AUBREY C. Mc KENNELL

COGNITION AND AFFECT IN PERCEPTIONS OF WELL-BEING

ABSTRACT. The general characteristics and some possible implications of the distinction between cognition and affect in the perception of well-being are reviewed. It is posited that currently-used rating-scale indicators of perceived well-being differ only marginally in the extent to which they are compounds of both factors, and consequently variables that move differently and possibly strongly on the underlying factors will have only muted relationships with the indicators. Two kinds of secondary analyses of data from recent American surveys are presented which support and amplify this hypothesis, along with some British data. The first kind focusses on the area of non-overlap between happiness and life satisfaction ratings by dichotomising and cross-tabulating the two indicators, and then observing what further variables change diagnostically between appropriate cells of the 2 × 2 table. Differential trends with age and education, barely discernible in straightforward correlations against the indicators now emerge strongly, along with further interesting differences for other outside variables, notably enjoyment-of-life, affect balance, income and personal competence. The second kind of analysis draws on data sets which include Bradburn's affect balance scales along with a range of global ratings of subjective well-being. The considerable variance in the global ratings which remains after the affect scales are partialled out, and allowance is made for correlated method effects, is attributed to cognition. Starting points are then explored for analysing the role of cognition and affect more exactly by means of path models which include the cognitive factor as an unobserved variable.

The notion of subjective well-being or perceived quality of life takes on specific meaning in terms of the measures used to operationalise it. It remains nevertheless an abstract concept capable of diverse interpretations. Different measures can carry different meanings. This paper examines some of the variety of measures that have been tried out in the national quality of life surveys recently conducted by the Institute for Social Research in the United States (Andrews and Withey, 1976; Campbell et al., 1976) and by the SSRC Survey Unit in Great Britain (Abrams, 1975; Hall, 1976). The focus of the paper is the distinction between cognition and affect which previous work has indicated is important but has left unclarified. While reference is made to data published elsewhere, the data displays below are largely based on previously unpublished secondary analyses of the American surveys carried out by the author.[1]

1. GENERAL CHARACTER OF THE COGNITIVE-AFFECTIVE
DISTINCTION

To set the scene it is worth noting briefly the views of others which appear to be in the spirit of the cognitive-affective distinction even though not couched expressly in terms of it. Campbell *et al.* (1976, p. 10) write:

It may be necessary to distinguish between satisfaction which is associated with an experience of rising expectations and one which is associated with declining expectations. An individual who has achieved an aspiration toward which he has been moving may be said to experience the satisfaction of success. Another person may have lowered his aspiration level to the point which he can achieve and he might be said to experience the satisfaction of resignation. The two individuals might be equally satisfied in the sense of fulfilled needs but the affective content associated with success and resignation may well differ. The difference may be less significant in experiences of dissatisfaction where the affective content of disappointment and frustration might be expected to accompany any failure to achieve one's expectations.

Strumpel (p. 186) also writes:

Satisfaction may reflect both goal attainment and the acceptance of its impossibility, i.e. accommodation to an immutable reality, and dissatisfaction may express either a sense of deprivation, inequity and bitterness or a constructive and needed disengagement from the present circumstances, preceding efforts for improvement.

Campbell *et al.* here state explicitly the view that a given level of satisfaction can go along with different affective states, while Strumpel implies also that the same may occur for dissatisfaction. We can think therefore of two separate dimensions, along which variation can take place independently.

We now consider more broadly how an understanding of perceived quality of life might be enhanced if the distinction between cognition and affect were more generally recognized and researched. Much of what can be said here is necessarily conjectural since firm results bearing on the issue have yet to be developed. Indeed it is part of our thesis that most data currently available rely on indicators in which the variance due to these two components is confounded, so that their separate effect is difficult to untangle. Nevertheless it will be seen that what scattered evidence there is points to the general importance of the distinction.

A main hurdle for the policy application of the perceived quality of life surveys has emerged in the by now quite common finding that people in disadvantaged circumstance frequently report higher than average levels of satisfaction. One way of resolving the dilemma raised by these findings is through further investigation of the way various types of comparative standards

are being employed. The studies by Abrams (1975) and Campbell *et al.* (1976, Chapter 6) represent a beginning here. Our proposal for modelling the separate operation of cognitive and affective factors may be considered a complementary line of attack. In what follows we will show how the proposed models are capable of penetrating beyond single indicators of happiness or satisfaction to the underlying factors that are confounded in these indicators. To the extent that we can trace the variance due to feeling states freed from the relativism inherent in cognitive assessments we will understand better some of the paradoxical findings of the latter. To fix what is implied by this relativism consider the following quotation from Campbell *et al.* (1976, p. 171).

If we were able to emerge on an English moor or country marketplace of the eleventh century equipped with a modern interview schedule bearing on the quality of life, it seems unlikely that our serf and yeoman respondents would in any great numbers answer to our adjective checklist that life was 'nasty', 'brutish', or 'short'. Human life at the time was not short, for example, relative to anything in the collective memory. It is quite possible that eleventh-century Englishmen would respond overall to such a question-naire with satisfaction distributions and characterizations of life not grossly different from that of the British or, for that matter, Americans of today. Indeed, if the horizons of the common man were as constricted in medieval times as is often supposed, then con-ceivably data from earlier times would have actually shown higher levels of satisfaction. The simple point is, then, that satisfactions are indeed tied to expectation and those available standards of comparison in which such expectations are moored.

All this may be granted but we may still question whether the quality of the individual's immediate feelings state is also tied, or tied to the same extent, to the available frames of reference. It seems plausible to argue to the contrary that the balance of positive over negative experiences will more straightforwardly reflect the diminished circumstance under which people are living. While the point must remain moot for eleventh-century Englishmen it is eminently researchable, if so far little researched, with respect to the wide variation in material conditions found within and between nations at the present day. For example, Cantril's (1965) cross-national study established, and it has since been well-confirmed, that within nations there is an associa-tion between an individual's income level and the degree of satisfaction he expresses with his life as a whole, even though the trend is weak and, as Strumpel (1974) has shown, by no means strictly linear. But between nations the trend shows some marked exceptions. In the Cantril (1965) study countries as far apart in per capita income as Nigeria and Japan, or Egypt and West Germany, did not differ in the average level of life satisfaction expressed

by their citizens. Easterlin (1974) has interpreted these results as indicating a reference group or relative deprivation phenomenon in which it is the respondent's status relative only to the others in his own country which determines his self-expressed satisfaction. The respondent in a rich country can thus feel dissatisfied with a level of living that would be eminently satisfying to the average respondent in a poor country. Easterlin (1974) goes as far as to suggest that "if the idea of the fundamental importance of relative status in material happiness proves correct, it raises serious questions whether economic growth can significantly improve the human lot". The large implications of such a question, however, should make us pause to consider whether the subjective indicators that give rise to it are sufficiently understood to carry such a weight of interpretation. Perhaps there is a sense in which the citizens of the very poorest countries can after all be said to enjoy fewer pleasures and more pain as a result of enduring living conditions that appear appalling from the standpoint of the average American or European. Perhaps the findings would be nearer what intuition tells us we ought to find if expressed in terms of measures that tap this balance of inner affective experience freed as far as possible from the relativity inherent in cognitive judgements of satisfaction. It seems a reasonable hypothesis, and one that is empirically testable, even if we do not currently know the answer.

Similar considerations arise when we turn from static to dynamic considerations. In fact the discrepancy between affect and cognition may be increased at time of social change, and may be even more important to detect when subjective social indicators are employed, as they are intended to be, for monitoring purposes. Solid empirical data are again lacking but the received wisdom has it that in the so-called 'revolution of rising expectations' dissatisfaction may increase while material conditions improve because aspirations may rise even faster. But here also it could be that measures of affect balance would move differently, and being more immediately linked to the material conditions of life would reflect improvement in those conditions. With regard to a decline in material conditions we do have some if not complete data from the economic indicators, subjective and objective, that have been monitored during the current recession. The recession follows an extended period of continually rising real incomes. Strumpel (1975) has noted how extremely vulnerable Western societies seem to even slight declines in their economic fortunes. At least for the majority who remain employed, the rhetoric about economic dissatisfaction seems out of proportion to the actual

decline in living standards which still remain at historically high levels. The concern would seem due rather to the disappointment of the expectation of continuing increases in real income and the use of the highest previous reached level as reference point. If this is true, and if affect balance (i.e., the 'balance' between feelings of positive affect and of negative affect) is more directly responsive to material conditions, then we should expect any changes in affect balance, had they been monitored over the recent period, to be less accentuated than the changes in satisfaction.

