PETRA L. KLUMB

BENEFITS FROM PRODUCTIVE AND CONSUMPTIVE ACTIVITIES: RESULTS FROM THE BERLIN AGING STUDY

ABSTRACT. The aim of this study was to assess the subjective instrumentality and immediate process benefits afforded by regenerative, productive, and consumptive activities and thus to extend the microeconomic perspective on time use. *Method*: For six consecutive days, 33 women and 48 men aged between 72 and 97 provided signal-contingent self-reports on everyday activities, the reasons for performing them, their contexts and concurrent affect. *Results*: The dominant reason given for performing productive activities reflected Reid's (1934) third-party criterion. With aggregated data, we found consumptive activities to be associated with higher positive affect. This finding was not corroborated on the occasion level, where social context (in company vs. alone) rather than activity type had a reliable effect on positive affect in situ. The main effect was a function of the individual level of neuroticism, and the association between social context and positive affect was a function of the proportion of time spent alone. Results indicated that the level of neuroticism moderates the association between social context and positive affect, but this was not statistically reliable. *Conclusion*: Being alone or in company makes a difference to positive affect. This may explain the protective effect that social relationships have on health and well-being. Compared to earlier phases of life, the relationship between personality dispositions and indicators of social relationships may not be as strong in late life.

INTRODUCTION

According to life-cycle theorists, age-related differences in time-use patterns are a consequence of differences in market-earning potential and in the intertemporal choices made by the individual (Heckman, 1976). Although old and very old individuals no longer participate in the labor market, productive and consumptive activities remain central to their daily lives (Herzog et al., 1989). Whether these activities maintain the same relationships with well-being is a question of practical relevance that has yet to be addressed in detail.

In microeconomic theorizing, the focus is on material well-being, for substantive and methodological reasons (Juster and Stafford, 1991). The basic assumption of microeconomic models of time

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use is that the loss of leisure time that work entails has to be compensated materially (Becker, 1965). This material compensation is the observable trace of productive activities, and the basis on which they are measured. This method of measurement is biased, however, because it does not include the unpaid production of goods and services that other individuals value and use at other points in time (Kahn, 1991). The third-party criterion (Reid, 1934) has been introduced to define production independently of its financial aspects. If an activity is performed predominantly for its outcomes and can, therefore, be delegated to a third party without loss of any beneficial effect (e.g., doing laundry, cleaning, running errands), then it is productive. In contrast, if an activity is performed primarily for its own sake and cannot, therefore, be delegated to a third party without loss of benefit (e.g., meeting friends, reading a novel, watching TV), then it is consumptive. This criterion allows the productive contributions of different societal groups including homemakers and unemployed or retired men and women to be assessed in an unbiased fashion. However, the conventional conception of work as a disutility derived predominantly from male, middle-aged, paid, (blue-collar) workers (cf. Juster et al., 1985) and is barely applicable to individuals whose work is not characterized by limited and partial tasks and by the absence of meaningful goals and challenges. Many activities – consumptive as well as productive ones – are not only performed because they are instrumental in reaching desired objectives, i.e., because of the expected utility of their outcomes, but also for their own sake because they are rewarding in themselves.

Sociological and psychological theorizing, in contrast, focuses not on external characteristics of activities, but on the subjective experience of the individual performing them. In these theories, the relationship to well-being is more direct. Economists (Juster, 1985; see also Gershuny and Halpin, 1996) use the term "process benefits" to denote this direct utility. There are two important psychosocial explanations of benefits from activity involvement. One emphasizes the opportunities for learning and using one's skills that challenging activities afford. Provided the individual has the necessary competencies and is able to exert control, this leads to enjoyment and mental and physical well-being (Baltes, 1996; Csikszentmihalyi and

LeFevre, 1987; Karasek and Theorell, 1990). The other explanation focuses on social activities, involvement in which creates a sense of belonging and emotional closeness, with subsequent effects on well-being (Clark and Watson, 1988). In addition, affirmative feedback from others and the knowledge that others benefit from one's actions add meaning to an activity. This is related to enhanced physical and mental well-being (Rowe and Kahn, 1998; Thoits, 1983).

Subjective interpretations and evaluations of activities may differ as a function of person and context factors such as age, gender, or personality (e.g., Clark et al., 1991; Lawton et al., 1986–1987). The concrete opportunities and constraints, "the important constellation of factors in a situation and their relationships" (Blossfeld, 1996: 184) play a key role in explaining the choice of everyday activities as well as the meaning and value they are accorded. This ecological perspective requires systematic observations of experience in situ. Based on this approach, many researchers have shown the subjective experience of activities to be determined by characteristics of both the person and the context (Diener et al., 1984; Emmons et al., 1986; Pawlik and Buse, 1996; Williams et al., 1991). With a heterogeneous sample of individuals aged between 18 and 60, Brandstätter (1994) has shown personality dispositions to explain interindividual differences in the work-leisure discrepancy of mood, in preferences for leisure or work (valence ratings), and in the time allocated to different activities. Analyzing person × situation interactions, he found the influence of personality on mood to differ as function of the situation rather than being generalized across situations.

