

2. RESEARCH QUESTIONS AND HYPOTHESES

The key objective of the present dissertation is to use a micro-longitudinal design to identify age-related differences in intraindividual fluctuations of self-reported positive and negative affect as well as in patterns of within-person coupling of affect and cognitive performance. This objective is implemented using 45 occasions of day-to-day assessment on self-reports and objective measures of affect and performance. The present study is based on lifespan theoretical propositions of multidirectionality, within-person plasticity, the orchestration of resources in the face of a shifting gain-loss balance across the lifespan, as well as age-related differences in motivation and goals related to the active shaping of life contexts (for review, see Baltes et al., 2006; Carstensen et al., 1999). On the basis of these conceptions, this dissertation examines three sets of main research questions concerning intraindividual variability in positive and negative affect:

1. Are there age-related differences in the stable and dynamic characteristics of day-to-day experiences of positive and negative affect?
2. Does age explain significant amounts of variance in day-to-day fluctuations in positive and negative affect above and beyond personality? Are there age-related differences in the association between fluctuations in PA and NA and trait-like and state-like correlates representing stress and psychological adjustment?
3. Are there reliable within-person associations between daily positive and negative affect and cognitive performance, and do age or other individual difference factors moderate this coupling?

The prospect is that the application of a micro-longitudinal design will provide insights into age-related differences in positive and negative affect from a dynamic, process-oriented perspective and to address theoretical notions of cross-domain linkages between affect and cognition at the level of the individual (and not at the between-person level). In the following, the rationale for each set of questions will be outlined, together with the specific hypotheses (see Table 2.1 for overview).

2.1 Are There Age-Related Differences in the Stable and Dynamic Characteristics of Day-to-Day Self-Reports of Positive and Negative Affect?

At a first glance, this general research question appears to be relatively clear-cut. However, in essence it requires an examination of age-related differences in PA and NA from three perspectives. First, regarding stable characteristics, it is important to ask about age-related differences in *mean levels* of PA and NA aggregated across the micro-longitudinal assessment period (i.e., nine weeks). Second, there is the question whether young and older adults differ in *time-related trends in these mean levels* across the nine-week assessment period. Finally, in terms of the dynamical characteristics, it is central to examine age-related differences in the amount of *intraindividual short-term variability (i.e., fluctuations)* in self-reported affect across the nine-week period.

With regard to mean levels, the expectation is that there should be only small age-related differences and that these differences should favor older adults: Older adults' everyday lives should be characterized by greater mean levels of PA and by lower levels of NA than younger adults' lives. This expectation is derived from two sources: First, traditional cross-sectional and longitudinal work on mean level-differences in experiences of PA and NA have yielded evidence that NA tends to be similar in young and older adults or slightly lower in older than younger adults (Costa et al., 1987; Kunzmann et al., 2000; Mroczek & Kolarz, 1998; Stacey & Gatz, 1991). For trait-like PA, most studies have found older adults to report either higher or similar levels as compared to young adults (Costa et al., 1987; Kunzmann et al., 2000; Mroczek & Kolarz, 1998). Second, several theoretical proposals on successful life management strategies have advanced the proposal that the psychological system is geared towards the maximization of positive and the minimization of negative affective-emotional experiences across the lifespan (e.g., Baltes & Baltes, 1990; Carstensen et al., 1999; Taylor, 1991; see Section 1.2.3).

Concerning time-related trends, it was expected that the novelty of the laboratory testing situation and the continuous adjustment to it would lead to a slight leveling off in both affect domains and in both age groups. It has been found, for instance, that mean levels of behavior and experience measured in daily diary studies may exhibit change-like *trends* over time in addition to short-term fluctuations due to processes of reactivity and self-observation triggered by the intense repeated assessment procedure (e.g., Affleck, Zautra, Tennen, & Armeli, 1999). Findings obtained from stress diaries yield that respondents tend to report less and less stressors over time (DeLongis, Folkman, & Lazarus, 1988). An examination of possible mean level change in daily reports of PA and NA also served as a prerequisite step to the question on age-related differences

in daily fluctuations of PA and NA (i.e., unconfounding relatively irreversible change from relatively reversible fluctuation; Nesselroade, 2001; S. G. West & Hepworth, 1991).