More generally we would expect the affective component of well-being to be more responsive to concerns in the immediate life-space of the individual than to events in the wider political and social environment, and vice-versa for the cognitive components. The scanty data available are at least consistent with this hypothesis. While we are a long way from being able to characterise what kind of occurrence in the wider social environment would lead to mass changes in affect balance, there is very clear evidence that measures of affect balance can remain impervious to the impact of even the most momentous of public events. We know this because of the extraordinary double coincidence by which Norman Bradhurn happened to have just finished his pilot study on the affect balance scales when the Cuban missile crisis occured, while just after the fieldwork for his main study President Kennedy was assassinated. In both cases the opportunity was seized to return to the field and reinterview a subsample of respondents; and in both cases it was firmly established that overall scores on both the positive and negative affect scales remained unchanged by these events (Bradburn and Caplovitz, 1965; Bradburn 1969). The inference would seem to be that these scales are influenced only by happenings that impinge directly on the individual's everyday role involvements, on his immediate live space. But since both these epoch making events were given extensive television coverage, and it is well confirmed that the majority of the population were aware of them, it is difficult to concede that the ordinary individual's perception of his life situation was not influenced in ways that might have been detected at the time with more cognitively orientated indicators.

The kind of linkages that the public and private spheres may have on the perceived quality of life have as yet been inadequately worked out. Those working on the problem from the political end — Citrin's (1975) study of political alienation as a social indicator is a good example — have not yet assimilated the findings from the recent quality of life surveys, and vice-

versa. It seems likely though that in so far as political attitudes do influence the perceived quality of life it will be through their operation on the cognitive rather than the affective component. It is not difficult to imagine for example that political points of reference will influence what the individual regards as his entitlement, the standards of which Abrams (1975) found to be potent in shaping life satisfaction.

Only meagre data are available on the relationship between indicators of perceived quality of life and attitudes that may be deemed political. Campbell *et al.* (1976) report small correlations, 0.28 and 0.22, between a compound index of well-being and satisfaction ratings with, respectively, life in the United States and the National Government. Would such correlations be higher on an index that loaded more purely on the cognitive factor, and lower on an index that was more affective? Citrin's (1975) study suggests that the correlations with political attitudes may even be opposite in sign for the cognitive and affective components. He reports, for his San Francisco Bay area sample, that "political alienation was negatively correlated with satisfaction about local community ($r = -0.27$), job ($r = -0.18$), standard of living ($r = -0.24$), and the level of public safety in one's neighbourhood ($r = -0.12$), but was *positively* associated with 'satisfied' responses to a general question about personal happiness ($r = 0.21$)" (*emphasis in the original*). These apparently contrary correlations become intelligible if we consider them in terms of the underlying cognitive and affective factors, and the way these move differently with age and education. The tendency for the young and educated to be more politically alienated is well known, and is evident again in Citrin's data. The quality of life studies (notably Campbell *et al.*, 1976) have shown that there is a tendency for these same demographic variables to be correlated in the same way, albeit weakly, with dissatisfaction in many (but not all) domains of life. Affect balance, however, moves differently. The better educated tend to have a higher affect balance. Younger people tend to have higher scores on *both* positive and negative affect (Andrews and Withey, 1976, Exhibit 10.17). As will be noted in the cross-tabulation exercise to be described below, it is among the young and better educated that we find a concentration of those who express themselves as happy but dissatisfied. Citrin's findings seem interpretable in these terms.

In the above quotation from Citrin, the inverted commas he places round the word 'satisfied' in relation to happiness suggests that he might have been weighing here the kind of cognitive-affective distinction that has engaged us,

but he does not pursue the thought. Much contemporary writing on the subject becomes confused just at the point where this distinction needs to be affirmed. Easterlin, for example, in the paper discussed above, alludes to 'personal happiness ratings' in the comparison he makes between nations when what he is describing are satisfaction ratings. As noted above, the answer to his question whether economic growth can improve the human lot might well turn on the difference. More is involved, then, than a quibble about the use of words. It is not simply the semantic distinction between satisfaction and happiness that is at issue, nor even between the rating-scale indicators bearing these labels. What is important is the distinction between the underlying dimensions of cognition and affect which, as we shall see, are only imperfectly tapped by these indicators.

II. LEADING ASSUMPTIONS

It is not difficult at a conceptual level to imagine situations where what we have termed cognitive satisfaction is out of line with associated affect. Evidence of a clear-cut separation at the empirical level has not been so readily forthcoming. This is largely, we feel, because appropriate indicators have not been available, and analyses that could show the separate workings for the factors underlying existing indicators have only rarely been made. For example, even before the recent series of quality of life surveys it had been noted (Robinson *et al.*, 1969) that self-ratings of life satisfaction and of happiness sometimes correlated differently with age and educational status, with the young and better educated being happier but less satisfied than those older and of poorer education. But these differential trends have not invariably appeared in all data sets,[2] and have always been weak compared with the substantial correlation (0.6 to 0.7) found between satisfaction and happiness ratings. These weak empirical relationships can be regarded in a new light if we make the distinction, to be emphasized throughout this paper, between questionnaire *measures*, such as the satisfaction and happiness ratings, and the underlying *factors* governing their variance. Evidence to be reviewed suggests that such measures tap both cognitive and affective factors, though to a different extent in some data sets. As will be shown in detail below, the loadings they have in common on the underlying factors can account for the correlation between these indicators, while a minor difference in the relative size of these loadings can account for the weak, differential trends sometimes found to

occur in correlations with outside variables such as age and education. Following conventional psychometric theory the variance composition of the scores on any measuring instrument can be regarded as partitionable into independent additive components or factors. Figure 1 shows the components which we are hypothesising to be present, with only minor variations in degree, in the rating scales currently being used to measure subjective well-being.
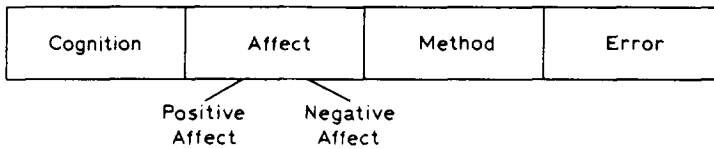

Fig. 1.   Schema for variance components in rating-scale indicators of well-being.

The radom or error component of the various measures can be specified from a study of their internal consistency and test-retest reliabilities. The component described as 'method' would cover response styles, instrument factors, social desirability responses and the like which feature in different degrees in the various measures, producing shared biases or correlated errors. Substantial progress has been made in systematically accounting for the method and error variance in subjective indicators of well-being (Andrews and Crandall, 1976; Andrews and Withey 1976, esp. Chapter 6). So far little progress has been made in isolating the separate effects of cognition and affect.

If the theory is correct that happiness and satisfaction ratings are compounded of both cognition and affect, then variables that move differently on the underlying factors would show a dampened trend with these actual measures. Such pale differences as are found in correlates against satisfaction and happiness may be due to the marginal differences in their loadings on the underlying factors. The following table of hypothetical factor loadings for happiness ratings, H, satisfaction ratings, S, and two further variables, X and Y, will serve to illustrate these ideas.

The loadings for S and H have been fixed to generate a correlation of 0.60, about the value usually obtained. Variable X is posited to show substantial but opposite trends with the underlying factors on which it loads to the extent of ± 0.5. To find the correlates of X with S and H, r_{sx} and r_{hx} respectively,

	Cognitive Factor	Affective Factor
(S)	0.6	0.5
(H)	0.5	0.6
(X)	0.5	−0.5
(Y)	0.5	0.1

we add the products of the loadings on the same factor for the variable pair in question. For r_{sx} we have $0.30 - 0.25 = 0.05$, while $r_{hx} = 0.25 - 0.30 = -0.05$. The difference in sign remains but the discrepancy becomes minuscule. Variable Y illustrates a case of a variable that owes more to cognition than to affect. For the loadings shown $r_{hy} = 0.31$ and $r_{sy} = 0.35$. Although the correlation with satisfaction reflects the greater cognitive component of the Y variable it now does so only marginally. Cognitive and affective factors are here shown uncorrelated, for simplicity, and no method factor has been introduced. Positive and negative affect have been considered in combination rather than separately. While it would complicate the arithmetic to introduce these further conditions, the general character of the argument would not be changed. A method factor which loaded differentially on the variables could in fact easily obliterate the small cognitive-affective differences in correlations against satisfaction and happiness ratings. Failure of the expected differences in correlation against satisfaction and happiness to turn up in some data sets[2] could be due to this effect.

The numerical estimates just discussed serve to illustrate our leading hypothesis, but are not based on real data. The data that are available lack any direct or even a good proxy measure of the cognitive factor, and are far from complete in other respects. Nevertheless it is possible to demonstrate the existence of the separate cognitive and affective factors through special kinds of analyses which isolate their effects. With this aim two kinds of secondary analyses of data from American quality of life surveys are presented below. The first kind in Section III shows the results of cross-tabulating satisfactions and happiness ratings and examining what further variables covary with one measure within categories defined by the other. The second kind, in Section IV, makes intensive use of those data sets (regrettably few) that have employed Bradburn's affect balance scales along with a series of global measures of subjective well-being. Path models are developed which include the cognitive factor as an unobserved variable, thereby enabling

alternative theories about its role in relation to affect to be examined more
exactly.

