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Psychological Science 2009 20: 1529
DOI: 10.1111/j.1467-9280.2009.02473.x

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Research Article

Seeking Pleasure and Seeking Pain

Differences in Prohedonic and Contra-Hedonic Motivation From Adolescence to Old Age

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ABSTRACT—Using a mobile-phone-based experience-sampling technology in a sample of 378 individuals ranging from 14 to 86 years of age, we investigated age differences in how people want to influence their feelings in their daily lives. Contra-hedonic motivations of wanting either to maintain or enhance negative affect or to dampen positive affect were most prevalent in adolescence, whereas prohedonic motivations of wanting either to maintain, but not enhance, positive affect or to dampen negative affect were most prevalent in old age. This pattern was mirrored by an age-related increase in self-reported day-to-day emotional well-being. Analyses of the emotional experiences that accompanied prohedonic and contra-hedonic motivations are consistent with the notions that contra-hedonic motivations are more likely to serve utilitarian than hedonic functions, and that people are more likely to be motivated to maintain negative affect when it is accompanied by positive affect. Implications for understanding affective development are discussed.

There are many occasions when people wish to, or should, control their feelings. Such affective self-regulation often aims at the enhancement of positive affect (e.g., elevating one's happiness) and the dampening of negative affect (e.g., calming one's anger). However, there may also be situations in which people seek the contrary. In the research we report here, we aimed to investigate age-related differences in the prevalence of such prohedonic and contra-hedonic motivations. We propose that one can better understand why individuals of different ages

feel different in their day-to-day lives if one is aware of differences in how they want to feel. To investigate this idea, we used mobile phones to assess affective experiences and affect-regulation motivations as they occurred in the everyday lives of individuals ranging in age from adolescence to late adulthood.

Affective experiences are not irresistible and overwhelming forces: They can be regulated to some extent. Research on the proactive aspect of affective experience has primarily focused on the strategies people use to influence their feelings, and on how effective and cognitively demanding these strategies are (Koole, 2009). Little attention has been paid to the fact that such self-regulatory behaviors are preceded, and fundamentally shaped, by motivational processes. Presumably, most investigators have assumed that the motivation driving affect regulation is always directed at maximizing the individual's well-being (e.g., Larsen, 2000), and few researchers have acknowledged that there can be situations in which people want to maintain or enhance negative affect or dampen positive affect. Attempts to explain why such contra-hedonic motivations occur typically converge on one of two overarching themes.

One explanatory theme is the idea that negative affect may occasionally be beneficial, or positive affect detrimental, for attaining one's goals or for maintaining consistent views of oneself. Contra-hedonic motivation may hence serve utilitarian purposes (e.g., Parrott, 1993; Tamir, Chiu, & Gross, 2007; Tamir, Mitchell, & Gross, 2008; Wood, Heimpel, Manwell, & Whittington, 2009). For instance, negative affect may be socially appropriate or instrumental, such as when anger helps one in standing one's ground during an interpersonal confrontation. Conversely, positive affect can be socially inappropriate or obstructive, as, for example, when joy distracts one's concentration.

The second explanatory theme is the idea that people may sometimes seek apparently negative affective experiences because, for them, these experiences also have a positive side.

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Andrade and Cohen (2007), for instance, demonstrated that students who liked to expose themselves to horror movies were more likely to experience both fear and happiness while watching such movies, whereas those who usually avoided horror movies were more likely to experience only fear.

Although a small number of investigations have shown that contra-hedonic motivation can indeed be induced in young adults in experimentally controlled (and therefore more or less artificial) situations (Erber, Wegner, & Theriault, 1996; Tamir et al., 2007, 2008), to the best of our knowledge, there has been no research on potential age-related differences in prohedonic and contra-hedonic motivations as they naturally occur in everyday life. There is, however, accumulating evidence that individuals of different ages differ in their day-to-day affective experiences. Adolescence, for example, is characterized by affective turmoil and a relatively high prevalence of negative emotionality (e.g., Larson, Moneta, Richards, & Wilson, 2002). Within adulthood, there are typical patterns of age-related differences: When repeatedly asked to report their momentary feelings, older adults report higher emotional well-being than younger adults (e.g., Carstensen, Pasupathi, Mayr, & Nesselroade, 2000), and this difference cannot be explained by age-related differences in time use (Riediger & Freund, 2008).

