

Predictors of Subjective Physical Health and Global Well-Being: Similarities and Differences Between the United States and Germany

Ursula M. Staudinger
Max Planck Institute for Human Development

William Fleeson
Wake Forest University

Paul B. Baltes
Max Planck Institute for Human Development

Predictors of subjective physical health and global well-being were compared in a representative U.S. ($N = 2,400$) and a German ($N = 1,607$) sample of adults (age range: 25–65 years). Because of cultural overlap between Western industrialized nations, similarities in predictive patterns were expected. Differences in the economic and social systems as well as the cultural background, however, should also generate differences. As expected, the overall predictive power of the three sets of predictors (sociostructural variables, personality traits, and self-regulatory characteristics) was sizable in both countries. The strongest unique predictors were self-regulatory indicators for subjective physical health and personality traits for global well-being. In addition, however, theory-consistent country differences emerged in how personal and social resources seem to be orchestrated to maximize well-being.

The pursuits of health and happiness or subjective well-being are central to human existence. Not surprisingly, therefore, subjective well-being and subjective physical health are popular topics of psychological research. Questions concerning the personal characteristics and contextual factors that predict global and domain-specific subjective well-being are central in that line of research.

In the context of bottom-up and top-down models of subjective well-being, three main sources are discussed: sociostructural characteristics, personality traits, and self-regulatory indicators (e.g., Brief, Butcher, George, & Link, 1993; Costa et al., 1987; Diener, 1994; Ryff, 1989; Smith, Fleeson, Geiselman, Settersten, & Kunzmann, 1999; Staudinger & Fleeson 1996; Veenhoven, 1991). Further, lifespan theory argues that sociostructural characteristics as well as psychological characteristics might take on different functions and, therefore, show different effects depending on the larger cultural context in which they are embedded (e.g., P. B.

Baltes, Lindenberger, & Staudinger, 1998). Such inter- and intra-cultural variability in predictive relationships, however, is a topic that, with some exceptions, only recently has received attention (e.g., Andrews & Inglehart, 1979; Davis & Fine-Davis, 1991; Diener & Diener, 1995; Diener, Diener, & Diener, 1995; Grob, Little, Wanner, Wearing, & Euronet, 1996; Lee, Kim, & Shin, 1982; Near & Rechner, 1993; Suh, Diener, Oishi, & Triandis, 1998).

In the present study, we had the opportunity to predict subjective physical health (i.e., domain-specific well-being) and global well-being from sociostructural characteristics, personality traits, and self-regulatory indicators in two different countries. Specifically, the purpose of this study was twofold. First, we compared sociostructural characteristics, personality traits, and self-regulatory indicators in their statistical power to predict subjective physical health versus global well-being. Second, we compared similarities and differences of these predictive patterns between two Western industrialized nations: Germany and the United States.

In order to illustrate how we generated hypotheses for the present study, we first review, irrespective of cross-national differences, empirical evidence with regard to the three sets of predictive variables (sociostructural variables, traitlike personality dimensions, and self-regulatory characteristics). In a second step, we explore, on the basis of past research, possible U.S.–German differences in these predictive relationships.

Sociostructural Predictors of Subjective Physical Health and Global Well-Being

One of the most well-established findings in the field of global well-being and subjective physical health is that demographic and sociostructural variables account for rather small amounts of variance when compared with psychological characteristics and pro-

Ursula M. Staudinger and Paul B. Baltes, Center for Lifespan Psychology, Max Planck Institute for Human Development, Berlin, Germany; William Fleeson, Department of Psychology, Wake Forest University.

This research was supported by the John D. and Catherine T. MacArthur Research Network on Successful Midlife Development (Orville G. Brim, Director) and by the Max Planck Institute for Human Development. The data are from the Midlife in the United States Survey and a German survey on midlife development.

We thank Alexander Grob, Gabriele Oettingen, and Harry Triandis for their comments on an earlier version of this article.

Correspondence concerning this article should be addressed to Ursula M. Staudinger or Paul B. Baltes, Max Planck Institute for Human Development, Lentzeallee 94, 14195 Berlin, Germany, or to William Fleeson, Department of Psychology, Wake Forest University, Winston-Salem, North Carolina 27109. Electronic mail may be sent to staudinger@mpib-berlin.mpg.de.

cesses as long as basic existential needs are satisfied (e.g., Diener & Diener, 1996; Myers & Diener, 1995). In the present study, we included three sociostructural variables, age, gender, and socioeconomic status (SES) with the purpose of comparing their predictive power with that of psychological variables.

Age

Evidence abounds for Larson's (1978) contention that during adulthood age uniquely accounts for very little (less than 1%) of the variance in global subjective well-being. In a meta-analysis of cross-sectional evidence, Stock, Okun, Haring, and Witter (1983) reported, for example, that zero-order effect sizes indicate minimal though statistically significant positive relations between age and subjective indicators of global life satisfaction. When single control variables are introduced, the relationship between age and subjective well-being becomes negative and statistically nonsignificant. In a recent review on age and subjective well-being, Diener and Suh (1998) reported that life satisfaction and negative emotions show no significant relationship with age whereas positive emotions demonstrate weak negative age differences. The finding of relative age stability also holds true when longitudinal data are considered (e.g., Costa et al., 1987). Only at very old ages, that is beyond age 80, when constraints in several areas of life prevail, do these constraints seem to result in some lowering of well-being ratings ($r = -.17$; Smith et al., 1999; see also Martin, Poon, Kim, & Johnson, 1996).

A slightly different picture emerges when we consider age trajectories of subjective physical health—that is, well-being in the domain of health. There is indication that older adults (above age 65) evaluate their health as being worse than do middle-aged adults even when controlling for objective health and other relevant demographic variables (Levkoff, Cleary, & Wetle, 1987). Ratings of subjective physical health are the only well-being ratings that evince stronger although, given the age-related increase in morbidity and functional impairments (e.g., Rowe, Andres, Tobin, Norris, & Shock, 1976; Steinhagen-Thiessen & Borchelt, 1999), still moderate negative relationships with age (Herzog & Rodgers, 1981). In adult lifespan samples (20 to 90 years), between 2.6% and 6.7% of the variance in subjective physical health ratings is accounted for by age (Herzog & Rodgers, 1981).

Gender

For both subjective physical health and global well-being, the dominant finding is an absence of mean differences between males and females (e.g., Levkoff et al., 1987; Myers & Diener, 1995). Although women report more negative emotions than men, they also report more positive ones. On balance, therefore, the predominant finding is that there are no sex differences. We aimed to replicate this finding and to investigate possible country differences in the predictive relationship between gender and subjective well-being.

SES

SES demonstrates relatively stronger well-being gradients (associations) than age and gender. Perhaps the strongest sociostruc-

tural predictors of well-being are income and social status. Income has repeatedly been found to evince moderate positive relationships with indicators of global subjective well-being (e.g., Myers & Diener, 1995), although longitudinal (historical) evidence also shows that increasing levels of average income in a given country have surprisingly little influence on levels of well-being (Diener & Diener, 1996).

With regard to subjective physical health, sociologists and anthropologists have consistently shown that culture and social class influence beliefs about disease and health evaluations (e.g., Kleinman, 1980; Zola, 1964). Most relevant in the present context are three large-scale studies conducted in the United States and Britain. Marmot and others (Marmot, Ryff, Bumpass, Shipley, & Marks, 1997) identified quite strong social gradients (e.g., education, occupational status) for depression and subjective physical health. In both countries, lower levels of education and occupational status were associated with lower ratings of subjective physical health.

Psychological Predictors of Subjective Physical Health and Global Well-Being

In the sociological and the psychological literature, the finding that objective hardship shows less importance for subjective evaluations of well-being or health than one might expect has sometimes been called the *well-being paradox*. Among other explanations, the adaptive capacity of the self has been called on to unravel this paradox (e.g., P. B. Baltes & Baltes, 1990; Brandtstädter & Greve, 1994; Filipp, 1996; Staudinger, Marsiske, & Baltes, 1995). As Myers and Diener (1995) put it, "Satisfaction is less a matter of getting what you want than wanting what you have" (p. 13). For instance, after a period of adaptation (about 3 months), even people who have experienced serious life events again report near baseline levels of well-being (e.g., Suh, Diener, & Fujita, 1996).

Several characteristics and mechanisms have been discussed that might in concert support this resilience of the self, especially in the context of adult development and aging (for reviews see, e.g., P. B. Baltes et al., 1998; Staudinger et al., 1995; Staudinger & Fleeson, 1996; Staudinger, Freund, Linden, & Maas, 1999). On the one hand, stable structural characteristics such as traitlike personality dimensions contribute to how we typically experience and view the world and how we typically react and behave (e.g., Costa & McCrae, 1980). On the other hand, self-regulatory mechanisms such as control beliefs and self-evaluatory processes help to maintain and recover levels of global and domain-specific well-being after critical events (e.g., Brandtstädter, 1998; Heckhausen, 1999; Taylor & Armor, 1996; Tesser & Martin, 1996). In the following, evidence concerning exemplars of both these facets of self and personality—characteristics and self-regulatory indicators—are reviewed with regard to their effect on subjective physical health and global well-being.