III. RESULTS FROM CROSS-TABULATING HAPPINESS AND SATISFACTION RATINGS

For the most part, for the majority of respondents in most surveys, happiness
and satisfaction ratings move together. We begin by briefly presenting evidence
that they are nevertheless not measures of the same thing, and at the same
time introduce a simple device for further elucidating the difference. Our
leading hypothesis states that while happiness and life satisfaction ratings
each load substantially on both the cognitive and affective factors, cognition
is tapped to a marginally greater extent by the satisfaction ratings, and affect
by the happiness ratings. If this is so then, random errors apart, those
respondents who give apparently inconsistent answers on the happiness and
satisfaction ratings will be those who occupy different positions on the under-
lying factors. We focus on these respondents by dichotomising and cross-
tabulating happiness and satisfaction ratings to yield a 2 x 2 table with four
cells or subgroups of respondents, as shown below:

	PRETTY HAPPY NOT TOO HAPPY	VERY HAPPY
COMPLETELY SATISFIED (Code 1)	(2)	(1)
OTHER THAN COMPLETELY SATISFIED (Codes 6–7)	(4)	(3)

The cutting points for both measures were deliberately placed high to achieve a 'pure' category on each, namely the 'Very Happy' and 'Completely Satisfied' categories, containing informants who responded in exactly these terms. One result is that cells 1, 2 and 3 have relatively small number of respondents — 272, 189 and 344 respectively, out of the 2116 in the sample (data from Campbell *et al.*, 1976). But this focus on small numbers is in itself appropriate to the present analysis. We are concentrating on the fringe area where happiness and satisfaction ratings differ marginally in their loadings on the underlying factors. It is the small groups with discrepant positions on the two measures who are discriminating most sharply between the two underlying factors.

For example, cell 2 contains the subgroup who have rated themselves unhappy-but-satisfied,[3] and cell 3 the happy-but-dissatisfied. Now if happiness and satisfaction ratings amounted to the same thing apart from measurement error there would be no systematic difference between the respondents in the two cells. Chance alone operating through the random unreliability of their responses would determine into which of the two cells respondents fell. Any difference between the characteristics of respondents in the two cells would fall below statistical significance level.

In Table I the first four columns correspond to the cells in the above 2 x 2 table. An entry in one of these columns shows the numbers in the variable category indicated on the left of the row expressed as a percentage of the total in the cell.

A quick glance at columns (2) and (3) of Table I is sufficient to show that the two subgroups differ systematically on many variables. The interpretation of the differences between the groups will be elaborated shortly. The immediate point being made is that many differences are statistically significant at a level (beyond 0.01 and mostly beyond 0.001) which shows that the operation of chance can safely be disregarded. The existence of statistically significant differences between these two subgroups enables us to reject the hypothesis that satisfaction and happiness ratings are equivalent measures of the same variable.

1. Isolating the Correlates of Cognition and Affect

The next step is to isolate those variables associated with happiness when satisfaction is held constant, and with satisfaction when happiness is constant.

TABLE I

Results from crosstabulating happiness and satisfaction ratings

	1	2	3	4	5	6	7
	Completely satisfied		Not completely satisfied			Ratio between column entries	
	% Very happy	% Not very happy	% Very happy	% Not very happy	% Total	Affect (1/2)	Cognition (1/3)
High positive affect (4 or 5)[a]	76	30	68	41	47	2.50	1.12
High negative affect (2–5)[a]	21	38	36	53	47	0.56	0.58
High affect balance (8, 9 or 10)[a]	70	29	58	27	34	2.40	1.20
Enjoy life more than average	60	26	59	25	35	2.30	1.01
Age							
(1) 18–24	12	9	20	16	15	1.33	0.60
(2) 25–34	18	14	26	21	21	1.28	0.69
(3) 35–44	16	13	18	18	17	1.23	0.88
(4) 45–54	15	18	15	18	17	0.83	1.00
(5) 55–64	19	14	11	13	13	1.35	1.72
(6) 65+	19	31	10	15	16	0.61	1.90
Education							
(1) Less than H.S. diploma	42	58	30	40	40	0.72	1.40
(2) H.S. diploma, no college	33	28	39	33	33	1.17	0.84
(3) Some college or degree	25	15	31	27	27	1.66	0.80
Age × Education							
(1) 17–34, no H.S. diploma	10	9	10	9	9	1.11	1.00
(2) 17–34, H.S. diploma	20	15	36	28	27	1.33	0.55
(3) 35–44, no H.S. diploma	3	8	2	6	5	0.36	1.50
(4) 35–44, H.S. diploma	12	5	16	12	12	2.40	0.75
(5) 45–54, no H.S. diploma	7	9	5	8	8	0.77	1.40
(6) 45–54, H.S. diploma	9	9	10	10	9	1.00	0.90
(7) 54 + , no H.S. diploma	23	32	12	17	19	0.71	1.91
(8) 54 + , H.S. diploma	16	13	9	11	11	1.23	1.77
Income							
(1) $ 5000	24	39	18	30	28	0.61	1.33
(2) $12 000	37	40	46	45	44	0.92	0.80
(3) $12 000	39	21	36	25	28	1.85	1.08
Personal competence	56	35	48	21	31	1.60	1.16
Feel rushed	44	40	56	46	47	1.10	0.78
Member 3 of more organizations	37	28	43	32	33	1.32	0.86
No. in subgroup	272	189	344	313	211		

[a] Denotes Andrews – Whithey data (1976). Remaining data from Campbell *et al.* (1976).

The general idea is to partial out, as it were, the area of overlap between the two measures so as to free each from the dampening effect of the other. We should then be able to focus more purely on the affective component in the happiness ratings and the cognitive component in the satisfaction ratings. An enhancement in the strength of contrasting associations with outside variables will then provide an indication of the success of the procedure, and improve

our understanding of the underlying factors. Comparisons between groups (2) and (3), above, though suggestive, are inadequate for this purpose since these groups vary simultaneously on both dimensions. What we need to look at are the covariates of one variable when it is analysed within categories defined by the other. The comparison between groups (1) and (2) holds satisfaction constant; both groups rates themselves as completely satisfied and vary only in their happiness ratings. Significant differences between these groups therefore must be attributed to the affect component, since cognitive satisfaction is being held constant. Likewise, in the comparisons between groups (1) and (3) we have people in the same happiness category who vary in their satisfaction ratings.[4] Significant differences between these groups therefore must be attributed to the cognitive component, since affect is being held constant. Given that both satisfaction and happiness ratings load substantially on both cognition and affect then, where trends on the underlying factors tend to run in opposite directions, we would expect their effects to be dampened if not cancelled out in the ratings. In such cases the above intergroup comparisons since they isolate the effects of each factor separately, should show sharper contrasts than do the ratings taken on their own.

The entries in column (6) in Table I show the results of dividing the percentages in column (1) by those in column (2), and similarly column (7) show the corresponding ratio for group (1) percentages divided by group (3) percentages. On the argument above column (6) has been labelled Affect and column (7) Cognition. To illustrate the derivation and use of the entries in columns (6) and (7) we will take first of all the enjoyment-of-life variable. Sixty per cent of those falling into column (1) say that they enjoy life more than average, compared to only 26 per cent of those in column (2). The trend in percentages between happiness categories, with satisfaction constant, is computed as the ratio 2.30. This ratio entered in column (6) then provides an indicator of the relationship of the enjoyment-of-life variable with affect factor, as discussed above. Now we compare the 60 per cent in column (1) with the 59 per cent in column (3), who have rated themselves as also very happy but not completely satisfied. The ratio between these percentages, 1.01 is entered in column 7 as an indicator of the relationship of the cognitive factor with the enjoyment-of-life variable. In this case there is no relationship. In general a ratio above 1.0 in column (6) or (7) reflects a positive relationship between the row variable and the corresponding factor, and below 1.0 a negative relationship. A variable that has discrepant relationships with affect

and cognition is then easily spotted in terms of the difference between the entries in column (6) and (7). In so far as the difference for the enjoyment-of-life variable is in line with what we should expect from our understanding of cognition and affect, it is evidence of the construct validity for the entries in columns (6) and (7) in Table I. The other differences and contrasts in these columns continue to provide supporting evidence.

We consider particularly the demographic variables age, education and income, which have featured in several quality of life surveys as correlates of happiness and satisfaction ratings. It has been observed that satisfaction tends to increase with age while happiness tends to decline; education shows trends opposite to those of age, while higher income leads to an increase in both happiness and satisfaction. The explanation of these trends has usually been along lines which suggest the cognitive-affective distinction, taking happiness ratings as a direct indicator of affect and satisfaction ratings as a direct indicator of cognition. But nowhere do we find strong correlates. Campbell *et al.* (1976) for example quote a correlation of 0.06 between age and life satisfaction ratings, while in one of the Andrews-Withey (1976) data sets the association with age fails to appear at all.[2] Where these single indicators do show trends with the demographic variables, the effects are seen 'as through a glass darkly'. By comparison it will be seen that the trends to be discussed that do emerge in columns (6) and (7) emerge both strongly and in many cases remarkably contrasted. Other trends fail to appear at all for reasons which, it will be seen, become comprehensible once the contribution of the underlying factors is understood.

The increase is cognitive satisfaction (happiness controlled) with age can be seen clearly in column 7. It holds up well even when controls for education are introduced. On the other hand, in column (6) little trend can be discerned between age and affect, and what there is disappears once controls for education are introduced. We will return to this latter result shortly.