The third perspective asks about emotional experiences as they unfold in everyday life (see Section 1.2). Traditional work on age and well-being has largely neglected this aspect. Theory and the available empirical evidence suggest different patterns of age-related differences in affect *fluctuation*. First, as outlined below, no differences between young and older adults are expected in domain specific differences in fluctuation in positive versus negative affect (i.e., greater fluctuation in PA than in NA). Second, across both affect domains, older adults should report less fluctuation than young adults.

Concerning the PA-NA comparison, the distinct pattern of variability relative to one another has emerged from separate studies with young and older adults (e.g., Eid & Diener, 1999; Lawton et al., 1996), and studies with young adults have indicated that the within-day ebb and flow of PA tends to be more synchronized with internal bodily functions, whereas NA is rather stable and more driven by external events (e.g., Clark & Watson, 1988; Watson et al., 1999; Watson, 2000b, 2000c). Furthermore, in young adults, positive events and social activities are more strongly related to daily reports of PA whereas negative events and stress are more intimately linked to daily reports of NA (Bolger et al., 1989; Nezlek & Gable, 2001; Watson, 1988; Watson et al., 1999). These processes are most likely age-invariant, therefore, as a reflection of the different functions of and the internal and external factors driving both affect domains, I expected that both age groups should show relatively less variability in NA than in PA (Lawton, Kleban, Dean, et al., 1992; Shifren & Hooker, 1995). Based on previous work with separate samples of young and older adults, I thus expected to find that individuals would show domain-specific differences in patterns of variability in positive versus negative affect, namely that variability in PA would be greater than variability in NA across individuals.

With regard to the old-young comparison across affect domains, theory would suggest two possible scenarios about the direction of age-related differences in fluctuations: increase in the range of fluctuation with age on the one hand, an expectation that is primarily driven by research in cognitive and physiological functioning, and decrease in the range of fluctuation with age on the other hand. This latter expectation is endorsed in the present dissertation and is derived from traditional cross-sectional and longitudinal work (see Section 1.2.3): It is suggested that older adults are increasingly motivated to regulate their emotions and to actively shape their social and general life contexts in a way that allows maximization of positive and the minimization of negative aspects of emotional well-being in the face of a shifting gain-loss balance and the perception of a limited future time perspective across the lifespan (e.g., Baltes &

Baltes, 1990; Baltes et al., 2006; Carstensen et al., 1999; Freund & Baltes, 2000). Furthermore, there is recent evidence that emotional competencies increase with age (e.g., Birditt & Fingerman, 2003, 2005; Blanchard-Fields, 1998; Blanchard-Fields, Stein, & Watson, 2004; Carstensen et al., 2000; Gross et al., 1997; Isaacovitz & Smith, 2003; Kunzmann et al., 2000, 2005; Labouvie-Vief, 1998; Lawton, Kleban, Rajagopal, et al., 1992; Levenson et al., 1991; Mroczek & Kolarz, 1998).

In addition, age-related differences in life styles are likely to play a role with respect to mood variability, such that younger adults' daily lives are characterized by study, work, and social participation regimes, which may be more emotionally challenging and less routinized than the daily lives of older adults (see also Larson et al., 1980; Schulz, 1985). For example, longitudinal work by Larson and colleagues (2002) has yielded evidence for a decrease in the range of mood variability from early to late adolescence (see also Carstensen et al., 2000). According to the authors' interpretation, early adulthood is a time of disruption and transition more so than late adolescence, hence possibly bringing about a shift in the magnitude of emotional variability. In extending this view, older adulthood (at least during the years that have been termed the young-old period of life, i.e., until age 80–85) as compared with late adolescence or young adulthood may even more be characterized by greater stability in both external but also internal factors that drive variability in mood. In this context, other theoretical models have suggested that aging in and of itself is characterized by processes of habituation (Kastenbaum, 1981) and that a lifetime of experiences with emotionally laden and emotionally challenging situations may lead to hedonic adaptation (Frederick & Loewenstein, 1999) as one specific habituation process in particular. Last, some evidence suggests that emotional experience both on a physiological and a self-report level is less intense in older than younger adults (e.g., Diener et al., 1985; Lawton, Kleban, Rajagopal, et al., 1992; Levenson et al., 1991; but see also Kunzmann & Grühn, 2005).

