2. Theoretical Background

The following sections present some central theoretical considerations and empirical findings by both personality and coping research. Beginning with more general theoretical accounts, specific consideration is then given to research addressing life-span and later-life aspects of both lines of research. While both concepts are initially looked at apart from each other, later sections of this chapter will present existing evidence for the joint venture 'coping as a personality process' proposition. A later part of the Theoretical Background chapter then briefly presents models and empirical findings concerning the major outcome variables employed in this study. Again, special emphasis is put on later-life aspects. The chapter concludes with a description of the special implications of the present study's setting.

2.1. Personality

"Personality is the dynamic organization within the individual of those psychophysical traits that determine his unique adjustments to his environment." (Allport, 1937, p. 48).

Gordon W. Allport may easily be referred to as a pioneer of modern personality research. His definition resulted from his collection of over 50 different conceptions of personality. Characteristic of his early work was an emphasis on *intra*individual trait organization, whereas more recent personality research focuses on *inter*individual differences, examining large groups of people. It is important to note, however, that both approaches to personality research distinguish fairly stable personality traits from more transient states. Today, traits are understood as components of emotional, motivational, and social behavior. They are proposed to describe and explain, as well as predict interindividual differences in human behavior and experience (Herrmann, 1991; McCrae & Costa, 1995).

Allport and Odbert (1936), establishing their research on personality, took advantage of the fact that language itself provides a style of classification of behavior into more "molar concepts" (Watson, Clark, & Harkness, 1994). Human language is filled with a confusing variety of descriptive attribute terms, many of which are redundant in their

meaning, yet others serve their purpose of making possible a fine-grained description of our living and breathing environment. Allport and Odbert (1936) reasoned that any important personality trait should exist in natural language (sedimentation hypothesis; lexical approach). Accordingly, they went through the 1925 edition of Webster's New International Dictionary and identified over 4500 terms describing personality traits. By this, they set the stage for a first attempt to establish a structural model of personality. Of course, the pool of 4500 items was vastly overinclusive and impractical to handle for research purposes.

Many personality researchers afterwards took advantage of the initial descriptor collection and further developed reduction and aggregation methods. Among the early attempts of aggregation was the work of Raymond B. Cattell (1945, 1946) who used a variety of grouping methods to form a coherent model of personality structure. He managed to reduce Allport and Odbert's items to 171 variables and subsequently aggregated these to 35 bipolar scales by means of cluster analyses of trait ratings. Further data reduction via factor-analytical techniques led to the identification of 12-15 factors in peer ratings of these scales. Cattell and his colleagues subsequently produced a considerable number of publications on these factors, some of which could be replicated (9 of 12 factors) in his later research. One of Cattell's great strengths lies in his efforts to approach data collection multi-methodologically: In his approach to human personality, he relied not only on questionnaire techniques, but also on peer-ratings as well as experimental and physiological evidence. In bringing results from these different data sources together, Cattell and Kline (1977) constructed the 16-Personality Factors (16-PF) inventory. Compared to other models of general personality factors (e.g., the 'Big Three' as suggested by Eysenck, 1978), Cattell clearly chose a different level of resolution. However, a summary of his work reveals an underlying model of a hierarchical structure of personality. At the bottom level of this hierarchy, Cattell placed the so-called behavior tendencies, or Surface-Traits, which by means of covariation build the basis of the next level First Stratum Source Traits, represented by the 16 personality factors. Further aggregation then led to the level of Second Stratum Source Traits (Extraversion, Cortertia, Independence, Anxiety, and Character Strength), which show marked resemblance to the more recently discussed five-factor solutions (e.g., Borgatta, 1964; Goldberg, 1990, 1993; Norman, 1963). One of the more popular

personality inventories today, the NEO Five-Factor Inventory (NEO-FFI) by Costa and McCrae (1989), can be traced back directly to the work by Cattell and colleagues, as will be elaborated below. With this early model of a hierarchical structure of personality, Cattell and his co-workers, though often unacknowledged, expressed ideas which in recent years became one of the foremost interests in personality research. In the next section, some of these more recent integrative attempts in personality psychology will be outlined briefly.

2.1.1. The Integrative Hierarchical Structure of Personality Traits

There has been considerable interest in an integration of large bodies of personality research since the 1990s. The goal of these integration efforts seems to be the development of a new and empirically guided basis for the formulation of new research questions, informed by decades of investigation into human personality (Digman, 1990; John, 1990; Watson, Clark, & Harkness, 1994).

In many instances, scientists successfully reconciled different models of personality and showed that general factor models (i.e., Big Three, Big Five, etc.) not only can be mapped upon each other, but also upon multidimensional structures of lower aggregation traits (Goldberg, 1990, 1993; Hampson, John, & Goldberg, 1986).

At the highest level of these proposed trait hierarchies, the so-called superfactors are located, which represent the broadest and most general dimensions of individual differences. The fact that they do represent *only* the highest level of aggregation taps into one of the most popular criticisms concerning general factor models: How can a construct as rich and complex as human personality be sufficiently captured by 3 to 5 dimensions?

An integrative hierarchical model answers this question and shows empirical evidence that superfactors indeed represent a meaningful and economical way of capturing broad areas of what is supposed to account partially for human behavior.

The Big Five dimensions, for instance, represent a rather broad level in the hierarchy of personality dimensions, as was alluded to earlier. As such, they are very useful for some initial rough distinctions, but of considerably less value for predicting particular behaviors (Paunonen & Ashton, 2001). John (1990) points out that the hierarchical level

a researcher selects depends on the descriptive and predictive tasks to be addressed. Generally, however, the number of attributes available for the description of an individual is infinite.

McCrae and Costa (1996, 1999) also recognize that there is a need in personality research to have a system in which different levels of generality are addressed. In their Five-Factor Theory (FFT) of personality that specifically highlights the distinction between biologically based basic tendencies and culturally conditioned characteristic adaptations, they assume different aggregational levels of traits. Basic tendencies in this model comprise abstract potentials and dispositions whereas characteristic adaptations include acquired skills, habits, beliefs, roles, and relationships. According to FFT, both broad personality factors and the specific traits that define them belong to the category of basic tendencies, which are proposed to be of genetic origin. The authors thus suggest that a hierarchy of traits and supertraits is located in a personality system that has a very strong biological basis.

McCrae and Costa's proposed hierarchical structure is also represented in the long version of the instrument they designed to assess the five personality factors, the Revised NEO Personality Inventory (NEO-PI-R, Costa & McCrae, 1989). Later sections (see Section 2.1.2) of this chapter come back to the construction of the instrument. The NEO-PI-R has 240 items that assess 30 facet scales, 6 of which form each superfactor or "domain scale" (N, E, O, A, and C). Table 1 presents Domain Scales and Facet Scales of the NEO-PI-R.

Another elaborated approach to an integrative hierarchical structure of personality was brought forth by Watson et al. (1994). In their influential paper on structures of personality and their relevance to psychopathology, the authors not only offered compelling arguments in favor of factor-analytic methods, they also pointed to the slow but tremendous progress in personality research over recent years. Specifically, they offer a "creative fusion" of all traditions of personality psychology by proposing a hierarchical model, composed of four higher-order traits which are congruent with each of the major structural subtraditions within personality.

Watson et al. (1994) view this model as merely a starting point for further research not only in personality, but also in clinical areas, the model suggested to prove useful in the investigation of the etiology of psychological disorders.

The four superfactors identified by means of principal component analysis comprise Neuroticism, Extraversion, Conscientiousness, and Agreeableness. To emphasize the congruence between the Big Three (N, E, Psychoticism or Disinhibition vs. Constraint) and Big Five Models, Watson and colleagues settled for those four superfactors, with Conscientiousness and Agreeablenes showing relations to what other theorists included in one factor, i.e., Psychoticism (e.g., Eysenck & Eysenck, 1975). The one factor not accounted for in the model, namely Openness or Culture, did not show any statistical associations to either of the Big Three factors and for this reason was not considered further in this particular study.

Table 1
Hierarchical Structure of Personality Traits (after Costa & McCrae, 1989, Watson, Clark, & Harkness, 1994, p. 26)

Domain Scale (Supertraits)	Facet Scale (NEO-PI-R)	Primary Trait (Watson et al., 1994)
Neuroticism	Anxiety, Angry Hostility, Depression, Self-Conscientiousness, Impulsiveness, Vulnerability	Anxiety, Depression, Anger, Guilt, Self-Consciousness, Oversensitivity, Self-Criticism, Stress Overreactivity, Emotional Lability, Negativistic Appraisal, Somatic Complaints
Extraversion	Warmth, Gregariousness, Assertiveness, Activity, Excitement Seeking, Positive Emotions	Gregariousness, Dominance, Exhibitionism, Energy, Positive Affectivity, Excitement Seeking
Openness	Fantasy, Aesthetics, Feelings, Actions, Ideas, Values	-
Agreeableness	Trust, Straightforwardness, Altruism, Compliance, Modesty, Tender-Mindedness	Trust, Straightforwardness, Empathy, Courtesy, Altruism, Cooperation,
Conscientiousness	Competence, Order, Dutifulness, Achievement Striving, Self-Discipline, Deliberation	Deliberation, Dependability, Self-Discipline, Achievement Striving, Orderliness, Socialization, Harm Avoidance

From this hierarchy of supertraits and lower-order component traits Watson et al. (1994) derive patterns of basic organizing principles that underlie each of the highest-order factors. On the basis of this integrative hierarchical structure that was derived from a number of earlier and more recent personality models, Watson and colleagues present

descriptions of high trait scorers for each domain scale and underlying primary traits. For instance, someone scoring high on Neuroticism is described as prone to fear, tension, worry, nervousness, and apprehension. He or she would be more likely to experience high levels of sadness, loneliness, and hopelessness. Also, this description includes proneness to high frustration and irritability, frequent guilt experiences, and episodes of self-blame. An emotionally labile person (high in Neuroticism) would furthermore be sensitive to criticism and ridicule, dissatisfied with him-/herself, and easily upset by even small disturbances, among others.

Aspects of the proposed integrative hierarchical structure of personality are taken up and discussed again in later sections of this chapter. The following paragraphs will elaborate further on issues of operationalization of higher- and lower-order personality traits, particularly focusing on the Five-Factor Model advanced by Costa and McCrae.

2.1.2. Assessment of the Big Five: The NEO Personality Inventory

As pointed out before, some of the more recent operationalizations of personality, such as the Big Five assessed by means of adjectives (Saucier & Goldberg, 1998), or the NEO Five-Factor Inventory (Costa & McCrae, 1989), go back more or less directly to the psycho-lexical approach employed by personality researchers, such as Gordon Allport (1937) or Raymond B. Cattell (1943).

The so-called sedimentation hypothesis expresses the underlying idea of this tradition. It states that virtually all interindividual differences, that is, all possible, useful, and information bearing attributes of individuals should somehow be represented in everyday language. The more important an attribute, the higher the chance of being represented in language. The sedimentation hypothesis thus implies that the entire universe of relevant attribute descriptors should be found in contemporary dictionaries.

Prominent representatives of this research tradition were Allport and Odbert (1936) and Cattell (1943), who have been alluded to in earlier sections of this paper. Employing factor-analytical techniques as central tools to reduce several different overconclusive item pools to a much smaller number of factors varying between 3 and 16, the field thrived considerably.