Education shows the expected positive and negative relationships with affect and cognition respectively, and these relationships hold up completely when controls for age are introduced. The effects are strong, but they are not continuous in the case of cognition where it is the gap between those having or not having a high school diploma which appears to be crucial. Further education beyond the high school diploma does not lead to much further decline in cognitive satisfaction, although higher education does lead through to a further increment in affect.

With increasing income there is a clear tendency for affect to rise, but no simple linear relationship in the case of cognition. The latter relationship is rather flat or a best curvilinear with even an at-first-sight anomalous slight downward slope, suggesting that the richest segment evince perhaps less and certainly no more satisfaction than the poorest. It is intuitively appealing to interpret the first result as showing how the increased enjoyment of the material aspects of life which a larger income makes possible is directly reflected in the affective component. The cognitive component on the other hand is more complicated, reflecting the relativity inherent in judgements along this dimension. On the commonly held theory, it is not the individual's assessment of his current situation that determines his satisfaction but the gap between this and his level of aspiration. The present result suggests that aspiration levels rise sharply enough with income to keep the gap constant or even to widen it somwhat as income continues to increase. The degree of relativity revealed here is greater than that normally uncovered in quality of life surveys which invariably show, within countries, a positive if not very strong relationship between income levels and ratings of either satisfaction or happiness. But as we are attempting to demonstrate, trends on these latter indicators arise from a compound of both cognition and affect. If a strong linear trend due to affect is being overlaid by the irregularities characteristic of the cognitive component, the resultant may well be the kind of muted relationship usually found. Although obtained for data within one country, the results have a bearing on Easterlin's hypothesis. As noted earlier his hypothesis is founded on results using happiness and satisfaction indicators. If the factors underlying these indicators could be disentangled in cross-national studies also, it could prove to be the case there too that affect levels did vary with income levels between countries, even if levels of cognitive satisfaction continued to show the relativisitic effects on which Easterlin focussed.

2. *Types of Affect-Cognition Combination*

There is an alternative way of looking at the above subgroup comparisons which is illuminating. If we have been successful in disentangling the separate effects of cognition and affect, we can go on to examine the characteristics of different types of combination of the two components. The cells of our 2 × 2 table suggest the following typology:

Cell Subgroup	Interpretation	Short Label
(1) Satisfied-Happy	Satisfaction of Achievement	'Achievers'
(2) Satisfied-Unhappy	Satisfaction of Resignation	'Resigned'
(3) Dissatisfied-Happy	Dissatisfaction of Aspiration	'Aspirers'
(4) Dissatisfied-Unhappy	Dissatisfaction of Frustration	'Frustrated'

The shorthand designations of the four groups, though obvious over-simplications, serve the purpose of easy identification. Some of the comparisons made earlier can now be seen as contrasting different types of affect-cognitive combination. Without attempting to comment on all contrasts between types evident in Table I, the following seem germane to our general theme.

There are some interesting comparisons to be made against Bradburn's affect scales.[6] Only group (4), the Frustrated, has a low score on the affect balance scale which arises from predominance of negative affect. None of the three small subgroups picked out for special consideration — the Achievers, the Resigned and the Aspirers — are characterized by the pain and psychological discomfort of which the negative affect scale in an indicator. The Resigned have a low affect balance but this is the result of their marked absence of positive affect. Both Achievers and Aspirers attain their relatively high affect balance through a predominance of positive affect. Both these latter groups see themselves as enjoying life more than the average. The correlates of high affect balance tend to be the same among both the groups that have it, whether satisfied (Achievers) or dissatisfied (Aspirers). That is the Achievers compared to the Resigned, and the Aspirers compared to the Frustrated tend to be better educated and of higher income. They have higher Personal Competance, belong to more organizations, and enjoy life more than average even though they tend to feel more rushed.

In one respect however, the Achievers and the Aspirers differ strikingly, and that is on the age variable. The distribution of the Aspirers is markedly skewed towards youth. Campbell et al. (1976, p. 168) noticing this result commented "the young may be happier exactly because they are hopeful, while their very hopefulness for the future leads them to more critical or dissatisfied evaluations of the present". The kind of affect or happiness that can accompany dissatisfaction is apparently more difficult to sustain with age. The age distribution for the Achievers, on the other hand, shows no trend until the decade before retirement when it actually rises to a peak before

dropping back somewhat.[7] These results suggest that there is another kind of affect or happiness, the kind that goes with the satisfaction of achievement, and that this can not only be sustained but may increase with age.

Earlier we noted that there was no consistent tendency for affect to decline with age. This conclusion was drawn from column (6) of Table I which shows the ratio of group (1) to group (2) percentages, interpreted earlier as variation in affect with cognition held constant. We may now re-appraise this result as the comparison between Achievers and the Resigned. Reference to columns (1) and (2) in Table I, show that the satisfaction of Achievement and the satisfaction of Resignation increase about equally with age.[7] Hence the ratio of the two shows no consistent trend with age.

Finally, we may note that if we put together the age distribution of the Achievers in column (1) with that of the Aspirers in column (3) we obtain the overall age distribution of those rating themselves as very happy. This distribution, examined in survey after suvey, has been quoted as evidence that happiness declines with age, even though the overall relationship with happiness does not always appear and is never strong. From the present standpoint it can be seen that breaks of this kind against the happiness item (or satisfaction item for that matter) can mix together very different types of cognitive − affective combination. While it is true that happiness declines with age for those types of combination we have designated Resignation and Aspiration, it is not true of the Achievement type. As noted, higher proportions of those rating themselves very happy are to be found among the older respondents in this group.

The point is a general one. No one doubts that the experience of overall well-being is more complex than the indicators being used to measure it. But we come nearer doing justice to the concept if we can separate out the effects of the different factors underlying these measures. At the present time, in the absence of direct or even good proxy measures of the cognitive factor this is difficult but not impossible to do. The cross-tabulation exercise just discussed represents one attempt. The available data also presents possibilities for more precise statistical modelling. The next section describes the beginning of an attempt to develop path models in which include the cognitive and affective factors as unobserved variables so that their role can be more exactly quantified.

IV. MODELLING THE ROLE OF COGNITION AND AFFECT

We now present a series of models for understanding the role played by
cognition and affect in judgements of well-being. Broadly speaking each model
introduced represents an increment in both complexity and adequacy on the
one preceding, until we reach the point where the kind of intensive secondary
analysis necessary to further elucidate the models is indicated. This secondary
analysis is currently under way.[1] What follows is a rationale and account of
progress to-date.

1. Single Indicator Models

The pioneering work on perceived quality of life at the University of Michigan's
Institute for Social Research proceeded initially on the assumption that it
might be possible to tap the cognitive and affective components differentially
by varying the wording of single questions. It was thought that questions
about 'satisfaction' would be more cognitive or judgemental; questions
involving the word 'happiness' would be less so and more indicative of affect
or short-term mood states' and judgement on the Andrews-Withey scales,
anchored at the extremes by the adjectives 'Delighted-Terrible', would fall into
a middle position. These hypotheses are illustrated by the positioning of the
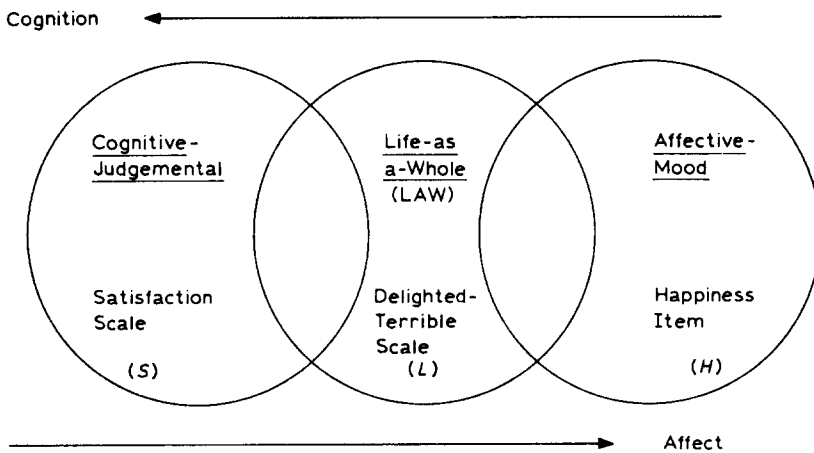three circles in Figure 2.

Fig. 2.   Intitial hypotheses about three indicators of well-being.

TABLE II

Observed relationships between the three indicators and affect balance

Correlations with Affect Balance Scale (AB)

Satisfaction scale (S)	Delighted-Terrible scale (L)	Happiness scale (H)	Intercorrelations

| | Life 1   Life 2
0.44   0.45
\   /
Life 3
\|
0.48 | 3Pt   7Pt
0.50   0.47
\   /
H_3
\|
0.53 | |

		AB	S	L	H
AB	x	0.43	0.48	0.53
S		x	0.67	0.64
L			x	0.76

0.43

Data Source: Andrews and Whitey (1976, Exhibit 3.5).

