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Facing the music or burying our heads in the sand?:

Adaptive emotion regulation in mid- and late-life

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Running head: Adaptive emotion regulation in mid- and late-life

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Abstract

Psychological defense theories postulate that keeping threatening information out of awareness brings short-term reduction of anxiety at the cost of longer-term dysfunction. By contrast, Socioemotional Selectivity Theory suggests that preference for positively-valenced information is a manifestation of adaptive emotion regulation in later life. Using six decades of longitudinal data on 61 men, we examined links between emotion regulation indices informed by these distinct conceptualizations: defense patterns in earlier adulthood and selective memory for positively-valenced images in late life. Men who used more avoidant defenses in midlife recognized fewer emotionally-valenced and neutral images in a memory test 35-40 years later. Late-life satisfaction was positively linked with mid-life engaging defenses but negatively linked at the trend level with concurrent positivity bias.

Key words: emotion regulation, defenses, coping, positivity effect, aging

Facing the music or burying our heads in the sand?:

Adaptive emotion regulation in mid- and late-life

The explosion of interest in emotion regulation began within the last two decades, but this interest has its roots in an older literature on defense mechanisms (Gross, 1998b). Psychodynamic theory, beginning with Freud, has for over a century posited that all human beings employ specific strategies – termed *defenses* – to manage or avoid uncomfortable emotions, thoughts, or impulses (A. Freud, 1937; S. Freud, 1894). Unacceptable psychological experiences could be transformed, banished from awareness, or channeled into more tolerable forms using an array of defenses. Building on this tradition, several influential theorists hypothesized that the adaptiveness of these strategies depended on the extent to which they impaired the user’s ability to engage with reality (Haan, 1977; Vaillant, 1971). By contrast, Socioemotional Selectivity Theory (Carstensen, Isaacowitz, & Charles, 1999), a prominent theory of emotion regulation in aging, suggests that preferential attention to and memory for positively- rather than negatively-valenced aspects of reality is adaptive, at least for older adults. In this paper we examine empirical links between these two conceptualizations of adaptive emotion regulation and the ability of these theories to predict emotional wellbeing in late life.

This focus is motivated by two aims: (1) to make connections across two historical periods and between different literatures on adaptive emotion regulation in an effort to bring attention to theories and research that are underappreciated by many modern emotion researchers; and (2) to explore what, on the surface, appears to be a significant conflict between these two lines of thinking about emotion regulation. Influential theories about defense

mechanisms posit that engaging directly with distressing or discomforting affects and experiences is adaptive, especially in the long run. By contrast, Socioemotional Selectivity Theory predicts that, at least in older adults, there are benefits to selectively attending to positive rather than negative aspects of experience. The latter view is echoed in other literatures, including recent developments in positive psychology (Fredrickson, 2001; Seligman, 2002). We explore these issues using data from a 70-year longitudinal study of adult development.

Emotion regulation encompasses a broad range of processes responsible for monitoring and altering aspects of emotional experiences (Thompson, 1994). Emotion regulatory efforts are undertaken in the service of particular goals (Campos, Mumme, Kermoian, & Campos, 1994). Defense mechanisms are a subset of these regulatory processes that are directed particularly at modulating internal distress (S. Freud, 1894; Vaillant, 1992). In addition to defenses, individuals may use a wide array of strategies to manage emotion such as rhythmic breathing, suppression of the expression of an emotion, or reappraisal of another person's intentions (Schulz & Lazarus, in press). Emotion regulatory efforts play a key role in shaping psychological wellbeing, emotional reactivity in daily life, and the attainment of key life goals (Carstensen, Mikels, & Mather, 2006; Gross, 1998a).

Engaging and avoidant defenses

Defenses have commonly been ranked hierarchically in terms of their adaptiveness, based on the psychodynamic postulate that minimizing or keeping threatening information out of awareness brings short-term reduction of anxiety at the cost of longer-term dysfunction (Vaillant, 1971; 2002a). From this perspective, a defense such as repression – dealing with an uncomfortable reality by banishing it from awareness – can be relieving in the moment but quite costly over time. Take for example a woman who feels a mass in her breast. This event would

typically arouse anxiety, and denying the experience (i.e., telling herself that she did not in fact feel the mass) may make her feel better but would result in neglect of a potentially life-threatening health problem. By contrast, a defense mechanism that allows her to manage emotion while staying engaged with reality would be considered more adaptive. For example, the defense of suppression is a conscious or semiconscious decision to postpone but not avoid paying attention to an uncomfortable feeling or situation (Vaillant, 1992). Using suppression in this case, the woman might make an appointment with her doctor for the following week and then put the subject out of her mind until she can get more information at her medical appointment. Once she has faced the problem head-on and taken steps to deal with it, suppression allows her to manage anxiety that might interfere with her daily functioning. Repression would be considered an avoidant defense, and suppression of worry until a problem can be dealt with appropriately would be considered a more engaging defense.

