced and single. The association was weak (less than 3% of variance), however, and age differences were not reported.

In times of adversity, lack of support is in itself a stressor. The close link between partnership and normative expectations becomes evident in a study by Kulik und Mahler (1989), who studied the length of hospitalization in male coronary artery disease patients with and without partner. They showed that patients living with a partner had the *longest* duration of hospitalization when they had *low* social support (operationalized as number of visits from the partner), in comparison to patients with both a partner and high social support, and also in comparison to patients without a partner. Thus, difficulties in close relationships entail a risk potential for positive adaptation. Furthermore, it underscores the futility of determining protective factors and vulnerabilities without paying attention to contextual factors (e.g., being in a stable relationship vs. not).

Summary

There are many instances in which social networks become stressors in their own respect (Rook, 1984). However, the beneficial effects of partnership and subjective social support in adulthood have been widely demonstrated. Unfortunately, there is no preferred measure for the functional aspects of social support, impeding the progress of understanding more precisely which aspects under what circumstances impact individuals' development and adaptation, and when main effects or buffering effects are present (e.g., Schwarzer & Leppin, 1991). This issue cannot be resolved here, as more theoretical work is needed.

Age has been found to moderate the relations between partner status and morbidity and mortality in such that as people get older, loosing or having lost a partner does not have such detrimental effects any more, pointing towards compensatory mechanisms. Whether there are age-differential effects of partnership on well-being and depressive symptoms has yet to be studied more extensively. Likewise, there is a surprising lack of research investigating whether age moderates the relationship between functional support indicators and cognitive-emotional adaptation, perhaps grounded in the assumption that the subjective availability of social support is equally desired and adaptive at all stages in life, and that it is more important

to determine the contextual factors that are associated with the presenceor absence, or changes in this perception.

For the present research, it is assumed that perceived social support is equally adaptive for middle-aged, young old and old adults with respect to their well-being, since here, unlike in previous studies, all age groups are expected to experience an equal degree of health stress. Both main and buffering effects in face of severe health stress are expected.

Being alone or having lost a partner is considered a normative event in young old and old age. For middle-aged individuals, the loss of a partner is an "off time" event, and should have more detrimental effects on well-being. Moreover, given the presence of other non-normative events, as is the case in this study, the lack of partnership itself (i.e., through widowhood, divorce or having been single in first place) can be considered an additional stressor.

Last, although not focused here, it has to be kept in mind that illness and disability may worsen the quality of social relationships (e.g., due to a negative balance between received and given support; Rook, 1984).

2.5.3. Resource Loss and Resource Gain

Health and vision can be viewed as resources that people value (see 2.4). Within the present study setting (cataract surgery), losses in these resources (as indicated by multimorbidity and visual impairment prior to surgery) have occurred. Importantly, also a *gain* in one of them (improved visual acuity after surgery) is present. The research question is, in how far this gain affects cognitive-emotional and functional adaptation.

Hobfoll, in his model of conservation of resources (COR) (e.g., 1998) conceives of perceived or actual loss of resources as the primary source of stress. The main assumption of the COR theory is that people generally strive to retain, protect, and build their resources, which comprise materialistic objects (e.g., a home, a car), conditions (e.g., marriage, employment), personal characteristics (e.g., self-efficacy), and energies (e.g., time, money, knowledge). Furthermore, the theory predicts that people aim at the minimization of resources loss, and strive to develop resource surpluses in anticipation of future losses. The prevention and regulation of loss thus is an important motivating force according to this theory. Most importantly, losses are assumed to have a higher impact on well-being than gains. Hobfoll undermines this position with data showing that many resource losses cannot be compensated by subsequent gains (Hobfoll & Wells, 1998). However, he also argues that loss is intertwined with gain. Losses may draw attention to the need to protect existing resources or acquire new ones, and small gains may appear even more important in the face of loss. Furthermore,

individuals might focus on even the smallest gains in order to downplay the negative experience of a loss Hobfoll (1998). For example, in a study with pregnant women, subjective reports of gains (e.g., pride, meaning in life) were significantly associated with less depressive symptoms, but only in women who at the same time had reported loss-experiences (e.g., loss of leisure activities), and not in women who reported no such losses through their pregnancy (Wells, Hobfoll & Lavin, 1999).

For the present study, it is assumed that gain in vision is especially salient and should have beneficial effects for well-being and depressive symptoms because all patients have experienced a prior loss in the same resource. Moreover, in line with Hobfoll's argument that gains are more highly valued when losses are present, it is assumed that those patients with multiple health problems should have even more benefit from vision gain than patients with no or low multimorbidity. For functional adaptation, however, the actual visual status is assumed to be the more important predictor than vision gain, because the pursuit of activities critically depends on sensory functioning.