Traitlike Personality Dimensions

Stable personality dimensions, such as the Big Five (which are part of the present measurement approach), have been demonstrated to relate to subjective well-being (Brief et al., 1993; Costa et al., 1987). Neuroticism, for instance, evinces a significant negative relation, and Extraversion and Openness to Experience a

positive relation to global well-being (e.g., Costa & McCrae, 1980; Costa, McCrae, & Norris, 1981; Diener & Fujita, 1995; Headey & Wearing, 1989). Also with regard to subjective health, fears about disease (i.e., health-related Neuroticism) were among the strongest negative predictors (Barsky, Cleary, & Klerman, 1992; Levkoff et al., 1987).

Besides the Big Five, personality measures that focus on the assessment of personality growth have been demonstrated to predict levels of adaptation (e.g., Veenhoven, 1991). For instance, maturity of ego development as measured according to Loewinger's Sentence Completion Test is reported to predict higher levels of adaptation (McCrae & Costa, 1983). In a longitudinal study, it was found that measures of ego maturity predicted different aspects of adjustment (Helson & Wink, 1987). Thus, growth-related dimensions of personality should also contribute to the prediction of global well-being. In this study, we considered growth-related personality constructs by including six dimensions developed by Ryff in her adult-developmental model of subjective well-being (e.g., Ryff, 1989; Ryff & Keyes, 1995).

Self-Regulatory Characteristics

In addition to broad, general, and stable personality dispositions of the trait kind, the predictive power of more specific indicators of self-regulation is noteworthy. It is such self-regulatory characteristics that are considered as being building elements of effective functioning and thereby facilitating subjective well-being (e.g., Mischel, Cantor, & Feldman, 1996). There is even some basis to argue that self-regulatory indicators are more closely linked to subjective well-being because self-regulation is at the core of adaptation (e.g., Bandura, 1997). This relative predictive superiority of self-regulatory indicators might be restricted, however, to domain-specific assessments of well-being such as subjective physical health. Global ratings of subjective well-being may themselves be more of a dispositional quality (e.g., Brief et al., 1993) and thus demonstrate relatively strong relations with traitlike personality characteristics (Costa et al., 1987).

Of the wide variety of self-regulatory indicators, two are considered in the present study: *personal life investment* and *psychological control* in the domains of work and health. By *personal life investment*, we mean how much thought and effort people report investing in a variety of life domains such as work or health (Staudinger & Fleeson, 1996; Staudinger, Freund, Linden, & Maas, 1999). By *psychological control*, we mean how much control people believe they have over what is happening in these same domains of life.

Domain-general and domain-specific psychological control has repeatedly been found to support the maintenance of well-being in the face of adversity (e.g., M. M. Baltes & Baltes, 1986; Lachman, 1993; Rodin, 1986; Seligman, 1991; Skinner, 1995). People who have a sense of control over their lives also report higher levels of well-being (e.g., Bandura, 1995; Kohn & Slomczynski, 1990). The predictive power of (domain-specific) control beliefs, however, seems among other factors dependent on predictable and realistic behavior–outcome relations (e.g., Colvin & Block, 1994; Little, Oettingen, Stetsenko, & Baltes, 1995). Consequently, given predictable behavior–outcome relations, perceived control over one's health and work situation should contribute to feelings of well-being.

Another self-regulatory facet that has been identified to support adaptation—however, in a different fashion—is personal life investment (e.g., Cantor & Fleeson, 1991; Staudinger & Fleeson, 1996). Teleological theories of well-being have claimed (e.g., Diener, 1984) and empirical evidence has demonstrated that involvement in the pursuit of goals, as well as goal commitment, contributes to subjective well-being (e.g., Emmons, 1996; Omodei & Wearing, 1990). Whereas perceived control refers to beliefs about one's own efficacy, personal life investment is more closely linked with actual behavior (Staudinger & Kolbe, 1998). It has been found that the zero-order relationship between life investment ratings in central life domains such as work, health, or family and indicators of subjective well-being is rather small as investment in such domains seems to be a necessity of life and does not differentiate between people. However, when such necessities of life cannot be taken for granted or become threatened, the protective power of personal life investment emerges. For example, under conditions of bad objective health, overall reduced levels of life investment (averaged across 10 domains) and selectively increased investment in the health domain are related to higher levels of well-being (Staudinger & Fleeson, 1996). In this vein, we suggest that reported investment in one's health and work situation should show stronger relationships with subjective well-being under conditions of lacking societal support and protection with regard to work and health. Under such societal conditions of relative neglect, a baseline level of functioning in these domains cannot be taken for granted, and thus individual differences in personal life investment become operative and thus predictive.

The United States and Germany: Two Western Industrial Societies Characterized by Similarities and Differences

The United States and Germany are often considered prototypical examples of Western industrialized democratic societies. Therefore, in general we expect large overall similarities in predictive patterns of well-being between the two countries. In this vein, one of the classical cross-national studies on subjective well-being (Andrews & Inglehart, 1979) found that structures of well-being in eight European nations and the United States were basically similar. At the same time, the European countries were more similar to each other than any of them were to the United States. Likewise, many similarities, but also differences, between the United States and Italy were found with regard to situational and personal correlates of happiness (Csikszentmihalyi & Wong, 1991). A closer look at the sociostructural conditions in the United States and in Germany may help to illustrate the differences between the two countries.

Sociostructural Characteristics

Although typologies have their limitations (Bolderson & Mabbett, 1995), it may nevertheless be useful to consider the following typology of welfare state regimes that distinguishes between liberal, conservative, and social democratic regimes (Esping Andersen, 1990). According to this typology, the United States can be considered a liberal and Germany a conservative social welfare state regime. Some of the more central differences between these two types of regimes may be reflected in sociostructural indicators. For instance, the income gini coefficient, an indicator of income

inequality, was reported to be .46 in the United States (for 1994; World Bank, 1998) and .31 in Germany (for 1996; Federal Statistical Office of Germany, 1998). This suggests that there is greater income inequality in the United States than in Germany, which may make income a more powerful predictor of subjective well-being in the United States than in Germany. A study referring to the relation between income and well-being based on data collected in the 1980s, however, did not identify differences in this association between the United States and Germany (Inglehart, 1990, p. 233). However, one should note that the gini index of income inequality in the United States in 1980 was still lower (.40) than in 1994 (.46).

Further, the German social welfare state differs from the U.S. social system, with regard to the sociostructural treatment of health care and employment. These differences might also bear special relevance for our topic of predictive patterns of global well-being and especially of subjective physical health. The German health insurance and health service system aims at providing health care of comparable quality to every German citizen. For instance, the public expenditure on health in the United States is 6.6% of the GDP, whereas in Germany it is 8.2%. However, the total amount spent on health (including private spending) is 14.2% in the United States and 10.4% in Germany (Organization for Economic Cooperation and Development, 1998). This discrepancy between public and total expenditure suggests that person-specific behaviors (and their interindividual differences) regarding the planning and accessing of health care are more important in the United States than in Germany. Furthermore, with regard to the social structure of employment, German employees are—independent of their occupational status—generally well protected with regard to minimum wages, discharge, retirement benefits, sick and maternal leaves, and vacation time (e.g., Habich, 1992). And indeed, for instance, in a study comparing the effects of unemployment on subjective well-being in various nations of the Western industrialized world, it was found that in liberal regimes (e.g., the United States) the detrimental effect of unemployment on subjective well-being was stronger than in conservative (e.g., Germany) and social democratic ones (Lapinski, Riemann, Shapiro, Stevens, & Jacobs, 1998). As a consequence, indicators of SES might also have less predictive power for indicators of well-being or subjective health in Germany than in the United States. We had no specific expectations for country differences in the predictive power of age and gender.

Traitlike Personality Dimensions

Beyond differences in the social system, the German and U.S. societal and cultural contexts also differ along other dimensions. Triandis (1989) described three major dimensions of cultural differences, namely individualism–collectivism, tightness–looseness, and cultural complexity. According to numerous cross-cultural studies (e.g., Diener & Diener, 1995; Inkeles, 1997; Triandis, 1995), which, among many other nations, included the United States and Germany, Germany seems to be a less individualistic and more homogeneous society than the United States. Thus, U.S. society can also be described as less well-structured and as conveying more insecurity than German society, which provides more structure and clearer as well as simpler procedures for achieving at least some security of existence. In this vein, we speculate that in

the United States interindividual differences in personality profiles may contribute more strongly to subjective well-being than in Germany. Statistically, this hypothesis would find support if more different traitlike personality dimensions were identified as significant predictors of subjective physical health and global well-being in the United States as compared with Germany. At the same time, these multiple personality predictors may also show more overlap in their predictive power as the paths to subjective well-being are more overdetermined in the United States than in Germany.

Self-Regulatory Characteristics

With regard to internal control beliefs, a case can be made that because of differences in objective and perceived behavior–outcome contingencies, control beliefs might have less predictive power in the United States than in Germany (e.g., Oettingen, 1995). The predictive power of subjective beliefs such as psychological control is at least to a certain degree also a reflection of outcome expectancies—for instance, the contingency-based availability of resources. Thus, we may expect that the lower the degree of behavior–outcome contingency, the lower the predictive power of perceived control with regard to objective and subjective measures of adaptation such as subjective well-being. Along this line of thinking, given the less well-structured social system in the United States (i.e., with its less stable and weaker contingency relationships), smaller relationships between perceived control ratings and indicators of well-being should be observed in the United States than in Germany. And indeed cross-cultural research in childhood has shown that although U.S. children had higher levels of control beliefs, the predictive power with regard to school achievement was much lower in the United States than in Germany (Little et al., 1995).