The psychological mechanisms underlying these age-related differences in daily-life affective experiences are not well understood. We propose that considering the proactive aspects of affective experience can provide new insights into such age differences. That is, we assume that age-related differences in everyday emotional well-being are brought about in part by differences in how individuals wish to influence their feelings. We hypothesized that age-related differences in everyday emotional well-being in a sample of individuals ranging from adolescence to old age would be mirrored by age-related differences in affect-regulation motivation. Specifically, we expected *contra-hedonic motivation*—the wish either to maintain or enhance negative affect or to dampen positive affect—to be most prevalent among adolescents. We based this hypothesis on the idea that exploring negative and nonconforming affective experiences is one way by which adolescents repudiate conventions in order to seek emotional autonomy from parents and other adults and to test their identities (Azmitia, Syed, & Radmacher, 2008; Thorne, 2004; see also Erikson, 1968). We also predicted that *prohedonic motivation*—the wish either to maintain or enhance positive affect or to dampen negative affect—would be most prevalent among older adults. This prediction is in line with the claim that the shrinking horizon of time to live shifts older adults' motivations toward maximizing their emotional well-being in the here and now (Carstensen, Fung, & Charles, 2003).

Furthermore, we expected contra-hedonic motivations, compared with prohedonic motivations, to be less strongly related to the individual's affect at a given moment. This prediction built on the theme that contra-hedonic motivations are more likely to

serve utilitarian than hedonic functions (e.g., Tamir et al., 2007, 2008). Building on research regarding mixed affective experiences and contra-hedonic motivation (e.g., Andrade & Cohen, 2007), we hypothesized that people would be more likely to be motivated to maintain negative affect when they simultaneously experienced intense positive and negative affect than when they experienced negative affect alone. We reasoned that in such situations, people may be more likely to consider negative affect as worth maintaining because it is accompanied by positive affect.

METHOD

Participants

A fieldwork agency recruited 378 participants ranging in age from 14 to 86 years ($M = 42$, $SD = 19$) from three sites in Germany. The sample was stratified by age and gender (50.3% men and 49.7% women). Twenty-four percent of the participants held a college or university degree.

Procedure

Participants were provided with Nokia E50 mobile phones. On the phones, a Java program was installed that controlled the assessment schedule, presented items to participants, and uploaded responses to a central server. Participants navigated and responded to the items using the phone's joystick and keypad. They carried the phone with them during three experience-sampling periods of 3 consecutive days each, which covered a total of 6 weekdays (Monday through Friday) and 3 weekend days (Saturday or Sunday) and were separated by intervals of 6 days. On each experience-sampling day, 6 assessments were distributed throughout a time window of 12 hr, the beginning of which was chosen by the participants. If participants did not respond to an assessment occasion, the program closed after 15 min, thus reducing participants' degree of freedom in determining when to complete the instrument. To obtain a sufficient number of assessments, experience-sampling periods were extended for a day if participants completed fewer than 5 of the 6 assessments on a given day. An experience-sampling period could thus last up to 6 days. Participants completed an average of 54.9 assessments ($SD = 4.1$). They were reimbursed with €100 (approximately \$140). The ethics committee of the Max Planck Institute for Human Development approved the study.

Experience-Sampling Measures

At each measurement occasion, participants first indicated how much they were currently experiencing each of six feelings, using a scale ranging from 0 (*not at all*) to 6 (*very much*). Averaging the responses for *joyful*, *content*, and *interested* yielded an indicator of positive affect ($M = 3.06$, $SD = 0.82$), and averaging the responses for *angry*, *nervous*, and *downhearted* yielded an indicator of negative affect ($M = 0.73$, $SD = 0.53$).