In a sample of individuals aged 72 to 97, the present study assessed the activity engaged in, the reason for performing it, the context, and the concurrent positive affect, by means of in situ time samples. Positive affect seems to be more sensitive to specific events and activities than negative affect (Clark and Watson, 1988) and, in contrast to research on paid work, research on productive activities has focused almost exclusively on the positive dimension of subjective well-being (McIntosh and Danigelis, 1995: S230). The first aim of the present study was to compare a theoretical categorization of everyday activities – into regeneration, production, and consumption – with participants' self-reported reasons for carrying out their activities. The second aim was to compare positive affect connected with the three activity types and with two social contexts, i.e., being alone or in company. If consumptive activities afford more process benefits than productive and regenerative ones, they should be accompanied by enhanced positive affect. If affect is influenced primarily by social context, there should be no difference between activity types with regard to concurrent mood. Rather, those instances spent in company should be associated with higher positive affect than those spent alone. The third aim was to model affect variation within and between individuals as a function of the stable personality dispositions neuroticism and extraversion.

METHOD

Participants

In the course of the third wave of data collection for the Berlin Aging Study (BASE), a sample of 33 women and 48 men ($N = 81$) volunteered to participate in an intensive time-sampling study. Their age ranged from 72 to 97 years, with a mean age of 80.6 ($SD = 5.0$). All were community dwelling, 34 (42%) lived with their spouses. Selectivity analyses (Klumb and Baltes, 1995) showed the participants of this study to be a positive selection of the BASE Intensive Protocol sample (N = 516). With +1.2 standard deviation, selectivity effects were largest for general cognitive functioning, followed by vision and hearing (+1.0 and +0.8 standard deviations, respectively).

Procedure

In situ self-reports. Signal-contingent self-reports (e.g., Fahrenberg, 1996) were used to assess the activities performed and their contexts in situ. Beyond behavioral data, these reports yield experiential information that could not be picked up by an observer. At five time points distributed randomly across the day, a portable beeper (Deutsche Telekom) prompted the participants to fill in a sampling form (software: Lang and Helle, 1994). The minimum time between two consecutive signals was 15 minutes; the average inter-signal interval was 2 1/2 hours ($SD = 20$ minutes). This procedure was repeated on six consecutive days, with different random patterns. Over the course of a year, there were five such six-day sampling periods, resulting in a maximum of 30 days of data. The five sampling forms for each day of the week were contained in separate booklets with corresponding labeling and different color covers. Because of the immediacy of responding, data collected in this fashion are assumed to be uncompromised by memory, selection, or aggregation problems. While still based on self-reports, this approach is as close as one can get to direct observation (see Fahrenberg, 1996; Buse and Pawlik, 1996). Because the time sampling was completely random, every activity has the same probability being sampled (exception: systematic missings). This enabled us to compute time budgets in which the relative frequency of an activity can be treated as the proportion of the waking day taken up by that activity. The daily proportions of activities, contexts, and moods computed in this manner converged with those derived from the complete reconstruction of the day via a Yesterday Interview (Klumb and Baltes, 1999b).

In contrast to other ecological-momentary-assessment studies (e.g., Fahrenberg and Myrtek, 1996), each participant was able to restrict the period of assessment to reduce the intrusiveness of the time-sampling procedure. The start and the end of the daily signaling window were set to equal the average waking-up and falling-asleep times reported by the participant during an initial briefing session. The participants also kept the beepers out of hearing distance during their afternoon naps, so that their sleep was not disturbed.

Of the maximum possible 30 sampling forms, an average of 26.2 (SD = 5.3), i.e., 87% were returned, in varying stages of completeness. This return rate is within the range reported for other studies (Perrez et al., 2001). For the purposes of hierarchical linear modeling, all occasions on which any of the employed variables were missing were discarded. This resulted in a range from 1 to 29 measurement occasions, with a sum total of 1138 and a mean of 15. Missing data were of the intermittent kind and probably related to some of the situational variables of interest rather than being "completely at random". Although higher numbers of missings were found in the afternoon hours (attributable to daytime naps), no systematic relationships existed between the number of missings and participants' age or cognitive functioning (Klumb and Baltes, 1999b).

Although there was no formal procedure to assess the degree of acceptance of the method, it seemed to be quite high. For example, the drop-out rates across the five measurement periods in the course of the year were low. Furthermore, participants were quite conscientious about filling in their forms, and some of them even returned more forms than signals were sent. There was no way of examining response latency with this paper-and-pencil procedure, however.

The item regarding the activity performed at the moment the beeper went off was open-ended, as was the question eliciting the reason for this activity. Participants were asked to give the first name or initials of any other people present, together with their relationship to the participant. Eight mood adjectives were to be rated along 5-point scales, with 0 indicating no experience of the particular mood, and 4 indicating that the affect was experienced very intensely. Four items were taken from the Positive-Affect-Negative-Affect Scales (PANAS, Watson, Clark and Tellegen, 1988); the remaining four were adopted form the Yesterday Interview (see Klumb and Baltes, 1999b).