To be sure, the adaptiveness of particular defenses is context-dependent (Lazarus, 1983). What may be useful in one situation may be maladaptive in another. However, across a variety of challenging situations, individuals have been found to rely on a limited repertoire of defenses. Indeed, one approach to personality typing involves delineation of one's habitual modes of dealing with emotional discomfort (Brenner, 1981; Shapiro, 1965). "Obsessional" individuals, for example, tend to manage anger by draining feelings from their experiences so that conscious appraisals of evocative events are largely devoid of affect ("I'm not angry about being fired; it was a perfectly rational business decision"). "Histrionic" individuals typically cope with stress in a strikingly different manner, emphasizing feelings while banishing disconcerting thoughts ("I'm furious, but I can't remember what it's about.").

Vaillant's hierarchical array of defenses from immature to mature emphasizes the degree to which defenses involve disengagement from discomforting experiences and from the reality of a situation. Studies have shown some maturation of defense mechanisms as people age (Costa et al., 1991; Vaillant, 2000). Nevertheless, patterns of coping with stress are thought to be relatively stable throughout adulthood. Psychodynamic concepts of personality posit such continuity of coping styles (Shapiro, 1965), as do developmental theories such as "dynamic interactionism" (Luyten, Blatt, & Corveleyn, 2005; Zuroff, Mongrain, & Santor, 2004) that emphasize the individual's role in constructing or selecting environmental conditions that are congruent with his or her vulnerabilities and preoccupations.

Selective focus on positive information and experience

Emotional wellbeing and certain emotion regulatory abilities appear to increase with age. Healthy older adults report lower levels of depressive symptomatology and higher levels of subjective wellbeing than younger adults (Carstensen, Isaacowitz, & Charles, 1999). They report focusing more on self-control of their emotions (Lawton, Kleban, Rajagopal, & Dean, 1992); they rate their emotion regulation skills as better (Birditt & Fingerhant, 2005); and they report being able to dissipate negative emotions sooner than their younger counterparts (Carstensen, Pasupathi, Mayr, & Nesselrode, 2000). According to Socioemotional Selectivity Theory (SST; Carstensen, Isaacowitz, & Charles, 1999), this shift toward greater wellbeing occurs because older adults place increasing priority on emotionally meaningful goals. SST argues that as people approach the end of life and perceive time as limited, goals associated with emotional meaning and wellbeing become more salient, whereas goals associated with acquiring knowledge for future use become less important. According to this theory, as maximizing emotional wellbeing

becomes a preeminent motivation, people invest more attentional, cognitive, and social resources in enhancing positive emotional experience.

Efforts to regulate emotion involve a number of psychological subsystems including attention and memory processing (Schulz & Lazarus, in press). The external stimuli, interactions, and experiences that we selectively focus on and retain influence our emotional states and wellbeing (Carstensen & Mikels, 2005). Research supports the existence of a *positivity effect* in what older adults attend to and remember – that is, older adults have been found to preferentially pay attention to and recall positive stimuli and events. This positive bias is believed to help regulate the affective states of elderly individuals (Carstensen & Mikels, 2005) and is linked to better mood (Kennedy, Mather, & Carstensen, 2004). The literature suggests that, although automatic attention processes relevant to emotion such as threat detection change little with age (Mather & Knight, 2006), older adults may actively use cognitive controls to spend less time than younger adults dwelling on negative information (Rosler et al., 2005). With regard to episodic memory, there is evidence that older adults remember a higher proportion of positive stimuli and a lower proportion of negative stimuli than younger adults. For example, Charles et al (2003b), found that young adults (age 18-29) had similar recall of positive and negative visual stimuli, whereas middle aged (age 41-53) and older adults (age 76-80) recalled more positive than negative stimuli.

Theories of positive psychology suggest that actively cultivating positive emotions may stimulate wellbeing, health, and improved general functioning across the life cycle (Fredrickson, 2001; Salovey, Rothman, Detweiler, & Steward, 2000). According to Fredrickson's (2001) broaden-and-build theory, positive emotions broaden one's cognitions and actions in the near term and foster growth and coping skills over longer periods. In this respect, positive

psychology and SST share the premise that focus on and cultivation of positive emotions is adaptive.

In this study we explore the tensions between a traditional view of defenses that emphasizes the adaptive benefits of directly engaging one's distress and the view outlined more recently in Socioemotional Theory that selective attention to and memory for the positive over the negative leads to enhanced wellbeing. Specifically, we ask the following research questions:

1. Are there links between two indices of emotion regulation that are informed by distinct conceptualizations: defense patterns evident in middle age and selective memory for positively-valenced information in late life?
2. To what extent do these two indices of emotion regulation explain wellbeing in late life?