Today, there is still much debate about how many factors are needed to sufficiently represent personality at a higher level of aggregation (Paunonen & Jackson, 2000). Currently, one of the more popular models is the Five-Factor Model or Big Five dimensions of personality. Research on the five-factor solution has been extensive and so far has yielded a number of well-replicated findings and characteristics concerning the factors. First, persons vary continuously on them and the dimensions are fairly stable over an extended period of time during adulthood (see Section 2.1.4; Soldz & Vaillant, 1999). Some specific factors or facets thereof are suspected to be of genetic origin (Jang, McCrae, Angleitner, Rieman, & Livesley, 1998). As a result of extensive intercultural research, the five factors are considered universal, having been recovered in cultures and languages as diverse as German and Korean (e.g., McCrae et al., 1999).

Among others, McCrae and Costa now strongly propose a five-factor solution of personality. During the early 1980s, McCrae and Costa developed their model of personality, which initially included only three factors, Neuroticism, Extraversion, and Openness to Experience, measured by the NEO Personality Inventory (NEO-PI; Costa & McCrae, 1985). Later, the authors extended the model by two factors, Agreeableness and Conscientiousness, to account for more recent developments and already well-replicated findings in factor-analytic personality research. The revised and short-form instruments developed by Costa and McCrae to assess the five factors are the NEO Five-Factor Inventory (NEO-FFI; Costa & McCrae, 1989) and the Revised NEO Personality Inventory (NEO-PI-R; Costa & McCrae, 1989). Note that the NEO-FFI is a briefer instrument; it incorporates only marker variables of the primary trait or facet scales (see Table 1), which are fully represented in the NEO-PI-R.

Once again, brief descriptions of high and low supertrait or domain scorers as they are measured by the NEOs are presented next.

Neuroticism. Persons scoring high on Neuroticism (emotionally labile) tend to experience negative affect, such as being nervous, sad, hostile, insecure, and self-conscious. They are constantly worried about their health, chase unrealistic ideas, may be unable to control their impulses, and adapt poorly to stressful situations.

Extraversion. Individuals scoring high on Extraversion usually are sociable, talkative, and open toward other people. They tend to be adventurous and outgoing. Introverts, on the other hand, describe themselves as withdrawn, calm, discreet, and rather cautious.

Openness to Experience. This dimension relates to characteristics such as appreciation for new experiences, preference for variety and change. Persons with high scores on Openness report to be curious, creative, imaginative, and independent in their judgment (Costa & McCrae, 1989).

Conscientiousness has been identified as the opposite pole of undirectedness. Individuals high on Conscientiousness are characterized as having the tendency to be habitually reliable, careful, hard-working, well-organized, and purposeful.

Agreeableness is proposed to be the opposite pole of antagonism. It describes persons who report to be friendly, understanding, caring, empathic, altruistic, and good-natured. High scorers report a high degree of interpersonal trust, willingness to cooperate, and compliance. They also report a great need for harmony.

2.1.3. Limitations of the Five-Factor Solutions

German personality researchers Borkenau and Ostendorf (1993) mention two grave limitations to the body of findings concerning the five-factor structure of personality. The first limitation concerns results of principal component analyses being dependent on the sample of variables used, and the second refers to the interpretation of some of the factors extracted.

With respect to the sample of variables used, there are major differences in personality inventories concerning emphasis of assessed traits. The NEO-FFI has been reported to yield relatively stable factor solutions across different samples. Other questionnaires (e.g., the EPI by Eysenck & Eysenck, 1968), however, reveal differences in assumptions about centrality of certain personality traits, and, therefore, they tend not to cover more-factor solutions.

Another limitation concerns factor interpretation. One good example for interpretative divergence is the factor "Openness to Experience." Some authors prefer to interpret this factor as "culture" or "intellect." Borkenau and Ostendorf (1993) offer an explanation for discrepancies among factor interpretations. Generally, all 3 to 7 personality factor models are very low in resolution, thus termed "superfactor models of personality." As has already been discussed, they can be seen as the highest level of a hierarchy of covariance that describes numerous different behavioral strategies or characteristics on

lower-order levels. Sampling of these high-resolution facets of behavior in a first step provides the basis of later factor interpretation. At this time, some factor names, such as Openness to Experience, still provoke intense discussion and disagreement among personality researchers.

Another topic of intense discussion pertains to the stability of the five factors throughout adulthood. Since the present research conceptualizes personality as a stable and predictive characteristic that is part of the dynamic of the stress and coping process, not only in a demanding situation, but also in the wider frame of adult development, the following sections will briefly outline some aspects the discussion about stability of personality across the life-span.

2.1.4. Stability of Interindividual Differences over the Life-Span

Despite cumulative health-related obstacles occurring in old age, elderly persons usually report a high degree of subjective well-being. How can we explain this seemingly paradoxical finding? Many attempts have been made to find resources special to the later part of the life-span to account for the enormous capability of old persons to adapt to various life stressors and still report high well-being. Among processes of biased perception, or social comparison strategies, personality has been and continues to be in the focus of attention regarding the ongoing debate about personal resources in old age.

One of the major reasons for this appears to be the fairly high structural stability of personality observed in many cross-sectional as well as longitudinal studies (e.g., Conley, 1984; Costa & McCrae, 1988; Haan, Millsap, & Hartka, 1986; McCrae & Costa, 1990; McCrae et al., 1999, 2000; Smith & Baltes, 1999). The Big Five Model has been proven to provide a high degree of structural invariance, seemingly a prerequisite for developmental research where questions focus on stability and change of the human psyche in different states of maturation.

McCrae and Costa (1990) examined issues of long-term stability concerning the Big Five factors, Neuroticism, Extraversion, Openness, Conscientiousness, and Agreeableness. Based on the findings of selected longitudinal studies (e.g., Conley, 1984; Costa & McCrae, 1988; Haan, Millsap, & Hartka, 1986), the authors report a high degree of rank stability on personality dimensions beginning in young adulthood.

Stability in this case refers to an individual's unchanging position within the tested sample, his or her stable ranking position. In more recent papers concerning, among other subjects, the structural stability of personality over the life-span, McCrae et al. (1999, 2000) found additional evidence of structural invariance of personality among different age groups in cross-cultural comparisons. The authors suggest that cross-sectional studies of age differences in different countries provide a simple way to avoid some limitations of cohort and cultural effects, for different cultures have different histories. In these most recent studies, data from Germany, Italy, Portugal, Croatia, South Korea, Estonia, Japan, the Czech Republic, Spain, and Turkey were analyzed by the authors. Compelling evidence for the relative stability of personality in age groups between 14 to 50+ years was reported.

As for the increase and decrease of mean scores over time, McCrae, Costa, and co-workers refer to "intrinsic maturation of personality." Absolute scores may change, but interindividual differences remain constant. Costa and McCrae (1988) report slight changes in means for Neuroticism, Extraversion, and Openness comparing younger and older cohorts cross-sectionally. Decrements in Extraversion, Openness, and Neuroticism were found. As for cross-cultural data, McCrae et al. (1999, 2000) largely replicated the changes in Neuroticism, Extraversion, and Openness to Experience and also found increases in Agreeableness and Conscientiousness in older age groups.

Smith and Baltes (1999) also report differences in personality means among different age groups in the Berlin Aging Study (BASE; Baltes & Mayer, 1999). Due to the cross-sectional nature of the data, Smith and Baltes compare mean scores between different age groups (age range: 70–100 years). Findings suggest a slight increase of Neuroticism means in older age groups as well as a slight decrease on factors Openness and Extraversion in the older cohorts.

Though always significant, differences between age groups reported in the above studies appear to be rather small. The same is true for longitudinal data in which test-retest correlations were found over 6, 12, or 20 years that strongly resembled short-term retest reliabilities (Costa & McCrae, 1992; Finn, 1986). Mainly, structural variation turned out to be small, which is surprising, considering the innumerable experiences and life-conditions an individual faces in his or her life course of which one would readily expect a radical change in a person's personality equipment. In making a case for a thus-

suspected strong genetic influence upon personality development, McCrae and co-workers (2000) argue:

> *"On the one hand, these findings pointed to the existence of something in the individual that endured over long periods of time - a key piece of evidence for the reality of personality traits. On the other hand, it cast into doubt the influence of intervening events. Over the course of a 30-year study, many participants would have had major life changes in occupation, marital status, family stage, physical health, and place of residence. They would have shared their cohort's experience of assassinations, wars, and recessions; read dozens of books; watched thousands of hours of television. But the cumulative force of all these external influences on personality test scores is barely detectable."* (p. 177)

With respect to the present research interest, the relative stability of personality over the life-span is of primary importance. Specifically, on the basis of the above-presented findings, personality is conceived of here as a stable human characteristic. Changes over a short assessment period of 6 to 7 weeks are expected to be negligable and will not be addressed in data assessment.

2.1.5. On the Coexistence of Stability and Change

Aside from the evidence presented above and on a more critical note, invariance of personality structure over the life-span by no means equals 100%. Depending on calculations employed, Staudinger and Pasupathi (2000) suggest that stabilities reported vary between 50 and 75%. However, the integration of stability and change remains a central interest in the present study, not so much regarding absolute scores of Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness, but mainly with respect to expected associations between personality differences and coping with stress.

Staudinger and Pasupathi (2000) offer a theoretical explanation for the coexistence of stability and change found in longitudinal personality data. The authors view continuity

and change as a necessary "dialectic" which is assumed to support the "proactive-adaptive function of the self" (p. 21):

> *"High levels of stability in personality structure should not be taken as evidence against personality development. Rather, such evidence indicates that people's self-related knowledge structures are organized in stable ways. But within this frame of a stable structure or a sense of coherence, individuals adapt to and compose their developmental contexts, that is they change and provide for change in the way they view themselves."*

With regard to the debate about dispositional versus state concepts in coping research, Krohne (1993, 1996) takes on a slightly different argument concerning the misinterpretation of stability versus remaining static and the interplay of structure and process.

Krohne argues that process and structure are merely located on different levels of abstraction. In his view, process pertains to the stream of observable events. Structure, on the other hand, describes a kind of orderliness or organization which may or may not be detected within the stream of events. Structure, in addition, refers to mechanisms of process, therefore potentially providing explanatory links. One condition of structural analysis is represented by the concept of "system" (Krohne, 1993, 1996).

Krohne further explains that stability and change are not mutually exclusive, for remaining stable does not equal remaining static. Change may be stable or unstable (Mischel & Shoda, 1995). Instability refers to the shortly anticipated or yet underway collapse of the system or its inability to prevent strong deviation of system states during times of confrontation (Ashby, 1956; Krohne, 1993, 1996). Stable change, on the other hand, implies the relative replicability of a process which can only be achieved if relevant mechanisms of change have been detected a priori (Herrmann, 1973).

Mechanisms of change may be identified via inductive or deductive approaches. A first step involves the analyses of very small units of events or microanalytic events. Laux and Weber (1987) argue that by this, one can observe first traces of organization in the process (inductive approach). Stability of change, however, can only be detected by means of deduction, in which one has to apply specific theoretical concepts upon the

analysis of events (or behavior). By this, one has the chance to find organization in what might otherwise be regarded as unorderly (Krohne, 1993, 1996).
Leaving now the issue of stability versus change in various conceptions of personality traits, the following chapters deal with a brief description of major theories on coping with stress. Different theoretical traditions on adaptation and coping are introduced along with a selection of empirical findings that seem relevant for the questions addressed in this paper.

