

Personal or Environmental Causes of Happiness: A Longitudinal Analysis

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ABSTRACT. The author analyzed an integrative model of happiness, which incorporated personal factors (demographics, extraversion, neuroticism, and locus of control) and environmental factors (life events and social support), using a longitudinal data set. A secondary purpose was to clarify the relationship between overall happiness and life satisfaction. Using systematic random sampling, 581 residents of Kaohsiung, Taiwan, completed structured questionnaires at Time 1; among them, 105 returned valid questionnaires 2.5 years later, at Time 2. Longitudinal analysis indicated moderate stability of the subjective well-being (SWB) measures. More importantly, when both the baseline SWB levels and personality traits were statistically controlled, social support still predicted overall happiness, and positive life events predicted life satisfaction. Furthermore, there was a consistently strong bi-directional relationship between overall happiness and life satisfaction.

IN THE RECENTLY REVIVED RESEARCH AREA of subjective well-being (SWB; often used interchangeably with the term *happiness*), researchers now believe that happiness is composed of three related components: positive affect, absence of negative affect, and satisfaction with life as a whole (Argyle, Martin, & Crossland, 1989). Happiness is not merely a transient emotional state, short-lived and completely dictated by environmental events (Veenhoven, 1994); rather, it is more often conceptualized as a personal trait (Costa & McCrae, 1980, 1984). The SWB research in psychology has now progressed from early social surveys looking for objective, external indicators of SWB (Andrews & Withey, 1976; Campbell, 1976) to scale development (Andrews & Withey, 1976; Diener, Emmons, Larsen, & Griffin, 1985) and explanations of the psychological mechanisms of happiness (Argyle & Lu, 1990a, 1990b; Headey & Wearing, 1989; Lu & Shih, 1997a). Related to this shift in research interest is the use of the multi-

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variate approach, which is becoming a dominant feature of SWB research; however, good causal models must still be tested using sound research methodology.

Psychological Correlates of SWB

Two generally oppositional perspectives, that of the person and the environment, form the bases for various models and theories proposed to explain the subjective experience of happiness. Personality models (Costa & McCrae, 1980, 1984) are typical examples of the first perspective. Such models conceptualize happiness as a stable trait that depends primarily on personality. This perspective looks to various personality traits to account for an individual's experiences. These models subscribe to the top-down approach and emphasize an individual's innate capacity for happiness.

In their research review, Myers and Diener (1995) reported on the existence of a happiness trait that consists of self-esteem, personal control, optimism, and extraversion. However, by focusing on longitudinal studies using three trait criteria (temporal stability, cross-situational consistency, and inner causation), Veenhoven (1994) concluded that happiness is at best moderately stable in the short-term, is sensitive to fortune and adversity, and is not entirely innate. Consequently, the trait analogy is not supported by empirical data.

However, limitations in Myers and Diener's (1995) study may have hampered the validity of their conclusions. First, among the 26 studies they reviewed, most used single-item measures of SWB; when multi-item scales were used, Bradburn's (1969) Affect Balance Scale was used most often. Hence, not only were the measurements quite varied, but they also tended to tap the hedonic component of the SWB concept, which could be more susceptible to changes in life circumstances. Second, the bulk of follow-up studies covered short periods of time, typically only a year. Long-term studies are rare and absolute stability is yet to be considered. Third, some of the SWB measures tap broader measures of psychological well-being rather than just happiness. For instance, the much-used Life Satisfaction Index (Neugarten, Hovinghurst, & Tobin, 1961) includes items about planning-mindedness, self-respect, and views on social progress. Such potential measurement contamination must be eliminated.

Although it seems that personality plays an important role in SWB levels, it is not the only influential factor. In fact, if it were the only influential factor, a person's level of SWB would remain virtually unchanged over his or her entire lifetime.

Life events models (Abbey & Andrews, 1985; Reich & Zautra, 1983) are representative of the environment perspective. Such models recognize that some people's levels of happiness can fluctuate quite substantially over time. As such, these models look to both major positive and negative life events to account for changes in SWB. These types of models are typically bottom-up. As demonstrated in Veenhoven's (1994) review, happiness does respond to life transitions, both good and bad, especially the major and dramatic ones. However, consistent with the thesis of

the adaptational model (Brickman, Coates, & Janoff-Bulman, 1978), only recent life events were found to influence SWB (Myers & Diener, 1995).