Method

Participants

Participants were drawn from a cohort of men recruited initially between 1939 and 1942 for a study of adult development. A university health service recruited 268 male college sophomores (ages 18–19) for an intensive multidisciplinary study (Vaillant, 2002b) that has continued for 70 years. Participants were originally selected because college entrance examinations revealed no mental or physical health problems, and their deans perceived them as likely to become successful adults. All were white; 50% were on scholarships or needed to work during college to meet expenses; 64% eventually obtained graduate degrees. In adult life, most participants worked in high level, white-collar jobs. Of the original study group of 268 men, 12 dropped out of the study during college and eight were killed in World War II. On entering the study, the men were assessed by internists, psychiatrists, psychologists, and anthropologists.

Participants completed questionnaires every 2 years thereafter, and they were re-interviewed by study staff at approximately ages 25, 30, and 50.

Surviving men ($n=93$) were asked to participate in home assessments between 2004 and 2008, when they were in their mid-80's. The sample for the current study consisted of 61 men. To be eligible to participate, men had to score above 25 (indicating minimal or no cognitive impairment) on the Telephone Interview for Cognitive Status (Brandt, Spencer, & Folstein, 1988) and be in sufficient physical health to be able to complete the in-home procedures described later. Of the 93 men from the original cohort of 268 who were alive and participating at the time of the study, 10 were unable to participate because of physical or cognitive impairment, and 6 declined to participate. Seventy-seven men completed the images protocol, but ratings of defenses from age 19 to 50 were not available for 12 of them. In addition, 4 men who completed the image-viewing protocol appeared to have difficulty comprehending the task and were excluded from analyses, leaving 61 men for whom complete data were available. Analyses revealed that the 6 eligible men who declined to participate in the study did not differ significantly from the 61 men who participated with respect to age, number of years of education, income at ages 55 and 80, health at age 70 based on an internist's rating of medical records (for details, see Vaillant, 1979; 1998), number of previous divorces, or marital satisfaction at ages 75 and 80. Mean age at the time of the home assessment was 86.1 years ($SD = 1.5$). The Human Research Committee affiliated with Partner's Healthcare approved the study, and written informed consent was obtained from all participants.

Procedures

Memory Task: To assess preferential memory for positively-valenced visual images as an index of the positivity effect, men were asked to view positive, negative, and neutral images

from the International Affective Picture System (Ito, Cacioppo, & Lang, 1998), which is a standardized set of images that are rated on a number of dimensions including emotional valence (positive vs. negative) and emotional arousal. In a protocol similar to that used by Charles et al (2003b), participants viewed a series of 60 positive, 60 negative, and 60 neutral pictures, each for 3 seconds (Bradley, Lang, Coan, & Allen, 2007). Images were selected so that positive and negative pictures were equal in arousal and in distance from neutral valence, and all images were matched for visual complexity, brightness, and the number that include people, buildings, and landscapes. Images were pseudorandomly intermixed with one another, and participants were asked to view the series of pictures as if they were watching TV. They were not told that there would be a subsequent test of memory for these images. After 30 minutes, they were again presented with these images intermixed with new ones. Participants were asked to indicate whether each picture was an “old” picture (viewed previously) or a “new” picture. Similar protocols have been used in a number of studies to assess responses to emotionally-valenced images in older adults (see, for example, Charles, Mather, & Carstensen, 2003a; Kensinger & Schacter, 2006).

Interviews: Participants were interviewed at three points in time by Study staff members. During college, a staff psychiatrist conducted eight one-hour interviews with each man. At age 30, men were interviewed by a trained anthropologist for approximately 2 hours. Interviews at age 45-50 were conducted by a psychiatrist or social worker, lasted 2-3 hours, and took place in participants’ homes or at their workplaces. Interview protocols were designed to focus on challenges in participants’ relationships, physical health, and work. Interviewers took notes during the interviews and wrote extensive summaries immediately following each meeting.

Interviewers were instructed to elucidate but not label the behaviors that participants reported using to cope with their difficulties (Vaillant & Vaillant, 1992).

Measures

Life satisfaction was measured using the Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985). The SWLS is a self-administered questionnaire that asks participants to rate how much they agree or disagree with 5 life satisfaction statements on a 7-point Likert-type scale. Scores are summed to generate a total score that ranges from 5 to 35. Validation studies have shown that the SWLS comprises a single factor and possesses high internal consistency ($\alpha = .87$) and high test-retest reliability ($r = .82$, Diener, Emmons, Larsen, & Griffin, 1985). In this study, the coefficient alpha was .84. Previous research has found expected correlations with peer and family reported life satisfaction (Pavot, 1991).