We make the contrary prediction for personal life investment. Personal life investment represents a subjective reflection of actual behavior rather than a belief about behavioral efficacy. When it comes to personal life investment ratings, it is relevant to consider that in contrast to Germany, the United States seems to provide fewer guaranteed employment-related and health-related goods. Thus, it is more necessary and efficient for the individual in the United States to show initiative and take action in order to achieve subjective well-being. As argued above, it is especially under such or similar conditions that personal life investment gains predictive power for adaptive outcomes. Consequently, we expected that personal life investment ratings would show stronger relationships to well-being in the United States than in Germany. In Germany, interindividual differences in personal life investment may have less predictive power as basic necessities, especially with regard to health, are provided by the state.

Hypotheses and Predictions

In sum, the following exploratory hypotheses and predictions guided the present study. With regard to the overall prediction of the two indicators of subjective well-being, we first hypothesized that a sizable amount of variance in both subjective physical health and global well-being can be accounted for by the combination of sociostructural characteristics, traitlike personality dimensions, and self-regulatory indicators (Diener & Fujita, 1995). Second, we predicted that traitlike and self-regulatory personality characteris-

tics would predict uniquely more variance than sociostructural characteristics. Third, with regard to differences between the two outcomes, we predicted that age, if significant at all, should be significant only in predicting subjective physical health. Because of the dispositional nature of global well-being ratings, traitlike personality dimensions were hypothesized to be related more strongly to global well-being. Because of their more direct link to the ongoing process of adaptation and their domain-specific assessment, we expected self-regulatory indicators to be more strongly linked to domain-specific well-being, such as subjective physical health.

With regard to country differences, we assumed that the overall predictive pattern would be very similar between the United States and Germany. Thus, our general expectation was that the hypotheses outlined above would be supported in both countries. However, we also predicted some country differences. Because of the more individualistic and less homogeneous context of U.S. society, we predicted that more significant predictors and more predictive overlap among predictors would be identified in the United States than in Germany. In terms of individual predictors, we expected that SES would turn out to be a stronger predictor in the United States than in the German social welfare society, that psychological control should have more predictive power in the well-structured and more contingent German context, and finally that personal life investment would evince more predictive power in the more individualistic context of U.S. society that is generative of personal initiative.

Method

Participants and Sampling

Data came from two independent national studies, one conducted in Germany and one conducted in the United States. The German sample was part of a larger survey conducted as a cooperative enterprise between the John D. and Catherine T. MacArthur Research Network on Successful Midlife Development (MIDMAC) and the Max Planck Institute for Human Development. The U.S. sample was part of a larger survey conducted by MIDMAC.

German sample. The German data set consisted of two separate waves of data collection with two sets of participants. The central differences between the two German waves were (a) changes in the sequence of assessment and (b) the number of participants sampled. In the following, the two waves are described as though they are the same study, as all features relevant for the present analysis were similar in the two waves.

The German survey assessed a German national sample of 1,607 participants between 25 and 65 years old, stratified by age (eight 5-year intervals), geographical location (former East vs. former West Germany), and gender. Random-root sampling, in which an interviewer carried a randomly assigned quota and condition cell to a randomly assigned dwelling, was carried out by a survey company (INFAS GmbH). Dwellings were chosen through a random procedure based on electoral districting.

All participants completed the sociostructural information (age, gender, income, education) and the subjective control beliefs ratings. Approximately 40% of the participants ($n = 629$) were randomly assigned to complete the remaining measures of interest in the present study. Participants were offered a lottery ticket (worth DM10, about \$6) in compensation for completing a face-to-face interview and a questionnaire booklet.

Response rate for the face-to-face interview was 69%, and of those completing the face-to-face interview, 76.5% filled out the questionnaire. Distributions of educational level and income seem to indicate that random sampling was reasonably successful. At a minimum, a heterogeneous sample approaching representativeness was recruited (see Table 1).

Table 1
Sample Description

Characteristic	United States	Germany
<i>N</i>	2,400	1,607
Age		
26–35	600	374
36–45	600	412
46–55	600	402
56–65	600	419
Educational level ^{a,b}		
1	9.1% (219)	5.7% (91)
2	26.6% (639)	66.8% (1,073)
3	30.0% (720)	27.5% (443)
4	34.3% (822)	
Income ^b		
Low	34.3% (823)	31.4% (504)
Medium	32.5% (781)	34.7% (557)
High	33.2% (796)	34.0% (546)

^a In Germany three and in the United States four educational levels were used in the assessment.

^b For definition of categories see text.

U.S. sample. The Midlife Development in the U.S. Survey (MIDUS) sample was recruited by applying a random digit dialing procedure. Again, recruitment was carried out by a survey company (DataStat). Twenty thousand telephone calls resulted in the identification of 3,032 respondents, ranging in age from 25 to 74 years, who fulfilled stratification criteria (age, gender), participated in the initial telephone interview, and also returned the two self-administered questionnaire booklets sent to them following the telephone-interview. Response rate for the telephone interview was 70%, and of those completing the telephone interview, 86.8% filled out the two questionnaire booklets (see also MIDMAC, 1998).

In order to increase the comparability of the German and the U.S. sample with regard to statistical power and age range, we performed a post hoc age stratification on the U.S. sample. That is, 600 participants were randomly sampled from each age decade in the U.S. sample in order to equate the number of participants in the differing age groups, as this is the case in the German sample (see Table 1). Thus, the U.S. sample used in this study consisted of 2,400 participants.

Procedure

German sample. Participants were first interviewed face-to-face (usually at the participant's home) for about 1 hr and were subsequently asked to fill out a questionnaire booklet. The questionnaire took about 1 hr to complete and was mailed back to the survey company.

U.S. sample. Participants were first interviewed by telephone for about 30 min and were then asked whether they would be willing to fill out a two-part self-administered questionnaire, which was subsequently sent to them. The questionnaire took about an hour and a half to complete.

Materials

Both samples were part of larger surveys. Therefore, materials were included in both surveys that were not used in this report; only the materials analyzed in this report are described. Means and standard deviations of as well as intercorrelations between all variables included in the study are reported in Appendix A (for the United States) and Appendix B (for Germany). The present study focused on two aspects of subjective well-being, which were measured equivalently in the two samples: subjective physical health and global well-being.

Subjective physical health. Subjective physical health, or health-

related well-being, was the mean of four items: (a) subjective physical health, (b) subjective physical health in comparison with others of one's age and gender, (c) subjective risk of heart attack in comparison with others of one's age and gender, and (d) subjective risk of cancer in comparison with others of one's age and gender.

In the U.S. sample, the two risk variables were originally measured with 7-point scales (and in a two-step procedure), in contrast to the 5-point scales used for the other items. These two items were adjusted to form a 5-point scale by collapsing scale points 2 and 3 into one response point, and scale points 5 and 6 into another response point. The Cronbach's alphas were reasonably high, .65 in the German sample and .66 in the U.S. sample, suggesting that these items form homogeneous scales. Thus, it seemed justifiable to calculate an average across the four items.

Global well-being. Global well-being was the mean of three items: (a) life satisfaction, (b) satisfaction looking back over one's life, and (c) subjective mental health. In both samples these items were assessed using 5-point scales. The Cronbach's alphas were in the same range as for the subjective health scores: .61 in the German sample and .60 in the U.S. sample. Again, these outcomes suggest that the items form a reasonably homogeneous scale, which makes averaging across the three items useful.

Factor analyzing all seven well-being and subjective-health items together across both samples using principal-component extraction and oblique rotation resulted in a clear two-factor solution that explained 54% of the variance. The four subjective-health items, described above, loaded on the subjective-health factor (.76, .74, .65, .56), and the other three items loaded on the global well-being factor (.80, .78, .59). Uniweighted composites formed according to the factors solution correlated .36 with each other. Highly similar solutions were obtained when factor analyzing the seven items for each country separately. These findings are in line with evidence on structural similarity from earlier research that compared eight European nations and the United States (Andrews & Inglehart, 1979) and suggested that comparative research on subjective well-being is feasible within this group of nations.

Sociostructural characteristics. In addition to age and gender, our interest in sociostructural characteristics was primarily in the role of SES indicators in predicting subjective physical health and global well-being (cf. Marmot et al., 1997). Income and educational level were chosen as such indicators.

Income was assessed with total household income, as all contributors to household income can be conceived as contributors to the SES of the participant. In the United States, total household income was measured as the sum of five separate gross yearly income sources: self, spouse, social security, government, and all other sources. Participants indicated their income by category range, and this value was converted into the middle value of the category range. In the German survey, participants were asked to either write down their actual household income or indicate which of several listed household income categories applied; after a participant acknowledged one of these categories, the participant was assigned the middle value of that category as his or her monthly income. In both samples missing substitution was carried out by computing the means by age, gender, and educational level (plus, in the German sample, place of origin: East versus West). This substitution was carried out for 11% of participants in the U.S. sample and 20% of participants in the German sample.¹

Education was assessed by the highest educational degree obtained. In the German sample, 1 indicates that the participant received no *Hauptschulabschluss* (roughly equivalent to not finishing high school); 2 indicates that the participant received a *Hauptschulabschluss*, *Realschulabschluss* (these are roughly equivalent to high school), or *Abschluss der Polytechnischen Oberschule* (these are roughly equivalent to a trade or technical high school degree); 3 indicates that the participant received at least a *Fachhochschulabschluss* or a *Hochschulabschluss* (roughly equivalent to a master's degree or higher). In the U.S. sample, 1 indicates that the participant did not finish high school; 2 indicates that the participant had

received a high school degree or its equivalent; 3 indicates that the participant received a college or vocational school degree; and 4 indicates that the participant had some graduate school or had finished a master's, doctoral, or other professional degree. The resulting sample characteristics are summarized in Table 1.