Even though the present study is not able to test these theoretical assumptions against each other, predictions about age-related differences in patterns of self-reported affect can nevertheless be drawn from the literature. In sum, the following hypotheses are tested:

1. *Young and older adults differ significantly in the stable and the dynamic characteristics of day-to-day positive and negative affect:*
 - (a) Regarding mean levels of day-to-day PA and NA, there will be a significant main effect of valence (NA < PA) and a significant age group \times valence interaction: All individuals will report higher mean levels of PA than of NA, and older adults will report higher mean levels of PA and lower mean levels of NA than young adults.
 - (b) Regarding time-related trends in mean levels of affect across the assessment period, there will be a small but significant main effect of time, but no significant

age group \times time interaction: Both age groups exhibit slight decreases in self-reported PA and NA across the nine weeks.

- (c) Regarding day-to-day intraindividual variability in affect, there will be a significant main effect of valence (NA < PA) and a significant main effect of age group (older < young): Both age groups will show less fluctuation from one day to the next in NA as compared to PA. Older adults will report less day-to-day fluctuations in PA and NA across the nine-week period than younger adults.

2.2 Does Age Explain Significant Amounts of Variance in Day-to-Day Fluctuations in Positive and Negative Affect Above and Beyond Personality? Are There Age-Related Differences in the Association between Fluctuations in Positive and Negative Affect and Trait-Like and State-Like Correlates Representing Stress and Psychological Adjustment?

A more complete understanding of individual differences in everyday affective experiences requires the examination of correlates of mean levels and particularly of variability at both the trait-like and the state-like level (see Section 1.3.1). The second set of research questions therefore consisted of three parts: First, the role of age relative to personality factors in explaining individual differences in variability in affect is investigated. Does age contribute to the average every day experience as well as to the daily ebb and flow of patterns of affective experiences, even after taking into account the contribution of personality factors? The second part focuses on age-related differences in the association between fluctuations in PA and NA and trait-like psychological adjustment. Finally, the role of age for within-person relationships between daily affect and daily stress and events is examined.

With regard to the first part, age is expected to explain individual difference variance in short-term fluctuations of self-reported affect even after taking the predictive value of personality factors into account. Determining the relative role of age versus personality for individual differences in variability of PA and NA is important because age per se may not be the force driving individual differences in daily mood fluctuations (e.g., Wohlwill, 1970). Particularly with regard to *average levels* of self-reported affect, extraversion and neuroticism tend to be strongly linked to PA and NA, respectively (Costa & McCrae, 1980, 1984; Watson & Clark, 1992). With regard to individual differences in *fluctuation* of affective experience, previous empirical accounts mainly in young adults have shown that intraindividual variability in PA and NA can in part be

explained by personality traits such as neuroticism, and to a lesser extent by traits such as extraversion (Eid & Diener, 1999; see also Kardum, 1999; Larsen, 1987, for the role of individual differences in trait-like affect intensity). Specifically, individuals scoring high in self-report measures of neuroticism tend to show greater variability in NA (and in some studies also in PA, Murray et al., 2002). There is some evidence about a weak positive association between extraversion and variability in PA. Overall, however, the amount of individual difference variance in within-person fluctuations in affect that is explained by personality factors is rather small (up to 5.0% variance accounted for; Eid & Diener, 1999). In contrast, there are strong theoretical and empirical claims for age-related differences in daily routines and in the orchestration of emotions and mood, which give rise to the proposition that age will account for greater portions of unique variance in variability than personality.