2.2. Coping with Stress

For over one hundred years (S. Freud, 1894), the question about how individuals deal with acute or chronic stressful encounters has been among the most-studied topics in psychology. Throughout this time span, the study of coping and adaptation has only briefly been separated from the study of interindividual differences. However, some scientists advocate a rather sharp distinction between personality and how people come to terms with managing upsetting situations or periods of time. As Suls, David, and Harvey (1996) suggest, the history of coping research can be divided into three eras which successively endorsed coping to be "synonymous with, completely distinct from, or as overlapping with personality traits" (p. 712). Adding one more theoretical line of reasoning which focuses purely on the stimulus perspective of stressful encounters, the following sections will elaborate on each of these distinct eras and their prominent findings to prepare an argument for the approach assumed in this study.

2.2.1. The Psychodynamic Perspective on 'Coping'

At the beginning of this century, psychoanalysis constituted much of the psychological discipline. Analysts proposed a psychodynamic/ego-development perspective as an underlying framework in their quest to understand how people handle adversity.
Coping was understood as mostly unconscious defense mechanisms which took over once an individual experienced internal sexual and aggressive conflicts (A. Freud, 1937; S. Freud, 1894/1964). Following this tradition, scholars later included external threats as sources of conflict (Haan, 1977).

Today, a relatively clear distinction is made between defense mechanisms and coping, with the most prominently claimed difference between the two concepts being the degree of their conscious representation (Aldwin & Yancura, in press; Haan, 1977). Moreover, defense mechanisms classically are designated as maladaptive, whereas coping research, especially in instances where it is shaped by transactional ideas (see Section 2.2.3.), typically avoids a priori evaluative labeling. Nevertheless, many of the present ideas and studies on how idnividuals deal with taxing situations can be traced back directly to early psychoanalytic theory as a common root for now distinct areas of research.

The collection of defense mechanisms represented many different unconscious strategies to protect the individual from harm originating either from the self or being imposed by the outside world. Among the first defenses suggested by S. Freud (1894/1964) were dissociation, repression, and isolation. Subsequently, other psychodynamically inclined scientists proposed a number of additional defense mechanisms.

Vaillant (1994) suggests a hierarchical structure of defenses, ranging from psychotic (e.g., denial) over immature (e.g., dissociation), and neurotic (e.g., repression), to mature (e.g., humor) mechanisms. Within this order, only the mature defense mechanisms allow the individual to deal with the reality of the stressor. Psychoanalytic theorists tended to see these defenses as enduring strategies, such that persons display stable and characteristic differences in their adaptational style (Watson & Hubbard, 1996).

Haan (1977), a very influential proponent of the psychodynamic perspective on coping, drew a distinction between defense mechanisms and coping. Both ego defenses and coping were suggested to develop out of mental processes. Nevertheless, ego defenses and their behavioral outcomes were conceptualized as more rigid, reality-distorting, and derived from unconscious elements. Coping, on the other hand, was presumed to be more flexible, reality-oriented, and largely derived from conscious mental processes (Haan, 1977).

Other scholars taking up psychodynamic concepts, focused on a more limited collection of defense mechanisms and their trait-like propensities. Byrne (1964) proposed the unidimensional coping style repression-sensitization. Repression stands for a tendency

to avoid sources of anxiety by means of distraction or denial. Sensitization representing the other extreme of the continuum, reflects the tendency to confront stressful situations, such as in worrying or intellectualization, etc. Coping behaviors elicited by the underlying trait repression-sensitization represented most of the earlier concepts of defense mechanisms.

The evident failure to distinguish coping from outcome along with the implicit suggestion that one "style" inevitably led to negative, the other to positive consequences for the struggling coper, soon became the focus of critique by other researchers (Folkman & Lazarus, 1980). Furthermore, the equation of personality and coping found in the psychodynamic literature fed additional dissonance in the discipline and eventually led to the slow disappearance of psychodynamic views from the literature on coping and personality.

With Mischels fundamental critique on personology (1968) and the notion that traits are poor predictors of behavior, trait approaches to coping were finally discredited. At the beginning of the 1970s, Cohen and Lazarus (1973) suggested further evidence for personality being a poor predictor of coping behavior and subsequently laid track for a new period of theories and research on coping and adaptation (Suls, David, & Harvey, 1996).

2.2.2. The Stimulus-Based Perspective

Another era of research on stress was brought to life between the late 1960s and the mid-1970s (Dohrenwend & Dohrenwend, 1974; Holmes & Rahe, 1967). This stimulus-based approach to stress and coping focuses on the average *amount of adaptive effort necessary* to cope with particular situations and defined it as a useful indicator of the severeness of events. In their line of research, Holmes and Rahe (1967) attempted to measure life stress by assigning numbers, the so-called 'life-change units,' to 43 critical life events (Social Readjustment Rating Scale, SRRS; Holmes & Rahe, 1967). Critical life events included for instance the death of a spouse as the most severe event, pregnancy and changing work environments ranging in the middle, and Christmas as a less severe but still taxing situation. The list of potential life events thus not only includes commonly claimed adverse situations, but also ones of a more benevolent if

not joyous nature which are *proposed* to be taxing nevertheless. Schwarzer and Schulz (in press) point out one frequent criticism directed at the life event approach which is closely connected to this feature of the SRRS: Average weights are assigned to events, but interindividual differences in the perception of these events are not taken into account. Also, life-event research too often relies on retrospective reports of previous challenges that might not be remembered well or distorted as a result of defense mechanisms. Moreover, coping processes and sources of social support are often insufficiently examined (Schwarzer & Schulz, in press).

2.2.3. The Transactional Perspective

The next generation of coping research was largely dominated by a process-view on coping, rather than the assumption of underlying stable structures (such as personality traits). New theories emerged (e.g., Carver & Scheier, 1988; Epstein, 1972; Leventhal & Everhart, 1980; Silver & Wortman, 1984), the citation classic of which is the transactional model by Richard Lazarus and Susan Folkman (1984, 1987; Lazarus, 1966, 1991).

Lazarus and his colleagues emphasized the importance of coping behavior and its cognitive antecedents as well as situational determinants. In a first revision of his original theory (Lazarus & Launier, 1978), Lazarus defines stress as a transactional process. Stress, according to this view, is not a mere propensity of a certain stimulus, nor is it but a reaction performed by an individual. The perception of stress is proposed to be determined by an interplay (transaction) of situational and personal factors, a reciprocal process. Lazarus elaborates on the term transaction by differentiating it from the term interaction as it is used in differential psychology. While interaction means that the interacting variables, person and situation, retain their separate identities and are fractioned statistically into portions of variance, a "[…] transaction implies a newly created level of abstraction in which separate person and situation elements are joined together to form a new relational meaning" (Lazarus & Folkman, 1984, p. 294). Dealing with stress, or *coping,* is defined by Lazarus (1991) as a process aimed at the management of external and internal demands which are appraised to be severely taxing or even exceeding an individual's resources (Lazarus & Folkman, 1984; p. 283).

Additionally, Lazarus and Folkman (1984) suggested two broad functions of coping i.e., emotion-focused coping and problem-focused coping.

Emotion-focused coping refers to efforts to regulate an emotional response and ultimately alleviate emotional symptoms of distress, specifically through an increase in tolerance for negative events, or the stabilization of emotional balance (Cohen & Lazarus, 1979). Problem-focused coping, on the other hand, describes actions or cognitions dealing with or altering the source of stress itself (Folkman & Lazarus, 1980), i.e., the minimization of harmful environmental aspects. According to the authors, employment of emotion-focused versus problem-focused coping depends on an individual's perception and appraisal of the situation at hand.

In the process of a potentially stressful encounter, different types of appraisals are employed:

Primary appraisal refers to an evaluation of the situational characteristics. An individual may evaluate any situation as being irrelevant, benign, or stressful with respect to his or her own well-being. In a second step within primary appraisal, a potentially stressful situation is evaluated as involving either harm-loss, threat, or challenge.

During secondary appraisal, the individual evaluates his or her resources in relation to the perceived situational demands. If a situation is further perceived as changeable, the individual is proposed to be more likely to engage in problem-focused coping. If changeability of the situation cannot be assured, the individual may deal solely with the regulation of his or her emotional response (e.g., anxiety). As a result of the situational as well as resource assessment, a reappraisal of the situation may evolve, starting the process anew. Note that albeit their being termed "primary" and "secondary appraisals", Lazarus explicitly refrains from describing them as being positioned in any sort of chronological order.

In 1979, Cohen and Lazarus contended that personality traits were of little predictive value when it comes to behavior; moreover, citing several different studies, they stated that individuals made use of many different coping strategies during a particular stressful encounter, thus giving situational determinants more weight with respect to choice of coping behavior.

Lazarus, Folkman and associates (Aldwin, Folkman, Schaefer, Coyne, & Lazarus, 1980) also developed a self-report measure of coping, based on their transactional

model. The Ways of Coping Checklist (WOC; Aldwin et al., 1980; Folkman & Lazarus, 1980) originally comprised 68 items, describing avoidance, intellectualization, information-seeking, and direct action strategies, grouped in either problem-focused coping or emotion-focused coping categories. In the first version of the WOC, study participants were asked to indicate on a yes or no basis which of the presented coping strategies they endorsed while facing "the most upsetting event of the week". Later, the WOC was revised (Lazarus & Folkman, 1984) and ultimately consisted of 66 items which were to be answered on a four-point scale, ranging from 0 (not used) to 4 (used a great deal). Since its development, the WOC has become one of the most widely used coping inventories, employed with a wide variety of participants (e.g., college undergraduates, community-dwelling adults), stressors (e.g., death of a spouse, surgery), and outcome variables (e.g., well-being).

Parallel to this cognitive/situational approach to coping research, a few attempts have been made to re-include personality into the concept. More specifically, personality types and their possible association with certain health outcomes were studied.

Among the most prominent personality type research projects ranged a concept originally introduced by the cardiologists Friedman and Rosenman (1959), the Type A Behavior Pattern (TABP; Friedman & Rosenman, 1959; Glass, 1977; Matthews, 1982). The Type A person was originally characterized by an excessive competitive drive, impatience, and hostility. TABP was furthermore found to be associated with an early development of coronary heart disease (CHD) in several large-scale epidemiological studies. Although TABP was assumed to be a coping style (Glass, 1977), coping was rarely directly assessed, but regarded to be implicit in the resulting relationship between stress and outcome (Suls et al., 1996). Inconclusive findings eventually led to the isolated examination of certain Type A characteristics, e.g., hostility, and therefore the notion of unhealthy personality trait patterns (or types) was soon questioned (e.g., Scheier, Carver, & Bridges, 1995).

The next section deals with a fairly new line of research which attempts to explicitly integrate traditional personality concepts and coping.

2.2.4. Personality and Coping

How might personality and coping be fruitfully reconciled on a new level? Bolger and Zuckerman (1995) address this question systematically and provide a framework for studying personality in the stress process. On the basis of numerous findings, they argue that personality not only affects the exposure to stressful events, the reactivity to those events, or both, but also, if only in part, leads to predictable coping processes that in turn affect the outcomes of such events. The authors maintain that the stress process can be divided into two fundamental stages, i.e., stressor exposure and stressor reactivity. *Exposure* represents the degree to which a person is likely to experience a stressful event, and *reactivity* pertains to the extent to which a person is likely to show emotional or physical reaction to a stressful event. Moreover, the authors claim that reactivity to a stressor can further be divided into *coping choice* and *coping effectiveness*, where choice represents the coping efforts individuals engage in while responding to a stressful event. Effectiveness, on the other side, refers to the extent to which these coping efforts reduce the negative outcomes of the stressful event.

For both partitions, (a) exposure and reactivity, and (b) choice and effectiveness, Bolger and Zuckerman delineate four models of effects personality may have on the stress process. Since the "third era of coping research," as Suls and David (1996) called it, is primarily concerned with how personality may affect the latter pair, the different models suggested by Bolger and Zuckerman are briefly reviewed next.