Finally, income and educational level were z-standardized within study. The mean of income and educational level was taken as an indicator of SES. In both samples the income distribution was skewed; participants scoring higher than 3 standard deviations above the mean were recoded to a z score of 3.

Traitlike personality characteristics. The present study focused on two types of widely used personality characteristics. The first is the five-factor model of personality traits (FFM), which consists of five traits: Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness. The two studies assessed the FFM in two distinct ways. Because of time constraints within these large-scale studies, use of reduced versions was required. In the German sample, the FFM assessment was adapted from the short version of the NEO Five Factor Inventory (NEO-FFI) created by Costa and McCrae (1989; German translation published by Borkenau & Ostendorf, 1993). Thirty items were randomly selected from the 60 in the NEO-FFI, with the requirement that each of the 6 facets for each of the five dimensions be represented (of the 12 for each dimension in the NEO). All items were responded to on a 5-point scale. Another data set ($N = 220$, age range = 20–87 years, $M = 45$ years) in which the NEO-FFI was administered allowed us to inspect correlations between the shortened and the full scales (Neuroticism, $r = .68$; Extraversion, $r = .75$; Openness to Experience, $r = .62$; Agreeableness, $r = .65$; Conscientiousness, $r = .76$).

The U.S. sample used 25 adjectives selected from existing trait lists and inventories (Bem, 1981; Goldberg, 1992; Trapnell & Wiggins, 1990) to fit John's (1990) factor solution of the FFM. Each of the five traits was assessed with between 4 and 7 adjectives on 4-point scales (cf. Lachman & Weaver, 1997). This measure was developed and tested in a pilot study ($N = 1,000$, age range = 30–70 years, $M = 48$ years). Scale consistencies were satisfactory (Neuroticism, $\alpha = .74$; Extraversion, $\alpha = .78$; Openness to Experience, $\alpha = .77$; Agreeableness, $\alpha = .80$; Conscientiousness, $\alpha = .58$). Research has suggested that different types of measures of the FFM (e.g., adjectives, full statements) are largely equivalent (John, 1990).

The second personality instrument was the short version of a questionnaire designed to assess six global dimensions of subjective well-being and continued personality growth (maturity) across the life span (e.g., Ryff, 1989, 1995): autonomy, environmental mastery, personal growth, positive relations, purpose in life, and self-acceptance. For the present study, the 18-item short version of the Ryff Inventory was used (Ryff & Keyes, 1995). Each of the six dimensions was assessed by three items. For this research, the items were translated into German using a backward translation method. A 5-point scale was used in the German sample. Because a 7-point scale was used in the U.S. sample, scores of 2 or 3 and 5 or 6 were collapsed together to create a 5-point scale in the U.S. sample.

Self-regulatory indicators. Our goal was to measure indicators of individuals' self-regulatory efforts in several life domains considered central to adult life. Specifically, control beliefs (e.g., Lachman & Burack, 1993) and personal life investment (e.g., Staudinger & Fleeson, 1996) were taken as two facets of self-regulation with established predictive power for subjective well-being. Health and work were chosen as domains of life for several reasons. First, work and health are the two life domains that we judged to be the most sensitive to differences in the social welfare systems of the United States and Germany. Second, health was chosen because it

¹ As missing substitution was carried out by using means of quite differentiated design cells, no significant differences between variances before and after mean substitution were found. Nevertheless, the main analyses are also reported without mean substitution.

matches the two adaptive outcomes selected for the present study (subjective physical health and global well-being). Third, both national data sets contained comparable measures for both these domains.

Each self-regulatory indicator (control, personal life investment) was measured with a single item separately for health and work. Control belief was measured with the question "How much control do you have over . . . ?", and personal life investment was measured with the question "How much thought and effort do you put into . . . ?" In the German sample, the items were measured on a 5-point scale; in the U.S. sample, the items were measured on 11-point scales (ranging from 0 to 10). These 11-point scales were transformed into 5-point scales by collapsing every 2 scale points, except for the middle point, where 3 scale points were collapsed into one. These and all other scales used in the study were coded such that higher scores indicate higher levels of the assessed construct.

Results

Data were analyzed separately for the domain-specific and the global indicator of subjective well-being (subjective physical health and global well-being). For each outcome, four specific questions reflective of the hypotheses stated earlier were pursued.

First, we analyzed the overall difference in predictive patterns between the two countries. In this way, we determined whether we should pursue analyses in the overall sample or investigate each country separately. Second, the total predictive power of sociostructural and personality-related characteristics in predicting global well-being or subjective physical health was tested. Third, we compared the relative contribution of sociostructural characteristics, traitlike personality dimensions, and self-regulatory indicators to the prediction, and how much these three predictor systems overlapped. Finally, fourth, we examined within each of the three sets which of the specific predictors are important.

Overall Country Differences in Predictive Schemes

First, two overall regression models were specified including the U.S. and German samples and all three predictive sets (i.e., sociostructural variables, traitlike personality, self-regulatory indicators) for each indicator of well-being. This procedure was intended as an overall test of whether country acts as a moderating variable.

Results showed that, indeed, interactions between country and all three sets of predictors led to a significant increase in variance explained in both indicators of subjective well-being. Table 2 illustrates that for global well-being the interactions between all predictors and country added a significant 1%. For subjective physical health the interactions between predictors and country added a significant 2%. (The results remain practically unchanged when all variables are z-transformed within country.) These results suggest that it is meaningful to pursue the question of unique and shared contributions of predictive sets for each country separately.

Sociostructural Characteristics, Traitlike Personality, Self-Regulatory Indicators: Total, Unique, and Shared Predictive Power

In the next step, we conducted hierarchical regression analyses separately for each country to determine the unique and shared contributions of each of the three predictive sets. Results of these two sets of hierarchical regressions were subsequently entered into a communality analysis (Hertzog, 1989; Pedhazur, 1982), which

Table 2
Overall Regression Models Predicting Subjective Physical Health and Global Well-Being

Step	Predictor	Cumulative R ²	ΔR ²	ΔF
Criterion: Subjective physical health				
1	Country			
	Sociostructural variables			
	Traitlike personality variables			
	Self-regulatory indicators	.25		49.75***
2	Interactions			
	Country × Sociostructural Variables			
	Country × Traitlike Personality Variables			
	Country × Self-Regulatory Indicators	.27	.02	4.64***
Criterion: Global well-being				
1	Country			
	Sociostructural variables			
	Traitlike personality variables			
	Self-regulatory indicators	.44		118.77***
2	Interactions			
	Country × Sociostructural Variables			
	Country × Traitlike Personality Variables			
	Country × Self-Regulatory Indicators	.45	.01	3.00***

*** p < .001.

allowed determination of (a) total, (b) unique, and (c) shared predictions of both indicators of well-being. Unique predictive variances for each set of predictors were obtained by entering all predictors except that of interest and then adding the predictor set of interest and examining the change in R². Table 3 shows the resulting total unique and shared predictive variances of each of the three sets of predictors and for both indicators of well-being.

When all predictors were entered in the model, 26% of the variance (R²) in subjective physical health was explained in both countries. Thus, the total predictability of subjective physical health was identical in the two nations, despite the differences in sample size and measurement.

With regard to global well-being, 46% of the variance was explained in the United States versus 34% in Germany. This difference was statistically significant (Z = 2.8, p < .05).² Table 3 demonstrates that the difference in total amount of variance explained was due primarily to a larger amount of variance shared between the three sets of predictors (sociostructural variables, personality traits, and self-regulatory indicators) in the United States (18%) as compared with Germany (7%).

Next, we compared the three sets of correlates in terms of their relative unique predictive power. With regard to subjective physical health, in both cultural contexts, the relatively strongest unique contributors were the domain-specific self-regulatory indicators of

² Furthermore, neither the standard deviations of subjective physical health (U.S. SD = .68; German SD = .61; F(2339, 1606) = .93, ns) nor the ones for global well-being (U.S. SD = .66; German SD = .65; F(2339, 1606) = .77, ns) differed significantly between countries.

Table 3
Variance (R²) in Subjective Physical Health and Global Well-Being Accounted for by Sociostructural Characteristics, Traitlike Personality Variables, and Self-Regulatory Indicators

Characteristic	Subjective physical health		Global well-being	
	United States	Germany	United States	Germany
Total variance explained	.26	.26	.46 ^a	.34
Unique to sociostructural characteristics	.01	.01 <i>ns</i>	.01	.002 <i>ns</i>
Unique to traitlike personality	.05	.07	.23	.23
Unique to self-regulatory indicators	.08	.12	.03	.03
Predictive variance shared between the three sets	.11	.07	.18 ^a	.07

Note. Unless marked *ns*, all variances are significant ($p < .01$).
^a Variance was significantly higher for the U.S. than for the German sample.

control and personal life investment (United States, 8%; Germany, 12%). Note that this effect holds while partialing out the influence of the traitlike personality characteristics in the model, suggesting that these effects of domain-specific self-regulation are above and beyond the contributions of generalized personality dispositions such as Neuroticism or environmental mastery. The second strongest contributors were personality characteristics. As expected, the weakest unique predictors were the sociostructural characteristics. In both countries, then, age, gender, and SES evinced less predictive power for subjective physical health than did personality characteristics or self-regulatory indicators. The pattern of results was the same for global well-being except that as predicted, in both countries, general traitlike personality dimensions and not domain-specific self-regulatory indicators were the most important unique contributors.