The second question about the association between variability and psychological adjustment or well-being is motivated by the different scenarios about the functional or dysfunctional nature of short-term variability across psychological domains advanced in the literature (see Section 1.3.2). In both young and older adults, variability in NA is expected to be negatively related to trait-like psychological well-being. This expectation is derived from the few studies examining the correlates of affect fluctuation in separate studies of young and older adults, which have shown that variability in negative affect is dysfunctional. On the other hand, findings regarding variability in positive affect are inconclusive, because it has been shown to be related both to functional and dysfunctional correlates (e.g., Lawton et al., 1996; Shifren & Hooker, 1995). Because of a lack of previous work regarding age-related differences in this area and due to the inconsistent findings across studies, setting up specific hypotheses is difficult. It is possible that due to age-related differences in lifestyles as well as in the orchestration and the physiological underpinnings of emotions, distinct associative patterns between variability in PA and psychological well-being are found in different age groups. Previous work on adolescence, for example, indicates that frequent mood swings are not necessarily related to psychological maladjustment during the adolescent years (Larson et al., 1980, 2002). Rather, variability may be a natural reflection of an adolescent life-style. It is an open question whether this is also true for later adulthood.

Finally, with regard to the role of age as a possible moderator of the within-person relationship between daily affect, stress and events, I propose that older adults exhibit a weaker coupling than young adults. Most previous research on the correlation of daily mood and events has been conducted with young adults. Results indicate that positive affect tend to be related to positive events, whereas daily negative affect shows associations with negative affect, pain, and

stress (see e.g., Bolger et al., 1989; Nezlek & Gable, 2001). Two scenarios of age-related differences in reactivity to stressors as well as positive events are available in the literature: One proposes a positive relationship between age and reactivity and the other proposes a negative relationship between age and reactivity. Few studies have empirically examined these scenarios on the within-person level. Initial evidence supports the first scenario, at least with respect to the relationship between daily stress and daily NA (Mroczek & Almeida, 2004). Given the scarcity of the data and the empirical evidence that older versus younger adults are more motivated and think of themselves as more able to regulate emotions (e.g., Gross et al., 1997; Lawton, Kleban, Rajagopal, et al., 1992), I tentatively expect fluctuations in self-reported PA and NA to be less tightly linked to daily context and appraisals in older as compared with younger adults.

In sum, the following hypotheses are tested:

2. *Individual differences in day-to-day fluctuations of positive and negative affect can be explained by age, above and beyond the effects of personality factors such as extraversion and neuroticism.*
 - (a) Neuroticism is positively related to variability in NA and to a lesser extent in PA, extraversion is weakly positively related to variability in PA: Individuals who report higher levels of neuroticism tend to show greater day-to-day variability in NA and in PA, individuals who report higher levels of extraversion tend to show slightly greater day-to-day variability in PA.
 - (b) After controlling for personality factors, age group will be a significant additional predictor of affect fluctuation, leading to a significant change in the individual difference variance explained: Even after controlling for individual differences in personality factors, age group will show a significant negative association with variability in both affect domains.
3. *There are valence-specific interrelations between affect variability and psychological adjustment.*
 - (a) In both age groups, variability in negative affect is negatively associated with psychological adjustment: Regardless of age, individuals who fluctuate more in NA tend to be less well psychologically adjusted.
 - (b) In young adults, variability in positive affect is positively related to psychological adjustment: Within young adults, individuals who show greater variability in PA tend to show higher psychological adjustment. The association between variability in PA and psychological adjustment in older adults will be explored.
4. *There will be an age group \times daily event/stress interaction in the prediction of daily positive and negative affect: Age moderates the extent to which day-to-day fluctuations in positive and negative affective experiences are related to fluctuations in perceived stress and daily events.*

- (a) In young adults, daily positive affect is positively related to daily positive events, and slightly negatively related to or unrelated to daily negative events and daily stress: Within young adults, days characterized by the presence of a positive event, the absence of a negative event, and below average stress tend to be days on which PA is higher.
- (b) In young adults, daily negative affect is positively related to daily negative events and daily stress, and unrelated to daily positive events: Within young adults, days with a negative event and those that are higher in perceived stress than the average day tend to be days on which NA is higher.
- (c) In older adults, daily reports of positive and negative affect are only slightly or even unrelated to daily positive and negative events and stress: Within older adults, reporting a minor positive or negative event and reporting greater stress than on average tends to be independent of reporting higher or lower daily PA and NA.

2.3 Are There Reliable Within-Person Associations Between Daily Positive and Negative Affect and Cognitive Performance, and Do Age or Other Individual Difference Factors Moderate this Coupling?