Moreover, in most available studies, life events are treated as exogenous, and their impact is viewed as static. In fact, some evidence has shown that the same kind of events may keep happening to the same type of people, indicating that there are subtle links between personality and the type of life situations people encounter (Headey & Wearing, 1989).

As in so many cases of psychological inquiry, a particular behavior or state of mind is most likely produced by a complex interaction between the individual and his or her environment. Previous research, based on the interactionist perspective, revealed that both personal and environmental factors are important correlates of happiness (Lu, 1996). Thus, an integrative model of happiness was theoretically constructed and empirically revised. It includes both the direct paths to happiness (e.g., neuroticism, locus of control, and social support) and the indirect paths to happiness (e.g., age, gender, and extraversion through social support). However, this earlier study used a cross-sectional design, which did not allow for causal inferences, even with the help of structural modeling techniques. Thus, the present study adopted a longitudinal design to further extend the previous integrative model and to explore both personality traits and life events as stabilizing and destabilizing agents of SWB.

Overall Happiness or SWB and Its Components

Although the majority of researchers now agree that happiness is most likely composed of three related components (positive affect, absence of negative affect, and satisfaction with life as a whole; Argyle, Martin, & Crossland, 1989), many existing studies have concentrated on either hedonic balance or life satisfaction as the sole indicator of SWB. This confusion has not only hampered the development of a coherent conceptualization of the SWB construct but also raised the serious concern that research results pertaining to different aspects of SWB may not be comparable. However, there seems to be an acquiescence toward this convenient operational interchangeability of SWB terms and indicators because very few serious attempts have been made to delineate the intricate relationship between overall SWB and its various components. Therefore, I also examined the relationship between overall SWB and one of its most often studied components, life satisfaction. The longitudinal data may shed light on the complicated relationship between the two concepts.

Method

Participants and Procedure

This longitudinal study had two waves of data collection with an interval of approximately 2.5 years. All the potential respondents were interviewed at home

using structured questionnaires. The first wave of interviews were conducted from July through September 1993 (Time 1) and the second wave from December 1995 through January 1996 (Time 2).

At Time 1, a multistage systematic probability random sampling procedure was used to select for interview 581 adults living in all parts of the metropolitan city of Kaohsiung, Taiwan. Participants were 18–65 years old. According to data from the national census, the sample was fairly representative of the city's population in terms of major demographic variables including gender, age distribution, level of education, and family income. Among the respondents, 278 consented to an invitation to be re-interviewed at a later date.

At Time 2, every effort was made to follow up with these 278 consenting participants. However, because the city of Kaohsiung had undergone several large-scale urban development and restructuring programs, which resulted in a high level of residential migration, the follow-up rate was seriously muted. Consequently, only 105 valid follow-up interviews were completed, representing a success rate of 38%.

Measures

The following data were collected using questionnaires and scales:

Demographic information. Participants' personal background information was recorded, including age, gender, marital status, and educational level. This information was collected at both interviews and cross-checked for validity.

Personality traits. Personality traits were measured at both the initial and the follow-up interviews. Extraversion and neuroticism were measured by the E and N scales of the Eysenck Personality Questionnaire, respectively (EPQ; Eysenck & Eysenck, 1975). The average Cronbach's alphas were .80 and .76 at Times 1 and 2, respectively. Locus of control was measured using the Revised Sphere of Control Inventory (Paulhus, 1983) covering personal efficacy and interpersonal control. The Chinese version has an average Cronbach's alpha of .71. In all three cases, higher scores indicate more manifested corresponding personality traits. (Locus of control was scored in the internal direction.)

Life events. A composite Life Events Checklist (Lu, 1996) was administered during the follow-up interviews. It contains 64 events (41 negative and 23 positive) covering seven life domains: family, work, social and leisure, finance, environment, legal, and health. Participants were asked to rate on a 4-point scale the perceived severity of each type of event that happened to them in the past year. Two scores were computed to represent, separately, levels of positive and negative impacts brought about by these life events.

Social support. During the follow-up interviews, actual received support was measured using the socially supportive behaviors (Barrera, 1981), which includes tangible, emotional-companionship, and informational support information. The Cronbach's alpha was .92. Higher scores indicate higher levels of received support.

SWB. Overall happiness was measured using the Oxford Happiness Inventory (Argyle et al., 1989). This is a well-established, 29-item measure tapping general, subjective experiences of happiness. It covers the three basic elements of the happiness concept (positive affect, negative affect, and overall satisfaction with life). A higher total score indicates a higher level of overall happiness. Life satisfaction was measured with a composite 8-item measure of domain satisfaction with an 11-point rating scale. A higher total score indicates a higher level of life satisfaction. Both SWB measures were administered at Time 1 and Time 2 and had average Cronbach's alphas of .92 and .83, respectively.