2.6. Correlates of Adaptation and Resilience in Midlife and Old Age II: The Process Perspective

It has been argued that the psychological impact of adverse circumstances in general, and chronic health stressors in particular, critically depends on how much they interfere with important personal goals (e.g., Brandtstädter, 1990; Heckhausen, 1999). Thus, the internal regulation of personal goals is an important component in successful adjustment processes. Three key features of goal regulation are discussed here: selectivity, accommodation, and assimilation. After that, age-related changes in situational coping strategies are reviewed[11]. As Rutter (1990) has pointed out, such strategies are generated, refined, or otherwise modified through engagement with adverse situations.

2.6.1. Selectivity in Goal Regulation

M.M. Baltes and Carstensen (1990) suggested that having and pursuing goals are key indicators of successful aging. Brunstein, Schultheiss, and Graessmann (1998) emphasized three functional aspects of goal-pursuit in that respect. First, the pursuit of personal goals may nourish the experience of purpose in life. Second, personal goals may motivate engagement in

cognitive, social and physical activity. And third, personal goals may serve as orientation markers for the self-regulated development of an individual.

These aspects suggest a protective potential of the pursuit and maintenance of personal goals with age. However, it is important to regulate goals according to changing life conditions, and be *selective* as to which goals to pursue, as resources such as time and energy are naturally limited (e.g., Heckhausen & Schulz, 1999). With increasing age, selectivity gains importance, as the amount of resources available to an individual declines due to age-associated changes in physical, cognitive, and social functioning, and future perspective.

In the following, two models of developmental regulation that deal with aspects of goal regulation are introduced: the model of "Selective Optimization with Compensation" (SOC) and the "Dual Process Model of Coping". Empirical data on assimilative and accommodative tendencies as well as "personal life investment", which provides a measure of selective goal investment, is presented.

The SOC Model

The framework of "Selective Optimization with Compensation" (SOC; P.B. Baltes & M.M. Baltes, 1990) is a meta-model of development. It proposes that the orchestration of *selection, optimization, and compensation* is of paramount importance in aging and life-span development: Optimization is conceptualized as the organization, attainment and improvement of goal-relevant means. Compensation refers to processes of goal maintenance and pursuit in the face of losses in goal-relevant means (Freund & P.B. Baltes, 1998). Selection denotes the choice and pursuit of goals from different domains. It refers to efforts of concentrating on *„those domains that are of high priority and involve a convergence of environmental demands and individual motivations, skill, and biological capacity"* (P.B. Baltes & M.M. Baltes, 1990, pp. 21-22). A distinction is made between selection that occurs reactively in the context of loss („loss-based") and proactive, or „elective" selection. The limitation of resources, such as time or energy, presses human beings to select domains, since not all opportunities can be pursued at a time or with a given amount of energy. This is not to say that selectivity per se is adaptive. Rather, successful development is only achieved when one finds the right balance between pursuing too many goals at the same time, and being overselective in focusing on too few areas and thus restricting one's opportunities for

[11] Goal regulation and coping strategies are subsumed under the term "self-regulation strategies" here, as they aim at influencing, modifying, or controlling one's own cognitions and behavior in accordance with personal goals (Brandtstädter, 1998; Emmons, 1986; Freund & Baltes, 1998; Heckhausen, 1999).

compensation when an important goal domain is lost. However, it is one of the core predictions derived from the SOC model that in the context of resource losses such as health constraints, which are likely to affect many important goal domains at the same time (e.g., work, family life, leisure activities), a selective focus on highly valued domains is adaptive, in that it helps to maintain energy for the continued pursuit of the possible and a positive view of the self, as well as to prevent worse health outcomes (see M.M. Baltes & Lang, 1997).

Selective Life Investment

Personal life-investment has been defined as the subjective amount of energy that is invested in the pursuit of goals in different aspects of life through thoughts and actions (Staudinger, Freund, Linden, & Maas, 1999). Staudinger and Fleeson (1996) have developed a measure to assess the degree of investment in 10 life domains (e.g., health, family, work). This allows for the assessment of different profiles of life investment. Selectivity in life investment (assumed to be a proxy for goal selectivity) has been derived from two indicators: the average investment across all domains (which is low in selective people), and the amount of domains with low to very low investment. Additionally, one can look at *variability* in investment across the ten domains.