1) *The null model* predicts that personality does not affect either coping choice or coping effectiveness.
2) *The differential coping choice model* holds that personality affects the choice of coping strategies but not their effectiveness. Once coping strategies are chosen they are equally effective for everyone. Here, coping mediates between personality and outcome.
3) *The differential coping-effectivenes model* proposes that personality does not have an effect on coping choice, yet coping still explains personality effects on reactivity. This occurs if personality moderates the effectiveness of coping.
4) Finally, *the differential choice-effectiveness model* holds that personality leads to differences in coping choice (mediation) and coping effectiveness (moderation)

and both account for personality differences in stress outcomes. Here, it is important to compare the relative impact of the two mediation and moderation processes.

The authors note that when coping is applied to explain personality effects, coping-choice models are the standard approach. Many studies have so far investigated the mediational role of coping when it comes to more specific lower-order trait variables or so-called personal resources. Possible mediation of Optimism or Locus of Control - outcome relationships have been studied in health (Carver et al., 1993; Scheier et al. 1989; Stanton & Snider, 1993), ego-relevant (Aspinwall & Taylor, 1992), and other stressful settings (Holahan & Moos, 1990, 1991). On a higher-order level, studies investigating a possible mediational role of coping between some or all of the five-factor traits (i.e., Neuroticism, Extraversion, Openness, Agreeablesness, and Conscientiousness) are still rare.

As an exception, Bolger (1990) examined fifty premedical students during an eight-week period surrounding their participation in the Medical College Admission Test (MCAT). The students reported their coping efforts 35 days before, 10 days before, and 17 days after the exam. Daily reports on state anxiety were obtained pre- and post-event. Neuroticism influenced coping efforts and increases in daily state anxiety with increasing proximity to the event. Two types of coping, i.e., wishful thinking and self-blame, explained up to 50% of the relationship between Neuroticism and increases in pre-examination anxiety. Neither Neuroticism nor specific coping efforts influenced test performance. It should be noted, that this independent causal status of coping remains somewhat controversial.

McCrae and Costa (1986) in a community sample of adults did not find marked associations between coping and distress after Neuroticism and Extraversion were controlled for. They concluded that reports of coping efforts were but "epiphenomena of personality" and did not obtain independent causal status, a claim which seems to challenge the central assumption of coping theories and research. Nevertheless, the authors did find significant associations between personality traits and coping efforts. McCrae and Costa reported Neuroticism being related to increased frequency of indecisiveness, escapist fantasy, self-blame, withdrawal, passivity, wishful thinking, and sedation.

Bolger (1990), having found that "neuroticism leads people to cope ineffectively, and this coping, in turn, leads to increases in distress" (p. 534), commented on this earlier study and suggested that the means of coping assessment (i.e., relying on retrospective reports on coping with a difficult life event) is to blame for the lack of independent causal status of coping in McCrae and Costa's research. Instructing participants to recall long-past (i.e., up to two years) life events and associated coping efforts is likely to result in bias due to inaccurate recollection of events and reactions. Peterson (1980) in his paper on "memory and the dispositional shift" suggests that with elapsing time, people become more biased towards dispositional accounts of their behavior. Accordingly, Bolger as well as Aldwin and Yancura (in press) offer, that McCrae and Costa's participants may have reported their habitual coping efforts instead of the ones employed during the long-gone stressful event. This in turn might have resulted in coping losing its independent predictor status when Neuroticism and Extraversion as "superordinate" constructs (and likely to encompass habitual coping) were controlled. The proposition, that trait assessment of coping leads to spurious effects between coping and outcome variables once higher-order personality traits are conrolled, has not yet been tested explicitly, however.

Watson and Hubbard (1996) also investigated associations between personality and coping in a cross-sectional study with college undergraduates. Using the COPE inventory (Carver, Scheier, & Weintraub, 1989), the authors found Neuroticism to be significantly related to coping strategies, such as behavioral disengagement, denial, and acceptance (negatively related). Extraversion was less broadly related to coping; however, correlations were obtained linking Extraversion with seeking social support, positive reappraisal, and problem-focused coping. Interestingly, Openness showed a moderately strong negative relationship with "turning to religion." Other than that, Openness seemed to be associated with a more flexible, imaginative, and intellectually curious approach to problem solving (Watson & Hubbard, 1996). Conscientiousness was related to active, problem-focused coping strategies. Agreeableness was not at all significantly related to coping.

David and Suls (1999) examined a broader range of daily hassles, associated coping, and personality dispositions. They found that high scorers on Neuroticism used more catharsis and relaxation strategies. Both are typical emotion-focused coping behaviors.

Moreover, distraction and relaxation were used more frequently by emotionally labile individuals and in response to less severe problems. With respect to Extraversion, David and Suls (1999) found positive associations with a variety of emotion-focused strategies, such as redefinition, catharsis, and religion. Also, extraverts more frequently engaged their social networks as a response to daily stressors. Openness to Experience was found to be significantly related to distraction and to moderate the relations between perceived problem severity and catharsis as well as religion. For both catharsis and religion, the association with problem severity was found to be stronger among less open persons.

Apart from the research conducted by McCrae and Costa (1986), none of the studies looking at the interplay of the five-factor traits and coping were specifically concerned with coping processes in older age groups. Also, prospective studies examining how both higher-order personality traits *and* coping contribute to the prediction of developments in outcome variables are scarce. However, it might be through their relations with personality that some of the more stable aspects of coping can be identified. Available results suggest that individuals of different ages (college, mid life, and old age) and while exposed to a variety of stressful situations (physical, ego-relevant, long-term, short-term) exhibit considerable variability within their coping efforts. At least some of this variance can consistently be explained by interindividual differences in Neuroticism, Extraversion, Openness, and, to a lesser degree, Conscientiousness and Agreeableness.

But how about emotional adaptation to demanding situations? If personality indeed predicts coping choice, does it also take over the coping-outcome associations? As noted earlier, there is some evidence for both a positive and a negative answer to the latter question. Interestingly, the only study testing this question with older subjects came to the conclusion that above and beyond general personality traits, coping strategies were of no considerable value in the prediction of adaptation to stressful events, stating that coping might be but an "epiphenomenon of personality" (McCrae & Costa, 1986). As pointed out before, however, there is some evidence pointing to the contrary (Bolger, 1990; Bolger & Zuckerman, 1995; Vollrath, 2001). Studies using a prospective and more proximal, situation-specific approach to the assessment of coping,

did find coping to remain a significant predictor of outcome variance even after personality traits were accounted for.

The present study attempts to examine more closely the interplay of higher-order personality traits and coping with regard to the adaptation to stress. Assessments of both situation-specific and dispositional coping make it possible to address in depth questions about the "coping as a mediator" (Bolger, 1990) versus coping as an "epiphenomenon of personality" (McCrae & Costa, 1986) debate.

2.2.5. Formal Classification of Coping

Aside from different theories on the definition, structure, and goals, one can also differentiate various *formal* classifications of coping. Depending on the level of abstraction or aggregation, a distinction can be made between macroanalytic versus microanalytic approaches to coping research (Krohne, 1990).

Microanalytic approaches look at many, rather narrow coping strategies. Macroanalytic approaches, on the other hand, consider very broad categories and higher levels of abstraction (Laux & Weber, 1990). The issue of level of aggregation also taps into the distinction between state versus trait approaches to coping (Cohen, 1987).

State concepts view coping as a number of mainly situationally determined strategies. The individual is suggested to employ different strategies during a stressful episode, and the choice of strategies is proposed to be determined by situational demands only (e.g., Lazarus, 1991). Dispositional or trait approaches suggest the existence of more or less stable interindividual differences with respect to coping efforts. Individuals are suggested to show a habitually consistent way of dealing with taxing circumstances. As outlined above, stability in this case *again* does not exclude change. As Krohne (1993) pointed out, process refers to the current of observable events, whereas structure highlights the orderliness or predictability of these events.

The present research compares the predictive quality of situation-specific versus trait coping with short- and long-term outcomes. The situation-specific approach chosen here spans a limited time-frame in the recent past (one week up to and including the day of assessment) and offers a situational anchor (the anticipated stressor) for reference. The trait measure on the other side asks for usual reactions to stressful situations without

yielding a specific frame of reference. Carver and Scheier (1994) contrasted the predictive value of stiuation-specific versus trait coping in a sample of college students preparing for an exam. Their findings pointed to a better prediction of emotional adaptation by situation-specific coping as opposed to trait coping measures. Testing both aspects of coping in the present research yields the possibility of a direct comparison of situation-specific versus trait coping as mediators between personality variables and various forms of outcome measures as outlined above.

Following in the next section, a number of content-free features of coping are briefly outlined. These meta-characteristics are often neglected in current coping research. They revolve around aspects of stability, flexibility, or patterning of coping.

2.2.6. "Content-Free" Characteristics of Coping

With regard to what is termed here "content-free" aspects of coping, not much is known to date. They include range or total number of coping strategies available, frequency of change and stability of coping behavior, degree of availability of certain coping strategies, typical employment sequence of strategies in different situations, and so on. The following section presents theoretical considerations and empirical findings on two content-free aspects that are closely related to the stability of coping efforts and how stability and instability affect adaptation. The concepts discussed here have recently been suggested by Staudinger and Fleeson (1996), they are, selective and non-selective flexibility of coping.

Flexibility in Coping. The construct of flexible coping has long been reflected by the systematic use of a wide variety of different coping strategies in different situations rather than the more rigid applications of few strategies across settings. So far, the construct has been operationalized mostly by determining the amount of coping strategies endorsed or the range of use of each coping strategy across different situations, but also only within one situational frame, or just within one assessment of different dispositional coping strategies (Carver et al., 1993; Staudinger & Fleeson, 1996). As an alternative, Schwartz and Daltroy (1991) have developed an ingenious but time-consuming card sorting measure, the *Flex*. With this technique, subjects indicate

how they would cope with potential problems in *many areas of life*, by placing cards with descriptions of different coping efforts in a matrix of categories, ranging from 'most like me' to 'least like me'. Flexibility of coping is determined by calculating the range of movement of each card across situations along the continuum from 'most' to 'least like me'. In a study with chronic pain patients, Schwartz and Daltroy (1991) found that flexibility thus determined, interacted with self-efficacy in the prediction of physical problems. Applying the same instrument and contrasting it with the more widely used methods to assess flexibility described above (e.g., range or total number of strategies), Lester, Smart, and Baum (1994) conducted a study with community-dwelling adults ranging from 18 to 66 years of age. Again, subjects were asked to indicate their preferred coping efforts across a number of different situations (e.g., arguments with a friend or moving). Coping flexibility was summed over situations. Among other findings, Lester et al. reported that both modes of assessing flexibility in coping across situations were negatively related with age, indicating less flexibility in coping across different situations in older than in younger persons. The authors suggest that people may learn to use particular coping methods, and that older persons may have learned to use successfully fewer options over time. Comparing the Flex to alternative, less time-consuming techniques to assess flexibility, the authors found much resemblance between the findings produced by both approaches.