Results

Descriptive analyses were conducted to illustrate the sample's demographic characteristics. Because the follow-up rate was low, descriptive values for the total sample at Time 1 ($N = 581$) are presented in parentheses in Table 1.

Although the follow-up success rate was low, the final sample of 105 was actually quite similar to the original, larger sample in terms of demographic characteristics. One exception was that there were substantially more people in the 41–50 age range in the smaller sample than in the original, larger sample. Overall, the Time 2 sample had slightly more men and included mostly young or middle-aged, well-educated, and currently married individuals. Furthermore, t tests revealed no significant differences on measurements of extraversion, neuroticism, and locus of control between those who participated at both times ($N = 105$) and those who participated only at Time 1 ($N = 581$).

Temporal stability was indicated by correlations of the same measurements taken at different times. However, the size of the correlations depends on the accuracy of the measurements: Errors may depress the correlations. Veenhoven (1994) suggested that true temporal stability can be estimated by the disattenuation of longitudinal correlations, that is, by dividing the longitudinal correlations by their corresponding reliability coefficients. In this study, extraversion, neuroticism, and locus of control had correlations over time of .55, .49, and .32, respectively. Divided by their corresponding reliability alphas of .80, .76, and .71, the resulting stability coefficients were .69, .64, and .45, respectively. This level of stability for personality was, on average, 32% higher than the corresponding correlation over time. Similarly, happiness and life satisfaction had correlations over time of .40 and .37, respectively. After dividing these figures by their corresponding reliability alphas of .92 and .83, the resulting stability coef-

TABLE 1
Demographic Characteristics of Participants at Time 2 (N = 105)

Variable	Time 1 (%)	Time 2 (%)	<i>n</i>
Gender			
Female	43.6	44.8	47
Male	56.4	55.2	58
Age			
18–30	26.4	21.0	22
31–40	23.6	20.0	21
41–50	19.9	30.5	32
51–60	10.3	10.5	11
≥ 61	19.8	18.0	19
Education			
Illiterate	5.7	2.9	3
Primary school	17.8	17.1	18
Junior school	14.1	18.1	19
Senior school	38.9	45.7	48
College and above	23.5	16.2	17
Marital status			
Married	68.9	77.1	81
Not married (including never married, divorced, separated, and widowed)	32.1	22.9	24

Note. The mean age of participants at Time 2 was 44.20 and the standard deviation was 14.54. At Time 1, these figures were 42.38 and 16.36, respectively. At Time 2, the mean educational level was 10.77 years and the standard deviation was 3.67. At Time 1, these figures were 10.79 and 4.30, respectively.

ficients were .43 and .45, respectively. This level of stability was, on average, 15% higher than the correlations over time. As expected, personality traits were quite stable, except for locus of control. However, the SWB measures were only moderately stable, even after the technical modification.

Pearson correlation coefficients were computed to examine the pattern of relationships among the research variables both simultaneously and over time. (In the analysis, women were coded as 1 and men as 2; unmarried people were coded as 1 and married people as 2. Education levels were converted into years of formal education.) Because none of the demographic variables correlated significantly with the dependent variable (SWB), they were omitted from the correlation matrix in Table 2.

It is important to note several facts in the correlation matrix. First, personality traits were significantly correlated with both overall happiness and life satisfaction. Simultaneous correlations (personality and SWB measures taken at the same time) were generally higher than cross-lagged correlations (personality and

TABLE 2
Pearson Correlations Among All Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. E (1)	—												
2. N (1)	-.18	—											
3. Control (1)	.33***	-.20*	—										
4. Happiness (1)	.40***	-.23*	.30**	—									
5. Satisfaction (1)	.32***	-.17	.27***	.59***	—								
6. E (2)	.55***	-.28**	.36***	.28**	.24*	—							
7. N (2)	-.20*	.49***	-.12	-.26**	-.17	-.27**	—						
8. Control (2)	.25*	.02	.32***	.29**	.28**	.18	-.22*	—					
9. Positive events (2)	.06	.00	.12	.02	-.01	.04	-.02	.16	—				
10. Negative events (2)	.01	.17	.01	-.04	-.06	.04	.06	-.17	.15	—			
11. Support (2)	.03	.15	.17	.13	.15	.18	.06	.03	.14	.17	—		
12. Happiness (2)	.21*	-.09	.16	.40***	.33***	.27**	-.35***	.34***	.15	-.14	.41***	—	
13. Satisfaction (2)	.25*	-.24*	.18	.28**	.37***	.26*	-.27**	.28**	.20*	-.21*	.23*	.69*	—

Note. Number in parentheses indicates the time when data were collected (Time 1 or Time 2). E = extraversion; N = neuroticism; Control = locus of control.
* $p < .05$. ** $p < .01$. *** $p < .001$.