Age Differences and Adaptivity of Selective Life Investment in Midlife and Old Age

Staudinger and colleagues investigated the role of investment intensity and selectivity for well being in older adults in the context of the Berlin Aging Study (BASE; Staudinger et al., 1999). They found that in this sample from 70 to 100 years, there was a slightly negative age correlation in average investment (-.17). More importantly, lower average life investment was found to attenuate the negative association between somatic risks (as indicated by a composite score of vision, hearing, weighted medical diagnoses and Activities of Daily Living) and life satisfaction and aging satisfaction. These buffering effects remained after controlling for rumination and accommodative tendencies, and were the same for investment selectivity (high frequency of low and very low investment). It was also shown that in people with very low somatic risks, high selectivity was associated with decreased aging and life satisfaction, indicating that "premature" disengagement from goals is likely to be dysfunctional.

Furthermore, investment selectivity proved to be protective for subjective well-being in the face of somatic risks over a period of four years, however, this seemed to be the case only in people with socioeconomic status above the median (Staudinger & Freund, 1998).

Looking at specific patterns of life investment, Staudinger & Fleeson (1996) reported that the average investment in the domain of health increased from rank 9 in young adults (25-35 years) to rank 2 in middle-aged adults (55-65 years) In the participants of BASE, healt hwas ranked first, before the well-being of close relatives. The differential adaptivity of these investements in the different life phases has not been examined.

Taken together, these results indicate that selective investment in fewer life domains may attenuate the negative impact of specific age-associated risk factors on well-being. Whether the same is true for functional indicators of adaptation has yet to be shown. For the present study, buffering effects of investment selectivity under high health stress are expected. In addition, it is explored how average life investment and selectivity are regulated across a 7 week period in a peri-operative setting, and whether resilient individuals regulate their investment in this context in a different manner than non-resilient individuals.

2.6.2. Accommodative and Assimilative Developmental Regulation

In old age, the prevalence and co-occurrence of negative, uncontrollable events increases (Brandtstädter, 1992). This does not necessarily affect the subjective evaluation of autonomous control (see 2.5.1). Moreover, at the same time, the expected decline in well-being and increase in depressive symptoms is not observed.

In response to this "satisfaction paradox", Brandtstädter (1989, 1992; Brandtstädter & Greve, 1994) has proposed the "Dual Process Model of coping". The core assumption underlying this model is that adverse events and threats to personal control are only relevant for people's well-being to the extent to which they are *perceived* to interfere with personal goals. If deviations from personal goals and strivings are perceived, adaptation occurs through the activation of two different, but complementary forms of coping: (1) assimilative tendencies, and (2) accommodative tendencies.

Assimilative coping refers to instrumental activities that aim to maintain desired levels of functioning in accordance with one's goals. These activities comprise preventive, corrective, compensatory, or optimizing efforts. Accommodative coping refers to the modification of personal goals due to environmental limitations. This involves the rescaling of priorities and standards, downgrading of blocked goals, and construction of palliative meanings, and often operates on a subconscious level (Brandtstädter & Wentura, 1995). The two coping modes operate antagonistically: assimilative strategies are assumed to be employed as long as individuals perceive a reasonable chance to achieve their goal. Accommodative shifts are triggered by feelings of helplessness, when efforts to persist in the pursuit of goals become too

taxing or futile. In contrast to the assimilative-problem-oriented actions, the adaptation of personal preferences is not per se a controllable and conscious activity, but very often reactive. The critical issue in the regulation of these processes lies in their balanced use: accommodating personal goals to subjective and objective action- and control potentials, without disengaging from important life goals too early[12].

Another assumption of the model is that individuals differ with respect to their tendencies to endorse in assimilative and accommodative coping when facing a situation that potentially threatens the successful pursuit of their personal goals (Brandtstädter, 1998). Two independent scales have been developed to measure these tendencies on a dispositional level: Tenacious Goal Pursuit (TGP; assimilative coping) and Flexible Goal Adjustment (FGA; accommodative coping; Brandstädter & Renner, 1990). TGP measures persistence in goal pursuit and adherence to self-evaluative standards (e.g., "I can be very obstinate in pursuing my goals"). FGA comprises different facts of accommodation, such as the shift to new commitments and positive reappraisals. Two subscales can be distinguished (Wentura, unpublished manuscript): Flexibility through positive *reframing* of goals (FGA-R, e.g., "Even if everything goes wrong, I can still find something positive about the situation") and flexibility through *orientation towards new things* (FGA-N, e.g. "After a serious disappointment, I soon turn to new tasks"). Importantly, FGA and TGP have been empirically shown to be independent dimensions (Brandstädter & Renner, 1990).