In general, the patterns of unique predictive variances were highly similar across the two countries. This is an indication that the correlates of subjective physical health and global well-being display consistency across the two national contexts (and do so despite the variations in measurement).

Individual Predictive Relationships: General Findings and Country Differences

To further examine the location of differences in predictive schemes between the two outcomes and the two countries, within each of the three predictive sets (sociostructural, traitlike personality, or self-regulatory indicators), we used communality analysis to determine unique and shared contributions of individual predictors. Table 4 shows the shared and unique predictive components from these regressions.

First, we tested whether the pattern of associations between each set of predictor variables and subjective physical health or global well-being differed between the countries. As before, this was done by forming multiplicative interaction terms for each variable with the variable country, and then evaluating whether the set of interaction terms added a significant amount of variance to the associated main effects. Such tests of country by predictor interactions were performed separately for each set of predictors and both indicators of subjective well-being ($p < .001$).

With regard to sociostructural predictors, differences in terms of unique predictive contributions were identified especially for SES and also for age. As predicted, SES was more strongly associated

with subjective physical health and global well-being in the United States than in Germany, even while controlling for age and gender. (The results presented in Tables 3 and 4 remain basically the same when level of education and income are used separately in the analyses. Also, when the educational variable, which in the United States was assessed using four levels, was recoded into three

Table 4
Unique Variances of Individual Predictors in Predicting Subjective Physical Health and Global Well-Being (Results of Three Separate Hierarchical Regressions)

Predictor	Subjective physical health		Global well-being	
	United States	Germany	United States	Germany
Sociostructural characteristics	.04	.03	.07	.03
Age	.00	.02	.00	.003
Gender	.005	.00	.002	.00
Socioeconomic status	.03	.007	.06	.02
Shared variance	.01	.01	.00	.007
Traitlike personality	.16	.12	.41	.30
Extraversion	.01	.00	.002	.00
Neuroticism	.01	.03	.02	.02
Conscientiousness	.01	.00	.002	.00
Agreeableness	.01	.00	.002	.01
Openness	.002	.00	.00	.00
Autonomy	.002	.00	.001	.00
Environmental mastery	.003	.00	.01	.01
Personal growth	.01	.00	.002	.00
Positive relationships	.00	.00	.002	.00
Purpose in life	.003	.01	.01	.01
Self-acceptance	.00	.00	.06	.08
Shared variance	.10	.07	.30	.18
Self-regulatory indicators	.18	.18	.18	.10
Health control	.08	.16	.04	.03
Work control	.003	.00	.04	.03
Health investment	.02	.01	.002	.00
Work investment	.006	.00	.01	.00
Shared variance	.07	.01	.09	.03

Note. All table entries are R² values. Total R² for the set is listed in bold by the name of the set. Unique R² for each predictor is the value obtained by controlling for other predictors in the same set. Shared R² is shared among predictors from the same set. All nonzero unique variances shown in the table are significant. Predictive patterns for all three sets differ significantly between countries.

levels, the predictive pattern remained the same.) And, even while controlling for gender and SES, higher age was related to lower subjective health and global well-being in the German sample but not in the U.S. sample. (Both effects held true when controlling for all other available predictors.)

With regard to traitlike personality characteristics, Neuroticism was the strongest unique predictor for both indicators of well-being in both countries. Self-acceptance was also a strong unique predictor in both countries but only with regard to global well-being.

However, in addition to these similarities, there were, as predicted, also country differences. In the U.S. sample, traitlike personality characteristics showed more significant unique contributions to the prediction of both indicators of well-being than were found for Germany. In the German sample, 2 and 5 of 11 predictors—for global well-being and subjective health, respectively—demonstrated significant unique predictions. In the U.S. sample, 9 and 10 of 11 predictors—for global well-being and subjective health, respectively—showed significant unique contributions (see Table 4).³ Chi-square tests were computed to test this difference in distribution. They yielded significant results for both indicators of well-being: subjective physical health, $\chi^2(1, N = 22) = 6.4, p = .01$; global well-being, $\chi^2(1, N = 22) = 7.36, p = .01$. In addition, again as predicted, the shared variance in predicting global well-being was significantly larger in the U.S. sample than in the German sample.

Concerning the self-regulatory indicators of perceived control and personal life investment, in both countries psychological control over health was the strongest unique predictor of subjective physical health. Second, work-related perceived control was significant only with regard to global well-being in both countries.

With regard to country differences, health control ratings showed more unique predictive power of subjective physical health in Germany than in the United States ($Z = -3.0, p = .001$). The predictive effect of work investment was stronger in the United States than in Germany for both outcomes (subjective physical health, $Z = -2.0, p = .02$; global well-being, $Z = 2.5, p = .006$). In addition, shared variances differed between countries for both outcomes (subjective physical health, $Z = -4.5, p < .00$; global well-being, $Z = -3.5, p < .00$). Shared variances again were larger in the U.S. than in the German sample.

We acknowledge that these unique variances are small in magnitude. This is at least to some degree due to the large number of predictors and to removing shared predictive variance (i.e., indirect or third-variable effects). That is, these semipartial associations are the relationships that are obtained when controlling for the other predictors in the respective predictive set, and therefore the magnitudes will necessarily be small. Note also that the shared portions of predictive variance are quite sizable. When evaluating magnitude of prediction, it is also important to keep in mind the overall R^2 s, as shown in bold in Table 4.

Finally, we note the difference in the predictive role of sociostructural characteristics in the United States that can be seen when Tables 3 and 4 are compared. As shown in Table 3, the overall analysis of shared and unique predictions across the three predictive sets resulted in 1% variance attributable to sociostructural characteristics. In contrast, the analyses computed separately for each predictive set as listed in Table 4 yielded 7% attributable to sociostructural characteristics in the United States. As predicted,

this difference is captured in the significantly larger amount of shared variance among predictors (or indirect effects) in the U.S. than in the German sample when all three predictive sets are considered at once. It seems that in the United States there is larger covariation between SES and personality characteristics in their relation to subjective well-being.

Discussion

The purpose of this study was to investigate predictors of subjective physical health and global well-being and how these predictive relationships compare between the United States and Germany. Three kinds of predictors were included: (a) sociostructural characteristics, (b) traitlike personality characteristics, and (c) self-regulatory indicators.

Limitations of the Study

From the outset, we acknowledge a number of limitations of the present study. First, both data sets are cross-sectional in nature. Consequently, any conclusion about prediction can only be understood in a statistical and not a causal sense. Longitudinal studies would be necessary to analyze, for instance, whether it is control beliefs that lead to increases in well-being or vice versa or whether changes in both variables are caused by a third variable.

Second, because this study is embedded within two large surveys, each of which had multiple independent purposes, we were not able to bring to bear the most comprehensive measurements of each of the constructs considered. The advantages to being part of these surveys are the large and heterogeneous samples as well as broad coverage of measures. The disadvantage concerned primarily the limited amount of time available for measurement.

Third, measurement was not completely identical across the two studies. Also, as in much cross-cultural research, comparability of meaning can only be approximated, never guaranteed. Furthermore, occasional variations in measurement were unavoidable. To compensate, we selected measures with what we considered to be only minor variations across studies, and we performed analyses that we believed would be least influenced by such variations (e.g., we did not compare mean levels). In our view, the strong consistency in findings across the two nations is even more impressive given these slight differences in measurement and potential differences in connotative meanings.

Fourth, both samples suffered from some selectivity. Notably, both studies had lower representation from the most disadvantaged. In the German sample, only individuals residing in residences were contacted; in the U.S. sample, only individuals in possession of a telephone were contacted. These sample biases may underestimate the effects of the social welfare system, as those marginal groups are underrepresented in the study. However, despite these limitations we submit that the comparisons involve a first and useful exploration into country differences.

³ Because the U.S. sample is larger than the German sample (2,400 vs. 1,600), a random subsample of the U.S. sample ($n = 1,600$) was selected and these analyses were performed again. The pattern of results was nearly identical; specifically, 8 of the 11 predictors for subjective physical health and 10 of 11 for global well-being were significant.

SES, Personality Traits, and Self-Regulatory Indicators as Predictors (Correlates) of Subjective Well-Being

As hypothesized, the three sets of predictors accounted for substantial amounts of variance in both indicators of subjective well-being and both countries (see Table 4; United States: socio-structural, 4%, 7%; traitlike personality, 16%, 41%; self-regulatory indicators, 18%, 18%; Germany: sociostructural, 3%, 3%; traitlike personality, 12%, 30%; self-regulatory indicators, 18%, 10%). Consistent with the literature (e.g., Diener & Fujita, 1995; Schwarz & Strack, 1991) and our predictions, personality characteristics and domain-specific self-regulatory indicators across the two countries showed stronger unique (partialed) relationships with subjective well-being than sociostructural characteristics (see Table 3; United States: sociostructural, 1%, 1%; traitlike personality, 5%, 23%; self-regulatory indicators, 8%, 3%; Germany: sociostructural, 1%, 0%; traitlike personality, 7%, 23%; self-regulatory indicators, 12%, 3%). This evidence is consistent with bottom-up models of well-being that postulate that subjective well-being is composed of direct effects of living circumstances (e.g., sociostructural characteristics) as well as subjective evaluations of such circumstances (e.g., self-regulatory indicators; Campbell, Converse, & Rodgers, 1976; see also Smith et al., 1999).