Measures

Activity types. The activities reported were coded into 59 activity categories and 29 subcategories by different coders. This yielded Kappas between 0.65 and 1.00 with a median of 0.76. Conceptually, activities were trichotomized into (1) regenerative activities such as resting, eating (with the exception of restaurant visits, entertaining guests, etc.) that respond to physiological needs, (2) productive activities such as doing laundry, cleaning, and running errands – performed predominantly because of their outcomes – and (3) consumptive activities such as meeting friends, reading a novel, or watching TV – performed primarily for their own sake. The third-party criterion (Reid, 1934; see also Klumb and Baltes, 1999a) was used to distinguish productive and consumptive activities. If an activity is performed chiefly for its outcomes and can, therefore, be delegated to a third party without loss of any beneficial effect, then it is productive. If, in contrast, an activity is performed primarily for its own sake and cannot, therefore, be delegated to a third party without loss of benefit, then it is consumptive.

Reasons for activity. The reason reported for performing each activity was coded as belonging to one of three categories – namely, no special reason/habit, instrumentality, and enjoyment – and aggregated within each individual.

Social context. An indicator variable was formed on the basis of the social-context information given in the time samples. It took on the value 1 when the participant reported being alone, and value 0 when company was present.

Positive affect. The positive adjectives interested, active, happy, and relaxed were combined to form the unit-weighted composite "positive affect". The alpha of the scale (calculated on the basis of intra-person averages for each of the four items) was 0.90. The composite scores were computed separately for each of the three activity types.

Personality. The personality information employed here was drawn from the first BASE measurement occasion in 1990. To assess neuroticism and extraversion, BASE researchers selected 12 items from the NEO-FFI (Costa and McCrae, 1985), six items for each dimension. The participants were asked to rate the items on 5-point Likert scales with the anchors "does not apply to me at all" (1) and "applies very well to me" (5). Some of the items had been modified slightly for use with older adults. The relationships with the original scales were 0.68 for neuroticism and 0.75 for extraversion. The present study used factor scores computed on the basis of the BASE sample with means of 2.24 (*SD* = 0.60) and 3.41 (*SD* = 0.53) for neuroticism and extraversion, respectively.

To aggregate the time samples, variables were first averaged within participants and then across the sample as a whole. This prevented individuals who handed in more forms than others having an undue impact on results (Larson and Delespaul, 1992). The distributions of both cross-sectional and intensive time-sampling variables did not require any transformation.

Statistical Modeling

To explain intraindividual differences in positive affect, the first model contrasted occasions on the basis of the dummy-coded activity types regeneration, production, and consumption. This intra-person relationship was represented in the following occasion-level model, with consumption as the reference category. The positive-affect (PA) rating of person j on occasion i was expected to be a function of the average positive affect of person j, the type of activity performed, and a random error:

$$\begin{aligned}\text{positive affect}_{\text{ij}} &= \beta_{0\text{j}} + \beta_{1\text{j}}(\text{regeneration})\\ &\quad + \beta_{2\text{j}}(\text{production}) + \text{r}_{\text{ij}}\end{aligned}$$

Intra-person intercepts and activity slopes were expected to vary across individuals as a function of a grand mean, neuroticism score (expressed as deviation from its grand mean), extraversion score (expressed as deviation from its grand mean), and a random error, resulting in the following person-level random-coefficient model:

$$\begin{aligned}\beta_{0\text{j}} &= \gamma_{00} + \gamma_{01}(\text{neuroticism}) + \gamma_{02}(\text{extraversion}) + \text{u}_{0\text{j}}\\ \beta_{1\text{j}} &= \gamma_{10} + \gamma_{11}(\text{neuroticism}) + \gamma_{12}(\text{extraversion}) + \text{u}_{1\text{j}}\\ \beta_{2\text{j}} &= \gamma_{20} + \gamma_{21}(\text{neuroticism}) + \gamma_{22}(\text{extraversion}) + \text{u}_{2\text{j}}\end{aligned}$$

In addition, it was hypothesized that positive affect would depend on social context. This intra-person relationship was represented in the following occasion-level model, with occasions in company serving as the reference category. The positive-affect rating of person j on occasion i was expected to be a function of the average positive affect of person j, the social context, and a random error.

$$\text{positive affect}_{\text{ij}} = \beta_{0\text{j}} + \beta_{1\text{j}}\ (\text{alone}) + \text{r}_{\text{ij}}$$

Intra-person intercepts and PA slopes were expected to vary across individuals as function of a grand mean, proportion of time spent alone, neuroticism score, extraversion score (all expressed as deviations form their grand means), and a random error. This resulted in the following intercepts- and slopes-as-outcomes model:

$$\begin{aligned}\beta_{0\text{j}} &= \gamma_{00} + \gamma_{01}(\text{proportion of time spent alone})\\ &\quad + \gamma_{02}(\text{neuroticism}) + \gamma_{03}(\text{extraversion}) + \text{u}_{0\text{j}}\end{aligned}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11}(\text{proportion of time spent alone}) + \gamma_{12}(\text{neuroticism}) + \gamma_{13}(\text{extraversion}) + u_{1j}$$

Regression coefficients, their confidence intervals, and variance components of the residuals (random effects) were estimated on the basis of the restricted maximum-likelihood procedure of HLM-2 (Bryk, Raudenbush, Seltzer and Congdon, 1988). Deviance was estimated on the basis of the full maximum-likelihood procedure.