Age Differences of Accommodative and Assimilative Coping Styles and their Adaptivity in Midlife and Old Age

In line with the prediction that increased constraints in resources and goal pursuit should trigger accommodative flexibility, Brandstädter and colleagues have repeatedly found an age-related increase in FGA and a decrease in TGP (Brandtstädter, 1992; Brandtstädter & Renner, 1990). In a study with 890 individuals aged 34 to 63 years, the age correlation was .34 for FGA and -.18 for TGP (Brandtstädter & Renner, 1990). The largest increase in FGA was found between the cohorts of 45-51 and 52-57 years, thus denoting a shift towards more accommodative processes already in midlife. Men reported higher levels of TGP, no sex differences were found for FGA.

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[12] Brandtstädter & Greve (1994) have distinguished a third category of so-called „immunizing processes", which suppress the operation of accommodative and assimilative tendencies. These processes involve the negation of self-discrepant information as well as the de-valuation of aspects of the self-concept once these are no longer successfully achieved (e.g., going out every night as part of the self-concept "I am a social person").

Although independent dimensions, both TGP and FGA were positively related to life satisfaction and optimism, and negatively to depression and the "belief in powerful others". This underscores that *both* processes are important in successful developmental regulation. Moreover, it was shown that an accommodative dispositional style alleviated the negative impact of *perceived goal discrepancies* in domains such as social recognition, occupational efficiency, and harmonious partnership. The negative relationship between perceived distance from these goals and goal satisfaction was significantly weaker in individuals with high levels of FGA.

Another study with 1200 participants aged 57 – 78 years found that the negative impact of residual life expectancy on the affective valence of their future perspective (e.g., hope and confidence) was less pronounced in individuals with higher levels of flexibility in goals adjustment (Brandtstädter & Wentura, 1995). Likewise, the "meaning of being old" has more positive and less negative aspects in flexible as opposed to non-flexible individuals as they age. These results demonstrate adjusting priorities and preferences to *"feasible ranges"* is a powerful mechanism to dampen emotional distress resulting from deviations from important personal goals.

Thus far, all studies relied on the subjective experience of goal discrepancies (which, of course, is the crucial component in the adjustment process). No study has investigated FGA and TGP in middle-aged and elderly persons who experience comparable stressors. In the context of the present study, it is expected that for the midlife sample, accommodative processes should be of even higher importance for cognitive-emotional adaptation than in the elderly. This is reasoned since the stressors at hand are not only likely to interfere with the pursuit of important life goals, but also non-normative, and as such, acceptance of the given circumstances is even harder to achieve (see Wrosch & Freund, 2001).

Summary

From the perspective of the SOC model, optimal development requires the successful "orchestration" of the three processes selection, optimization, and compensation. Optimal development from the perspective of the dual process model requires a good *balance* between assimilation and accommodation of a person's commitments and goals. Both models stress the importance of creating a balance between one's personal goals and strivings on the one hand, and the objective possibilities and restrictions of a given developmental context on the

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Immunizing processes are entirely pre-intentional and automatic, and as such not subject to empirical investigation.

other. Important prerequisites for the balanced use of any of the strategies are openness to change, the ability to adequately judge the fit of one's available resources with environmental demands, the subjective and objective modifiability of these resources (plasticity), and knowledge about effective use of resources and their refinement (Brandstädter & Wentura, 1995). In the context of the present health-related stressors, selectivity, accommodation, and assimilation are all assumed important processes, since chronic diseases and vision impairment are likely to interfere with important personal goals in all life domains. Both accommodative and assimilative tendencies should be independent predictors of the criteria of adaptation. A more active life style, indicated by low selectivity in life investment is assumed to be associated with better adaptation under low health risk, whereas the opposite is expected in the presence of more severe health stress. In addition to their positive main effect, accommodative tendencies are assumed to serve as protective buffers in face of moderate to severe health stress. Resilient individuals are expected to show a particularly pronounced accommodative coping style, as a result of dealing with the hardship of multiple chronic diseases and vision impairment.

2.6.3. Coping Strategies

Apart from accommodative and assimilative tendencies in the regulation of perceived deviations from personal goals, much research has focused on assessing (situational) coping strategies that are more generally aimed at the alleviation of distress in the encounter with different kinds of stressful events. These are assumed to be important pathways through which the above reviewed personal and social resources exert a positive influence on developmental adaptation (e.g., Holahan & Moos, 1991; Scheier, Carver, & Bridges, 2001; Schwarzer & Jerusalem, 1995). For example, optimists have been shown to experience less stress and depression through an increased use of *positive reinterpretation* as a coping strategy in dealing with adverse events (Brissette, Scheier, & Carver, 2002). In samples of HIV patients and caregiver daughters, perceptions of internal control and self-efficacy were associated with a higher likelihood to use *problem-focused* coping strategies, which in turn were associated with decreases in depressive symptoms over time (Folkman, Chesney, Pollack, & Coates, 1993; Li, Seltzer, & Greenberg, 1999).