The difference between positive and negative affect served as an indicator of *emotional well-being* ($M = 2.32$, $SD = 1.94$). The items were selected because they represent prototypical pleasant and unpleasant affective experiences that are relevant to, and evince sufficient intraindividual variation in, the daily lives of individuals from different age groups.

Participants also reported their activities at the time of sampling by checking one or more of the following response options: (a) “work/school/study,” (b) “chores/errands,” (c) “leisure activity,” (d) “doing nothing/sleeping/watching TV,” (e) “doctor visit/office run,” (f) “conversation/visit,” and (g) “other.” They also indicated which other persons were present at that time by choosing one or more of the following response options: (a) “nobody,” (b) “partner,” (c) “family,” (d) “friends,” (e) “colleagues/fellow pupils or students,” (f) “strangers,” and (g) “other.”

At the end of the experience-sampling protocol, participants indicated for each of the six feelings under study whether they currently wanted to (a) “dampen,” (b) “maintain,” (c) “enhance,” or (d) “not influence at all” the feeling. The total number of responses indicating the wish to maintain or enhance positive affect (i.e., joy, interest, contentment) or to dampen negative affect (i.e., anger, nervousness, downheartedness) was used as an indicator of prohedonic motivation. Similarly, the number of responses indicating the wish to maintain or enhance negative affect or to dampen positive affect served as an indicator of contra-hedonic motivation.

RESULTS

Multilevel regression analysis performed with the SAS PROC MIXED procedure confirmed the expected relationship between increasing age and increasing daily-life emotional well-being (see Fig. 1 and Table 1). This relationship, which remained robust ($p < .001$) after controlling for participants’ activities and social partners, was driven more by the age-related increase in positive affect (average increase of 0.01 per year of age, $p = .001$) than by the decrease in negative affect (average decrease of -0.003 per year of age, $p = .058$).

We had predicted that the age differences in affective experiences would be mirrored by differences in affect-regulation motivations. On average, participants reported that they wanted to regulate their feelings in 84.0% of the assessments for positive affect and in 48.9% of the assessments for negative affect. As expected, the vast majority of the reported affect-regulation motivations were prohedonic. Whereas prohedonic motivation was reported, on average, in 92.4% of the measurements ($SD = 18.2$), contra-hedonic motivation was reported, on average, in 15.0% of the measurements ($SD = 19.3$). There were significant age differences in the prevalence of prohedonic and contra-hedonic motivations. Contra-hedonic motivations were most prevalent in adolescence, and prohedonic motivations were most prevalent in old age (see Fig. 1 and Table 1). These age

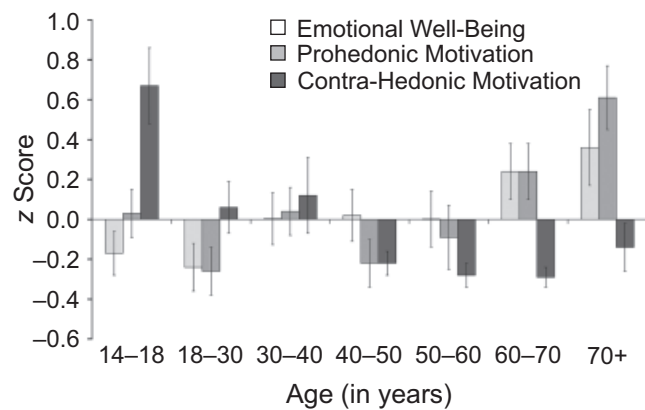


Fig. 1. Age-related differences in everyday emotional well-being, prohedonic motivation, and contra-hedonic motivation. Scores are shown as standardized deviations from the grand mean. Each error bar represents 2 standard errors of the respective age group’s mean.

effects remained significant after controlling for participants’ momentary affect, as well as for their activities and social partners ($ps \leq .01$). Table 1 summarizes main results from multilevel regression analyses showing the effect of age on emotional well-being, prohedonic motivation, and contra-hedonic motivation.