Defenses (age 19-50) were assessed using ratings of the occurrence of specific defenses by 3 independent raters who were blind to other information about participants. From all available interview summaries described in the Procedures section above, raters identified vignettes illustrating coping styles during challenging times, and the number of identified vignettes per participant ranged from 10 to 30 per interview. Coders gave each vignette a single rating for the best-fitting defense. Ratings were based on a coding manual developed by Vaillant (1977). These codes were then tallied and given the following scores based on the frequency with which each particular defense appeared across all vignettes: 1 = no significant vignettes noted illustrating this defense; 2 = defense evident in 1 vignette; 3 = 2 or 3 vignettes; and 4 = 4 or more vignettes, or if no defense was rated this frequently, the two or three most frequently used individual defenses were rated 4. Interrater reliability for these frequency ratings ranged from $r = .72$ to $.84$ (Vaillant, 1992).

Defenses were re-categorized for this study based on the degree to which the defense represented avoidance or engagement with threatening or stressful phenomena. (For a similar conceptualization, see Schulz, Waldinger, Hauser, & Allen, 2005). Avoidant defenses reflected emotion regulatory strategies that were directed at avoiding both upsetting emotions and the source of stress. These included most of the defenses labeled immature or neurotic in Vaillant's hierarchy of defenses: acting out, displacement, dissociation, hypochondriasis, isolation of affect, passive aggression, projection, reaction formation, and repression. Psychosis and schizoid fantasy were not included insofar as they represented a clear break from reality and were deemed qualitatively different from these other ways of managing emotion. Engaging defenses were ones in which individuals appeared to be making efforts to manage uncomfortable emotions without disengaging from the painful or stressful source of those emotions. With the exception of altruism, engaging defenses included all those labeled mature in the Vaillant hierarchy: anticipation, humor, sublimation, and suppression. Altruism was excluded from this grouping because it did not involve direct engagement with uncomfortable stimuli and also did not fit in the avoidant defense category. Validity of the defense ratings and Vaillant's hierarchy is supported by concurrent links of maturity of defense scores with overall mental health and the absence of DSM-diagnosed personality disorders (Vaillant, 1994).

Overall scores for avoidant and engaging defenses were calculated by summing the ratings reflecting the number of times these defenses appeared in interview vignettes. In addition, because both the number of vignettes analyzed and the number of defenses identified varied across participants, the percentage of total defenses that were engaging defenses was also computed ($=$ engaging defenses divided by sum of engaging plus avoidant defenses) and used in analyses.

Memory Bias was calculated from data collected during the images viewing protocol described above. Corrected recognition scores for positive, negative, and neutral images were calculated by subtracting the number of images that were incorrectly identified as previously studied (“false alarms”) from those that were correctly identified as previously studied (“hits”). Subtracting the number of falsely remembered from correctly remembered images provides a more accurate index of memory than correctly remembered images alone insofar as it accounts for the possibility that some participants could fail to discriminate between pictures they had and had not encountered previously. *Positivity scores* were calculated for each participant by subtracting his corrected recognition score for negative images from (1) his corrected recognition score for positive images and (2) his corrected recognition score for neutral images. Scores greater than zero indicate bias toward remembering positively-valenced images, and scores less than zero indicate preferential memory for negatively- or neutrally-valenced images.

Results

Participants were, as a group, fairly satisfied with life: on a scale ranging from 5 to 35, the average score was 26.5 ($SD = 5.7$). The men were rated as using avoidant defenses ($M = 18.6$, $SD = 3.1$) at twice the rate of engaging defenses ($M = 8.8$, $SD = 1.9$) when they were age 19-50. With respect to memory bias associated with emotional valence, the men in the sample correctly recognized, as octogenarians, as many positive as negative images ($M_{\text{positive}} = .70$, $SD = .17$; $M_{\text{negative}} = .69$, $SD = .19$; $t = -1.0$, $p = .32$). There was considerable variability in the degree to which the emotional valence of the presented stimuli was related to memory accuracy: difference scores between correct recognition of positive and negative images ($M = .03$, $SD = .13$) ranged from $-.21$ (signifying preferential memory for negative images) to $.33$ (signifying preferential memory for positive images). Difference scores between correct recognition of positive and

neutral images ($M = .01$, $SD = .14$) ranged from $-.30$ (signifying preferential memory for neutral images) to $.66$ (signifying preferential memory for positive images). This degree of variability suggested the feasibility and potential importance of studying the predictors and correlates of positive or negative memory bias in this sample.

The first question we examined was whether there were links between the use of engaging or avoidant defenses in midlife and memory accuracy for positive and negative images in late life. Pearson correlations revealed moderate to strong negative links between the total number of avoidant defenses assessed from midlife vignettes and correct recognition of positive, ($r = -.39$, $p < .01$), negative ($r = -.46$, $p < .001$), and neutral ($r = -.33$, $p < .01$) images as older men. That is, the presence of more avoidant defenses in midlife interviews was associated with less accurate recognition of all types of images in a laboratory-based memory test more than 30 years later. More frequent engaging defenses (i.e., the sum of coded engaging defenses) by themselves were not linked with correct recognition of images of any valence in late life ($r_{positive} = .12$; $r_{negative} = .01$; $r_{neutral} = .09$). However, the percent of all defenses that were engaging was linked with better memory for negative ($r = .28$, $p < .05$) and neutral ($r = .28$, $p < .05$) images, but not for positive images ($r = .12$). Moreover, there was a marginally significant link between the relative predominance of engaging defenses in midlife and the difference in correctly recognized images that were positive versus negative in late life, $r = -.22$, $p = .09$. This trend indicates that individuals rated as displaying proportionately greater use of engaging defenses in midlife displayed less selective memory for positively-valenced (as compared to negatively-valenced) images in their 80s.