We also found, however, in line with top-down models of well-being (e.g., Costa et al., 1981), that there is a unique association between personality dispositions and subjective well-being (Table 3; United States: 5%, 23%; Germany: 7%, 23%). Top-down models of well-being maintain that individuals are predisposed to react to events and circumstances in positive or negative ways. Thus, our results seem to be consistent with the suggestion that bottom-up and top-down theories of well-being should be integrated and considered jointly when accounting for differences in subjective well-being (e.g., Brief et al., 1993; Headey & Wearing, 1989).

Further, we can add one other piece to the bottom-up and top-down debate because we have available both domain-general and domain-specific assessments of well-being as well as domain-specific self-regulatory indicators and personality dispositions. On the basis of our results, we suggest that the importance of top-down vis-à-vis bottom-up theories also depends on the type of well-being indicator under consideration. When it comes to domain-specific assessments of well-being, such as subjective physical health, domain-specific self-regulatory indicators showed the strongest unique associations (subjective physical health: United States, 8%; Germany, 12%; global well-being: United States, 3%; Germany, 3%), which is more in line with bottom-up models. In contrast, in the case of global ratings of subjective well-being, it seems that consistent with top-down models, personality dispositions demonstrated the strongest unique relationships (global well-being: United States, 23%; Germany, 23%; subjective physical health: United States, 5%; Germany, 7%).

Differences in Correlational Patterns Between the United States and Germany

Besides these similarities in predictive patterns across countries, we also identified three major differences that were consistent with our hypotheses. In this respect, the present study also illustrates how a comparison between seemingly very similar countries may be quite informative.

First, SES had a stronger positive relation with global well-being in the United States than in Germany (United States: 3%, 6%; Germany: 0%, 2%). Although based on cross-sectional data, this finding is consistent with the interpretation that the social system in the United States seems to make differences in individual economic productivity a more important predictor of interindividual differences in subjective well-being than is the case in Germany. Further, when the relationship between subjective well-being and SES was considered jointly with the two kinds of personality correlates, the unique association between SES and well-being was substantially reduced (compare Tables 3 and 4). At the same time, however, the covariation between personality and SES in their mutual relationship with well-being was much larger in the United States than in Germany. This seems to be consistent with the interpretation that the "visible" (zero-order) relationship between SES and well-being becomes "invisible" when SES is considered in concert with personality characteristics. Our rationale predicting this outcome was related to what we call the overdetermination of pathways in U.S. society. Put more concretely, in the United States, certain personality profiles are related to higher or lower income and in turn are related to higher well-being. In the United States, SES seems to be a powerful variable within a system of person characteristics that in concert predict interindividual differences in subjective well-being.

Second, we found that, as hypothesized, a larger number of significant unique correlates was identified in the United States than in Germany. This finding is consistent with the interpretation that within the context of a more heterogeneous and less well-structured U.S. society (e.g., Inkeles, 1997; Triandis, 1995), it is adaptive to have more different resources (i.e., personality characteristics) available that may contribute to subjective well-being. In contrast, in the context of the more homogeneous and more structured German society, a smaller number of personality characteristics seems sufficient.

This finding is also in line with the results of a study that compared more or less individualistic societies with regard to elements entering into life satisfaction judgments (Suh et al., 1998). The hypothesis in this study was that in more individualistic countries, intrapsychic states would show stronger relations with judgments of well-being than in less individualistic societies. In comparison to the United States, Germany is judged as being relatively less individualistic. And indeed, Suh et al. found that Germans relied less than U.S. citizens on intrapsychic states such as emotions for their well-being judgments. In a similar way, one could argue that in the present study, personality characteristics and self-regulatory indicators showed weaker relationships with subjective well-being in Germany than in the United States (see Table 4).

Finally, we had some hypotheses about the predictive power of specific self-regulatory indicators that were supported by the findings. It was demonstrated that psychological control in the domains of health and work was more strongly related with subjective physical health in Germany than in the United States. We had hypothesized that this might be so because the well-structured German social welfare system provides a context richer in behavior-outcome contingencies, implying that individual actions generate outcomes in a more predictable manner. Thus, a context is provided that supports the adaptive value of perceived control. The finding of a weaker relationship between psychological control and well-being in the United

States is in line with cross-national research in the field of childhood development. In this work, it has been shown that school-related control beliefs, for example, are less related to the adaptive outcome of school performance in the United States than in Germany (e.g., Little et al., 1995).

In contrast, ratings of personal life investment, especially in the domain of work, showed stronger relationships with well-being in the United States than in Germany. Our preferred view of this finding—and clearly it is only one view because the United States and Germany differ in many ways other than their social structure—is that the U.S. social system may be such that it assigns adaptive power to personal life investment (see also Staudinger & Fleeson, 1996). In the United States, it indeed has functional value for the individual to invest himself or herself, to show initiative, and to take action because less is provided for by the state, whereas personal life investment is less rewarded and less needed in the context of the German social welfare system. Surely, in both of the above cases—that is, psychological control and personal life investment—it could also be the other way around, such that well-being results in more feelings of control in Germany and more investment in the United States. It would take longitudinal data to shed more light on this issue.

In sum, this article offers a window on the joint and unique effects of sociological and psychological influences on well-being. Comparing two countries characterized by many similarities but also select differences allowed us to get a glimpse of how social macrostructure and psychological microstructure interact in their relation to indicators of well-being.

References

- Andrews, F. M., & Inglehart, R. F. (1979). The structure of subjective well-being in nine Western societies. *Social Indicators Research*, 6, 73–90.
- Baltes, M. M., & Baltes, P. B. (Eds.). (1986). *The psychology of control and aging*. Hillsdale, NJ: Erlbaum.
- Baltes, P. B., & Baltes, M. M. (Eds.). (1990). *Successful aging: Perspectives from the behavioral sciences*. Cambridge, MA: Cambridge University Press.
- Baltes, P. B., Lindenberger, U., & Staudinger, U. M. (1998). Life-span theory in developmental psychology. In W. Damon (Ed.-in-Chief) & R. M. Lerner (Ed.), *Handbook of child psychology: Vol. 1. Theoretical models of human development* (5th ed., pp. 1029–1143). New York: Wiley.
- Bandura, A. (Ed.). (1995). *Self-efficacy in changing societies*. New York: Cambridge University Press.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Barsky, A. J., Cleary, P. D., & Klerman, G. L. (1992). Determinants of perceived health status of medical outpatients. *Social Science and Medicine*, 34, 1147–1154.
- Bem, S. L. (1981). *Bem Sex-Role Inventory manual*. Palo Alto, CA: Consulting Psychologists Press.
- Bolderson, H., & Mabbett, D. (1995). Mongrels or thoroughbreds: A cross-national look at social security systems. *European Journal of Political Research*, 28, 119–139.
- Borkenau, P., & Ostendorf, F. (1993). *NEO Fünf-Faktoren-Inventar (NEO-FFI) nach Costa und McCrae: Handanweisung* [NEO five-factor inventory (NEO-FFI) adapted from Costa and McCrae: Manual]. Göttingen, Germany: Hogrefe.
- Brandstädter, J. (1998). Action perspectives on human development. In W. Damon (Ed.-in-Chief) & R. M. Lerner (Ed.), *Handbook of child psychology: Vol. 1. Theoretical models of human development* (5th ed., pp. 807–863). New York: Wiley.
- Brandstädter, J., & Greve, W. (1994). The aging self: Stabilizing and protective processes. *Developmental Review*, 14, 52–80.
- Brief, A. P., Butcher, A. H., George, J. M., & Link, K. E. (1993). Integrating bottom-up and top-down theories of subjective well-being: The case of health. *Journal of Personality and Social Psychology*, 64, 646–653.
- Campbell, A., Converse, P. E., & Rodgers, W. L. (1976). *The quality of American life: Perceptions, evaluations, and satisfactions*. New York: Sage.
- Cantor, N., & Fleeson, W. (1991). Life tasks and self-regulatory processes. In M. L. Maehr & P. R. Pintrich (Eds.), *Advances in motivation and achievement* (pp. 327–369). Greenwich, CT: JAI Press.
- Colvin, C. R., & Block, J. (1994). Do positive illusions foster mental health? An examination of the Taylor and Brown formulation. *Psychological Bulletin*, 116, 3–20.
- Costa, P. T., & McCrae, R. R. (1980). Still stable after all these years: Personality as a key to some issues in adulthood and old age. In P. B. Baltes & O. G. Brim (Eds.), *Life-span development and behavior* (Vol. 3, pp. 66–102). New York: Academic Press.
- Costa, P. T., & McCrae, R. R. (1989). *The NEO-PI/FFI manual supplement*. Odessa, FL: Psychological Assessment Resources.
- Costa, P. T., Jr., McCrae, R. R., & Norris, A.-H. (1981). Personal adjustment to aging: Longitudinal prediction from Neuroticism and Extraversion. *Journal of Gerontology*, 36, 78–85.
- Costa, P. T., Jr., Zonderman, A. B., McCrae, R. R., Comoni-Huntley, J., Locke, B. Z., & Barbano, H. E. (1987). Longitudinal analyses of psychological well-being in a national sample: Stability of mean levels. *Journal of Gerontology*, 42, 50–55.
- Csikszentmihalyi, M., & Wong, M. (1991). The situational and personal correlates of happiness: A cross-national comparison. In F. Strack, M. Argyle, & N. Schwarz (Eds.), *Subjective well-being: An interdisciplinary perspective* (pp. 193–212). Oxford, England: Pergamon Press.
- Davis, E. E., & Fine-Davis, M. (1991). Social indicators of living conditions in Ireland with European comparisons. *Social Indicators Research*, 25, 103–365.
- Diener, E. (1984). Subjective well-being. *Psychological Bulletin*, 95, 542–575.
- Diener, E. (1994). Assessing subjective well-being: Progress and opportunities. *Social Indicators Research*, 31, 103–157.
- Diener, E., & Diener, M. (1995). Cross-cultural correlates of life satisfaction and self-esteem. *Journal of Personality and Social Psychology*, 68, 653–663.
- Diener, E., & Diener, C. (1996). Most people are happy. *Psychological Science*, 7, 181–185.
- Diener, E., Diener, M., & Diener, C. (1995). Factors predicting the subjective well-being of nations. *Journal of Personality and Social Psychology*, 69, 851–864.
- Diener, E., & Fujita, F. (1995). Resources, personal strivings, and subjective well-being: A nomothetic and idiographic approach. *Journal of Personality and Social Psychology*, 68, 926–935.
- Diener, E., & Suh, E. (1998). Subjective well-being and age: An international analysis. *Annual Review of Gerontology and Geriatrics*, 17, 304–324.
- Emmons, R. A. (1996). Striving and feeling: Personal goals and subjective well-being. In P. M. Gollwitzer & J. A. Bargh (Eds.), *The psychology of action: Linking cognition and motivation to behavior* (pp. 313–337). New York: Guilford Press.
- Esping Andersen, G. (1990). *The three worlds of welfare capitalism*. Princeton, NJ: Princeton University Press.
- Federal Statistical Office of Germany. (1998). *Figures and facts* [On-line]. Available on the World Wide Web: http://www.statistik-bund.de/erg_d.htm