RESULTS

Descriptive. Table I contains aggregations of the in situ measures. Participants were alone on more than half of the sampling occasions; one-third of the sampled activities were regenerative, one-fourth were productive, and the remainder consumptive. Average positive affect was relatively high – typical of this kind of rating – yet there was a reliable effect of the within-subjects factor "activity type" ($F(2,144) = 3.83$, $p < 0.05$). Pairwise comparisons showed consumptive activities to be accompanied by higher positive affect than regenerative and productive ones. Correlations between cross-sectional and aggregated measures are shown in Table II. Mean positive affect was negatively related to neuroticism and positively related to extraversion. The proportion of time spent alone was positively related to the proportion of time spent on productive activities.

Activities and reasons for performing them. Figure 1 displays the distribution of the reported reasons for performing activities in each of the three categories. Whereas the dominant reason given for productive activities was their perceived instrumentality in reaching certain outcomes, the patterns for regenerative and consumptive activities were not as clear cut. Participants reported performing regenerative activities for two main reasons, habit and instrumentality, while reasons given for consumptive activities were distributed equally across all three categories.

Activities and positive affect. The fully unconditional model of positive affect, i.e., the model without any explanatory variables,

TABLE I

Means and standard errors of the aggregated measures of proportion of time spent alone, proportion of activities categorized as regenerative, productive, and consumptive, and mean positive affect in regeneration, production, and consumption

Measure	*M*	*SE*
Proportion alone	0.62	0.03
Proportion regeneration	0.29	0.01
Proportion production	0.24	0.02
Proportion consumption	0.46	0.01
Positive affect/regeneration	2.72	0.09
Positive affect/production	2.69	0.10
Positive affect/consumption	2.82	0.09

$N = 81$.

TABLE II

Correlations of the cross-sectional measures of age, neuroticism, and extraversion, and the aggregated measures of positive affect and proportion of activities categorized as productive and as alone

	Age	Neuroticism	Extra-version	Proportion production	Mean positive affect
Neuroticism	0.27*				
Extraversion	−0.23*	−0.30**			
Proportion production	0.01	−0.11	0.00		
Mean positive affect	−0.23*	−0.48***	0.29**	0.00	
Proportion alone	0.15	−0.03	−0.13	0.22*	−0.14

$N = 81$, $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$.

revealed 69% of variance to originate between individuals (intra-class correlation coefficient $\rho = 0.69$). The occasion-level predictor "production" was included first. The average of the mean affect ratings was estimated to be 2.77. About half of the production slopes were positive and the other half negative, meaning that, on average, there was no effect of production on positive affect on the occasion level ($\beta_{1j} = -0.03$, $SE = 0.03$). Adding regeneration as a level-1 predictor did not yield a reliable effect, either. Although both

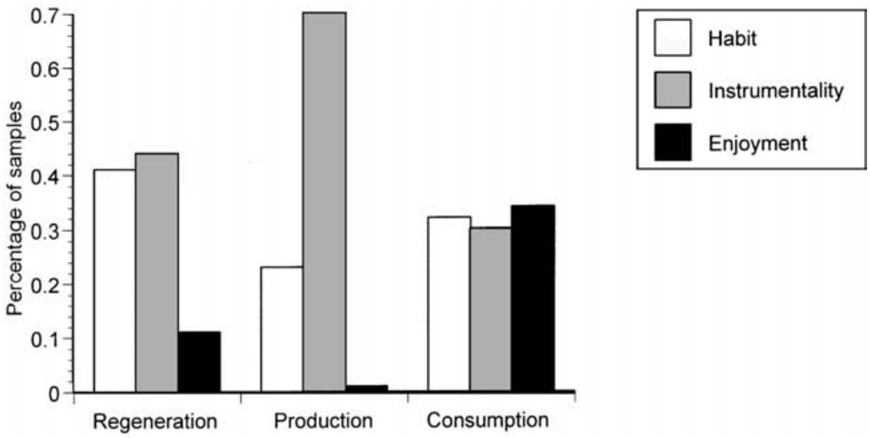

Figure 1. Distribution of the three categories of reported reasons for performing an activity (habit, instrumentality, and enjoyment) across the activity types (regeneration, production, and consumption).

predictor activities were accompanied by reductions in positive affect, these reductions were very small and not reliable. The differences in the aggregated data were not corroborated on the occasion level.

Social context and positive affect. Social context proved to be a more powerful occasion-level predictor. The average of the mean affect ratings was estimated to be 2.77 for occasions with company present. Notwithstanding 23 positive slopes, on average, the effect of being alone was a reliable reduction of 0.14 (*SE* = 0.03) in positive affect. The predictor accounted for 3% of the unconditional intra-individual variance. The estimated reliabilities were 0.99 for means and 0.41 for slopes, i.e., there was more "true" parameter variance in means than in slopes. The correlation between intercepts and slopes was 0.29. In other words, individuals with higher positive affect tended to display a weaker relationship between social context and positive affect (fewer negative slopes).