Table II shows the intercorrelations found among these three types of indicators and between these indicators and the affect balance scale. The latter is a good measure, probably the purest available, of the affective component.[6] Examining these correlations, it can be seen that the initial working hypothesis can be deemed at best only partly successful. The three indicators overlap considerably. Their correlations with affect balance do change in a direction consistent with the hypothesis, it is true, but the distinction are fine. It is the degree of overlap which is the more impressive. The facts could be fairly represented if the three circles in Figure 2 were rolled together until they were almost, if not quite, concentric. On this perspective the three single-question measures can be regarded as equally good, or almost equally good (or bad) indicators of subjective well-being. They may be something to choose between them in their capacity to tap separate components of subjective well-being, but not a great deal.

2. *Single Factors Models*

Following this line of thought the different questions can be regarded as alternative indicators of the same underlying common factor which might be termed 'Life-as-a-Whole' (LAW). For example, if it were posited that the satisfaction and happiness items loaded equally on this common factor, the obtained correlation of 0.64 between these items could be explained in terms of loadings of 0.8 in a model which could be diagrammed as in Figure 3.
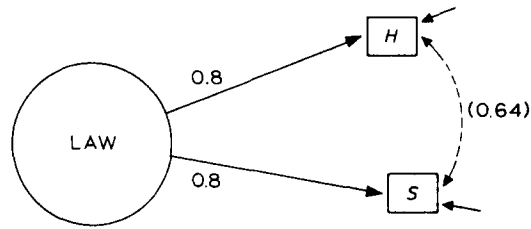
Fig. 3.   Essentials of single factor model.

Figure 3, simple as it is, takes the first step towards representing unobserved variables, that is factors, in path models. Factors are represented by circles and the measured variables by squares, a convention that will be followed in further diagrams. The relationship between the factor and the observed variable is represented as a causal path, the path coefficient being equal to the size of the factor loading.

Of course the supposition of equal loadings may be incorrect. When the correlations for a larger number of indicators are available it becomes possible to assess the size of their individual loadings by solving the equations for the single factor model. The loadings of the LAW factor may also be exaggerated because part of the correlation between the indicators arises from the shared biases or correlated errors associated with the use of rating scales. Allowance can also be made for these method effects. For a model that estimates the loading of more than two indicators on the LAW factor, and also incorporates a method factor, see Andrews and Withey (1976, Exhibit 6.6). The facility to specify method factors and estimate their impact represents one of the major contributions of the new structural equation methods for the quantification of unobserved variables. Such specification will have an important place in further analyses now under way.[1]

3. Bi-factor Models

We return to our basic hypothesis that judgements of subjective well-being can be subdivided into two components, affective and cognitive. If this is so, and we have already discussed evidence to suggest that it is, it should be possible to construct a model which explains the variances and covariances of the single-item indicators in terms of these two factors. Figures 4a to c show, in a simplified form for only two indicators, the basic steps in the construction

of such a model. In 4a and 4c it is assumed that the affect balance scale is a perfect measure of the affective component.[6] The correlations with affect balance can then be used to show what part of the correlation between the indicators of satisfaction(s) and happiness (H), which is 0.64, is due to affect: we have $0.53 \times 0.43 = 0.23$.

(a) Due to Affect   (b) Remaining for cognition
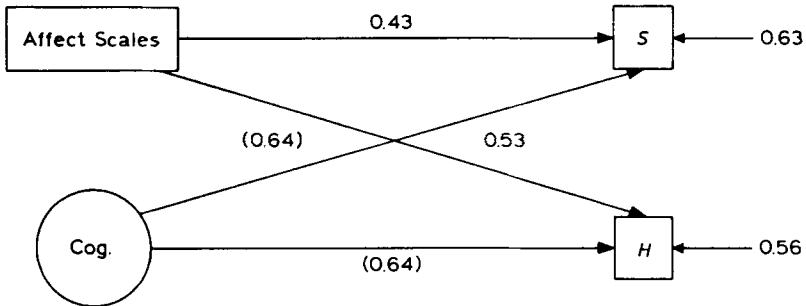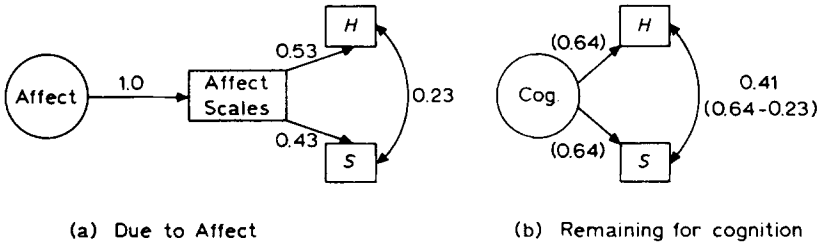
(c) Basic bi-factor model

Fig. 4. Basis of bi-factor models.

Next we assume, as in Figure 4b, that all the remaining covariation between S and H, $0.64 - 0.23 = 0.41$, is due to the cognitive factor. If we were to postulate that both indicators load equally on the cognitive factor we would obtain the factor loading of 0.64 ($\sqrt{0.41}$).

Putting this information together, and making for the time being the admittedly large assumption that the correlation between cognition and

affect is zero, we obtain the model in Figure 4c which shows how each indicator is determined by the underlying factors and a residual variable. Squaring the coefficients of the paths leading to a single indicator allows us to partition the variance of that indicator into the proportions due to each factor and the residual variable. The path coefficient for the residual variable is simply the square root of the unexplained variance. Thus for the satisfaction variable the proportions of variance on this model due to affect, cognition and the residual variable are, respectively, 0.43^2, 0.63^2, 0.64^2, the sum of which equals unity.

When the correlations for a larger number of indicators are available we need no longer assume that the path coefficients for the cognitive factor are equal. We can solve the equations of the model to estimate the size of these coefficients. A crude first approximation to a solution in terms of a varimax factor analysis of 12 global measures, including the seven-point satisfaction measure, the three-point happiness scale and positive and negative affect together with affect balance, has been reported by Andrews and Withey (1967, Exhibit 3.6). Three factors were extracted and labelled Cognitive evaluation, Negative affect and Positive affect. The varimax machine-solution is appropriate to the basic model in Figure 4c in so far as it incorporates the assumption that the factors are uncorrelated. The affective component is split into negative and positive affect factors. This complicates slightly but does not change the basic properties of the model in Figure 4c. There is a good deal of evidence both in Bradburn's study and replications in other studies (e.g. Andrews and Withey, 1976; Hall, 1976) that the positive and negative affect scales are indeed uncorrelated. The proportional contribution of affect balance as a whole to the variance of any indicator can therefore be obtained simply by adding together the separate loadings (squared) on the postive and negative factors.

There are several ways in which the factor analytic results already obtained can be developed and improved. First, accepting that the two affect scales are uncorrelated, the loading of the positive affect scale on the uncorrelated negative affect factor should be zero, and vice versa for the negative affect scale (in the Andrews-Withey result the loadings in question are small, 0.12 and 0.18, but they are not zero). These, however, are only minor imperfections compared to others stemming from a central property of the varimax factor solution. Varimax factors are orthogonal. A zero correlation between positive and negative affect corresponds with previous well-established

empirical results. But the correlation of zero between the cognitive factor and the affect factor runs against both theory and intuition. We need not go all the way with the consistency theorists to accept that many people adjust their cognitive appreciation of a situation to their evaluative feelings about it. Hence we would expect a correlation between pure measures of cognition and affect. We would not expect this correlation to be as large as the 0.6 to 0.7 values found between the indicators S, L and H, since it is our thesis that these indicators are compounds of both cognition and affect components. The correlation between the indicators will thus be higher, perhaps very much higher than that between the underlying factors. But we do not expect the correlation between the factors to be zero, either. We are beginning to anticipate that the true value will fall into a range significantly above zero and significantly below 0.7. This is still a very wide hypothetical range. As we proceed we will look for ways of narrowing it down.

The factor analytic results obtained so far could therefore be improved in these respects:

(1) The loadings of the negative affect scale on the positive affect factor, and of the positive affect scale on the negative affect factor, should be zero.

(2) The loadings of both the affect scales on the cognitive factor should be zero.

(3) The orthogonality between the positive and negative affect factors should be retained, but the cognitive factor should be oblique to, that is correlated with, both the negative and the positive affect factors.

(4) Ideally we would like to explore the effects on the total model of varying the degree of correlation between the affective and cognitive factors.