- Filipp, S.-H. (1996). Motivation and emotion. In J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of aging* (pp. 218–235). San Diego, CA: Academic Press.
- Goldberg, L. R. (1992). The development of markers for the Big-Five factor structure. *Psychological Assessment*, 4, 26–42.
- Grob, A., Little, T. D., Wanner, B., Wearing, A. J., & Euronet. (1996). Adolescents' well-being and perceived control across fourteen sociocultural contexts. *Journal of Personality and Social Psychology*, 74, 785–795.
- Habich, B. (1992). *Sozialberichterstattung und sozialer Wandel: Wohlfahrtentwicklung im Zeitverlauf—Objektive und subjektive Indikatoren für die Bundesrepublik Deutschland 1978–1988* [Social statistics and social change. Welfare development across time—Objective and subjective indicators for Germany 1978–1988]. Unpublished doctoral dissertation, Free University Berlin, Germany.
- Headey, B., & Wearing, A. (1989). Personality, life events, and subjective well-being: Toward a dynamic equilibrium model. *Journal of Personality and Social Psychology*, 57, 731–739.
- Heckhausen, J. (1999). *Developmental regulation in adulthood: Age-normative and sociostructural constraints as adaptive challenges*. New York: Cambridge University Press.
- Helson, R., & Wink, P. (1987). Two conceptions of maturity examined in the findings of a longitudinal study. *Journal of Personality and Social Psychology*, 53, 531–541.
- Hertzog, C. (1989). Influences of cognitive slowing on age differences in intelligence. *Developmental Psychology*, 25, 636–651.
- Herzog, A. R., & Rodgers, W. L. (1981). Age and satisfaction: Data from several large surveys. *Research on Aging*, 3, 142–165.
- Inglehart, R. (1990). *Culture shift in advanced industrial society*. Princeton, NJ: Princeton University Press.
- Inkeles, A. (1997). *National character. A psycho-social perspective*. New Brunswick, NJ: Transaction.
- John, O. P. (1990). The "Big Five" factor taxonomy: Dimensions of personality in the natural language and in questionnaires. In L. A. Pervin (Ed.), *Handbook of personality: Theory and research* (pp. 66–100). New York: Guilford Press.
- Kleinman, A. (1980). *Patients and healers in the context of culture: An exploration of the borderland between anthropology, medicine, and psychiatry*. Berkeley: University of California Press.
- Kohn, M. L., & Slomczynski, K. M. (1990). *Social structure and self-direction*. Cambridge, MA: Blackwell.
- Lachman, M. E. (Ed.). (1993). Planning and control processes across the life span: An overview [Special issue]. *International Journal of Behavioral Development*, 16(2).
- Lachman, M. E., & Burack, O. R. (1993). Planning and control processes across the life span: An overview. *International Journal of Behavioral Development*, 16, 131–143.
- Lachman, M. E., & Weaver, S. L. (1997). *The midlife development inventory (MIDI) personality scales: Scale construction and scoring* (Tech. Rep.). Waltham, MA: Brandeis University.
- Lapinski, J. S., Riemann, C. R., Shapiro, R. Y., Stevens, M. F., & Jacobs, L. R. (1998). Welfare state regimes and subjective well-being: A cross-national study. *International Journal of Public Opinion Research*, 10, 2–24.
- Larson, R. (1978). Thirty years of research on the subjective well-being of older Americans. *Journal of Gerontology*, 33, 109–125.
- Lee, H., Kim, K.-D., & Shin, D. C. (1982). Perceptions of quality of life in an industrializing country: The case of the Republic of Korea. *Social Indicators Research*, 10, 297–317.
- Levkoff, S. E., Cleary, P. D., & Wetle, T. (1987). Differences in the appraisal of health between aged and middle-aged adults. *Journal of Gerontology*, 42, 114–120.
- Little, T. D., Oettingen, G., Stetsenko, A., & Baltes, P. B. (1995). Children's action-control beliefs about school performance: How do American children compare with German and Russian children? *Journal of Personality and Social Psychology*, 69, 686–700.
- Marmot, M., Ryff, C. D., Bumpass, L. L., Shipley, M., & Marks, N. F. (1997). *Social inequalities in health—A major public health problem*. Unpublished manuscript.
- Martin, P., Poon, L. W., Kim, E., & Johnson, M. A. (1996). Social and psychological resources in the oldest old. *Experimental Aging Research*, 22, 121–139.
- McCrae, R. R., & Costa, P. T. (1983). Psychological maturity and subjective well-being: Toward a new synthesis. *Developmental Psychology*, 19, 243–248.
- MIDMAC. (1998). *Midus*. Tech. Rep. Vero Beach, FL: Lifetrends. Available on the World Wide Web: <http://midmac.med.harvard.edu>
- Mischel, W., Cantor, N., & Feldman, S. (1996). Principles of self-regulation: The nature of willpower and self-control. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 329–360). New York: Guilford Press.
- Myers, D. G., & Diener, E. (1995). Who is happy? *Psychological Science*, 6, 10–19.
- Near, J. P., & Rechner, P. L. (1993). Cross-cultural variations in predictors of life satisfaction: A historical view of differences among West European countries. *Social Indicators Research*, 29, 109–121.
- Oettingen, G. (1995). Cross-cultural perspectives on self-efficacy beliefs. In A. Bandura (Ed.), *Self-efficacy in changing societies* (pp. 149–176). New York: Cambridge University Press.
- Organization for Economic Cooperation and Development. (1998). *Statistics at the OECD* [On-line]. Available on the World Wide Web: <http://www.oecd.org/std/index.htm>
- Omodei, M. M., & Wearing, A. J. (1990). Need satisfaction and involvement in personal projects: Toward an integrative model of subjective well-being. *Journal of Personality and Social Psychology*, 59, 762–769.
- Pedhazur, E. J. (1982). *Multiple regression in behavioral research: Explanation and prediction* (2nd ed.). New York: Holt, Reinhart & Winston.
- Rodin, J. (1986, September 19). Aging and health: Effects on the sense of control. *Science*, 233, 1271–1276.
- Rowe, J. W., Andres, R., Tobin, J. D., Norris, A. H., & Shock, N. W. (1976). The effect of age on creatinine clearance in men: A cross-sectional and longitudinal study. *Journal of Gerontology*, 31, 155–163.
- Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology*, 57, 1069–1081.
- Ryff, C. D. (1995). Psychological well-being in adult life. *Current Directions in Psychological Science*, 4, 99–104.
- Ryff, C. D., & Keyes, C. L. M. (1995). The structure of psychological well-being revisited. *Journal of Personality and Social Psychology*, 69, 719–727.
- Schwarz, N., & Strack, F. (1991). Evaluating one's life: A judgment model of subjective well-being. In F. Strack, M. Argyle, & N. Schwarz (Eds.), *Subjective well-being: An interdisciplinary perspective* (pp. 22–47). Oxford, England: Pergamon Press.
- Seligman, M. E. P. (1991). *Learned optimism*. New York: Knopf.
- Skinner, E. A. (1995). *Perceived control, motivation, and coping*. Thousand Oaks, CA: Sage.
- Smith, J., Fleeson, W., Geiselman, B., Settersten, R., & Kunzmann, U. (1999). Well-being in very old age: Predictions from objective life conditions and subjective experience. In P. B. Baltes & K. U. Mayer (Eds.), *The Berlin Aging Study: Aging from 70 to 100* (pp. 450–471). New York: Cambridge University Press.
- Staudinger, U. M., & Fleeson, W. (1996). Self and personality in old and very old age: A sample case of resilience? *Development and Psychopathology*, 8, 867–885.
- Staudinger, U. M., Freund, A. M., Linden, M., & Maas, I. (1999). Self, personality and life regulation: Facets of psychological resilience in old age. In P. B. Baltes & K. U. Mayer (Eds.), *The Berlin Aging Study:*