SWB measures taken at different times). Second, positive life events were positively correlated with life satisfaction; negative life events were negatively correlated with life satisfaction. Neither was correlated with overall happiness. Third, social support was positively correlated with both overall happiness and life satisfaction. Finally, overall happiness and life satisfaction were consistently correlated, both simultaneously and cross-laggedly.

An important purpose of the present study was to clarify the contributions of personality traits and environmental factors to SWB, after controlling for its baseline level. To this end, I conducted two separate multiple regression analyses using the longitudinal data. Hierarchical methods were used to enter variables measured at Time 1 (the three personality traits and the two baseline SWB indicators) followed by those measured at Time 2 (positive and negative life events, social support, satisfaction, or happiness).

For predictions of overall happiness at Time 2, these nine variables accounted for 64% of the total variance, $F = 14.48$, $p < .001$. Among them, happiness at Time 1 ($\beta = .26$, $p < .01$), social support at Time 2 ($\beta = .27$, $p < .001$), and life satisfaction at Time 2 ($\beta = .64$, $p < .001$) were all positively related to happiness at Time 2.

For predictions of life satisfaction at Time 2, these nine variables accounted for 62% of the total variance, $F = 13.16$, $p < .001$. Among them, life satisfaction at Time 1 ($\beta = .22$, $p < .05$), positive life events ($\beta = .16$, $p < .05$) at Time 2, and happiness at Time 2 ($\beta = .68$, $p < .001$) were all positively related to life satisfaction at Time 2.

Discussion

This longitudinal study incorporated the personality and life events models of SWB and further extended the recently proposed integrative model of happiness (Lu, 1996) to include both personal and environmental variables. Results showed moderate temporal stability of the SWB measures over 2.5 years. Analysis also revealed significant correlations between personality traits and SWB, whether measured at the same time or at different times. However, after controlling for baseline SWB, only environmental variables remained consistently related.

Before the discussion of the results, the issue of cultural comparability needs some contemplation. Veenhoven and his associates compiled the "World Database of Happiness" (Veenhoven, 1993), which contains thousands of studies of happiness from all over the world. In large-scale cross-cultural studies, researchers consistently have found significant differences in the reported SWB measures among nations; the most salient difference was in the divide between the Asian countries and the European and North American nations (Diener, Diener, & Diener, 1995; Micholas, 1991; Veenhoven, 1993, 1995). Thus, levels of happiness do not seem to be culturally comparable. However, theoretical and cultural studies dealing with the construct of happiness revealed some fundamental similarities in both

cognitions and experiences of happiness between the Chinese people and their Western counterparts. Studies have shown that happiness is regarded in all cultures as a subjective, positive, and inner psychological state that should be aspired to as an ultimate life goal (Bauer, 1976; Wu, 1992). Empirical evidence generated using a qualitative approach suggested that the Chinese concept of happiness pertains to positive affect, lack of psychological distress, and life satisfaction (Lu & Shih, 1997b), which is in accordance with the Western definition of happiness quoted at the outset of this paper. A tentative conclusion seems to be that although levels of happiness may be varied, the central components of happiness are largely similar across cultures. This finding should enable some generalizability of research results between the East and the West.

Given that good longitudinal studies are always difficult to conduct (hence, their rarity in the SWB area), the moderate temporal stability found in the present study is noteworthy. However, it is arguable that the statistical stability of SWB can be the result of factors other than an individual's inner disposition to happiness. For instance, the correlations can be the result of the stability of some personal characteristics, such as social extraversion. Indeed, in this study, personality traits seemed to be more stable than SWB measures. Nonetheless, after controlling for baseline personality, the longitudinal relationships within each pair of SWB measures persisted rather than disappeared. This powerful multiple regression analysis using the longitudinal data removed the influence of stable preconditions for happiness from the longitudinal correlations. Thus, the present findings not only dissipated the usual longitudinal correlations but also empirically delineated the effects of baseline personality as well as baseline happiness. The conclusion seems to be that although SWB may not be as stable a personal trait as personality, it is at least somewhat stable over a moderate period of time.