Person × situation interactions. Person-level variables were employed to explain the variance in the coefficients indicated by the χ^2 statistics in the previous analysis. For purposes of model stability, the aggregated occasion-level predictor "proportion of time spent alone" was included first. Table III displays the result of this analysis. As indicated by the cross-sectional correlations reported in Table II, proportion of time spent alone was not related to mean positive affect. There was, however, an interaction between levels: The more time an individual spent alone, the less pronounced the PA difference between instances alone and in company. Compared to the reference model above, including the amount of time spent alone resulted in a proportion reduction of 1.4% in the variance of the random intercepts and of 29% in the variance of the random slopes. The χ^2 statistics indicate that, after controlling for proportion of time spent alone, residual variances were still unequal to zero.

In the next step, the individual level of neuroticism was included in the model (see Table IV). Each increment in this variable reduced the mean positive affect and the slope substantially, but the cross-level interaction was not reliable. Compared to the reference model, this model resulted in a proportion reduction of 20% in the variance of the random intercepts and of 32% in the variance of the random slopes. Still, the χ^2 statistics indicate that, after controlling for proportion of time spent alone and neuroticism, residual variance of both intercepts and slopes remains to be explained. Therefore, in a final step, individual level of extraversion was included as a predictor. There were no reliable relationships (γ_{03} = 0.26, *SE* = 0.16; γ_{13} = −0.01, *SE* = 0.07) and there was no further reduction in the variance of the random intercepts or slopes compared to the previous model. According to the χ^2 statistics, residual variance of both intercepts and slopes remains to be explained.

In sum, the largest proportion (about one-fifth) of the variance in the mean levels of positive affect was explained by the individual level of neuroticism, and the largest portion (about one-third) of the variance in the PA slopes was explained by the proportion of time spent alone. Beginning with a six-parameter model that was unconditional on the person level, the reduction in deviance associated with each additional predictor helped decide between models. Adding proportion of time spent alone to the null model reduced deviance by 10.56; entering neuroticism in this model reduced deviance by a further 18.63, including extraversion in the last model reduced deviance by a final 2.64. Compared to the chi-square distribution with 2 degrees of freedom, only the first two

TABLE III

Positive affect as a function of momentary social context and proportion of time spent alone: Point estimates and standard errors of the fixed effects and variance components of the random effects between and within participants

Fixed effects	Estimated coefficients	*SE*	*p*
Model for positive affect			
Intercept	3.017	0.194	0.000
Proportion alone	−0.004	0.002	0.153
Model for alone-slopes			
Intercept	0.065	0.071	0.357
Proportion alone	−0.004	0.001	0.002
Random effects	Variance component	Chi-square (df)	*p*
Individual positive affect	0.50	4534.68 (66)	0.000
Individual alone-slope	0.02	109.01 (66)	0.001
Intra-individual variance	0.22		

$N = 68$.

models (containing proportion of time spent alone and neuroticism) led to a reliable reduction in deviance.

DISCUSSION

In this study, signal-contingent self-reports of everyday activities, the reasons for performing them, their contexts and concurrent affect were elicited with the aim of assessing the subjective instrumentality and process benefits afforded by regenerative, productive, and consumptive activities. Social context, but not type of activity, had a differential effect on positive affect. Being in company was associated with more positive affect than being alone. This association, however, was moderated by characteristics of the individual, namely the amount of time spent alone. A similar moderation effect emerged for neuroticism, but was not statistically reliable.

TABLE IV

Positive affect as a function of momentary social context, proportion of time spent alone, and level of neuroticism: Point estimates and standard errors of the fixed effects and variance components of the random effects between and within participants

Fixed effects	Estimated coefficients	*SE*	*p*
Model for positive affect			
Intercept	3.031	0.175	0.000
Neuroticism	−0.545	0.127	0.000
Proportion alone	−0.004	0.003	0.093
Model for alone-slopes			
Intercept	0.057	0.071	0.424
Neuroticism	−0.093	0.053	0.079
Proportion alone	−0.004	0.001	0.003

Random effects	Variance component	Chi-square (df)	*p*
Individual positive affect	0.40	3246.95 (65)	0.000
Individual alone-slope	0.02	104.49 (65)	0.002
Intra-individual variance	0.22		

$N = 68$.

Reasons for performing an activity. Productive activities were clearly motivated by their perceived instrumentality for reaching valuable outcomes. This can be taken as a validation of the activity categorization based on Reid's (1934) third-party criterion. Reasons given for performing consumptive activities, in contrast, were distributed equally across the three categories. A consumptive activity that is performed because of its outcome may be indicative of an investment (for the economic model of human capital formation, see, e.g., Blinder and Weiss, 1976; see also Baltes and Baltes, 1990, for a similar argument). Solving crossword puzzles, for instance, is seen by many elderly individuals as a means of using cognitive abilities and skills and thereby maintaining their independence or, in economic terms, their household productivity.