In the following, the prominent transactional model of coping is briefly described, before age differences in the use of strategies and their predictive value are discussed.

The Transactional Model of Coping

Lazarus and Folkman (1984, 1987; Lazarus, 1966, 1991) define stress as a transactional process, which is determined by the perceived discrepancy between the demands of a situation and available coping resources. Thus, the interplay of both situational and personal factors is focused here. Cognitive appraisals of a given situation encountered determine whether it is perceived as irrelevant, as challenging, as harmful (involving loss), or potentially threatening (primary appraisal). In addition, individuals evaluate their available resources in relation to the demands of the situation (secondary appraisal). If the situational demands are perceived as exceeding one's resources, the individual might reappraise the situation, and coping efforts are elicited.

A common distinction within the manifold idiosyncratic (not necessarily conscious) strategies that individuals employ in dealing with perceived stress is that between *emotion-focused* and *problem-focused* coping (Lazarus & Folkman, 1984). Emotion-focused coping involves strategies of emotion regulation aimed at the immediate alleviation of distress (e.g., reappraisal of the situation, wishful thinking, denial, drug use). Problem-focused coping is aimed at transforming the perceived source of stress itself, by means of concrete problem-solving efforts as well as information gathering (e.g., taking on a healthier life-style, quitting a stressful job, seeking information and advice when facing interpersonal problems). The use of these two coping modes depends on the cognitive appraisal of the situation and one's ability to cope with it. Furthermore, other person characteristics, such as optimism and self-efficacy are associated with the process of evaluating a stressor with respect to its valence and threat potential, but also with the choice and implementation of coping strategies, the sequence in which they are employed, individual standards for determining their effectiveness and persistence in their pursuit. Also, not everyone is equally successful in implementing a certain strategy (Holahan, Moos, & Schaefer, 1996).

Many of the coping inventories that have been developed assess strategies that can be more or less distcintly grouped along these two dimensions (e.g., Carver, Scheier, & Weintraub, 1989; Endler & Parker, 1990; Epstein & Meier, 1989; Folkman & Lazarus, 1980).

Age Differences in the Use of Coping Strategies and their Adaptivity in Midlife and Old Age

Age-related differences in coping styles have been viewed from two different angles (Filipp & Schmidt, 1995). From a contextual perspective, the type of strenuous events changes with age, thus eliciting different responses. From a developmental perspective, the average pattern of coping changes due to intraindividual shifts in preferred coping strategies that occur as a

result of previous coping experiences, overall changes in resource status, and / or subjective reevaluations of one's control potential.

Within the transactional model of coping (e.g., Lazarus & Folkman, 1984, 1987), age-differences seem plausible at various stages of the appraisal process. First, the evaluation of stressful events as challenging, threatening, or neutral, may change. Due to different standards according to contextual differences, different levels of comparison, and a reduced life span, age-related differences in primary appraisal could occur. Second, limited resources with age might lead to a differential evaluation of the availability of means of coping, thus leading to a change in secondary appraisal. One such example would be a decrease in mobility or activity radius, which may prevent coping strategies that require physical activities (e.g., distracting oneself through physical and social activities, going to church, etc. …). Third, cumulative experience could lead to either a more focused or a more variable implementation of coping strategies. Specifically, experience with respect to the *efficiency* of coping strategies may lead to a general choice of specific strategies over others.

However, the empirical basis for age-related changes in coping behavior in adulthood is rather mixed. One study showed that in younger adults, "challenges" are ranked generally higher, while "threats and losses" rank higher in the elderly (Costa, Zonderman, & McCrae, 1991). As to specific coping strategies, surprisingly little is known about the development of coping in midlife. Aldwin and Levenson (2001) proposed that the increased risk for both acute and chronic illnesses and the experience of loss in general makes it necessary to develop a different attitude towards coping with stress. Anticipatory coping should gain more importance, and loss-related events constitute new challenges that might instigate a reexamination of one's cooping resources and repertoire of strategies.

Data from the Normative Aging Study (Aldwin, Sutton, Chiara, & Spiro, 1996) revealed no difference between middle-aged and older men with respect to perceived stressfulness of problems and coping efficacy. Interestingly, middle-aged men were more likely to report annoyances and problems. In a study on patients dealing with various chronic illnesses, middle aged compared to elderly subjects reoprted higher levels of „information seeking", „emotional expression", and „self-blame" (Felton and Revenson (1987).