A more complete understanding of human development and successful psychological functioning has to go beyond single domains of functioning and examine cross-domain interactions (Magnusson, 1998; J. Smith & Baltes, 1997; Thelen & Smith, 1998). In the context of the present study on age-related differences in fluctuations of PA and NA is that a prior theoretical and empirical work has demonstrated that in young adults, both positive and negative affect can be critical as performance-enhancing as well as performance-disrupting factors (e.g., Ashby et al., 1999; Bless, 2003; Bower, 1981; Forgas & Fiedler, 1998). The third set of questions thus addresses the within-person association between daily affective experience and daily cognitive performance (i.e., reaction time for correct responses in a working memory and a vigilance task). The two central expectations are first, that daily affect and basic daily cognitive functioning are related within individuals and second, that the relationship should be stronger in older than younger adults.

The first hypothesis was derived from mostly experimental and cross-sectional work on the interplay between (induced) mood and cognition. Negative affective states (including stress and anxiety) are thought to reduce attentional scope and to be related to effortful and analytic processing. As a consequence, these negative states can have enhancing effects for performance

on novel and complex tasks that require careful processing, but these states can have disrupting effects for familiar and creativity tasks (e.g., Bless, 2003; Easterbrook, 1959). Apart from negative affect, researchers have stressed the important and functional role of the positive side of life (e.g., Fredrickson & Losada, 2005; Lyubomirsky et al., 2005; Zautra, Affleck, Tennen, Reich, & Davis, 2005). Positive affect is related to a broadened focus of attention and enhanced performance in creativity tasks, but can be harmful for tasks that require a narrow attentional focus rather than heuristic-driven processing (e.g., Bodenhausen et al., 1994; Fredrickson, 1998; Isen, 1999). Thus, the direction of the interrelationship between emotion and cognition is very complex and appears to depend on the specific affect domain by cognitive task pairing. In addition to the functional accounts of emotions for cognition, several theories propose that both positive and negative emotions and their regulation entail a cognitive cost in the sense of reducing attention and warranting inhibitory efforts, resulting in performance impairments (e.g., Ellis & Ashbrook, 1988; M. W. Eysenck & Calvo, 1992; Richards & Gross, 2000; Schmeichel et al., 2003). In the present dissertation, the concurrent successful regulation of emotions and cognitive functioning was considered as one example of a dual-task context in everyday life.

To be consistent with emotion-cognition theories, which postulate that resource competition between emotion regulation and cognitive performance is driven by cognitive processes related to attention and working memory, the cognitive tasks used in the present study assess working memory capacity and vigilance. Based on findings about the facilitative and deleterious effects of positive and negative affect on specific aspects of cognitive performance, it is expected that positive affect may have a detrimental effect on performance as indicated by a positive relation between daily positive affect and reaction times (i.e., greater reaction times represent worse performance; e.g. Bodenhausen et al., 1994; Forgas & Fiedler, 1996; Seibert & Ellis, 1991). On the other hand, expectations about the role of negative affect are less clear based on the literature (Bless, 2003; Seibert & Ellis, 1991). Therefore, both beneficial and detrimental effects of negative affect on performance were conceivable. The cognitive tasks selected, particularly the working memory task, require careful processing of the presented stimuli. For such tasks, negative affect may have a beneficial effect (see Section 1.4.1), so the hypothesis is formulated in directional terms.

The second hypothesis addresses age-related differences in the within-person coupling (see Section 1.4.2). This question is derived from the literature on lifespan changes in the ratio between gains and losses and consequential changes in patterns of resource allocation (Baltes, 1987; Baltes & Baltes, 1990) as well as from the literature on cognitive consequences of emotion regulation (Baumeister et al., 1998; Deptula et al., 1993; Ellis & Ashbrook, 1987; M. W. Eysenck