The conventional exploratory factor analyses used so far to aid the preliminary interpretation of the factors and the generation of specific hypotheses about them cannot be used to test the consequences of these hypotheses. What we now have is a restricted factor analysis model which specifies certain parameters in the factor structure while leaving the remaining parameters free to be estimated. Solutions for this type of problem can be obtained using Joreskog's Confirmatory Factor Analysis. Though the LISREL computer program (Joreskog and van Thillo, 1972) was designed for the solution of more complex models, it is easily adapted for confirmatory factor analysis by imposing varous restrictions on the general model. Table III shows the output from a trial run. Instead of using the total scores on the positive and negative affect factors, the separate items constituting these

TABLE III

Confirmatory factor analysis of 10 affect items and 5 global measures

Measures	Factor loadings				
	Positive Affect	Negative Affect	Cognition	Method	Error
Life 1	−0.43	0.36	0.23	0.43	0.58
Life 2	−0.43	0.34	0.26	0.53	0.50
3-pt. Happiness	−0.47	0.36	0.22	0.08	0.70
7-pt. Happiness	−0.44	0.33	0.29	0.40	0.54
7-pt. Satisfaction	−0.37	0.36	0.26	0.36	0.65
Positive affect items:					
Excited	0.46	0.0	0.0	0.0	0.90
Proud	0.51	0.0	0.0	0.0	0.90
Accomplished	0.63	0.0	0.0	0.0	0.80
Top-of-world	0.54	0.0	0.0	0.0	0.86
Things-your-way	0.60	0.0	0.0	0.0	0.82
Negative affect items:					
Restless	0.0	0.47	0.0	0.0	0.89
Lonely	0.0	0.61	0.0	0.0	0.80
Bored	0.0	0.58	0.0	0.0	0.83
Depressed	0.0	0.71	0.0	0.0	0.72
Upset	0.0	0.37	0.0	0.0	0.93

Zero entries were fixed parameter values. Correlation between the affect factors was fixed at zero. Correlations of cognitive factor with positive and negative affect were fixed at minus and plus 0.5, respectively. Correlations between method factor and other factors also fixed at zero.

Data Source: Andrews and Withey (1976). 1072 respondents to November 1972 survey.

scales were used. This step was taken as it seemed to make available a greater number of degrees of feedom for testing the goodness of fit of the model, while avoiding the assumption that the scales were perfect measures of the factors. In the model, the two affect factors were kept orthogonal, the loadings of the positive affect items on the negative affect factor were fixed at zero, and vice versa for the negative affect items. The correlations of the cognitive factor with positive and negative affect were fixed at plus and minus 0.50, respectively.

A methods factor was introduced and kept orthogonal to the other three factors. All the remaining parameters were left free to be determined by the program. The program also reproduces the correlation matrix implied by the obtained factor structure and a matrix of residuals which can be examined for goodness of fit. In this case the pattern of residuals suggest that the loading

of the five global items on the affect factors is too high, while the cognitive loadings are underestimated. A factor structure such as the above can be diagrammed as a causal model (not shown), the examination of which helps to suggest ways in which the parameters of the model might be further constrained to secure a better fit. The linkages of 0.5 between the cognitive factor and the two affect factors are probably set too thigh in the above model. The consequences of fixing these links at lower levels are under examination. The method affects also appear high on the basis of other work reported by Andrews and Withey (1976) and the effects of fixing these at lower levels will be examined. The parameters for Life 1 and Life 2, replications of the same measure, are almost identical in the above results, so that it will be justifiable to constrain them to be equal in further work.

In the models that have been considered so far the factors have entered only as causes of the measured variables. In what follows we look at the causal natue of the relationship between the factors themselves.

4. Path Model Encompassing Both Single and Bi-Factor Models

We have looked at two different factor analytic models to account for the covariance among global indicators of well-being. The single factor model of which the main features are shown in Figure 3, has a basic appeal as we have seen. It makes sense to assume that since respondents are assessing their life as a whole, the different global measures are alternative indicators of the same underlying global factor. At the same time we have presented various arguments, verbal and statistical, in favour of the view that the variance in these global indicators arises from two separate sources, the cognitive and affective components. This was the model for which the basic elements were presented in Figure 4c. We would be hard put to decide between these models on statistical grounds. Both could account about equally well for the covariance among the global indicators. It would seem more fruitful therefore to regard these analytical models not as alternatives but as parts of a more general model. The outline of such a model is presented in Figure 5.

Figure 5 presents, in essence, a more satisfactory way of modelling the process by which individuals arrive at judgements of their subjective well-being. We retain the idea of a global assessment expressed in the life-as-a-whole factor and its indicators, but the cognitive and affective components are now introduced as determinants of the global factor.
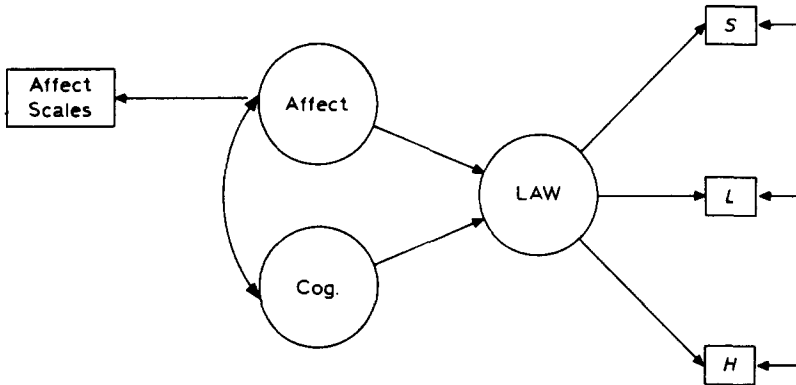
Fig. 5. Basic scheme for a path model encompassing both single and bi-factor models.

In Figure 5, we have moved on from the factor analytical models and taken the first step to more adequate models that reflect the causal relation between factors. Joreskog's general method, as incorporated in the LISREL program (Joreskog, 1972) enables us to handle problems of this kind. Given the leading hypotheses sketched in Figure 5, we can diagram the model in more detail in order to see which parameters are to be specified in advance, and which remain to be estimated by the programme. Figure 6, shows the structure of such a more detailed model in which a method factor has been included.

It is possible to estimate the parameters of the model in Figure 6, given various additional constraints, for example different assumptions about the correlation between cognition and effect, and fixing the coefficients for method effects according to values derived independently from other work (notably Andrews and Withey, Chapter 6). These analyses are currently being carried through,[1] along with an examination of the consequence of dropping the assumption that the positive and negative affect scales, or alternatively the effect balance scales, are pure measures of the underlying factors.

5. *Path Models with Domain Satisfaction Inputs*

In both British and American surveys of perceived quality of life it has been found that a linear additive combination of satisfactions in specific domains will explain about fifty per cent of the variance in global ratings of life
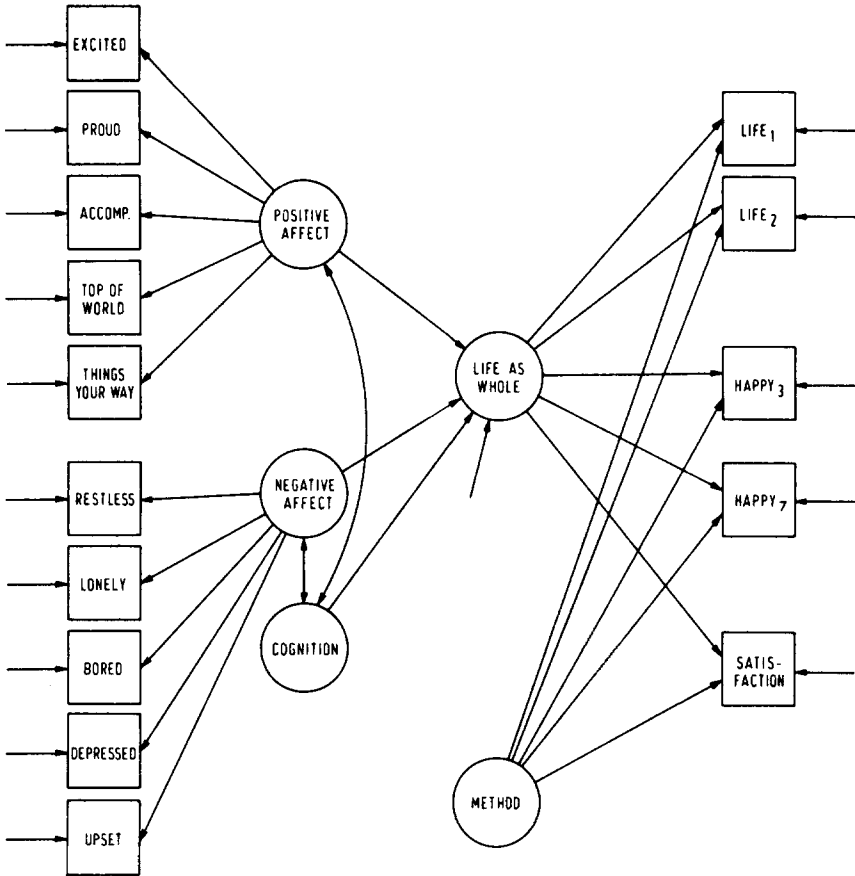
Fig. 6. Detailed path model encompassing both single- and bi-factor models and including a method factor.

satisfactions. Usually the results have been expressed in terms of a simple regression equation containing only the measured variables. Andrews however, has developed path models in which the measured variables have featured as indicators of the underlying constructs, and the path coefficients have been estimated by the LISREL program (see Andrews and Withey, 1976, Exhibit K). In principle it should be possible to incorporate such a model into that shown in Figure 6. We would then have a multi-stage factorial model in which the cognitive and affective factors entered at an intervening stage between the domain factors and the global quality of life factor.