Stability rather than change in coping strategies has been reported in a number of studies (e.g., Aldwin, 1994; Costa & McCrae, 1991; Rott & Thomae, 1991). A continued discussion focuses on the development of so-called "mature" (e.g., humor, positive reappraisal) vs. "regressive" (e.g., giving up responsibilities, withdrawal) defense styles in adulthood (e.g.,

Pfeiffer 1977; Vaillant, 1977)[13]. In BASE (Staudinger et al., 1999), where 13 coping styles were assessed with reference to problems situations in general, an increase in regressive styles (e.g., giving up, letting someone else take over) was not observed. The three highest ranked styles were "comparison with the past", "comparison with others", and "wish for information". Interestingly, "wish for information" and "giving up" were negatively associated with age. Among the coping styles that were higher in the oldest participants were both mature (e.g., faith, adaptation to the given) and regressive styles (e.g., life loses meaning, someone else take over). Notably, this is in line with the above reported data showing an age-related increase in dispositional accommodation and a decrease in tenacious goal pursuit. In this context, "adaptation to the given" was negatively related to aging satisfaction, and "keep going" was positively related to it, suggesting a different connotation of the adaptation item in contrast to the FGA scale (Brandstädter & Renner, 1990).

Diehl, Coyle, and Labouvie-Vief (1996) found that the defense and coping pattern of older adults was characterized by greater impulse control and the tendency to positively reinterpret situations.

It is beyond the scope of this chapter to provide a detailed overview on the numerous studies that analyzed the predictive value (adaptivity) of single coping strategies for emotional and functional adaptation under various life circumstances. It was proposed that a strategy "works" best when there is an optimal *fit* between the situation demands and the available resources (Zeidner & Saklofske, 1996). For example, if there is no need for compliance in a given situation, a conscientious person will not be better off than its counterpart. In general, problem-focused strategies have been found to be linked to lower levels of emotional distress in situations that seem *controllable*, whereas emotion-focused strategies work better when the situation is uncontrollable (Compas, 1998; Weisz et al, 1994). This is of particular relevance for health-related stressors that often involve both controllable and uncontrollable aspects.

However, it is an overly simplistic view, given that emotion-focused strategies, for example, comprise such distinct dimensions as positive reappraisal and denial of the situation, which are surely not equally adaptive in all situations (e.g., Zeidner & Saklofske, 1996; Lyons, Mickelson, Sullivan, & Coyne, 1998). Some researchers have proposed that emotion-focused coping should be better divided into strategies involving a reappraisal of the situation and those that involve avoidance (e.g., wishful thinking, overt denial, self-distraction; Endler

[13] Some authors distinguish defense mechanisms as unconscious, unintentional responses, from coping responses as conscious and intentional strategies (e.g., Cramer, 2000). However, this distinction has been criticized, in that people can be aware of what they did unintentionally, and they can also intentionally implement automatic

& Parker, 1990; Scheier, Weintraub, & Carver, 1986). In most cases, avoidant coping is rather dysfunctional. In contrast, there is evidence that positive reappraisal and humor seem quite adaptive under various health-related stressors. Moreover, a flexible repertoire and combined use of coping strategies seems to be of advantage (see Zeidner & Saklofske, 1996).

Still, even with more fine-grained levels of analyses, coping researchers yet have to come up with a comprehensive taxonomy of situational features –resource constellations that will allow to make predictions about when, for whom, under which circumstances and at what point in the coping process which strategies work best, and which only exacerbate the negative responses to the stress experience (e.g., Filipp, 1992). As Zeidner and Saklofske (1996) have put it, *"we need to clarify the meaning and function of a particular response at a level that permits meaningful generalizations about coping-outcome relations"* (p. 511).

The focus of the present research is to examine whether there are age difference in the use of coping strategies in the encounter of a standardized stressor that is the same across age groups (cataract surgery). Moreover, it is of interest to compare coping efforts of individuals that are resilient (high level of well-being in the presence of moderate to severe health stress) to non-resilient individuals and those who show positive adaptation under less severe health stress. The assumption is that resilient individuals – in dealing with the hassles of longer term adversities with little control potential – have refined their coping strategies towards the use of more emotion-focused strategies, specifically more positive reappraisal of the situation. The present analyses will not focus, however, on the predictive value of the selected coping strategies for post-surgical adaptation.

2.7. Selection of the Present Study Setting

The setting of the empirical study was chosen following two major requirements. First, the study of resilience per definition requires the presence of a developmental risk. Second, it was intended to compare middle-aged and elderly adults who face (approximately) comparable health stressors. Both requirements are assumed to be fulfilled in cataract patients. Before the reasons for selecting this particular population are explicated in more detail, symptoms, progression, and treatment of the cataract are briefly described.