& Calvo, 1992; Hasher & Zacks, 1979; Richards & Gross, 2000; Schmeichel et al., 2003). These theoretical accounts would predict that a reduction in cognitive resources should lead to a stronger relationship between affective experiences and cognitive functioning. The two functional domains should thus be more intimately linked in older than in younger adults, because older adults' cognitive capacity is reduced as compared with that of younger adults (Hasher & Zacks, 1979; Unsworth et al., 2005). In addition, the effect of mood regulatory processes may exert a stronger influence on a more inconsistent cognitive system (i.e., one with greater within-person variability in cognitive performance) than on a more stable cognitive system (Hultsch et al., 2002; Li et al., 2004; R. West et al., 2002a). Initial support for older adults' greater vulnerability to disrupting emotion-cognition interactions stems from experimental (between-person) studies, at least with respect to negative moods (e.g., Hogan, 2003; Phillips, Smith, et al., 2002; see also Sliwinski et al., 2004; Stawski et al., 2004). Complementary evidence comes from studies by David Hultsch and colleagues (Hultsch et al., 2002; B. R. Williams et al., 2005; but see also Salthouse, 1993) who showed that variability in reaction time performance may be more strongly driven by attentional lapses in older as opposed to younger adults. Such attentional lapses may be induced by emotional or other well-being related states such as fatigue, and hence this would speak to the idea of a greater degree of within-person moment-to-moment coupling of the two domains in older than younger adults.

As a follow-up to the second hypothesis, individual differences in the average day-to-day cognitive performance and in personality factors are examined as potential moderators of the within-person coupling of affect and cognitive performance. These exploratory analyses are driven by the rationale that in accord with the process hypotheses underlying the coupling, individuals with overall lower performance (rather than simply older adults), should show a stronger coupling, as well as individuals who tend to be more vulnerable to ruminative thinking styles (i.e., individuals scoring higher on measures of neuroticism) and thus to processes imposing an additional cognitive load in a dual-task context. Another reason why personality factors are of interest is their fundamental role for individual differences in mean levels of PA and NA (Costa & McCrae, 1980; Eid & Diener, 1999) and for individual differences in cognitive performance variability (M. D. Robinson & Tamir, 2005).

Finally, both from a theoretical and a methodological perspective, it is an open question whether observed relationships between mood and cognition at the between-person level generalize to the level of everyday co-occurrences within single individuals (Borsboom, Mellenbergh, & van Heerden, 2003; Cervone, 2005; Molenaar et al., 2003; Nezlek, 2001; Schmitz, 2000; Tennen et al., 2000). The theories outlined above postulate intraindividual processes and

hence would best be tested in micro-longitudinal designs that are capable of addressing the coupling at an intraindividual level. Most previous research has employed single-session (i.e., between-person) laboratory experiments and there are only few within-person studies linking mood and cognitive performance. These within-person studies have mainly linked negative affect and stress to cognition (i.e., positive moods have been rarely included). In addition, only a minority of studies includes both young and older adult samples (e.g., Ong et al., 2004, Sliwinski et al., 2004; Stawski et al., 2004). The present dissertation represents a unique contribution to this literature, as it examines the within-person relationship between two types of affect (PA and NA) and two different cognitive tasks (vigilance and working memory).

In sum, the specific hypotheses examined are as follows:

5. *Fluctuations in positive and negative affect are moderately related to fluctuations in cognitive performance at the level of individuals. Age, mean cognitive performance, and personality, moderate the within-person coupling of affect and cognitive performance.*
 - (a) In the total sample, the average within-person relationship (i.e., slope) between daily reaction time and daily PA is positive: On days with higher than average PA, reaction times are also higher indicating that individuals' responses are slower.
 - (b) On the other hand, the average within-person relationship (i.e., slope) between daily reaction time and daily NA is negative: On days with higher than average NA, reaction times tend to be lower indicating that individuals' responses are faster.
 - (c) There is a significant age group \times daily affect interaction in the prediction of daily cognitive performance: Older adults show stronger coupling than younger adults.
 - (d) The direction of the potential moderating role of average cognitive performance and personality factors for the affect-performance coupling will be explored by testing average cognitive performance/personality \times daily affect interaction terms in the prediction of daily performance.