Preliminary attempts to model the role of affect as an intervening variable between domain satisfactions and LAW, however, notably by Hall (1975), have led to puzzling and unexpected results. Hall (1975) has reported on a model fitted to data collected in the British quality of life surveys. No un-observable variables or factors were postulated. The cognitive factor was thus omitted, and the positive and negative affect scales were postulated as the only variables intervening between the domain satisfactions and the global assessment. It was then found that satisfaction in three domains — family, leisure and job appeared to generate no affect whatsoever, positive or negative. The coefficients of the causal paths between these domains and the effect scales were not significantly different from zero. Satisfaction with living standards appeared to generate only positive affect and financial situations only negative affect. Most curious of all the total contribution of affect to perceived life quality was almost negligible, as indicated by the minuscule path coefficients of 0.13 and −0.12 for positive and negative affect respectively. The present writer recently replicated Hall's model with American data from the Andrews-Withey (1976) study, and obtained very comparable results. Moreover, the last mentioned outcome of the path model, the minuscule contribution of affect to perceived life quality can be deduced from the straightforward results of regressing both domain-level evaluations and affect variables on global ratings of well-being. The results of such regression are show in Table IV.

The most important structural feature of the results in Table IV runs

TABLE IV

Multiple regression results of predicting global measures from indicated variables

Data:	American Data		British Data
Global measure:	Life 3	3-Pt. Happiness	10-Pt. Satisfaction
	R^2	R^2	R^2
Predictors used in regression			
(a) Evaluations of life concerns	0.64	0.59	0.48
(b) Positive and negative affect	0.24	0.29	0.20
(c) $a + b$	0.65	0.61	0.50

Data Sources: American results are from Andrews and Withey (1976. November 1972 Form 2 national survey). British results are from Abrams and Halls 1975 survey (Hall, 1976).

parallel in the different countries, as it does for the different global indicators. This feature lies in the finding that when the affect measures are added to the set of domain evaluation measures and the two sets of variables are used as a team to estimate assessments of global well-being, there is little or no increase over the correlation obtained for the domain evaluations on their own. When researchers obtain a result of this kind they invariably draw the conclusion that there can be no direct effects of the added set of variables on the dependent variable. The results therefore lead to the at first sight puzzling conclusion that affect balance has no direct effect on the ratings of global well-being.

There are both theoretical-intuitive and empirical grounds for rejecting the model which leads to such results. Intuitively and theoretically we would expect that the running average of a person's mood states, which is what the affect balance scales purport to measure, would play a not inconsiderable part in his experience of the quality of life. The well-established hypothesis that the weighted sum of domain evaluations determines overall assessments of lifequality makes intuitive sense, but we would also expect that domain evaluations would operate as direct influences on affect balance.

Domain evaluations show in fact a rich pattern of correlations with positive and negative affect. Out of 37 domains examined in the Andrews-Withey data set[8] over half correlate about equally, around 0.25, with positive and negative affect. The remainder correlates predominantly with either positive or negative affect in interesting ways. Domains that correlated predominantly with positive affect are Health, Admired by others, Friends, Family Life, Fun and (most extreme of all) Creativity. There are many more concerns in the set for which the predominant relation is with negative affect. Especially notable for their near absence of relation with positive affect are Time-to-do-things and Housework. Other concerns predominantly related to negative rather than positive affect were Privacy, Society's Standards, Community, Security-from-theft, Sleep, Recreation, Goods and Services, Job and Yourself. Clearly data as rich as these cannot be ignored. We begin to see how a correct analysis of the role of affect here could further an understanding of how differential adaptation in various specific domains could alter the balance of pain and pleasure in a person's total life experience.

Part of the reason we would want to reject a simple intervening variable model for affect balance, therefore, is the existence of this meaningful pattern of correlations between the affect variables and a variety of domain

satisfactions. One line of advance is to look for a model which could embody these correlations, as well as the correlation that occurs between the affect variables and the global ratings, and yet show no direct path between affect and global ratings. The regression results suggest the basic elements of a model that could explain the empirical findings. Reduced to its simplest terms such a model could be diagrammed as follows (see Figure 7).
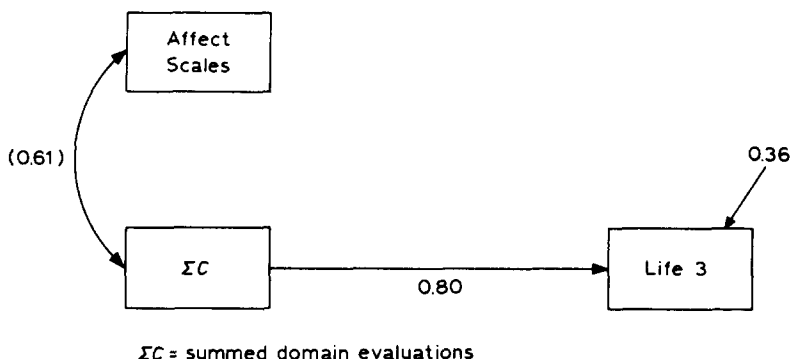

ΣC = summed domain evaluations

Fig. 7.   Possible basis for a path model including affect, domain evaluations and global indicators.

This says simply that the obtained correlation between affect and $Life_3$ of $\sqrt{0.24} = 0.49$ could be explained by a path or correlation coefficient (identical in this case) of $\sqrt{0.64} = 0.80$ between $Life_3$ and ΣC, the summed concern evaluations, and an implied correlation of 0.61 between the latter and affect. $(0.61 \times 0.80 = 0.49)$. (We assume here that the implied correlation of 0.61 would be borne out if we made the quite simple check in the computer. This has not in fact been done at this stage. It is the basic structure of the path model, its leading hypothesis, that we wish to stress at this point). The data for other global indicators could be incorporated into a more elaborate model which would still retain the essential features of the scheme in Figure 7.

It should be noted that if the model whose basic outline is sketched in Figure 6 is accepted then the model in Figure 7 has to be rejected, for they are not compatible. It may be possible to develop alternative models which would be compatible yet still be consistent with the results in Table IV. One such model would postulate[9] that each domain entailed its own component of affect which explained its correlation with the affect scales, but left the

contribution of affect to global well-being implicit in the paths running from domains to the global measures. While it may prove possible to examine and test the fit of a model elaborated from the sketch in Figure 7, it is doubtful whether the parameters of the latter model could be estimated from available data. Hopefully thought it will be possible to assess the consequences for the model of a range of assumptions about the values that the unknown parameters could take, even if the determination of the best estimates has to wait upon further rounds of data collection.

V. SUMMARY AND DICUSSION

Two kinds of secondary analyses have been presented to show the existence and demonstrate the nature of the cognition and affect factors. The first kind, in Section III, derived from the assumption that happiness and satisfaction ratings tap both factors but to marginally different extent. By focussing on the area of non-overlap, differential trends with age and education, barely discernible in straightforward correlations against the indicators, were now strongly revealed along with further interesting differences for other outside variables (notably enjoyment-of-life, affect balance, income and personal competence). These results were in line with a general understanding of the role of cognition and affect, and with deduction from the model which posits that the indicators are compounds of both factors. The second kind of analysis, in Section IV, drew upon data sets which included Bradburn's affect scales along with a range of global indicators of subjective well-being. The considerable variance in these measures which remains after the affect scales are partialled out, and allowance made for method affects, was attributed to cognition. Starting points were then explored for analysing the role of cognition and affect more exactly by means of path models which include the cognitive factor as an unobserved variable.

In this study treatment of the cognitive factor had necessarily to be indirect. Clearly it would have been desirable to have had empirical anchor points for cognition as we have for affect. We are inclined to think that Bradburn's scales have fair construct validity,[6] notwithstanding the suggestion in recent studies (Brenner, 1975; Cherlin and Reeder, 1975) that there may still be a good deal to be learned about the nature and measurement of affect. Certainly it can be said that compared with the progress that has been made towards conceptual clarity and operational definition of the affect

component, the measurement of cognition is in its infancy. The mental calculus which determines a person's position on the cognitive component is undoubtedly complex. Nevertheless, advances are being made which suggest that it may yet be possible to capture the process by questionnaire.[10] Notable here is the work of Campbell *et al.*, (1976, Chapter 6) and Abrams (1975). In addition to direct satisfaction ratings these researchers employed a gap measure, the deviation between the respondent's assessment of the current situation and some standard of comparison. The comparison standard was 'entitlement' in the case of Abrams' study of the correlates of life satisfaction, while Campbell *et al.*, investigated several standards, of which the 'best experienced' was the most influential, in their study of housing satisfaction. It is tempting to interpret the results of both of these latter studies as supporting the basic model put forward in this paper. The interpretation would run as follows. Generally in social and psychological research if one attempts to use distance or discrepancy measures the usual statistical result is a lower level of correlation than that achieved with the original measures from which the distances were calculated. In the above studies however, there was an enhancement of the correlation of the gap measure with age and other variables beyond that found with the original satisfaction measures. An explanation of the enhanced correlation in this instance could lie in the fact that a purer measure of the cognitive factor was obtained. According to our leading hypothesis the satisfaction ratings compound both cognition and affect. When respondents are required to work explicitly with comparison standards, as in the above types of gap measures, it could be that cognitive processes come more directly and exclusively into play. The operation of the cognitive factor can then be seem more purely in the correlations that result.