- Aging from 70 to 100* (pp. 302–328). New York: Cambridge University Press.
- Staudinger, U. M., & Kolbe, M. (1998). *Personal life investment as a window on internal and external living conditions*. Manuscript in preparation, Max Planck Institute for Human Development, Berlin, Germany.
- Staudinger, U. M., Marsiske, M., & Baltes, P. B. (1995). Resilience and reserve capacity in later adulthood: Potentials and limits of development across the life span. In D. Cicchetti & D. J. Cohen (Eds.), *Developmental psychopathology* (Vol. 2, pp. 801–847). New York: Wiley.
- Steinhausen-Thiessen, E., & Borchelt, M. (1999). Morbidity, medication, and functional limitations in very old age. In P. B. Baltes & K. U. Mayer (Eds.), *The Berlin Aging Study: Aging from 70 to 100* (pp. 131–166). New York: Cambridge University Press.
- Stock, W. A., Okun, M. A., Haring, M. J., & Witter, R. A. (1983). Age differences in subjective well-being: A meta-analysis. In R. J. Light (Ed.), *Evaluation studies. Review annual* (Vol. 8, pp. 279–302). Beverly Hills, CA: Sage.
- Suh, E., Diener, E., & Fujita, F. (1996). Events and subjective well-being: Only recent events matter. *Journal of Personality and Social Psychology*, 70, 1091–1102.
- Suh, E., Diener, E., Oishi, S., & Triandis, H. (1998). The shifting basis of life satisfaction judgments across cultures: Emotions versus norms. *Journal of Personality and Social Psychology*, 74, 482–493.
- Taylor, S. E., & Armor, D. A. (1996). Positive illusions and coping with adversity. *Journal of Personality*, 64, 873–898.
- Tesser, A., & Martin, L. (1996). The psychology of evaluation. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 400–432). New York: Guilford Press.
- Trapnell, P. D., & Wiggins, J. S. (1990). Extension of the interpersonal adjective scales to include the Big Five dimensions of personality. *Journal of Personality and Social Psychology*, 59, 781–790.
- Triandis, H. C. (1989). Self and social behavior in differing cultural contexts. *Psychological Review*, 96, 269–289.
- Triandis, H. C. (1995). *Individualism and collectivism*. Boulder, CO: Westview Press.
- Veenhoven, R. (1991). Questions on happiness: Classical topics, modern answers, blind spots. In F. Strack, M. Argyle, & N. Schwarz (Eds.), *Subjective well-being: An interdisciplinary perspective* (pp. 7–25). Oxford, England: Pergamon Press.
- World Bank. (1998). *Data facts* [On-line]. Available on the World Wide Web: <http://www.worldbank.int/data/databytopic/databytopic.html>
- Zola, I. K. (1964). Illness behavior of the working class. In A. Shostak & W. Gomberg (Eds.), *Blue collar world: Studies of the American worker* (pp. 350–361). Englewood Cliffs, NJ: Erlbaum.

(Appendixes follow)

Appendix A

Correlations Between Predictor and Outcome Variables in the U.S. Sample

Construct	1	2	3	4	5	6	7	8	9	10
1. Age	—									
2. Gender	.04	—								
3. Income ^a	.12**	-.15**	—							
4. Autonomy	.10**	-.05**	.00	—						
5. Environmental mastery	.04*	-.08**	.10**	.30**	—					
6. Personal growth	-.13**	-.02	.04	.21**	.38**	—				
7. Positive relationships	.07**	.02	.05*	.46**	.42**	.36**	—			
8. Purpose in life	-.11**	-.02	.17**	.15**	.28**	.42**	.35**	—		
9. Self-acceptance	-.01	-.06**	.17**	.27**	.57**	.39**	.47**	.36**	—	
10. Extraversion	-.05**	.06**	.00	.20**	.30**	.31**	.41**	.17**	.32**	—
11. Neuroticism	-.11**	.14**	-.06**	-.23**	-.44**	-.23**	-.32**	-.21**	-.41**	-.15**
12. Openness	-.06**	-.09**	.05**	.27**	.24**	.38**	.28**	.22**	.26**	.52**
13. Agreeableness	.07**	.26**	-.10**	.08**	.14**	.19**	.36**	.11**	.16**	.52**
14. Conscientiousness	.05**	.11**	.09**	.21**	.34**	.25**	.28**	.29**	.32**	.28**
15. Health control	-.06**	-.03	.06**	.11**	.29**	.24**	.18**	.17**	.21**	.21**
16. Health investment	.12**	.09**	.00	.09**	.13**	.17**	.14**	.10**	.09**	.20**
17. Work control	.04	.00	.12**	.11**	.31**	.19**	.19**	.15**	.25**	.18**
18. Work investment	-.02	.02	.12**	.11**	.19**	.26**	.16**	.20**	.20**	.20**
19. Global well-being	.00	-.07**	.21**	.20**	.48**	.34**	.38**	.35**	.57**	.27**
20. Subjective physical health	.01	-.10**	.13**	.11**	.27**	.26**	.20**	.22**	.26**	.20**

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

^a Annual income.

Appendix B

Correlations Between Predictor and Outcome Variables in the German Sample

Construct	1	2	3	4	5	6	7	8	9	10
1. Age	—									
2. Gender	.01	—								
3. Income ^a	-.04	-.04	—							
4. Autonomy	.02	-.04	.05	—						
5. Environmental mastery	.05	-.01	.06	.39**	—					
6. Personal growth	-.16**	-.02	.02	.43**	.40**	—				
7. Positive relationships	.03	.08	-.04	.17**	.39**	.39**	—			
8. Purpose in life	-.10*	.03	.04	.22**	.40**	.43**	.25**	—		
9. Self-acceptance	.02	.09*	.16**	.24**	.55**	.25**	.30**	.23**	—	
10. Extraversion	-.15**	.03	.06	.13**	.31**	.35**	.38**	.25**	.32**	—
11. Neuroticism	-.01	.17**	-.17**	-.29**	-.54**	-.27**	.22**	-.36**	.46**	-.35**
12. Openness	-.14**	.07	.04	.13**	.08*	.29**	.14**	.06	.03	.16**
13. Agreeableness	.15**	.18**	-.14**	.17**	.32**	.33**	.38**	.25**	.26**	.26**
14. Conscientiousness	.07	-.06	.02	.37**	.57**	.39**	.32**	.35**	.34**	.26**
15. Health control	-.20**	.02	.03	.09*	.18**	.21**	.10*	.16**	.15**	.15**
16. Health investment	.15**	.03	-.12*	.01	.09*	.11**	.12**	.00	.15**	.09*
17. Work control	-.33**	-.08**	.17**	.06	.09*	.13**	.02	.12**	.20**	.23**
18. Work investment	-.31**	-.07	.10*	.15**	.11**	.31**	.08	.21**	.07	.20**
19. Global well-being	-.08**	.02	.16**	.10*	.38**	.10**	.21**	.23**	.49**	.21**
20. Subjective physical health	-.15**	-.01	.05	.16**	.24**	.13**	.08*	.20**	.17**	.12**

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

^a Monthly income.

11	12	13	14	15	16	17	18	19	20	<i>M</i>	<i>SD</i>
										44.57	11.16
										57,290.0	51,466.1
										3.90	.72
										3.79	.77
										4.26	.70
										4.01	.68
										3.98	.77
										3.88	.78
										3.19	.57
										2.29	.68
—										3.06	.52
-.17**	—									3.47	.50
-.04	.34**	—								3.41	.46
-.19**	.27**	.31**	—							4.10	.87
-.23**	.16**	.11**	.21**	—						3.86	.91
-.05*	.13**	.18**	.20**	.26**	—					3.81	1.10
-.23**	.14**	.08**	.13**	.28**	.11**	—				4.24	.94
-.09**	.19**	.11**	.21**	.22**	.15**	.39**	—			3.49	.66
-.42**	.22**	.11**	.29**	.32**	.14**	.33**	.24**	—		3.35	.67
-.26**	.20**	.03	.23**	.38**	.23**	.20**	.20**	.43**	—		

11	12	13	14	15	16	17	18	19	20	<i>M</i>	<i>SD</i>
										44.79	11.52
										3,504.3	2,716.8
										3.71	.70
										3.84	.69
										4.00	.76
										3.62	.75
										3.92	.77
										3.67	.81
										3.46	.62
										2.32	.71
.07	—									3.24	.54
-.12**	.10*	—								3.89	.56
-.40**	.05	.33**	—							3.81	.64
-.22**	.08	.04	.20**	—						3.55	1.00
.02	.03	.15**	.18**	.04	—					3.58	.92
-.19**	.08*	-.09*	.04	.26**	-.08	—				2.91	1.34
-.16**	.02	.02	.21**	.20**	.02	.42**	—			3.78	1.09
-.40**	-.04	.07	.21**	.28**	.06	.23**	.10*	—		3.74	.65
-.31**	.04	.02	.21**	.41**	-.08*	.15**	.09*	.34**	—	3.15	.61

Received April 9, 1998
 Revision received August 4, 1998
 Accepted August 27, 1998 ■