Much of the flexibility research has been concerned with demonstrating that more flexibility *across situations* leads to higher well-being (e.g., Felton, Revenson, & Hinrichsen, 1984; Shapiro, 1986). Staudinger and Fleeson (1996) also contend that rather than any particular manner of coping, self-rated resilience seems related to the availability of a variety of different forms of coping. However, they further qualify this claim. The authors warn that the availability of a wide repertoire of coping responses and flexibility in using them should not be mistaken to be equivalent with what they term non-selective flexibility, or an indiscriminant use of all available coping strategies. According to Staudinger and Fleeson, the indiscriminant use of all available strategies is not likely to contribute to the facilitation of the person-situation fit. Somewhat in line with this idea, Coyne, Aldwin, and Lazarus (1981) suggested that depressed individuals use a greater number of coping strategies when dealing with a stressor than do non-depressed individuals. Hence, Staudinger and Fleeson (1996) propose a distinction

between *selective* versus *non-selective flexibility* in coping. In contrast to non-selective flexibility, selective flexibility is defined as selecting a moderate number of coping styles from the repertoire that fit the special demands of challenging situations. Using the cross-sectional data of the Berlin Aging Study (BASE; Baltes & Mayer, 1999), the authors operationalized selective flexibility by computing the intraindividual variance in endorsement across 13 assessed coping styles. They found a moderate positive association between selective flexibility in coping and emotional well-being. This association remained significant when the content of the coping pattern was controlled for.

Looking at the less selective aspect of flexibility and closely resembling what Staudinger and Fleeson termed non-selective flexibility, Krohne (1993, 1996) comes to a similar conclusion regarding the lack of adaptiveness of this form of lacking selectivity in coping in his dispositional coping theory. He proposes a theory that suggests two independent dimensions of coping, vigilance and cognitive avoidance. In their orthogonal constellation, they yield four quadrants, each representing one habitual coping modus. Individuals scoring high on cognitive avoidance and low on vigilance are called *repressors*. Those high on vigilance and low on cognitive avoidance are referred to as *sensitizers*, those low on both dimensions are termed *non-defensives*, and those high on both dimensions *unsuccessful copers*. Regarding formal characteristics of coping, especially this last group is of interest. Unsuccessful copers are suggested to be highly intolerant towards ambiguous stressor characteristics and also towards high levels of emotional arousal. As a consequence, they should tend to seek information about the stimulus to reduce uncertainty (vigilance), but at the same time find themselves unable to stand the associated emotional arousal and draw back before the mission is accomplished. To lower their arousal, they subsequently turn away from the stressor (cognitive avoidance), again risking a higher degree of uncertainty. According to Krohne (1986, 1996), unsuccessful copers' behavior should be characterized by a continuous change of coping strategies moving back and forth between avoidant and vigilant coping, yet being unable to adequately manage the taxing situation. In a large number of field studies and laboratory experiments, Krohne and colleagues (e.g., Kohlmann, Weidner, & Messina, 1996; Krohne & Hock, 1993; Krohne, Schumacher, & Egloff, 1992) found evidence favoring this theory.

The investigation of different aspects of what Staudinger and Fleeson (1996) termed *flexibility* is one of the central aims of the present research. Since this study mainly looks at coping reactions to one specific situation, cross-situational aspects of flexibility will only be inspected to a very limited degree (i.e., through an additional dispositional approach to coping). Hence, to avoid misleading terminology it was refrained from referring to these context-free aspects of coping as two forms of flexibility. However, what has been termed *selective flexibility* by Staudinger and Fleeson (1996) is simply coined *selective coping* in this context, for the selectivity issue seems to be the most salient characteristic of this particular pattern of coping. The operationalization remains the same; selective coping in this study refers to the intraindividual variance in coping endorsed by participants, high intraindividual variance pointing to a more pronounced endorsement pattern. What was termed *non-selective flexibility* of coping by Staudinger and Fleeson, is labeled more simply *total range* of coping strategies endorsed. Furthermore, the formation of predictions and research questions in this setting was guided by theoretical considerations and empirical findings by Staudinger and Fleeson (1996) and Krohne (1993, 1996).

2.2.7. Coping in Old Age

Does the way people handle potentially stressful situations change as they grow older? Aldwin and Levenson (2001) summarize theoretical approaches to coping and adult development in three basic views: theories emphasizing decrement that point to 'worse' coping in old age, those emphazising increment, i.e., improvement in coping ability with age, and those emphasizing stability, implying little or no intrinsic change with chronological age.

Strack and Feifel (1996) as well as Folkman, Lazarus, Pimley, and Novacek (1987) also address this question and divide the same theoretical approaches in *developmental* (including both decrement and increment theories) versus *situational* (stability theory) perspectives.

"Developmental perspectives" include theories on coping over the life-span which explore human development in the context of individual growth. In this tradition, associations between chronological age, intrapsychic functioning, and coping behavior

are assumed. Developmental models of aging and coping go back to the work of Jung (1959), who conceived aging essentially as a process of ripening in which an individual experiences differentiation and reintegration of character facets. Jung termed this process of maturation "individuation." Seeing old age as a time of fulfillment, Jung described the dynamics of the way of getting there as meeting more and new challenges. In coming to terms with these challenges, the individual refines his or her coping efforts and thus increases the understanding of the meaning of life.

Also, Erikson (1963) proposed coping to be part of a process of maturation. Suggesting a stage model of life tasks to be worked on, Erikson put more emphasis on both external influences and individual differences having an effect on the process outcome. Aging in his sense does not automatically result in positive growth.

Pfeiffer (1977) had a completely different impression of the development of coping as persons age. From clinical as well as empirical experience, Pfeiffer suspected coping to grow increasingly immature or primitive with age. Pfeiffer maps the coping development to reach its peak adaptiveness during young adulthood and thereafter to continuously fall prey to age-related decline. The author asserts that indeed some individuals remain on high levels of coping power, but most "return to the use of more projection, somatization, and denial..." (p. 615).

Vaillant (1977) paints a more optimistic picture in his theory of coping and change. It is suggested that coping matures from age 20 through middle adulthood. Coping according to Vaillant evolves during childhood and adolescence, as do other physical and psychological attributes. Nevertheless, when physical abilities start to regress, coping resources continue to evolve further. The author presumes that, at least to healthy, elderly people, the use of potentially adaptive strategies, such as suppression, sublimation, altruism, etc., increases, whereas employment of presumably ineffective strategies such as projection or denial decreases.

For a more situationalist perspective, the work by Richard Lazarus (Lazarus, 1966; Lazarus & Folkman, 1984) shall once again be mentioned. Lazarus does not explicitly take on a developmental stand in his theory. Appraisal of the situation may change with growing age and thus lead to the choice of different coping strategies, but age according to Lazarus' theory is not a major determinant of either coping behavior or coping effectiveness. Also, within this tradition the notion of effective versus ineffective coping

is heavily determined by the appraisal of the situational characteristics at hand. Therefore, categorizing coping strategies into mature versus immature or effective versus ineffective a priori is neither possible nor useful.

McCrae and Costa (1990) see coping in close connection with personality. Their empirical work suggests that coping like personality traits undergoes only comparatively little change during adulthood. Specifically, the authors ascertain that individuals who are successful copers by age 30 are very likely to remain competent in accommodating to life events and hassles throughout old age. For young adults who have trouble adapting to stressful situations, the same should be true later in life.

Within their Five-Factor Theory (FFT) of personality, McCrae and Costa (1996, 1999) suggest the distinction between biologically based basic tendencies and culturally conditioned characteristic adaptations (including self-concept). Basic tendencies comprise abstract potentials and dispositions. Characteristic adaptations, on the other hand, include acquired skills, habits, beliefs, roles, and relationships.

"According to FFT [...] both broad personality factors and the specific traits that define them are best understood not as characteristic adaptations, but rather as endogenous basic tendencies" (McCrae et al., 2000; p. 74).

The authors also propose that attributes measured by personality questionnaires can be identified as temperaments and are essentially hereditary in nature. Coping as a characteristic that is conceptually very close to personality will as a result be closely determined by these supposedly innate and very stable personality traits. In terms of age differences in coping, McCrae (1982) suggests that they are more likely to be the result of what people have to cope with as they age rather than intrinsic changes.

Associations of personality traits and use of coping strategies is of high interest in the present study. To assess the degree to which "coping is personality in action under stress" (Bolger, 1990) in older persons, the more or less intimate relationship between interindividual differences in personality as well as interindividual differences in use of coping strategies is examined closely.

2.2.8. Coping in Old Age - Empirical Results

Both cross-sectional and longitudinal studies on coping over the life-span suggest some change at least on the level of strategies in use.

Concerning medical illness, Felton and Revenson (1987) studied men and women between ages 41 and 89 who suffered from a number of different chronic conditions. Assessed by means of the Ways of Coping Questionnaire, the authors found that middle aged compared to elderly subjects used information seeking, emotional expression, and self-blame more often in dealing with their illnesses. Feifel, Strack, and Nagy (1987) found no evidence of age-related coping in a sample of men (ages 40 to 64) with chronic and/or life-threatening diseases.

Costa, Zonderman, and McCrae (1991) detected indications of associations between age and self-reported use of defense mechanisms. Age in their findings was positively associated with the use of principalization, reversal, repression, displacement, projection, doubt, image distortion, and adaptive responding.

In a longitudinal design, McCrae (1989) reports modest age and cohort differences in use of such coping strategies as expression of feelings, escapist fantasy, positive thinking, and hostile reaction. In this study, persons tended to report less of these strategies as they aged.

Folkman, Lazarus, Pimley, and Novacek (1987) reported similar findings using the Ways of Coping Checklist. They observed that compared to young adults, older adults used more distancing and positive reappraisal to cope with stressful situations.

In more recent literature, theoretical and empirical approaches to the changes in coping over the life-span started to emphasize variables that might be essentially involved in individuals' cognitive as well as emotional development. Such theories postulate that as a person strives for more complex skills of affect coordination or reflection, coping strategies concurrently develop for both the better and the worse.

Labouvie-Vief, De-Voe, and Bulka (1989) studying a life-span sample, found that participants' understanding of emotions and coping was positively associated with a dimension of cognitive complexity.

In sum, there is a fairly consistent body of findings indicating that indeed coping changes over the life-span. If this change is due predominantly to the maturation of

various psychological systems or due to a change in the nature of stressful contexts encountered, needs to be the subject of further empirical research.

Another consistent body of literature suggests that coping changes toward the use of more passive coping strategies (e.g., impulse control, acceptance, or cognitive reassessment). This is also largely reflected in the work by Brandtstädter and Renner (1990), who propose a shift from assimilative to accommodative modes of coping during middle and later adulthood.

Assimilative coping is conceptualized to involve instrumental behavior aimed at changing characteristics of a potentially stressful situation. Accommodative coping, on the other hand, comprises more palliative behavior, which is aimed at "soothing" rather than changing anything (e.g., readjustment of personal standards, turning away from unrealistic goals, etc.).

The question of whether employment of coping strategies develops for the better or the worse, or for both over a human life-span and whether age differences in coping are due to maturation processes or contextual demands can only be addressed indirectly by the present study: First of all, different conceptualizations of coping are related to age. Secondly, associations between coping and different indicators of emotional as well as functional adaptation to a stressful situation and its consequences are examined in relation to age and degree of functional impairment. Additionally, a more personal perspective on 'successful coping' is examined by asking participants to indicate their satisfaction with their own coping efforts.

2.3. Outcomes in Stress and Coping Research

The next few sections of the Theoretical Backround chapter are concerned with theories and findings on typical outcome variables of stress and coping research. Such outcomes are mostly indicators of emotional well-being on different levels of aggregation, but also health-related, or functional adaptation to stressful situations and their consequences are commonly studied. Findings on the various outcomes are reported as they relate to the constructs' structures and major correlates.