We next examined links between men's midlife defenses and their satisfaction with life as octogenarians. Men who displayed a higher percentage of engaging defenses in midlife

reported greater late-life satisfaction, $r = .34, p = .008$. We also found significant links between frequency of avoidant defenses displayed in midlife and lower life satisfaction in late life, $r = -.32, p = .01$. To address the possibility that these links are driven by confounds that were present in young adulthood, we ran additional regression analyses with two possible confounds. The links between defenses and life satisfaction remained significant and were of similar magnitude even after controlling for IQ at age 19 and for family of origin socioeconomic status using Hollingshead-Redlich classifications (Hollingshead & Redlich, 1958). There was no link between the frequency of engaging defenses and late-life satisfaction, $r = .16, p = .22$.

Finally, we examined links between correct recognition of emotionally-valenced images in late life and concurrent life satisfaction. There were no significant links between scores for corrected recognition of positive, negative, or neutral images and life satisfaction (r 's ranged from $-.07$ to $.13$, all non-significant). There was a trend toward a negative link between life satisfaction and the difference between correctly-recognized positive and negative images, $r = -.22, p = .098$, indicating that preferential memory for positive information was linked with lower levels of self-reported wellbeing. There was no relationship between life satisfaction and the difference between correctly-recognized positive and neutral images, $r = -.14, p = .27$.

Discussion

The purpose of this study was to examine links between indices of emotion regulation arising from two distinct psychological traditions – psychodynamically-informed conceptualizations of defenses and preferential memory for information with positive emotional valence informed by Socioemotional Selectivity Theory (Carstensen, Isaacowitz, & Charles, 1999). These two perspectives reflect the diversity of how emotion regulation has been conceptualized and operationalized over the past century of psychological research.

Defenses are strategies for managing uncomfortable emotions and experiences. An individual's preferential use of certain defenses across situations and over time is one way of characterizing his or her emotion regulatory style. The participants in this study are part of a long term investigation that has linked the quality of defenses with a number of indices of adaptation throughout the lifespan, including physical health in mid- and late life (Vaillant, 1979; Vaillant & Mukamal, 2001). This is the first time we have extended these analyses to late life satisfaction and established links between defenses and late life memory processes. In this study we emphasized the distinction between defensive styles characterized by avoidance and those characterized by engagement with discomforting emotions and situations. Investigators who have ranked defenses by their adaptiveness or maturity (e.g., Haan, 1977; Vaillant, 1971) have emphasized this distinction.

By contrast, Socioemotional Selectivity Theory begins with the premise that a natural and adaptive response to the sense of limited time experienced by older adults is to maximize positive emotional experiences in their daily lives. The emphasis is on enhancing positive experience, although use of regulatory skills to reduce the frequency or intensity of negative experiences is also incorporated into this theoretical framework. An important laboratory-based marker for this regulatory preference for positivity has been memory for positively and negatively-valenced stimuli.

Measurement strategies for assessing these two indices of emotion regulation differed markedly in this study. Defenses were coded from narratives culled from multiple interviews collected over more than 30 years. Memory bias was measured by performance at a single point in time on a task using standardized visual images. Given these differences and the fact that defenses and memory bias were measured at such different life stages, it is impressive that

connections were found between adaptive emotion regulation in early adulthood, as assessed by greater use of more engaging defenses, and performance on the memory task that serves as a marker for one conceptualization of adaptive emotion regulation in old age – preferential attention to and memory for positively-valenced information. The primary links were between less frequent use of avoidant defenses earlier in life and better memory for all types of images later in life. The magnitude of the links was strongest for negatively-valenced images, where the *frequency* of avoidant defenses in mid-adulthood explained over 21% of the variance in correct recognition of negative images in late adulthood, but correlations of medium effect size were also found for neutral and positive images. Moreover, medium-sized correlations were also found when the *proportion* of avoidant defenses (relative to engaging defenses) was the predictor and memory for negative and neutral images were the relevant outcomes in late life.

The findings of strong links *across more than thirty years* between predominant modes of defense and subsequent memory for visual images is impressive. The measures of defenses derived from careful coding of interview material may successfully capture an underlying tendency of not turning away from uncomfortable stimuli and reactions – a tendency that persists and manifests in the ability to attend to and recall all types of information including unpleasant information as we age. Conversely, “burying one’s head in the sand” by using avoidant defenses to cope with distressing experiences and emotions may manifest as poorer attention to and memory for novel stimuli of any valence in old age.