In the historical labor-supply literature, nonmarket activities that contribute to market productivity are termed "productive consumption" (e.g., Marshall, 1920; see also Biddle and Hamermesh, 1990).

Activities and positive affect. The aggregated ratings of positive affect in the three activity types revealed a reliable difference between regeneration and production relative to consumption in favor of the latter. These effects were not corroborated on the occasion level, however. In fact, although productive activities were reported to be performed because of their outcome utility rather than because of the pleasure they afford, positive affect in situ is about as high as that accompanying consumptive activities. This is consistent with the assumption that, in addition to outcome utility, productive activities also afford direct utility, i.e., process benefits (Juster, 1985). Bear in mind, however, that the majority of productive activities in the present study were household chores – participation in paid and volunteer work was low in this sample (Klumb and Baltes, 1999a). Household chores differ from productive activities investigated in other studies in a number of ways. They are carried out in isolation and there is barely any social recognition for engaging in them. In Juster's (1985) study, household chores ranked very low in direct ratings of liking. Compared to consumptive activities, they are less challenging, they yield less feedback, and the demands they make cannot be as easily adjusted to one's skill level or preferences because they are not as freely chosen. This makes the finding of comparable levels of positive affect in productive and consumptive activities even more notable. It cannot be ruled out that the relationships between activities and mood are moderated by the respective reasons for performing the activities, thus masking differential effects of the activity types. A straightforward test of this possibility would be to perform separate aggregations of mood in regenerative, productive, and consumptive activities carried out for each of the possible reasons.

Social context and positive affect. Part of the variation in positive affect was explained by social context (in company vs. alone). The size of this effect depended on the total time spent alone. The former result is consistent with Juster's (1985) finding that activities involving other people ranked very high in a direct rating of liking. Furthermore, it may explain the discrepancy between occasion-level and aggregated data. Because regenerative and productive activities are more likely to be performed alone than consumptive ones, activity type and social context are confounded in the aggregate, leading to lower mean levels of positive affect for regenerative and productive activities. This shows just how important it is to look at this kind of data from many different angles in order to avoid premature inferences (Larson Delespaul, 1992). A straightforward test of this possibility would be to perform separate aggregations of mood in regenerative, productive, and consumptive activities performed alone, with a close partner, and with other social partners.

Person × situation interactions. The difference in PA between occasions with and without company was modified by the amount of time an individual spent alone. For those individuals who spent more time alone, the difference was reduced. For neuroticism, only the main effect on positive affect was reliable, though there was a tendency of a cross-level interaction. The PA difference between occasions with and without company was somewhat reduced among individuals with higher neuroticism scores. Extraversion did not have any effect on mean level of positive affect, on the PA slope, or on the amount of time spent alone. This result was unexpected and differs from the previous findings (Brandstätter, 1994).

The most obvious explanation for this discrepancy is the difference in the age ranges of the samples. In late life, an individual may have different needs and preferences regarding social relationships than in midlife. Change in personal networks has been shown to result partly from deliberate discontinuation of peripheral relationships, but mostly from uncontrollable losses (Lang and Carstensen, 1998). It seems plausible, therefore, that the influence of contextual factors such as the existence of a partner in the household – a characteristic of the social environment that is more proximally represented here through the amount of time spent alone – outweighs the influence of interindividual differences in personality. In addition, Lang, Staudinger and Carstensen (2000) found only small or insignificant associations between neuroticism and extraversion and indicators of social relationships.

Conclusions. This study contributes to our understanding of daily activities and experiences in three ways. First, the participants' perceptions of productive activities reflect Reid's third-party criterion in that they were aware of the instrumentality of these activities. However, this did not affect their mood when performing productive activities. It thus seems important to assess the various dimensions that characterize activities, because covariation between these dimensions may not be very high. Second, whether the participants were alone or in company did make a difference to positive affect. The association may explain the protective effect that social activities have for well-being, health, and even survival (Glass et al., 1999; Lennartsson and Silverstein, 2001). Third, in late life, the relationship between personality dispositions and indicators of social relationships maybe not be as strong as in earlier phases of life, when contexts are chosen more freely according to an individual's needs and preferences.

Strengths and limitations. Intensive time sampling is an ecological approach to work and leisure that can help to revive this time-honored research tradition in both theoretical and methodological respects. It allows production and consumption to be described with reference to the same attributes – a desideratum identified, by Kabanoff (1980), for example. Furthermore, by emphasizing positive experiences, it overcomes the fixation of many social scientists on negative emotions such as alienation, anxiety, distress, etc. The multi-level approach is another strength of this study, which makes the best possible use of both situation-level and person-level information.