Table 2 summarizes results from multilevel regression analyses examining the effects of momentary positive and negative affect on prohedonic and contra-hedonic motivations. Parameter estimates from multilevel models predicting prohedonic motivations showed that individuals wanted to enhance their positive affect when it was low, maintain their positive affect when it was high, and dampen their negative affect when it was high (Table 2). Of interest are interactions with age for two of these effects: The older participants were, the more motivated they were to maintain high positive affect and the less motivated they were to further enhance their positive affect (see Figs. 2 and 3).

Parameter estimates in two of the three multilevel models predicting contra-hedonic motivations (Table 2) showed significant associations with participants’ momentary affect. Contra-hedonic motivation was more likely when emotional well-being was relatively low: Participants were more likely to report the motivation to dampen positive affect when their positive affect was comparatively low, and they were more likely to report the motivation to enhance their negative affect when it was comparatively high. The latter effect was attenuated with increasing age. Region-of-significance analyses (Bauer & Curran, 2005; Preacher, Curran, & Bauer, 2006) showed that this association was not significant for participants older than 52.9 years of age. In accordance with our prediction, momentary affect accounted for considerably smaller percentages of within-person variance for contra-hedonic (2.2–12.6%) than for prohedonic (17.0–24.7%) motivations.

Our final prediction was that people may be more likely to be motivated to maintain negative affect when it is accompanied by

TABLE 1
Effect of Age on Emotional Well-Being and Affect-Regulation Motivation in Everyday Life: Selected Results From Multilevel Regression Models

Model parameter	Emotional well-being	Prohedonic motivation	Contra-hedonic motivation
Fixed effects			
Intercept	2.31**	3.54**	0.14**
Age	0.01**	0.01*	-0.01**
Age ²	< 0.0001	0.0006**	0.0002**
Modeled between-person variance ^a			
Pseudo-R ² intercept	2.46%	3.65%	10.65%

Note. Restricted maximum likelihood parameter estimates (fixed intercept and slopes) were obtained by fitting multilevel regression models with spatial power residual covariance structures (Littell, Milliken, Stroup, Wolfinger, & Schabenberger, 2007). Age is grand-mean-centered. The interpretation of the multilevel fixed effects shown is equivalent to that of parameter estimates in ordinary least squares regression. The models also included random effects for the intercept and residual. The full model thus included two levels, namely, assessments nested within persons. Level 1 comprised assessments: $DV = \beta_{0j} + r_{ij}$ (where DV = dependent variable, β_{0j} = random intercept, and r_{ij} = random residual associated with the i th assessment in the j th individual). Level 2 comprised persons: $\beta_{0j} = \gamma_{00} + \gamma_{01}Age + \gamma_{02}Age \times Age + u_{0j}$ (where γ_{00} = fixed intercept, γ_{0k} = fixed slope for the k th predictor, and u_{0j} = random residual for the j th person).

^aThe modeled between-person variance represents proportional reductions in the variance-component intercept in comparison with models without explanatory variables (Singer & Willet, 2003). * $p < .05$. ** $p < .01$.

positive affect. We investigated this idea by identifying episodes in which an individual's positive and negative affect were at or above the respective means for that individual. On average, such mixed affect occurred in 11.0% of participants' assessments (SD

= 8.9). Irrespective of the participant's age, episodes of mixed affect were associated with an increased prevalence of the motivation to maintain negative affect, $F(1, 342) = 97.6, p = .002, \eta_p^2 = .03$. On average, participants reported being motivated to

TABLE 2
Associations Between Momentary Affect and Prohedonic and Contra-Hedonic Motivations: Selected Results From Multilevel Regressions