Table 2.1

Overview of Research Questions and Hypotheses

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- I. Are there age-related differences in the stable and dynamic characteristics of day-to-day PA and NA?
1. *Young and older adults differ significantly in the stable and the dynamic characteristics of day-to-day PA and NA:*
- (a) Regarding mean levels of day-to-day PA and NA, there will be a significant main effect of valence (NA < PA) and a significant age group × valence interaction: All individuals will report higher mean levels of PA than of NA, and older adults will report higher mean levels of PA and lower mean levels of NA than young adults.
 - (b) Regarding time-related trends in mean levels of affect across the assessment period, there will be a small but significant main effect of time, but no significant age group × time interaction: Both age groups exhibit slight decreases in self-reported PA and NA across the nine weeks.
 - (c) Regarding day-to-day intraindividual variability in affect, there will be a significant main effect of valence (NA < PA) and a significant main effect of age group (older < young): Both age groups will show less fluctuation from one day to the next in NA as compared to PA. Older adults will report less day-to-day fluctuations in PA and NA across the nine-week period than younger adults.
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- II. Does age explain significant amounts of variance in day-to-day fluctuations in PA and NA above and beyond personality?
- Are there age-related differences in the association between fluctuations in PA and NA and trait-like and state-like correlates representing stress and psychological adjustment?
2. *Individual differences in day-to-day fluctuations of PA and NA can be explained by age, above and beyond the effects of personality factors such as extraversion and neuroticism.*
- (a) Neuroticism is positively related to variability in NA and to a lesser extent in PA, extraversion is weakly positively related to variability in PA: Individuals who report higher levels of neuroticism tend to show greater day-to-day variability in NA and in PA, individuals who report higher levels of extraversion tend to show slightly greater day-to-day variability in PA.
 - (b) After controlling for personality factors, age group will be a significant additional predictor of affect fluctuation, leading to a significant change in the individual difference variance explained: Even after controlling for individual differences in personality factors, age group will show a significant negative association with variability in both affect domains.
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3. *There are valence-specific interrelations between affect variability and psychological adjustment.*
- (a) In both age groups, variability in NA is negatively associated with psychological adjustment: Regardless of age, individuals who fluctuate more in NA tend to be less well psychologically adjusted.
 - (b) In young adults, variability in positive affect is positively related to psychological adjustment: Within young adults, individuals who show greater variability in PA tend to show higher psychological adjustment. The association between variability in PA and psychological adjustment in older adults will be explored.
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(Table continues)

Table 2.1 (continued)

4. *There will be an age group \times daily event/stress interaction in the prediction of daily PA and NA: Age moderates the extent to which day-to-day fluctuations in PA and NA are related to fluctuations in perceived stress and daily events.*

(a) In young adults, daily positive affect is positively related to daily positive events, and slightly negatively related to or unrelated to daily negative events and daily stress: Within young adults, days characterized by the presence of a positive event, the absence of a negative event, and below average stress tend to be days on which PA is higher.

(b) In young adults, daily negative affect is positively related to daily negative events and daily stress, and unrelated to daily positive events: Within young adults, days with a negative event and those that are higher in perceived stress than the average day tend to be days on which NA is higher.

(c) In older adults, daily reports of positive and negative affect are only slightly or even unrelated to daily positive and negative events and stress: Within older adults, reporting a minor positive or negative event and reporting greater stress than on average tends to be independent of reporting higher or lower daily PA and NA.

III. Are there reliable within-person associations of daily PA and NA with cognitive performance, and do age or other individual difference factors moderate this coupling?

5. *Fluctuations in PA and NA are moderately related to fluctuations in cognitive performance at the level of individuals, and age, mean cognitive performance, personality, and task characteristics moderate the within-person coupling of affect and cognitive performance.*

(a) In the total sample, the average within-person relationship (i.e., slope) between daily reaction time and daily PA is positive: On days with higher than average PA, reaction times are also higher indicating that individuals' responses are slower.

(b) On the other hand, the average within-person relationship (i.e., slope) between daily reaction time and daily NA is negative: On days with higher than average NA, reaction times tend to be lower indicating that individuals' responses are faster.

(c) There is a significant age group \times daily affect interaction in the prediction of daily cognitive performance: Older adults show stronger coupling than younger adults.

(d) The direction of the potential moderating role of average cognitive performance and personality factors for the affect-performance coupling will be explored by testing average cognitive performance/personality \times daily affect interaction terms in the prediction of daily performance.

Notes. PA = Positive Affect, NA = Negative Affect.

Hypotheses are first stated in statistical terms, followed by more descriptive terms.