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cognitive procedures (Newman, 2001). Newman further pointed put that contrary to common disbeliefs, even Freud had not conceived of defense mechanisms as always being outside individual awareness.

2.7.1. The Cataract: Symptoms, Progression, and Treatment

Cataract is one of the most prevalent age-related conditions (Wolfson & Katzman, 1992). It is characterized by a clouding of the natural lens, which swells and becomes opaque. This process usually occurs gradually, taking several years and leading to symptoms such as decrease in visual acuity (especially distance vision), blurred vision, distorted images, and increased sensitivity to light and glare. Next to glaucoma and age-related macular degeneration, cataract used to be the leading cause of visual impairment and blindness in all nations and still today it is the leading cause of blindness in the world (Prevent Blindness America, 1998).

Cataract commonly affects both eyes, although seldom at the same time (Trevor-Roper & Curran, 1984). The incidence of cataract is strongly associated with age, with an exponential increase beyond the age of 60 (for estimated prevalence rates in midlife and old age see 2.4). There appears to be a higher prevalence among females, with an approximate 2:1 gender ratio in cataract patient populations (Prevent Blindness America, 1998).

Neither the etiology nor the natural history of cataract is well known. Obviously, the various types of cataract morphology do not represent one unique disease "cataract" or "senile cataract", but reflect different biochemical characteristics (Müller-Breitenkamp. 1995). Epidemiological studies suggested a number of risk factors to be associated with cataract. These include personal characteristics, such as age, sex, race, and educational status, ocular characteristics, such as iris color, and others, such as undernutrition, diabetes mellitus, hypertension, drug exposure, smoking, and sunlight exposure (e.g., Harding, 1997). However, the behavioral factors are not well studied, and have comparatively little – if any –impact that is independent of age, the most powerful risk factor.

Cataract can only be treated by a surgical procedure, which involves the destruction (by means of an ultrasound procedure) and removal of the opaque lens and subsequent implantation of an artificial lens. This procedure is highly standardized and lasts about 15 to 20 minutes. Most operations are performed in ambulatory settings, and patients receive local anesthesia rather then narcosis whenever possible. Inpatients, that comprise the sample of this study, are usually discharged from hospital within 48 hours. Although this procedure is not associated with substantial risk or pain, psychological studies on affect changes around surgery have shown that it represents a mildly to moderately stressful episode for people (e.g., Knoll, 2002).

2.7.2. Outcomes of Cataract Surgery

In Germany, cataract surgery is one of the most common surgical interventions.. It also ranges among the most successful interventions: according to the German Ophthalmic Society (Ohrloff, 1998), post-surgical visual acuity is greatly enhanced in 90% to 95% of all patients. Complications during or following surgery are extremely rare (0.01% - 2%). In many patients, however, vision is still not fully restored, but substantially improved. In a population-based study in Sweden (Mönestam & Wachtmeister, 1999), 22% of cataract patients continued to have "poor vision" in the eye operated on (<=.50 in Snellen Decimals). Factors independently predicting worse post-surgical visual acuity were age and ocular comorbidity. Nevertheless, the majority of these patients had better vision than before, which is why this still can be considered a “gain” in an important resource. This is supported by the fact around 90% reported satisfaction with the outcome and improvement in vision-related activities (e.g., reading, household tasks).

Fagerström (1994) found higher levels of depressive symptoms immediately prior as compared to two months post-surgery. The negative association between objective visual acuity and depressive symptoms was stronger post- than pre-surgery, and supposedly temporary declines in visual acuity were unrelated to increases in depressive symptoms after surgery. These results indicate the strong impact of expectations regarding surgery, and disappointed expectations in those patients with little or no prospect of change after surgery. A renewed fear of impending blindness might be another mechanism that leads to higher depressive symptoms post-surgery in those with no or negative changes in vision.

2.7.3. Why Cataract Patients?

The development of a cataract in midlife is associated with a decreased life expectancy, particularly for midlife patients (see 2.4.1). Thus, there is evidence that cataract can be viewed as a "marker" for biological aging (Meddings et al., 1999). Given these findings, it is assumed that in middle-aged cataract patients, especially those who undergo surgery in an inpatient as opposed to ambulatory setting, chronic age-related conditions (e.g., diabetes, arthritis, cardiovascular disease) are prevalent, and multimorbidity (the simultaneous presence of two or more diseases) is present to a degree comparable to elderly cataract patients in this setting.