Model parameter	Prohedonic motivations			Contra-hedonic motivations		
	Enhance positive affect	Maintain positive affect	Dampen negative affect	Enhance negative affect	Maintain negative affect	Dampen positive affect
Fixed effects						
Intercept	1.17**	1.27**	1.38**	0.02**	0.11**	0.08**
Momentary positive affect	-0.20**	0.27**	—	—	—	-0.04**
Momentary negative affect	—	—	0.39**	0.01**	0.002	—
Age	-0.005**	0.010**	0.007**	-0.001**	-0.004**	-0.002**
Age × Momentary Positive Affect	-0.002*	0.002*	—	—	—	< 0.001
Age × Momentary Negative Affect	—	—	0.002	-0.0004**	< -0.001	—
Explained within-person variance ^a						
Pseudo-R ² residual	16.98%	19.37%	24.71%	2.23%	4.05%	12.63%

Note. Restricted maximum likelihood parameter estimates (fixed intercept and slopes) were obtained by fitting multilevel regression models with spatial power residual covariance structures (Littell, Milliken, Stroup, Wolfinger, & Schabenberger, 2007). All predictors are grand-mean-centered. The interpretation of the multilevel fixed effects shown is equivalent to that of parameter estimates in ordinary least squares regression. The models also included random effects for intercept, residual, and momentary affect. The full model thus included two levels, namely, assessments nested within persons. Level 1 comprised assessments: $DV = \beta_{0j} + \beta_{1j}PA + \beta_{2j}NA + r_{ij}$ (where DV = dependent variable, PA = positive affect, NA = negative affect, β_{0j} = random intercept, β_{kj} = random slope for the k th predictor in the j th individual, and r_{ij} = random residual associated with the i th assessment in the j th individual). Level 2 comprised persons: $\beta_{mj} = \gamma_{m0} + \gamma_{m1}Age + u_{mj}$ (where γ_{m0} = fixed intercept for the m th random coefficient, γ_{m1} = fixed slope for age as predictor of the m th random coefficient, and u_{mj} = random residual associated with the m th random coefficient for the j th person).

^aThe modeled within-person variance represents proportional reductions in the variance-component residual in comparison with models without explanatory variables (Singer & Willet, 2003).

* $p < .05$. ** $p < .01$.

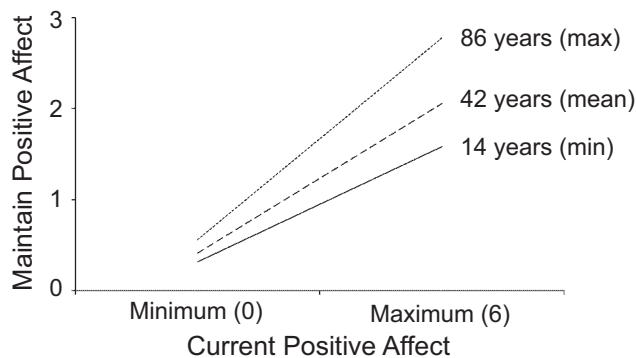


Fig. 2. The association between momentary positive affect and the motivation to maintain positive affect as moderated by participants' age in a multilevel regression analysis. Simple slopes for the minimum, mean, and maximum ages in the sample are shown.

maintain negative affect in 7.0% ($SD = 14.7$) of their assessment occasions without mixed affect, but in 10.4% ($SD = 21.6$) of those with mixed affect.

Adolescents showed the highest prevalence of mixed affect, and old adults showed the lowest prevalence of mixed affect, $F(6, 371) = 4.4, p = .000, \eta_p^2 = .07$. Although this pattern mirrors the age differences in the motivation to maintain negative affect (see Fig. 4), the effect of age on the motivation to maintain negative affect remained significant after controlling for the prevalence of mixed affect ($p < .05$). Thus, the two effects are empirically distinguishable.