2.3.1. Positive and Negative Affect

When Tomkins (1981) declared "the next decade or so belongs to affect" he could already look back upon a long tradition of research into human emotions. Bradburn's influential work (1969) on affect had earlier set the stage for what was to become a now widely known and discussed two-dimensional model of affect. Bradburn's results had shown that two major emotional factors, namely Positive Affect (PA) and Negative Affect (NA) are independent of one another when measured over time. Orthogonal or uncorrelated dimensions of human affect since revolutionized common sense understanding of the affective structure.

Nevertheless, a number of criticisms were raised as well. There were test-statistic issues with Bradburn's measures' failing reliability (Watson, 1988), item sampling, or response format (Diener & Emmons, 1984). This in turn nurtured suspicion about the test itself being the only reason for the observed independence of PA and NA.

However, the beginnings were fascinating enough for several researchers to further investigate the structure of human mood states.

For instance, Zevon and Tellegen (1982) found independence of PA and NA using a 60-item mood checklist over a 90-day time span. Diener and Emmons' (1984) findings were less consistent. Exploring boundary conditions, they found that affect independence could be proven only for larger time frames, i.e., for daily mood reports of 70 versus 30 consecutive days. PA and NA assessed in times of high emotional arousal showed considerable inverse correlations (see also Section 4.2.9). Additional influences on affect independence were shown to be the response format (Warr, Barter, & Brownbridge, 1983), and the degree to which measurement error was controlled (Green, Goldman, & Salovey, 1993).

Egloff (1998), in an attempt to resolve some of this contradictory evidence, took a methodological approach. In an experimental setting, Egloff induced mild success and failure conditions upon college undergraduates. To assess affect, he employed both the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) and the Pleasentness-Unpleasentness scale (Watson & Tellegen, 1985). Consistent with prior findings, Egloff showed that PA and NA were independent when measured by the PANAS and intercorrelated when assessed with the Pleasentness-Unpleasentness scale.

Since both tests revealed equally high reliability, the author concludes that they are affected by measurement error in the same way, thus suggesting that the PANAS scales indeed showed fewer intercorrelations.
Scale composition, on the other hand, might contribute to an explanation of the differences. Based on an emotional circumplex model, Egloff argues as follows:

> *"For instance, in the circumplex, the PANAS scales appear to be separated by 90^0 (i.e., orthogonal) because the PA scale contains adjectives in the aroused positive segment (northeast) and the NA scale contains adjectives in the aroused negative segment (northwest). However, the Pleasentness scale appears to have a greater than 90^0 separation from the Unpleasentness scale. The former contains some more aroused (happy and joyful) and some less aroused (calm, content, and at ease) positive mood terms, and is on average due "east" on the circumplex (i.e., pure pleasentness). The latter, however, contains exclusively low arousal mood terms (i.e., "southwest" on the circumplex). Thus, the Pleasentness-Unpleasentness scales may be more negatively correlated than the PANAS because they do not simply reflect a 45^0 rotation of the same axes."* (p. 1107)

In a 1992 paper, Watson and Clark (1992a) elaborate on their proposed hierarchical structure of self-reported affect. That is, although the two general dimensions account for a substantial amount of variance in affect, specific emotional states can also be pinpointed. The authors suggest a hierarchical taxonomic structure in which the broad dimensions each consist of several related yet distinguishable emotional states. Here, the lower level comprises the specific content of the mood descriptors (e.g., fear, sadness guilt, hostility), whereas the upper level indicates the valence (Negative Affect). On the basis of multitrait-multimethod analyses (Watson & Clark, 1991) the authors present evidence for the claimed hierarchical organization, that is, matrices revealed generality (the content-scales were correlated with oneanother) and differentiation (alternative measures of the same affect were more strongly associated than were scales assessing different affects). The hierarchical structure of affect and how it applies to the present study is also disscussed in the Method Chapter (Sections 4.2.8. and 4.2.9.).

2.3.2. A Word on Interrelatedness: Personality and Affect

Several studies have found strong and systematic relations of personality measures, especially Extraversion and Neuroticism, and self-rated state as well as trait affect, the former associations usually being weaker than the latter (e.g., Tellegen, 1985; Watson & Clark, 1992b). Most of these findings point to a striking differential pattern: Neuroticism is substantially correlated with measures of Negative Affect, but (mostly) not Positive Affect. Extraversion is substantially associated with Positive Affect, but not Negative Affect. As mentioned earlier, correlations with state affect measures are generally weaker, ranging around .20 to .40, than associations between personality and trait affect(ivity), with coefficients as high as .66 (e.g., Meyer & Shack, 1989). The robustness of this pattern has inspired Tellegen (1985) to argue that Neuroticism and Extraversion should be renamed into "Negative Emotionality" and "Positive Emotionality," respectively, both higher-order factors of his own personality inventory, the Multidimensional Personality Questionnaire (MPQ; Tellegen, 1982). Tellegen holds that both Neuroticism and Extraversion are basic dimensions of emotional temperament that broadly represent individual differences in the propensity to experience Negative and Positive Affect. This temperamental model acknowledges that individual differences in personality and emotionality reflect the same underlying, essentially innate mechanisms. Tellegen (1985), among others (e.g., Depue & Collins, 1999; Lucas, Diener, Grob, Suh, & Shao, 2000), suggested that these common constructs might go back to differential sensitivities to painful and pleasurable stimuli, respectively, referring to Gray's (1970) emotion-based psychobiological model. Watson and Clark (1992b) take a similar stance. They do not propose, however, that both affect dimensions and the big two of personality are interchangeable concepts. The authors assert that the processes that produce Neuroticism and Extraversion (as higher-order dimensions, see Section 2.1.1.) are systematically related to those that are responsible for the existence of the general affect dimensions. They contend that:

> *"Although we are espousing a temperamental view of Extraversion and Neuroticism, this should not be construed as a claim that these personality dimensions can simply be reduced to individual differences in positive and*

> *negative emotionality. Both are associated with a wide range of cognitive, attitudinal, and behavioral characteristics that are related to, but certainly not reducible to, the temperamental factors we have been discussing […] Instead, this temperamental view emphasizes that individual differences in negative and positive emotionality comprise central, organizing features of Neuroticism and Extraversion, respectively." (p. 470)*

The temperamental/biologically-based view is now shared by a host of researchers in the field (Depue & Collins, 1999; Lucas, Diener, Grob, Suh, & Shao, 2000; McCrae & Costa, 1991; Watson & Clark 1992b). It accounts for a strong biological basis of underlying processes which constitute the primary organizational force behind Neuroticism and Extraversion on the one side, and Positive and Negative Affect(ivity) on the other.

From a measurement perspective, however, the danger of artificially boosting correlations due to significant overlaps in the wording of personality and affect measures is still imminent and often criticized. McCrae and Costa (1986; Costa, Somerfield, & McCrae, 1996) usually point out that numerous studies have been conducted relating observer-rated personality traits to different correlates under investigation. Mounting evidence from this effort speaks against mere artificiality of the observed associations between personality and well-being. The authors concede that while findings on correlations between mere self-report measures may represent the upper bound of the personality-well-being relationship, correlations between observer ratings of personality traits and self-report well-being provide the lower bound counterpart.

The present research is mainly concerned with associations between personality traits and *states* of Positive and Negative Affect in a situation involving a potential physical stressor. While common origin is still a relevant issue that is also clearly beyond the scope of the present endeavor, another parallel, highlighted by, e.g., Bolger (1990) must be mentioned. In his study Bolger points to formulations of the state-trait anxiety theory (Spielberger, 1972), while predicting relationships between especially Neuroticism and developments of Negative Affect in a stressful situation. Spielberger notes that state anxiety may vary in intensity and may fluctuate over time as a function of the stressors

that an individual faces. He explicitly distinguishes between state and trait anxiety and holds that although state anxiety is experienced by everyone now and then, there are substantial differences with which state anxiety is experienced by individuals high and low in trait anxiety (Spielberger, 1985). In his model, Spielberger proposes that trait anxiety is a reactive disposition; it remains latent until activated by stress associated with danger. Persons high in trait anxiety should then show considerably higher levels of state anxiety while facing potential danger. Spielberger notes, however, that only findings concerning ego-relevant stress (e.g., test situations) speak for this particular pattern. In studies concerned with physically relevant stressors (e.g., surgical stress), no such patterns were found. Note that the predictions made by the state-trait anxiety theory correspond nicely to findings linking Neuroticism to higher emotional reactivity to stress (Costa & McCrae, 1985). But how would this concern relations between state affect and other Personality traits, such as Extraversion or Openness to Experience under stress? How would a propensity to reward orientation or experience seeking relate to affect under adverse circumstances?

All of the above-presented arguments touch a very important aspect with respect to the formulations of research questions and the interpretation of findings. While the present work does not include participant-independent sources of data, like observer ratings on personality, it will make an effort to control for possible measurement confounds resulting from an overlap in item wording between personality and affect measures. Also, in the prediction of partial relations between personality traits and affect states, a state-trait perspective will be considered. Moreover, a central aim of this study is to show that under defined circumstances, a substantial part of the personality-affect relationship should actually be explained by factors associated with, but not equal to, personality traits, namely specific coping efforts.

2.3.3. Health, Affect, and Old Age

So far, research on affect has largely been done with young adults, specifically college undergraduates. In terms of correlates of affect, especially health problems seem to have an effect on diurnal change in NA which is generally reported to be the more stable of the two affect dimensions (Clark & Watson, 1988; Watson & Pennebaker, 1989).

Looking at young student samples, correlations between Negative Affect and self-reported health conditions are usually modest but stable. Deserving special attention is the fact that Positive Affect and health typically are not associated. Moreover, although Negative Affect and self-reported health are in many cases related, NA and objective health constraints are not (Watson & Pennebaker, 1989).

Kunzmann (1997) suggests that the reason behind the lack of statistical associations found between physical symptoms and Positive Affect may be that the illnesses investigated by Watson and co-workers did not affect performance domains, for they were rather low impact and of transient nature. Positive Affect, on the other hand, has been reported to entail a large arousal component, which might explain the rather low to non-existent association with minor health problems. Minor symptoms, such as, headaches or the flu do not actually constrain daily activities (e.g., work or hobbies). Kunzmann argues that functional constraints due to moderate to severe health conditions in old age should in contrast have an effect on both Positive as well as Negative Affect.

Since emotion researchers are primarily concerned with younger people, studies on Positive and Negative Affect investigating a wider age range rarely found. There are a number of findings dealing with the relation between facets of general health and their effects on Positive and Negative Affect. However, the majority of them are cross-sectional designs that do not allow for causal interpretation. Moreover, Positive and Negative Affect in these studies are assessed as long-term components of emotional well-being, i.e., they concern the more transient affect states only to a limited degree.

Among earlier studies, Bild and Havighurst (1976) tested self-reported general health and Positive and Negative Affect in a sample of 474 persons, ages 60 and older. In their cross-sectional data, poor self-reported health was connected with both low levels of Positive Affect and high levels of Negative Affect. Similar findings were reported by George and Landerman (1984), performing secondary data analyses on a sample of N = 4254 individuals, ages 18 and older. They too found poor self-reported general health being related to low Positive Affect and high Negative Affect. Okun, Stock, Haring, and Witter (1984), using meta-analytical techniques on a total of 104 samples (mean age >= 65), also looked at self-reported general health and affect. The authors found poor general health related to low Positive Affect and high Negative Affect, once again.

Using cross-sectional data of the Berlin Aging Study (BASE; Baltes & Mayer, 1999), Marsiske and co-workers (1996) focused on performance-based functional health (i.e., constraints in vision, hearing, and mobility). On a sample of 516 individuals (ages 70 to 100), analyses concerning functional health parameters and Positive and Negative Affect were performed. Yet again, the authors revealed poor functional health to be associated with lower Positive and higher Negative Affect. In this case, Positive and Negative Affect were composite scores comprising indicators for PA/NA, Extraversion, Openness to Experience, emotional loneliness, and Neuroticism.