Despite the strength and presence of these multiple links across more than 30 years, there was little connection between earlier defenses and the memory scores used to tap late-life positivity. Only one marginally significant link was found between the defense measures and memory for positive *relative to* negative or neutral images. The lack of more consistent

connections between defenses and a positive memory bias suggests caution in inferring that these two indices of emotion regulation are truly linked across these developmental periods. The lack of consistent connections might point to important ways in which selective memory bias and defenses differ. For example, memory biases may involve rapid and largely automatic processing of emotion, whereas defense mechanisms might operate in more sustained ways that are particularly relevant to how individuals respond as a stressful encounter unfolds over time. It is also important to recognize that the memory biases are based on direct observations of participants performing a task, while the defense measures depend on participants' reflection and response to questions in a series of interviews.

Associations between the two indices of emotion regulation and satisfaction with late life raise interesting issues. The strength of the links between engaging defenses and life satisfaction (accounting for as much as 11% of the variance in life satisfaction) across more than 30 years is noteworthy. It is also critical to highlight that these links exist above and beyond any influence of family of origin SES or early adult intelligence, suggesting that these links cannot be explained by the association of the use of engaging defenses with other factors that have been known to bestow an adaptive advantage in life. The fact that more frequent use of engaging defenses in midlife predicted greater life satisfaction in old age suggests that, at least over time, facing life's uncomfortable aspects more squarely may enhance one's appreciation of life rather than detract from it. The advantages of coping strategies that involve more direct engagement with a source of challenge or distress have been highlighted in two other literatures. Research arising out of behavioral traditions has established behavioral avoidance as a risk factor for multiple kinds of psychopathology including depression and anxiety (Harvey, Watkins, Mansell, & Shafran, 2004; Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). Investigations of different

coping styles have found that strategies involving relatively more direct engagement with a stressful challenge rather than avoidance are more closely linked with adaptation (Holahan & Moos, 1991).

Only one marginally significant link was found between measures of positive memory bias and life satisfaction, and it accounted for less than 5% of the variance. More surprisingly, this link was negative, indicating that preferential memory for positive images relative to negative images was linked with reports of less life satisfaction. Positive memory bias may have detrimental as well as beneficial consequences in regard to wellbeing. For example, research suggests that selective memory for positive information could negatively impact older adults' decisions about health matters (Lockenhoff & Carstensen, 2007). If replicated, the finding that positive memory bias was associated with less life satisfaction would suggest that “burying one’s head in the sand” may have immediate emotional benefits but may also lead to challenges in living that chip away at one’s overall satisfaction with life.

The study has limitations that are important to note. Only 61 men participated, and they are a subset of the 268 in the original cohort. The fact that all were Caucasian males from middle- and upper-class backgrounds of one historical cohort limits the generalizability of our findings. We have used only a single measure of positivity in late life. It is important to recognize that positivity has been operationalized and assessed in multiple ways (e.g., autobiographical memory, Kennedy, Mather, & Carstensen, 2004) and that these may be differentially associated with wellbeing. In addition, we have used a single self-report measure of wellbeing. It would be helpful to investigate links between indices of emotion regulation and other indices of adaptation.

The inspiration for this special issue was Stuart Hauser's work in the field of human development. Among his many contributions are his elegant demonstrations of the importance of studying individual lives through time and his documentation of the adaptive consequences of various ways of managing life's inevitable ups and downs. This study uses data collected over more than six decades to examine links between styles of emotion regulation earlier in adulthood and wellbeing in the 9th decade of life. It incorporates two indices of emotion regulation – defenses and memory for emotionally-valenced information – that are informed by two important and potentially contradictory theories of the nature of successful coping. Clarification of what constitutes adaptive emotion regulation at different points in the life cycle and in different contexts is important to our understanding of the determinants of psychological wellbeing throughout life. Stuart Hauser's mentorship was, for each of us, pivotal in developing our interests in these areas, and it gives us great pleasure to present our work as part of this effort to honor his substantial legacy.