DISCUSSION

This research was guided by an interest in how people want to influence their affective experiences. This interest arose from the idea that one can better understand why individuals of different ages feel different in their everyday lives when one knows whether they differ in how they want to feel.

Consistent with evidence from other studies (e.g., Carstensen et al., 2000; Riediger & Freund, 2008), our findings revealed an

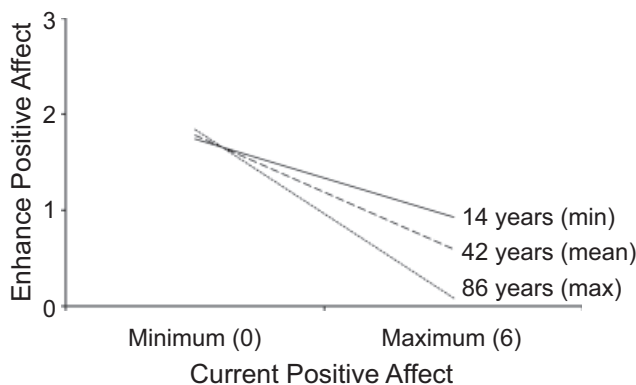


Fig. 3. The association between momentary positive affect and the motivation to enhance positive affect as moderated by participants' age in a multilevel regression analysis. Simple slopes for the minimum, mean, and maximum ages in the sample are shown.

age-related increase in day-to-day emotional well-being. These age differences largely corresponded to differences in how people wanted to influence their feelings. Specifically, contra-hedonic motivations (to enhance or maintain negative affect, or to dampen positive affect) were most prevalent among adolescents, and were less prevalent among older participants. Prohedonic motivation, in contrast, was most prevalent in old age, and this effect was driven by the motivations to maintain (but not to enhance) positive affect and to dampen negative affect. This latter finding is in line with a central prediction of socioemotional selectivity theory, according to which awareness of the finitude of remaining lifetime shifts individuals' motivation toward wanting to maximize their emotional well-being (Carstensen et al., 2003). The age differences in prohedonic and contra-hedonic motivation could not be attributed to age-related differences in daily-life affective experiences, activities, or social partners. We propose instead that part of the negative emotionality that is characteristic of adolescence, and part of the positive emotionality that is characteristic of older adulthood, appears to be intentionally sought and maintained by the individual.

Prohedonic motivations corresponded with participants' momentary affect; that is, participants wanted to enhance positive affect when it was low, maintain positive affect when it was high, and dampen negative affect when it was high. The older individuals were, the less motivated they were to further enhance high positive affect, but the more motivated they were to maintain it. Assuming that it is more resource intensive to enhance than to maintain positive affect, this finding suggests that people adapt their affect-regulation motivations to age-related declines in available resources (Riediger, Li, & Lindenberger, 2006).

Contra-hedonic motivations were less strongly related to momentary affect than prohedonic motivations were. This finding is consistent with the idea that contra-hedonic motivations are likely to serve functions that are not necessarily strongly related to an individual's momentary affective state (e.g., Parrott, 1993; Tamir et al., 2007, 2008). The nature of these functions, and whether they vary with age, are open topics for future research. The relatively high prevalence of contra-hedonic motivations in adolescents strengthens the speculation that contra-hedonic motivations play an important role in adolescents' socioemotional development. Repudiating prevailing hedonic conventions may help adolescents tackle developmental tasks they face, such as establishing affective autonomy from their parents, affirming a sense of maturity, and developing their personal and social identity (e.g., Azmitia et al., 2008; Thorne, 2004). This interpretation is in line with research demonstrating that a temporary increase in so-called risky behaviors during adolescence—behaviors that depart from familial or social standards and that pose risks to the well-being of the individual or others—is normative and adaptive (e.g., Maggs, Almeida, & Galambos, 1995; Michaud, 2006; Moffitt,