Contrary to results concerning minor health problems and their relation to affect in younger samples, the above-reported findings strongly suggest that different components of self-reported health problems, including functional limitations, are associated with both lower levels of Positive Affect and higher levels of Negative Affect in older individuals. Since, many of the present study's outcome measures entail various affect components (featuring various degrees of complexity), this influence of morbidity on levels of affect is of some importance. Additionally, the present setting yields the opportunity to study varying degrees of sensory impairment (cataract) and change thereof (cataract surgery), and thus makes it possible to differentially investigate effects of functional limitations on affective adaptation.

Before turning to a brief description of coping satisfaction as another outcome criterion to coping research, the following paragraphs contrast definitions of some specific subcomponents of Negative Affect with 'stress' as a broader construct.

2.3.4. Anxiety, Fear, and Stress

Subcomponents of Negative Affect frequently distinguished in coping research are anxiety versus fear. According to Izard (1972, 1991), anxiety pertains to a collection of different emotional states. Fear represents the most powerful of which, however, may go along with guilt-aggression, shyness, or shame.

Many researchers do not so much account for structural phenomena in their definitions of anxiety versus fear. One common distinction is more of a functional nature. Authors such as, Epstein (1967), Lazarus (1966, 1991), or Mandler (1975) suggest that the

occurrence of anxiety or fear depends upon an individual's perception of the situation at hand.

Epstein (1967) hypothesizes that anxiety is felt if an individual experiences a taxing situation, yet cannot respond "adequately" due to situational barriers or uncertainty with respect to the nature of the stressor.

Fear is widely described as an emotional state that occurs as a response to a well-defined threat which also yields possibilities for escape or avoidance. From a motivational perspective, fear could be described as an escape-avoidance motive, whereas anxiety, due to the unspecific nature of the stressor, might be termed as a motive to collect further information about the stress-related aspects of the situation.

The above-outlined definitions both go back to the work of Sigmund Freud (1926, 1971) who described anxiety as "lacking an object," whereas fear was defined as anxiety "having found an object."

Although these distinctions bear far-reaching consequences for theories of anxiety, fear, and coping, they mostly remain on a subjective level. Empirical evidence favoring a valid distinction between anxiety and fear as different emotional states remains inconclusive (Krohne, 1996; Mason, 1975a; Schwarzer, 1990, 1993).

Stress. The stress construct has enjoyed enormous popularity among behavioral scientists in recent decades (e.g., Lazarus, 1991; Levi, 1972).

Originally, stress has been a merely physical concept, describing a force (stress) meeting a body, causing a measurable amount of strain or deformation (Mason, 1975b, 1975c). In biology as well as the behavioral sciences a marked change in the understanding of stress occurred. In these contexts, stress mainly refers to the physiological state of an organism facing taxing circumstances (Selye, 1976). This is suggested to be associated with feelings of tension, resistance against the compromising force, and given the organism is exposed repeatedly, it may also lead to irreversible damage or even death. In this case, the compromising forces influencing the organism are called "stressors" (Selye, 1976).

Theories allowing for a closer analysis of the relation between stress and anxiety can be divided into two traditions, i.e., the "systemic stress" approach (Levi, 1972; Selye, 1976) and the "psychological stress" approach (e.g., Lazarus, 1966, 1991).

Selye's (1976) systemic stress theory leaves little room for psychological aspects of stress, such as certain expectations or appraisal cognitions. It mainly accounts for stress responses.

Among the less psychobiologically oriented stress theories, the transactional model by Lazarus (1966, 1991) has gained wide recognition. Since its first presentation, Lazarus himself has revised his original theory numerous times (1966, 1991; Lazarus & Folkman, 1987). Lazarus suggests that stress is a relational concept, i.e., a specific process related to environmental as well as personal characteristics. Lazarus calls this specific process a person-environment transaction (see Section 2.2.3.). Two central constructs, namely appraisal and coping serve as mediators in the transaction also determining the proximal and distal consequences of the encounter.

Scherer (1985) describes stress as a special case of an emotional reaction. Compared to what he calls "normal" emotions, such as happiness, anger, anxiety, or fear, which represent rather brief adaptational mechanisms, stress describes a state in which the organism as a system is "out of balance" for extended periods of time. Such extended emotional arousal may be caused by continuous exposure to disturbing internal or external stimuli, ineffective coping, or cognitive perseverations about present or future coping efforts.

Some of the constructs described above, namely anxiety and fear, may be considered components of Negative Affect. Stress, however, is a very heterogeneous construct, defined in many different ways. To date, Lazarus' transactional model remains the most popular approach to the definition of stress as it underscores its nature as a *process* that depends on the interplay of *personal* and *situational* characteristics.

The next section turns to a not-so-common outcome in stress and coping research, "coping satisfaction". Coping satisfaction entails individuals' own appraisals of their coping efforts during stressful times.

2.3.5. Coping Satisfaction

Coping researchers usually ask whether individuals use particular strategies or plans to deal with a problem. They do not ask, how well the plan was designed, whether the individual was able to carry it out successfully, or if it yielded positive or negative

outcomes. Simply correlating frequency of use of a particular strategy with a psychosocial or physiological outcome criterion assumes that using the strategy will have homogeneous effects regardless of the individual, the situation, or the execution of the strategy. As Aldwin and Revenson (1987) pointed out: "In short, the relation between coping and health outcomes is generally assessed without examining a crucial intermediate step: whether coping efforts are successful in achieving the individual's goals. As there are seldom objective (or objectively measured) criteria for this, efficacy is often best assessed by asking the individuals for their perception of the outcome of coping efforts" (p. 339).

Suls and David (1996) too criticize the frequent confounding of different aspects of competence of coping. A good or bad outcome, such as any change in negative emotions, depression, or well-being after the engagement in coping efforts might not indicate anything about the subjectively perceived competence of coping by an individual. A nice example of an effort to deconfound these two aspects of competence is the study by McCrae and Costa (1986), who asked their participants to rate their coping with respect to (a) how helpful it was to solve a problem, and (b) how helpful it proved in terms of reducing stress. Analyses revealed that high Neuroticism scorers tended to report the so-identified least effective coping strategies (e.g., hostile reaction, indecisiveness, wishful thinking, self-blame, and passivity).

In a study by Aldwin and Revenson (1987), 291 community dwelling adults, ages 18 to 84 years, were asked to complete coping measures and inventories assessing different aspects of their physical and psychological health. With respect to coping satisfaction, the authors reported interactions between coping satisfaction and problem-focused coping strategies, such as negotiation. When negotiation was frequently used and the coping effort was perceived as successful, it markedly decreased psychological symptoms. When the coping effort was not perceived as successful, however, it increased emotional distress. Remarkably, when respondents thought they had coped with a problem well, infrequent use of instrumental action was associated with low symptom levels. Aldwin and Revenson (1987) conclude that if persons perceive that they can handle a problem easily, then this effectively decreases symptoms of emotional distress.

In the present research, coping satisfaction is explored as an alternative situational outcome criterion to changes in state Positive and Negative Affect.

Furthermore, longer-term aspects of adaptation to a stressful life event and its consequences, although not central, are also considered here. As the setting of the present study incorporates the possibility to look at the way older persons begin to adapt to a changed functional health situation, i.e., impromptu improved vision after cataract surgery, two domains of more distal adaptation are examined in addition, namely aspects of longer-term well-being and (vision-related) functional status.

2.4. Longer-Term Outcomes in Coping Research

2.4.1. Emotional Well-Being

Most research on long-term consequences of coping with stressful life events and especially adaptation to health-related problems look at indicators of emotional well-being. The assessment of emotional well-being in these studies is usually concerned with a wider time-frame, typically covering periods of several weeks or even months since the occurrence of the stressful incident, or else assessing average emotional well-being (e.g., depressive symptoms or PA/NA) for a period of X months or weeks and subsequently relating it to a past critical life event and the retrospective assessment of employed strategies to deal with it (e.g., Staudinger, Freund, Linden, & Maas, 1999; McCrae & Costa, 1986). Some pieces of literature on emotional adaptation to chronical stressors and acute life events in old age have already been presented in above sections on coping in old age (Section 2.2.8.) and affect (Section 2.3.3.).

Concerning the present study setting in particular, not much is known about more distal emotional consequences of cataract surgery. Although there is a thorough documentation on functional benefits of cataract surgery for different age groups, which will partly be reviewed below, longer-term emotional outcomes have hardly been studied so far. Also, on a more general level, little is known about age-related vision impairment and its emotional consequences (for an overview see Tesch-Römer & Wahl, 1996; Wahl & Oswald, 1996).

Coming back to the specificity of the situation studied here, clear-cut predictions about longer-term emotional adaptation are tricky. Considering the low probability of complications versus the high probability of improvement of visual acuity as a result of cataract surgery, one could assume that this is a "no-loss" situation that does not require much energy for adaptation. However, the post-surgical situation offers some features which might indeed cause variation with regard to common indicators of emotional well-being and more pointedly *cause stress*. Such factors include most of all differences in surgical outcome, and associated with it, re-adaptation to the new situation. While a moderate to low surgical outcome, i.e., a low or no increase in visual acuity post-surgery seems to be a plausible source of stress, some might argue that the need for the individual to cope with the consequences of often drastically improved vision following the intervention might also be costly. Although this is most likely viewed as a benefit, there are possible drawbacks associated with it which might include a loss of social support due to enhanced independence in pursuing activities or simply needing to get re-acquainted with an environment that had previously been seen only through a veil of fog. The impact of such sudden changes in visual acuity is nicely summarized by a small humorous rhyme by an anon source:

Paradise

My face in the mirror
Isn't wrinkled or drawn.
My house isn't dirty.
The cobwebs are gone.
My garden looks lovely
And so does my lawn.
I think I might never
Put my glasses back on.

(Source: Anon)

Generally, however, results point to worse emotional outcome in connection with low visual acuity, especially in elderly populations. Accordingly, for the visually impaired elderly, rates for both functional disability and depression are particularly high (Horowitz, Reinhardt, McInerney, Balistreri, & Serapio, 1994; Wahl, 1994). Psychological reactions to impeding blindness and severely impaired vision in particular may be extreme anxiety and depression, feelings of social isolation, severe

damage to one's sense of self, and partial loss of a generalized expectation of one's own ability to function and associated self-efficacy (Branch, Horowitz, & Carr, 1989; Schwarzer, 1992; Tesch-Römer & Wahl, 1996). Nevertheless, in many instances subsequent adaptation to the new situation is possible, often facilitated by rehabilitation measures (Bentz, 1987; Horowitz et al., 1994). However, with moderately to severely visually impaired elderly, reorganization and adaptation often fail, and depression becomes permanent (Calvani, Capezuti, & Mollé, 1987). In a prospective study with 100 cataract patients undergoing surgery, Fagerström (1994) found higher levels of depressive symptoms immediately prior as compared to two months post-surgery. However, correlations between objective visual acuity and depressive symptoms were higher post- than pre-surgery. Depression increased slightly with decreasing visual acuity and diminished with improved visual acuity post-surgery. Nevertheless, diminished visual acuity that was presumed to be temporary in nature was unrelated to increases in depressive symptoms. Fagerström concludes that patients whose vision remained poor after the operation experienced a new threat of impending blindness, and thus presented with higher depressive symptoms.