References

- Birditt, K. S., & Fingerman, K. L. (2005). Do we get better at picking our battles? Age group differences in descriptions of behavioral reactions to interpersonal tensions. *Journals of Gerontology: Series B: Psychological Sciences and Social Sciences*, *60*(3), P121-p128.
- Bradley, M. M., Lang, P. J., Coan, J. A., & Allen, J. J. B. (2007). The International Affective Picture System (IAPS) in the study of emotion and attention. In *Handbook of emotion elicitation and assessment*. (pp. 29-46). New York, NY US: Oxford University Press.
- Brandt, J., Spencer, M., & Folstein, M. (1988). The Telephone Interview for Cognitive Status. *Neuropsychiatry, Neuropsychology, & Behavioral Neurology*, *1*(2), 111-117.
- Brenner, C. (1981). Defense and defense mechanisms. *Psychoanalytic Quarterly*, *50*, 557-569.
- Campos, J. J., Mumme, D. L., Kermoian, R., & Campos, R. G. (1994). A functionalist perspective on the nature of emotion. In N. A. Fox (Ed.), *The Development of Emotion Regulation: Biological and Behavioral Considerations* (Vol. 59, pp. 284-303). Chicago: University of Chicago Press.
- Carstensen, L., Isaacowitz, D. M., & Charles, S. T. (1999). Taking time seriously: A theory of socioemotional selectivity. *American Psychologist*, *54*(3), 165-181.
- Carstensen, L., Mikels, J., & Mather, M. (2006). Aging and the intersection of cognition, motivation, and emotion. In J. Birren & K. Schaie (Eds.), *Handbook of the Psychology of Aging* (6th ed., pp. 343-362). New York: Elsevier.
- Carstensen, L., & Mikels, J. A. (2005). At the intersection of cognition and emotion. *Current Directions in Psychological Science*, *14*, 117-121.

- Carstensen, L., Pasupathi, M., Mayr, U., & Nesselroade, J. R. (2000). Emotional experience in everyday life across the adult life span. *Journal of Personality & Social Psychology*, 79(4), 644-654.
- Charles, S. T., Mather, M., & Carstensen, L. L. (2003a). Aging and emotional memory: The forgettable nature of negative images for older adults. *Journal of Experimental Psychology: General*, 132(2), 310-324.
- Charles, S. T., Mather, M., & Carstensen, L. L. (2003b). Focusing on the positive: Age differences in memory for positive, negative, and neutral stimuli. *Journal of Experimental Psychology*, 85, 163-178.
- Costa, P. T., Jr., Zonderman, A. B., McCrae, R. R., Cummings, E. M., Greene, A. L., & Karraker, K. H. (1991). Personality, defense, coping, and adaptation in older adulthood. In *Life-span developmental psychology: Perspectives on stress and coping*. (pp. 277-293). Hillsdale, NJ, England: Lawrence Erlbaum Associates, Inc.
- Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction With Life Scale. *Journal of Personality Assessment*, 49(1), 71-75.
- Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist*, 56(3), 218-226.
- Freud, A. (1937). *The Ego and the Mechanisms of Defense*. London: Hogarth Press.
- Freud, S. (1894). The neuro-psychoses of defense (J. Strachey, Trans.). In *The Standard Edition of the Complete Psychological Works of Sigmund Freud* (Vol. 1, pp. 160-172). London: Hogarth Press.

- Gross, J. J. (1998a). Antecedent- and response-focused emotion regulation: Divergent consequences for experience, expression, and physiology. *Journal of Personality and Social Psychology*, *74*(1), 224-237.
- Gross, J. J. (1998b). The emerging field of emotion regulation. *Review of General Psychology*, *2*(3), 271-299.
- Haan, N. (1977). *Coping and Defending: Processes of Self-Environment Organization*. New York: Academic Press.
- Harvey, A. G., Watkins, E., Mansell, W., & Shafran, R. (2004). *Cognitive behavioral processes across psychological disorders: A transdiagnostic approach to research and treatment*. New York: Oxford University Press.
- Hayes, S. C., Wilson, K. W., Gifford, E. V., Follette, V. M., & Strosahl, K. (1996). Experiential avoidance and behavioral disorders: A functional dimensional approach to diagnosis and treatment. *Journal of Consulting and Clinical Psychology*, *64*, 1152-1168.
- Holahan, C. J., & Moos, R. H. (1991). Life stressors, personal and social resources, and depression: A 4-year structural model. *Journal of Abnormal Psychology*, *100*, 31-38.
- Hollingshead, A., & Redlich, F. (1958). *Social class and mental illness: A community study*. New York: John Wiley.
- Ito, T. A., Cacioppo, J. T., & Lang, P. J. (1998). Eliciting affect using the International Affective Picture System: Trajectories through evaluative space. *Personality and Social Psychology Bulletin*, *24*(8), 855-879.
- Kennedy, Q., Mather, M., & Carstensen, L. L. (2004). The role of motivation in the age-related positivity effect in autobiographical memory. *Psychological Science*, *15*(3), 208-214.