The study also has a number of shortcomings, some of which may limit the generalizability of its results. (1) There are two types of selectivity in the data: one pertaining to persons, the other to measurement occasions. First, the sample was a positive selection of the BASE intensive Protocol sample, which means that generalizability to the population of individuals aged 70+ may be limited. The effects barely exceeded one standard deviation, however, and in the original sample, a similar activity distribution was found using a different method (Klumb and Baltes, 1999a). Second, and more important, the number of time samples differed across participants. While the random time-sampling schedule was employed to ensure representative samples of relevant activities, states, and contexts, the fact that some participants had a considerable number of missings that were unlikely to occur completely at random may also limit generalizability with respect to measurement occasions. (2) Even if it could be assumed that the measurement occasions are representative, there is no random assignment of participants to situations in a naturalistic approach. Therefore, a *ceterus paribus* assumption does not apply: Differences between variables of interest tend to be confounded with differences in other properties of the person and the situation and thereby limit internal validity. As Larson and Delespaul (1992) have pointed out, aggregates over specific, naturally occurring situations may differ from aggregates over experimentally controlled situations. Therefore, they cannot be interpreted in the same way. (3) It cannot be ruled out that the unexpected failure to find effects of personality dispositions on self-reported social context resulted from diminished reliability of the six-item scales employed. This does not seem likely, however, because the scales have shown the expected relationship patterns in other contexts of analysis (Smith and Baltes, 1999).

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REFERENCES

Baltes, M. M.: 1996, 'Successful aging', in S. Ebrahim and A. Kalache (eds.), Epidemiology in Old Age (BMJ Publishing Group, London).
Baltes, P. B. and M. M. Baltes: 1990, 'Psychological perspectives on successful aging: The model of selective optimization with compensation', in P. B. Baltes and M. M. Baltes (eds.), Successful Aging: Perspectives from the Behavioral Sciences (Cambridge University Press, Cambridge), pp. 1–34.
Becker, G.: 1965, 'A theory of the allocation of time', The Economic Journal 75, pp. 493–517.
Biddle, J. and D. Hamermesh: 1990, 'Sleep and the allocation of time', Journal of Political Economy 98, pp. 922–943.
Blinder, A. and Y. Weiss: 1976, 'Human capital and labor supply: A synthesis', Journal of Political Economy 84, pp. 449–472.
Blossfeld, H. P.: 1996, 'Macro-sociology, rational choice theory, and time', European Sociological Review 12, pp. 181–206.
Brandstätter, H.: 1994, 'Pleasure of leisure – pleasure of work, Personality makes the difference', Personality and Individual Differences 16, pp. 931–946.
Bryk, A. S., S. W. Raudenbush, M. Seltzer and R. Congdon: 1988, An Introduction to HLM: Computer Program and User's Guide, 2nd edn. (University of Chicago Department of Education, Chicago).
Buse, L. and K. Pawlik: 1996, 'Ambulatory behavioral assessment and in-field performance testing', in J. Fahrenberg and M. Myrtek (eds.), Ambulatory Assessment: Computer-Assisted Psychological and Psychophysiological Methods in Monitoring and Field Studies (Hogrefe & Huber, Seattle, WA), pp. 29–50.
Clark, L. A. and D. Watson: 1988, 'Mood and the mundane: Relations between daily life events and self-reported mood', Journal of Personality and Social Psychology 54(2), pp. 296–308.
Clark, S. M., A. S. Harvey and S. M. Shaw: 1990, 'Time use and leisure: Subjective and objective aspects', Social Indicators Research 23, pp. 337–352.
Costa, P. T. Jr. and R. R. McCrae: 1985, NEO: Five-Factor Personality Inventory (Psychological Assessment Resources, Inc., Talahassee, FL).
Csikszentmihalyi, M. and J. LeFevre: 1987, 'Optimal experience in work and leisure', The Journal of Personality and Social Psychology 56, pp. 815–822.
Diener, E., R. J. Larsen and R. A. Emmons: 1984, 'Person × situation interactions: Choice of situations and congruence response models', Journal of Personality and Social Psychology 47(3), pp. 580–592.
Elliott, D. H. and J. L. Elliott: 1990, 'Behaviour and the life-cycle: A consideration of the role of longitudinal time use studies', Social Indicators Research 23, pp. 395–414.
Emmons, R. A., E. Diener and R. J. Larsen: 1986, 'Choice and avoidance of everyday situations and affect congruence: Two models of reciprocal interactionism', Journal of Personality and Social Psychology 51(4), pp. 815–826.

Fahrenberg, J.: 1996, 'Ambulatory assessment: Issues and perspectives', in J. Fahrenberg and M. Myrtek (eds.), Ambulatory Assessment: Computer-Assisted Psychological and Psychophysiological Methods in Monitoring and Field Studies (Hogrefe & Huber, Seattle, WA), pp. 3–20.

Fahrenberg, J. and M. Myrtek: 1996, Ambulatory Assessment: Computer-Assisted Psychological and Psychophysiological Methods in Monitoring and Field Studies (Hogrefe & Huber, Seattle, WA).

Gershuny, J. and B. Halpin: 1996, 'Time use, quality of life, and process benefits', in A. Offer (ed.), In Pursuit of the Quality of Life (Clarendon Press, Oxford), pp. 188–210.

Glass, T. A., C. M. de Leon, R. A. Marottoli and L. F. Berkman: 1999, 'Population based study of social and productive activities as predictors of survival among elderly Americans', British Medical Journal 319, pp. 478–483.

Hackman, J. J.: 1976, 'A life-cycle model of earnings, learning, and consumption', Journal of Political Economy 84, pp. 11–21.