2.4.2. Functional Adaptation

With regard to functional adaptation to cataract surgery, a whole number of publications within the ophthalmologic literature exists. This is in part due to the fact that the objective level of visual acuity is often not highly related to patient satisfaction post-surgery. Emerging from an ongoing debate (e.g., Lundström, Stenevi, & Thorburn, 2001; Talbot & Perkins, 1998) on the necessity of second-eye operations in refractive cataract surgery especially in cases where the second eye presents with comparatively high visual acuity, ophthalmologists began to develop self-report questionnaires that quantify patient satisfaction with post-surgical outcome in several domains (Lundström, Roos, Jensen, Fregell, 1997; Mangione, Phillips, & Seddon, 1992; Steinberg, Tielsch, & Schein, 1994). These domains typically include general satisfaction with vision, intensity of limitation in pursuit of vision-dependent activities, level of activities, or extent of experienced cataract symptoms. In ophthalmology, acceptance and use of these self-report questionnaires, especially for research purposes, has increased greatly

over the past years (Uusitalo, Brans, Pessi, & Tarkkanen, 1999). Thus, studies on outcomes in cataract surgery nowadays often rely not only on visual acuity data, but also on the change of predominantly functional aspects of quality of life pre- to post-surgery.

According to a recent population-based study in Sweden (Mönestam & Wachtmeister, 1999), the overwhelming majority (89%) of patients (N=459, first- and second-eye patients) having undergone cataract surgery were satisfied with its outcome as it corresponded to their pre-surgical expectations. Ophthalmic factors (apart from demographic factors, no other predictors were tested) predicting satisfaction independently were change in visual acuity in the eye operated on, and post-operative visual acuity in the eye operated on. Satisfaction and subjective visual ability were assessed twice in this study, once three days before and once roughly five months after surgery. Increased subjective visual ability concerned reading, watching television, orientation in unfamiliar surroundings, estimating distances, pursuing housework, etc. Subjective visual ability in 46 cases (10%) deteriorated in one or more visual abilities from pre- to post-surgery. Eighty-seven percent reported improvements in all areas, and 3% were unchanged. In this study, only 4% of patients did not have an objective increase in visual acuity in the eye operated on. However, while having increased in visual acuity from pre- to post-surgery, about 22% stayed within the range of what is still considered "poor vision" (<=.50 in Snellen Decimals). Factors independently predicting worse post-surgical visual acuity were age and ocular comorbidity.

A Finnish study evaluating changes of vision-related limitations in specific functional areas (Uusilato et al., 1999) tested 168 first-eye cataract patients at two points in time ranging from one week before to 4 months after surgery. The authors found the most pronounced changes within activities requiring excellent short-distance vision (e.g., handwork, reading small print) and large-distance vision with low illumination (e.g., nighttime driving or watching television). Correlations of changes in activities in the above-mentioned areas and patient satisfaction ranged around r=.40. The bivariate relation between reduced limitations and change in visual acuity in the eye operated on was r=.17 ($p<.05$).

Aside from debatable methodological limitations, such as failing to correct reported change scores in patient satisfaction for baseline differences, most of the

ophthalmologic studies report a considerable increase of satisfaction with functional ability in cataract patients. But are there any possible psychological predictors of functional or emotional adaptation to improved vision or a lack thereof? Thus far, only a small number of psychological studies have examined possible predictors of adaptation to vision loss as a chronic stressor in late-life.

In a study dealing with visually impaired elderly (N=150), Benn (1999) investigated the role of personality and coping in late-life adaptation to vision loss. Adaptation was assessed with global mental health outcomes (life satisfaction and depressive symptoms) and the domain specific outcome of adaptation to vision loss. The latter outcome included acceptance of the vision loss, positive attitudes toward rehabilitative training, and maintenance of relationships with family and friends. Neuroticism, Optimism, and coping served as predictors. Four domains of coping strategies were looked at: avoidance, distancing, seeking social support, and positive reappraisal. Both personality traits and coping had significant direct effects on all outcome variables. While the indirect effects of personality through coping were generally weaker than the direct effects, they were, in some instances, essential to the significant total effect of personality on adaptation. Neuroticism and escape-avoidance coping (wishful thinking and behaviors to escape or avoid the situation) predicted poorer adaptation. In contrast, optimism, seeking social support, and distancing (i.e., cognitive efforts to withdraw and minimize the significance of the situation) predicted better adaptation.

Thus, there is evidence pointing to a significant role of both personality dispositions and coping in the adaptation to chronic visual impairment. As will be argued below (see Section 3.2.2.), the same should be true when it comes to psychological and even functional adaptation to the long-term consequences of cataract surgery.

Before turning to the central research questions and hypotheses, a brief overview of the "what, how, and why" of the setting chosen for this study is presented.

2.5. Selection of the Study Setting

2.5.1. Perioperative Stress

The present study focuses on elderly persons facing an acute physical stressor, i.e., cataract surgery, dealing with the prospect of it, subsequently recovering from it, and

beginning to adapt to its long-term consequences. This particular setting was chosen for a number of reasons.

First of all, as opposed to laboratory experiments, the study of coping with stress in a natural setting seems to bear more impact (Kazdin, 1998). From a research perspective, the induction or occurrence of stress is a necessary first step to investigating coping responses. Because of the apparent lack of control in field experiments, many scientists prefer the laboratory setting to the field to ensure isolated variation of experimental conditions, yet often fail to induce the particular emotion they are interested in due to a very appropriate lack of impact in laboratory induction methods.

Specifically, observing physical threat in study participants is therefore often done in clinical or surgical settings, i.e., situations in which individuals have to undergo various diagnostic procedures, surgery, or dental treatment (e.g., Janis, 1958; Schröder & Schwarzer, 1997; Schröder, Schwarzer, & Konertz, 1998; Schröder & Schwarzer, 2001; Sergl & Müller-Fahlbusch, 1989; Krohne, Slangen, & Kleemann, 1993). Empirical studies of surgical patients especially found that having to undergo surgery may mean a fairly heterogeneous collection of different stressors for patients. Individuals may fear, for instance, certain types of anesthetic procedures, experience of pain, possibility of a threatening diagnosis, or negative surgical outcomes (Dony, 1982; Höfling, 1988; Schmidt, 1988). Many of these systematically confounded factors in surgical settings are not of concern to the cataract surgery setting, as will be elaborated in the following sections.

Compared to surgical procedures usually studied, e.g., heart surgery (Schröder, 1997), cataract surgeries are fairly benign, and according to the German Ophthalmologic Society (Deutsche Ophthalmologische Gesellschaft; Ohrloff, 1998) one of the safest, most successful, and most often performed surgical interventions in Germany. The risk of unsuccessful surgery has been reduced greatly during recent years, and now according to German statistics varies around 0.01% (Ohrloff, 1998). Before briefly outlining the special characteristics of the stressor (cataract surgery), a description of the cataract is provided.

2.5.2. The Cataract

Cataract and glaucoma are common eye diseases in old age, weakening vision and leading to blindness if not treated. The cataract is an eye disease in which the lens swells and becomes opaque, obstructing the penetration of light to the retina. This usually occurs gradually, taking several years. The onset of the disease often occurs around age 60.

During the course of the disease, visual acuity, especially distance vision, gradually deteriorates, eventually leading to blindness. The cataract is one of the main causes for blindness in old age in Germany (press release "Häufige Ursache für Altersblindheit", World Health Day, 1999; Source: World Wide Web). The cataract always affects both eyes, but seldom at the same time (Trevor-Roper & Curran, 1984). Additional symptoms are heightened sensitivity to light and glare, difficulties with night vision, and distorted images in either eye.

The most common etiological factor is an age-related slowing metabolism. Certain metabolic diseases are discussed as risk factors associated with the cataract, for instance diabetes. The cataract found in younger persons is rare, usually associated with congenital metabolic diseases or their treatment (e.g., cortico-steroids). As behavioral factors, heightened exposure to UVA rays is discussed as one factor in the etiology of the cataract.

2.5.3. Cataract Surgery

The only possible treatment of the cataract is an operation. With about 200,000 to 250,000 patients operated per year (data covers 1994 to 1999, including all age groups), cataract surgery ranges among the most common surgical interventions in Germany (German Federal Statistical Office, Federal Health Monitoring System, 2001). Depending on ocular comorbidity and surgical outcome, visual acuity is oftentimes greatly enhanced for about 90% to 95% of patients after surgery (German Ophthalmologic Society, 1998; Lundström, Stenevi, & Thorburn, 2001; Mönestam & Wachtmeister, 1999). Complication is rare, with about 0.01% - 2% of cataract patients older than 65 years of age (Ohrloff, 1998).

The preparatory procedures for the surgery involve a total assessment of lens characteristics. For inpatients this is usually done upon admission to the hospital, the day before surgery, depending on cases and hospital routines. Cataract surgery has been greatly refined during the past years. Due to its very low risk and high success rate, a regular admission of the patient to a hospital has greatly been reduced, and many times surgery is performed in an ambulatory setting (Tageskliniken). Outpatients often have at least two appointments per eye, one for diagnostic procedures and lens assessments and one for the surgery itself. In ambulatory settings patients are usually discharged on the day of the operation.

In all cases, narcosis is avoided where possible. The overwhelming majority of patients receive local anesthesia, usually by means of eye drops and an injection next to the outer eye, or an anesthetic gel directly applied to the eye. The surgical procedure itself involves a fixation of the patient's head to prevent him or her from moving during the operation. The patient's cornea is minimally incised (2.5 mm to 3.5 mm, depending on the model of the artificial lens). Subsequently, the opaque lens is destroyed nowadays mostly by means of an ultrasound procedure (phacoemulsification) and removed, with the capsula of the lens remaining intact. Then, the artificial lens is implanted. After the artificial lens is placed in the natural lens capsula, it stabilizes itself by means of little elastic spring arms. With the widely employed small incision technique, the incision to the cornea heals without having to be surtured (Ohrloff, 1998). Lasting only around 15 to 20 minutes on average, the procedure is very brief. Inpatients are usually released within 48 hours of the surgery (1999, mean time frame from admission to discharge = 3.2 days; German Federal Statistical Office, 2001).

Depending on a number of interindividual factors related to the healing of the incision, comorbidity in the eye, and lack of complications, improvements of visual acuity may occur until four to eight weeks following surgery. Patients are instructed to avoid rubbing the eye operated on, carry heavy loads, or laying on the respective side immediately after the surgery. Driving is possible after vision is tested by the ophthalmologist. The eye operated on may be very sensitive to light and wind during the first couple of days post-surgery; thus, patients are advised to wear sunglasses.

In sum, cataract surgery in most cases is a highly standardized and very economical form of operative intervention. Patients may differ widely with respect to the degree of

vision loss. However, all of them have experienced a gradual and slowly progressing loss of visual acuity. Generally, blindness is an objective long-term threat if an operation is avoided. In an inpatient setting (which is examined in the present study), the surgical context is highly standardized: Patients receive standard information and consent material, eye exams, and medication pre- as well as post-surgery. Apart from rare cases with severe post-surgical complications, some severe forms of comorbidity in the eye, or intraoperative complications, most patients remain hospitalized for a total of three days. Compared to other study settings concerned with perioperative stress, such as heart, tumor, or even cosmetic surgery, the present context minimizes possible confounds frequently discussed in literature on surgical stress.

Moreover, cataract surgery yields the possibility to study a very uncommon aspect of longer term adaptation to the consequences of any surgical intervention. For most patients, given the eye operated on is otherwise healthy, a significant improvement of visual acuity and color vision is highly likely. This constitutes an objective gain situation with, compared to the longer term consequences of most surgical interventions, relatively low costs once the eye has been treated.