- Kensinger, E. A., & Schacter, D. L. (2006). Amygdala Activity is Associated with the Successful Encoding of Item, But Not Source, Information for Positive and Negative Stimuli. *Journal of Neuroscience, 26*(9), 2564-2570.
- Lawton, M. P., Kleban, M. H., Rajagopal, D., & Dean, J. (1992). Dimensions of affective experience in three age groups. *Psychology and Aging, 7*(2), 171-184.
- Lazarus, R. S. (1983). The costs and benefits of denial. In S. Breznitz (Ed.), *The Denial of Stress* (pp. 1-30). New York: International Universities Press.
- Lockenhoff, C. E., & Carstensen, L. L. (2007). Aging, Emotion, and Health-Related Decision Strategies: Motivational Manipulations Can Reduce Age Differences. *Psychology and Aging, 22*(1), 134-146.
- Luyten, P., Blatt, S. J., & Corveleyn, J. (2005). Introduction. In J. Corveleyn, P. Luyten & S. J. Blatt (Eds.), *The theory and treatment of depression: Towards a dynamic interactionism model* (pp. 5-15). Leuven, Belgium: University of Leuven Press.
- Mather, M., & Knight, M. R. (2006). Angry faces get noticed quickly: Threat detection is not impaired among older adults. *Journals of Gerontology: Series B: Psychological Sciences and Social Sciences, 61*(1), 54-57.
- Pavot, W., Diener, E., Colvin, C.R., Sandvik, E. (1991). Further validation of the Satisfaction with Life Scale: Evidence for the cross-method convergence of well-being measures. *Journal of Personality Assessment, 57*(1), 149-161.
- Rosler, A., Ulrich, C., Billino, J., Sterzer, P., Weidauer, S., Bernhardt, T., et al. (2005). Effects of arousing emotional scenes on the distribution of visuospatial attention: changes with aging and early subcortical vascular dementia. *Journal Neurological Sciences, 229-230*, 109-116.

Salovey, P., Rothman, A. J., Detweiler, J. B., & Steward, W. T. (2000). Emotional states and physical health. *American Psychologist*, *55*(1), 110-121.

Schulz, M. S., & Lazarus, R. S. (in press). Emotion regulation during adolescence: A cognitive-mediational conceptualization. In A. M. Cauce & S. T. Hauser (Eds.), *Adolescence and Beyond: Family Interactions and Transitions to Adulthood, Advances in Family Research*. Mahwah, NJ: Lawrence Erlbaum Associates.

Schulz, M. S., Waldinger, R. J., Hauser, S. T., & Allen, J. P. (2005). Adolescents' behavior in the presence of interparental hostility: Developmental and emotion regulatory influences. *Development & Psychopathology*, *17*, 489-507.

Seligman, M. E. P. (2002). *Authentic happiness: Using the new positive psychology to realize your potential for lasting fulfillment*. New York, NY, US: Free Press.

Shapiro, D. (1965). *Neurotic Styles*. New York: Basic Books.

Thompson, R. A. (1994). Emotion regulation: A theme in search of definition. In N. A. Fox (Ed.), *The Development of Emotion Regulation* (Vol. 59, pp. 25-52). Chicago: University of Chicago Press.

Vaillant, G. E. (1971). Theoretical hierarchy of adaptive ego mechanisms. *Archives of General Psychiatry*, *24*, 107-118.

Vaillant, G. E. (1977). *Adaptation to Life*. Boston: Little, Brown.

Vaillant, G. E. (1979). Natural history of male psychological health: Effects of mental health on physical health. *New England Journal of Medicine*, *301*, 1249-1254.

Vaillant, G. E. (1992). *Ego mechanisms of defense: A guide for clinicians and researchers*. Washington, D.C.: American Psychiatric Press, Inc.

- Vaillant, G. E. (1994). Ego mechanisms of defense and personality psychopathology. *Journal of Abnormal Psychology, 103*, 44-50.
- Vaillant, G. E. (1998). Natural history of male psychological health, XIV: Relationship of mood disorder vulnerability to physical health. *American Journal of Psychiatry, 155*, 184-191.
- Vaillant, G. E. (2000). Adaptive mental mechanisms: Their role in a positive psychology. *American Psychologist, 55*(1), 89-98.
- Vaillant, G.E., & Mukamal, K. (2001). Successful aging. *American Journal of Psychiatry, 158*(6), 839-847.
- Vaillant, G. E. (2002a). Defense Mechanisms. In V. J. Smelser & P. B. Baltes (Eds.), *International Encyclopedia of the Social and Behavioral Science*. Amsterdam: Pergamon Press.
- Vaillant, G. E. (2002b). The Study of Adult Development. In E. Phelps, A. Colby & J. F. Furstenberg (Eds.), *Looking at Lives*. New York: Russell Sage Foundation.
- Vaillant, G. E., & Vaillant, C. O. (1992). Empirical evidence that defensive styles are independent of environmental influence. In G. E. Vaillant (Ed.), *Ego mechanisms of defense: A guide for clinicians and researchers* (pp. 105-126). Washington, D.C.: American Psychiatric Press.
- Zuroff, D. C., Mongrain, M., & Santor, D. A. (2004). Commentary on Coyne and Whiffen (1995). *Psychological Bulletin, 130*, 489-511.

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