As to the degree of vision impairment, it is expected that age should be slightly negatively related to visual acuity in this population. Cataract surgery is a common procedure available at no costs for German patients. There are no clinical criteria as to when surgery should be performed. It is left to the patient to decide when he or she wants to undergo surgery,

suggesting that this decision is based on the subjective experience of impairment, and that objective vision differs substantially between patients presenting for first eye surgery. There is evidence that older cataract patients scheduled for surgery typically present with lower levels of visual acuity, and have a lower likelihood of gaining fully restored vision after surgery (Mönestam & Wachtmeister, 1999; Westcott, Tuft & Minassian, 2000). Thus this objective stressor is expected to show a moderate age-related decline. Loss in visual acuity, however, is but one symptom of cataract leading to subjective impairment, others are blurred vision, distorted images, and increased sensitivity to light and glare, and these are typically not assessed on a standard basis.

Thus, based on the expected rates of multimorbidity and the degree of vision impairment, it is reasoned that – considering the mean level – middle-aged and elderly cataract patients in inpatient settings experience *approximately* comparable health stressors.

Both conditions have been empirically shown to increase the risk for cognitive-emotional and functional maladaptation. However, the amount of criteria variance explained by these stressors is only low to moderate, suggesting individual differences in adaptation to them. Consequently, the study of resilient vs. non-resilient individuals in this setting is possible.

In sum, the particular population of cataract patients scheduled for surgery provides a setting to study adaptation with respect to:

1. *chronic* stress of multimorbidity and pre-surgical visual impairment (which is assumed to have lasted at least a few weeks, typically some months or years)
2. *acute* stress of anticipated surgery
3. post-surgical changes in visual acuity (a “gain” situation for most patients)

Accordingly, the present study comprises one pre-surgical (during the week prior to surgery) and two post-surgical assessments (one and six weeks after surgery, see 4.3).

2.7.4. Defining Resilience in the Present Context

Resilience is defined here as positive adaptation in face of chronic stress due to high visual impairment and multimorbidity. For the person-centered analyses, resilient patients are identified as those within the sample who have the highest levels of multimorbidity and lowest vision at baseline (one week prior to surgery), and at the same time report high well-being at both baseline and after six weeks. Well-being is chosen as the only indicator of positive adaptation under adversity, since it represents a global perception of one’s overall life situation. In contrast, depressive symptoms and functional difficulties, as well as well-being

immediately after surgery, are assumed to be more state-dependent and not necessarily short-term criteria of successfully dealing with severely adverse health problems (cf. Luthar, 1993). However, it should be noted that this choice is highly subjective, and one might just as well have chosen low functional difficulties as the most important indicator of resilience.

2.7.5. Rationale for the Comparison of Middle-Aged, Young Old, and Old Patients

Thus far, due to the scarcity of empirical evidence, this chapter has broadly focused on empirical comparisons between middle-aged and old adults. Almost all of the reported studies differ with respect to the definition of middle-aged and old or elderly participants. Furthermore, a distinction between young old and old is only made in gerontological research, but not in studies including middle-aged adults.

For the present research, midlife will be defined as the period between 40 and 65, thus accounting for the "middle" and late years of midlife. Patients beyond that age will be further divided in the "young" old and old group. This is in line with growing evidence that biological, social, and cognitive constraints accumulate significantly around age 80 – 85, leading to a fundamental decline in level and plasticity of sensori-motor functions, and eventually functional capacity in everyday life (Ketchman & Stelmach, 2001). However, the sample in the present study is not a representative population-based sample, but rather selective due to the fact that only cataract patients in an inpatient setting were assessed. Hospitalization for cataract surgery is assumed as an indicator for the presence of more severe comorbid conditions. Whether these are age-related cannot be determined here, however, on the assumption that health deterioration is greater than average in this population, it was decided to set the threshold between young old and old age in the present sample at a slightly lower age, to 75 years.

Table 2.2 outlines the rationale for the prediction of adaptational differences in the age groups within the selected setting. As has been explicated throughout this chapter, the two health stressors focused here – vision impairment due to cataract and multimorbidity – are assumed normative conditions in young old and old age, and non-normative conditions in midlife. Reserve capacities (level of resources at any given point in time) and plasticity (= potential for change), are assumed to be equally high across all age groups for cognitive-emotional adaptation. Due mostly to biological constraints, functional reserve capacities and plasticity are expected to be lowest in the oldest group.

Table 2.2

Rationale for the comparison between middle-aged, young old and old cataract patients

	Middle-aged	Young old	Old
Normativity of the selected health stressors	Low	High	High
Reserve capacities and plasticity in			
Cognitive-emotional adaptation	High	High	High
Functional adaptation in everyday life	High	Moderate – High	Low