Herzog, A. R., R. L. Kahn, J. N. Morgan, J. S. Jackson and T. C. Antonucci: 1989, 'Age differences in productive activities', Journal of Gerontology: Social Sciences 44, pp. 129–138.

Juster, F. T.: 1985, 'Preferences for work and leisure', in F. T. Juster and F. P. Stafford (eds.), Time, Goods, and Well-Being (Institute for Social Research, Ann Arbor, MI).

Juster, F. T., P. M. Courant and G. K. Dow: 1985, 'A conceptual framework for the analysis of time allocation data', in F. T. Juster and F. P. Stafford (eds.), Time, Goods, and Well-Being (Institute for Social Research, Ann Arbor, MI).

Juster, F. T. and F. P. Stafford: 1991, 'The allocation of time, empirical findings, behavioral models, and problems of measurement', Journal of Economic Literature 29, pp. 471–522.

Kabanoff, B.: 1980, 'Work and nonwork: A review of models, methods, and findings', Psychological Bulletin 88, pp. 60–77.

Kahn, R. L.: 1991, 'The forms of women's work', in M. Frankenhaeuser, U. Lundberg and M. Chesney (eds.), Women, Work and Health: Stress and Opportunities (Plenum, New York).

Karasek, R. A. and T. Theorell: 1990, Healthy Work (Basic Books, New York).

Klumb, P. L. and M. M. Baltes: 1995, 'Berlin Aging Study: Selective participation and attrition in a study on everyday competence in old age based on the experience-sampling method', Paper presented at the EURODEP Conference, Dublin, Ireland, November 17–19.

Klumb, P. L. and M. M. Baltes: 1999a, 'Time use of old and very old Berliners: Productive and consumptive activities as functions of resources', Journal of Gerontology: Social Sciences 54B, pp. S271–S278.

Klumb, P. L. and M. M. Baltes: 1999b, 'Validity of retrospective time-use reports in old age', Applied Cognitive Psychology, 13 pp.

Lang, F. R. and L. L. Carstensen: 1998, 'Social relationships and adaptation in late life', in A. S. Bellack and M. Hersen (eds.), Comprehensive Clinical Psychology, Vol. 7 (Pergamon, Oxford, England), pp. 55–72.

Lang, F. R. and G. Helle: 1994, 'RC-GEN: Random call generation software'.
Lang, F. R., U. M. Staudinger and L. L. Carstensen: 1998, 'Perspectives on socioemotional selectivity in late life: How personality and social context do (and do not) make a difference', Journals of Gerontology: Psychological Science 53B, pp. P21–P30.
Larson, R. and P. A. E. G. Delespaul: 1992, 'Analyzing experience sampling data: A guidebook for the perplexed', in M. W. deVries (ed.), The Experience of Psychopathology: Investigating Mental Disorders in their Natural Settings (Cambridge University Press, New York), pp. 58–78.
Lawton, M.P., M. Moss and M. Fulcomer: 1986 – 87, 'Objective and subjective uses of time by older people', International Journal of Aging and Human Development 24, pp. 171–188.
Lennartsson, C. and M. Silverstein: 2001, 'Does engagement with life enhance survival of elderly people in Sweden? The role of social and leisure activities', Journals of Gerontology: Social Sciences, pp. S335–S342.
Marshall, A.: 1920, Principles of Economics (Macmillan, London).
McIntosh, B. R. and N. L. Danigelis: 1995, 'Race, gender, and the relevance of productive activity for elders' affect', Journal of Gerontology: Social Sciences 50B, pp. S229–S239.
Perrez, M., P. Wilhelm, D. Schoebi and M. Horner: 2001, 'Simultaneous computer assisted assessment of causal attribution and social coping in families', in J. Fahrenberg and M. Myrtek (eds.), Progress in Ambulatory Assessment (Hogrefe and Huber, Seattle, WA).
Reid, M.: 1934, Economics of Household Production (Wiley, New York).
Rowe, J. W. and R. L. Kahn: 1998, Successful Aging (Pantheon Books, New York).
Smith, J. and P. B. Baltes: 1999, 'Trends and profiles of psychological functioning in very old age', in P. B. Baltes and K. U. Mayer (eds.), The Berlin Aging Study: Aging from 70 to 100 (Cambridge University Press, New York).
Thoits, P. A.: 1983, 'Multiple identities and psychological well-being: A reformulation and test of the social isolation hypothesis', American Sociological Review 48, pp. 174–187.
Watson, D., L. A. Clark and A. Tellegen: 1988, 'A development and validation of brief measures of positive and negative affect: The PANAS Scales', Journal of Personality and Social Psychology 54, pp. 1063 – 1070.
Williams, K. J., J. Suls, G. M. Alliger, S. M. Learner and C. K. Wan: 1991, 'Multiple role juggling and daily mood states in working mothers: An experience sampling study', Journal of Applied Psychology 76, pp. 664–674.

TU Berlin, BH 8
Ernst-Reuter-Platz 1
10587 Berlin
E-mail: petra.klumb@tu-berlin.de