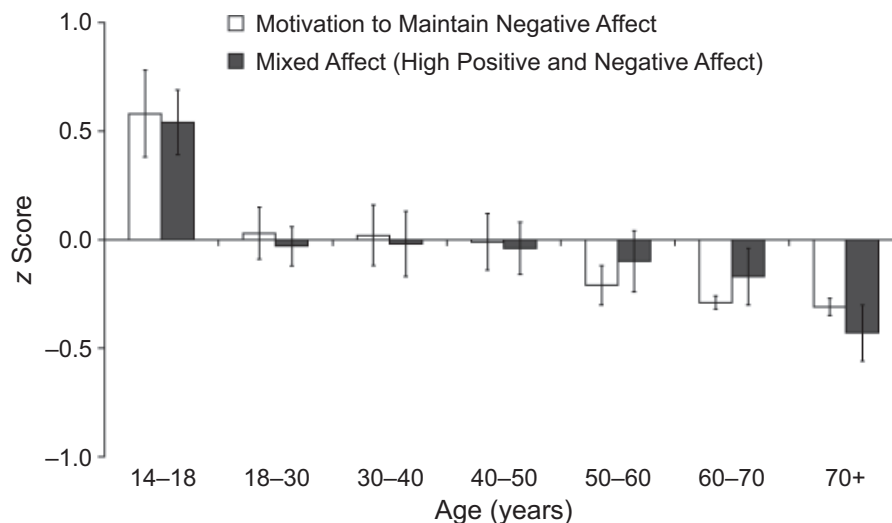


Fig. 4. Age-related differences in the motivation to maintain negative affect and in the prevalence of mixed affect. Mixed affect is operationalized as the simultaneous occurrence of both positive and negative affect at levels at or above the individual's average. All scores are shown as standardized deviations from the grand mean. Each error bar represents 2 standard errors of the respective age group's mean.

1993). Contra-hedonic motivation may also help adolescents in the refinement of self-regulation competencies. This interpretation builds on recent evidence by Wrosch and Miller (2009), who found that dysphoric mood in adolescents facilitated the development of goal-disengagement capacities over the course of about one year, which in turn contributed to a long-term reduction in subsequent depressive symptoms.

Our findings further demonstrate that adolescents are more likely than individuals of older age groups to experience episodes of mixed affect, that is, to simultaneously experience positive and negative affect of high intensity. This raises the question of whether adolescents are more motivated to maintain negative affect because it is accompanied by positive affect and they therefore are more likely to experience it as worth maintaining. In fact, we found that people were more likely motivated to maintain negative affect during episodes of mixed affect than when they did not experience mixed affect. However, the adolescents' higher motivation to maintain negative affect could not be statistically accounted for by the higher prevalence of mixed affect in that age group. The mechanisms driving the higher prevalence of contra-hedonic motivations in adolescence, as well as potential linkages between these motivations and the biological changes in puberty, thus remain to be explored.

Overall, this study demonstrates that knowing how people want to influence their feelings can contribute to understanding affective development above and beyond the contribution of age-related differences in affective experience. Our study focused on the age range from adolescence to old age and on consciously accessible aspects of affect-regulation motivations. Intriguing prospects for future research will be to examine additional age groups and to implement assessment methods that allow measuring affect-regulation motivations operating beyond

conscious awareness. Furthermore, longitudinal investigations are necessary to determine whether the age-related differences observed in this study correspond to intraindividual changes as people grow older, and to explore the antecedents, correlates, and consequences of interindividual differences in these changes (cf. Baltes, Nesselroade, & Cornelius, 1978).

Acknowledgments—This research was supported by German Federal Ministry for Education and Research Grants MPI001 and 01UW0706. We thank the company bit-side for the software development; Infratest Sozialforschung, and particularly Andreas Stocker, for the data collection; and Moritz Eberhardt, Jörg-Tobias Hof, and Kathrin Klipker for helping to prepare the study.

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(RECEIVED 1/29/09; REVISION ACCEPTED 4/21/09)