However this may be, it does seem as if investigators in the quality of life field must look to their own research efforts to clarify the distinction between cognition and affect, even though these notions have an intellectual history as old as the discipline of psychology itself. An earlier paper (McKennell, 1974) looked at the tradition of cognitive psychology for suggestions how cognition and affect might work in combination. Cognition was conceived as entering into judgements of well-being by way of the importance weights respondents attached to satisfactions in different domains. This view was initially suggested by the literature on consistency theory and some experimental evidence on the way separate evaluative beliefs combine into an overall attitude (Rosenberg, 1956; Anderson and Fishbein, 1965). It has since

become clear that importance weights, as studied in the quality of life surveys (Campbell *et al.*, 1976, Chapter 3; Andrews and Withey, 1976, Chapters 4 and 7) do not function in the manner described by such a model.

Our discussion has centred round the distinction between cognition and affect as it applies to the prediction of feelings of global well-being. We have implied though that it may be possible, and in the long term may even prove necessary to articulate the same distinction at the domain and subdomain level. Among the domains, job satisfaction is the one that has been most intensively researched, mainly by occupational and industrial psychologists. But here too it has been found that importance weights do not function in the manner prescribed by the classical cognitive model (Quinn and Mangione, 1972; Mikes and Hulin, 1968). On the affect side Bradburn (1969) has pointed out the parallel between his affect balance theory and the 'two-factor theory' of job satisfaction proposed by Herzberg *et al.* (1959). These researchers reported that "the factors in our study that made people happy with their jobs turned out to be different from the factors that made people unhappy with their jobs". (1959, p. 11). Subsequent to the publication of the original study, a considerable number of empirical studies designed to test the validity of the two-factor theory have been published. The heated controversy[11] that has developed between supporters and critics of the two-factor theory should give us pause to reflect that if tracking the role of cognition and affect at the global level is difficult, the road at the domain level is likely to be no smoother.

While it is disappointing that the body of theory built up within the traditional discipline of psychology is not more applicable, future surveyors of perceived well-being have an important resource in what may turn out to be one of the most significant findings to emerge from the first rounds of data collection, namely that the structural properties of the data conform to a simple linear additive model. This is not something that could have been predicted in advance, and indeed ran counter to the initial expectations of the researchers. Both teams of American investigators searched diligently for patterns of interaction and curvilinearities in their data.[12] Nothing important enough to question the adequacy of the linear additive model was found. The assumption of interval measurement implied by the use of rating scales was also tested and found to hold good. Methodologically this means that the way is open for the deployment of structural equation models. These would be inapplicable or would have had a severely limited applicability if the assump-

tions of linearity and additivity had been found not to hold. Given these minimum statistical assumptions it becomes possible to examine and test a much wider range of assumptions of a more substantive kind. The work reported in Section IV represents first steps in this direction.

Beyond the fact that the data allow it, there are further reasons why discussions focussing on linear causal models have a special potential for the analysis of perceptions of well-being. Sociologists have found the approach useful in building models of social structure. Applied to survey data the variables in the sociologists models have for the most part been those that define the respondents' place in the social structure. We on the other hand are attempting to simulate a psychological process — what goes on in respondents' minds when they are asked to arrive at an assessment of their own well-being during the course of an interview. While the variables in our models are much nearer the actual items in the questionnaire, and even leave open the possibility of experimental manipulation, we still draw a careful distinction between the items and the concepts or hypothetical constructs to which they stand as indicators. The main thrust of this paper has been towards identifying the factors underlying the rating-scale indicators. The recent extension of path analysis to incorporate unobserved variables becomes important here. It provides a much-needed technique for amplifying and quantifying the distinction between concept and measure. A fully developed path model will include a measurement model as well as the structural equation model (Joreskog and Sorbom, 1976). The measurement model specifies how the unobserved variables (factors of hypothetical constructs) are measured in terms of the observed variables (questionnaire items). The structural equation model specifies the relationships among the factors. The latter relationships can remain invariant despite changes in questionnaire design. It has therefore become technically possible to still make rigorous comparisons even between surveys that have used somewhat different measures — as is the case, for better or worse, in the recent pioneering attempts at assessing perceived quality of life. Relationships at the level of the schedule items can be blurred and distorted partly because of random and correlated errors in the items and partly because of their true factorial complexity. It is the purpose behind the measurement model to tease out the sources of error and show in addition how the observed variables project on to the underlying factors. The relationships among the factors themselves can then be more precisely articulated in terms of the structural equation model. The development of models at this

level may be necessary for an adequaty understanding of the perception of well-being.

Finally, the new developments also provide a means, perhaps the only systematic means, for countering one type of criticism to which much survey research is vulnerable, the surveys of perceived quality of life in particular. There are those who feel uneasy about if not downright hostile to the apparent facility with which sovereign concepts such as life satisfaction or happiness are being rendered into simple questionnaire items. Viewed against the grand abstractions they are supposed to index, the measures strike some observers as oversimple to the point of travesty. If pressed most researchers will admit that the variables they are trying to index are more complex than the operational definitions embodied in their measuring instruments. The admission is hardly likely to still the critics. A methodology which both obliges and enables the investigator to follow the logical consequences of the admission into the kind of data he collects and the way these get analysed can provide a more worthwhile answer. In a field where the relations between theory and research are notoriously loose, some merits of the path analytic approach are, then, that it (1) provides a technique for analysing the relation between concept and measure, (2) forces a level of specificity in theoretical thinking that is not often encountered in the absence of an explicit model and (3) points the way in which further rounds of data collection should go in order to decide between competing models.

University of Southampton, England

NOTES

[2] In the Andrews-Withey (1976) study one data set (1072 respondents to November Form 2 national survey, see Exhibit 10.17) fails to show any systematic trend with advancing age for happiness or satisfaction ratings, while trends with socioeconomic status are very weak and show reversals.

[3] Strictly, cell 2 contains the subgroup who have rated themselves completely-satisfied but less-than-very-happy, and cell 3 the very-happy but less-than-completely satisfied. For convenience shorthand descriptions are used in the text.

[4] Similar partial associatiations might be looked for among those rating themselves lower on either happiness or satisfaction. Thus a comparison of group (2) against group (4) would contrast the completely satisfied with the less satisfied among those who rated themselves less than very happy; while a comparison of group (3) against group (4) contrasts the very happy with the less than very happy among those rating themselves less than completely satisfied. If interactions were present these latter comparisons could yield different results for the happiness and satisfaction effects. On the whole such interaction effects do not seem pronounced. But we have not thought fit to base inferences about separate factor effects on these latter comparisons. Less reliance can be placed on comparisons against group (4) for this purpose because it is a very large group, comprising the majority of the sample, and covers a wide range of satisfaction categories (2 to 7). The controls for satisfaction in comparison against this group are therefore minimal.

[5] For the Andrews-Withey data the subgroup totals for columns 1, 2, 3 and 4, in Exhibit 1 were respectively 80, 66, 149 and 748. (Based on data from November national survey Form 2, $N = 1072$; 29 respondents had insufficient data for classification).

[6] The ratio for Bradburn's affect balance scale, 2.40 as against 1.20 in columns 6 and 7, Table I, suggest that it is a good indicator of the affect component without too much contamination by cognition. It is notable though that this result is due entirely to relationships with the positive affect scale. The negative affect scale would appear on these data to owe as much to the cognitive as to the affective component. We will not attempt to interpret this result further here. It is a result which, together with those reported by Cherlin and Reeder (1975) and Brenner (1975), needs to be borne in mind in any final reckoning of the relationship between Bradburn's affect balance scale and the concept of affect. With regard to straightforward correlations against happiness ratings it is notable that, while Bradburn (1969) reported equal relationships with his positive and negative affect scales, in the Andrews-Withey data (1976) positive affect is more closely related to happiness than is negative affect, but only marginally. Brenner (1975) found that happiness ratings were much more closely related to positive than to negative affect, though his operational definition of these affect components different from Bradburn's.

[7] In reading the trend of percentages for any subgroup in columns 1 to 4 in Table I, allowance should of course be made for variations in the marginal percentages in column 5. The trends emerge more clearly when the comparisons are made after actually computing the ratios of subgroup percentages to the corresponding marginal percentages.

[8] Unpublished correlations obtained by the author using data from the Andrews and Withey (1976) study: November Form 2 national survey ($N = 1072$). Exhibit 5.3 in Andrews and Withey (1976) shows correlations obtained for a selection of concern measures with July respondents ($N = 222$).

[9] Suggested by Frank Andrews.

[10] Work in this area has also been recently reported by Mason and Fulkenberry (1977). The paper by Bortner and Hultsch (1973) on patterns of subjective deprivation, re-working data from the original Cantril (1965) study is also well worth consulting.

[11] For a convenient review and references to several studies up to 1970 see King (1970.

[12] See Andrews and Withey (1976, pp. 116–117, and 244–5): Campbell et al. (1976, pp. 77–80). The present writer also conducted an independent search for interaction in

the Campbell *et al.* data, but failed to find any major effects. If anything the substantive implications of these findings are understated in current accounts. What we are now learning about the structural similarities between British and American data – for example in Table IV, and in the replication of Hall's (1975) path analysis referred to on page 416, suggest that what is being encountered here is not something local or incidental but a fundamental constancy in perceptions about well-being among heterogeneous adult populations generally.

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