Against this background of moderate stability, levels of happiness still fluctuate over time. Is happiness, then, influenced more by personality or by environment? In this regard, the results of the present multiple regression analysis using the longitudinal data could be interpreted as delineating the forces responsible for the change in SWB. Furthermore, we can look at the respective weights of personality, life events, and social support for additional evidence. In the equation predicting happiness, the betas for extraversion, neuroticism, and locus of control were .07, $-.03$, and .08, respectively, whereas positive life events, negative life events, and social support had betas of .03, $-.06$, and .27, respectively. Social support had the only significant weight on happiness, whereas the non-significant ones were comparable in magnitude. In the equation predicting life satisfaction, the betas for extraversion, neuroticism, and locus of control were .05, $-.12$, and .03, respectively. Positive life events, negative life events, and social support had betas of .16, $-.12$, and .06, respectively. Positive life events had the only significant weight on life satisfaction, whereas the weights of neuroticism and negative life events were comparable in magnitude.

Overall, the regression exercises revealed that none of the personality traits

could account for the change in SWB; however, positive life events and social support could account for such a change. Does this overall pattern mean that environmental factors are more important than personality traits? This is not necessarily so. In fact, the mechanisms underlying these effects may be different.

Lu (1996) found that extraversion is not directly related to happiness: Contrary to most existing research (Costa & McCrae, 1980), its impact was mediated by social support. However, both neuroticism and internal control had direct effects on happiness. On the other hand, the effect of extraversion on SWB was not mediated by the impact of life changes. Headey and Wearing (1989) found, in a panel study, that extraversion was related to the occurrence of certain life events. Thus, it seems that extraversion not only predisposed people to encounter certain types of life situations but also served to retain the stability of SWB rather than depressing or inflating it to correspond with these various life situations. The present findings corroborated this interpretation: Although personality may contribute to an inner disposition to enjoy life (or the contrary, in the case of neuroticism), it does not seem to explain changes in happiness.

Environmental factors seem to be responsible for the versatility in happiness and such factors complimented the stabilizing effects of personality. Lu (1996) found that social support is the most important factor contributing to happiness. In addition to being a vital mediator for various personal factors, social support has a strong impact on the enhancement of happiness. Incorporating these results with the present ones, it is clear that social support not only enhances an individual's absolute level of happiness but also contributes to a positive change in the level of happiness, that is, by lifting it up in the face of adversity. Undoubtedly, the long-celebrated protective effects of social support can now be extended to happiness, and researchers cannot afford to omit such a key agent in future research.

Life events were recently incorporated in studies of SWB (Headey & Wearing, 1989; Myers & Diener, 1995) revealing a subtle distinction between positive and negative life events. The hidden assumption may be that positive life events enhance positive life experiences (e.g., happiness), whereas negative life events trigger negative life experiences (e.g., psychological ill-health). In other words, there seems to be a "congruence hypothesis" underlying the SWB research, tilting it toward a positive bias. This line of thinking has unwittingly restricted the scope of SWB research.

However, in at least one study (Lu, 1996), this "congruence hypothesis" was disputed: Negative life events were found to be detrimental to happiness, whereas positive life events bore no relation to happiness. Interestingly, in the present study, positive life events (unlike negative ones) were related to life satisfaction, after controlling for baseline personality and SWB. Nonetheless, differences exist between this study and the earlier one that may account for the discrepancy. First, with cross-sectional data, negative life events were found to be detrimental to the absolute level of happiness, whereas with longitudinal data, posi-

tive life events were found to be related to a change in life satisfaction. With the strength of the latter research methodology, the inference that life events act as destabilizing agents seems to have a more secure grounding.

Second, negative life events were found to be detrimental to overall happiness, whereas positive life events were related to life satisfaction, one of the three components of happiness. If the "whole" and the "part" have different predictors, can they still be interchangeable? The answer seems to be no. Although overall happiness and life satisfaction were always significantly correlated, the strength of the relationship was at most moderate (average $r = .47$), with a small, overlapping variance (approximately 22% in this study). A balanced conclusion seems to be that although there is a recursive relationship between overall happiness and life satisfaction, it is nonetheless inappropriate to adopt life satisfaction as the sole indicator of the SWB construct. More caution should also be exercised in synthesizing research pertaining to life satisfaction with research covering the whole of the SWB construct.

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