

MEASUREMENT MODELS OF LIFE SATISFACTION: A STRUCTURAL EQUATION MODELING APPROACH

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Two types of indicators are usually employed for measuring life satisfaction at individual level. One of the options is to measure a general or overall life satisfaction (OvLS). Another option is to consider the satisfaction with various life facets or domains (DS). Top-down, bottom-up and integrated models may be imagined for describing the relations between the overall life satisfaction and the domain satisfactions. The top-down (TD) approach supposes that OvLS determines DS as an intermediate chain for more general personality characteristics which determines life satisfaction. The bottom-up (BU) explanation sees OvLS as a product of the objective life condition mediated through the DS. An integrated model (IM) searches to reconcile the two perspectives, simultaneously considering the TD and the BU dependencies. Our paper tests for empirical validation of the three approaches, using simultaneous equation modeling on the EQLS 2003 data. We show that BU, TD and IM find similar support within the data, but the IM seems to better fit empirical evidences. On the other hand, no matter the approach, each DS-OvLS relation remains significant, even when controlling the objective life conditions. We found support for conceiving each domain of satisfaction as part of a dense network of interrelations with all other DS. More than this, each DS is strongly embedded in a more general satisfaction that depends on the objective conditions.

Keywords: life satisfaction, domain satisfactions, top-down, bottom-up, SEM models of life satisfaction.

Life satisfaction is usually conceived as an indicator of subjective well-being (Diener and Suh, 1997; Christoph and Noll, 2003; Bălătescu, 2005; Veenhoven, 2007). This does not make the concept less general. Even when conceptualizing life satisfaction as a basic trait, with no lower level indicators, the analyst should

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consider the existence of a general feeling of satisfaction and of some more particular ones related to more concrete fields or domains of one's life.

Two main approaches contribute to explaining the individual level variation of the Overall Life Satisfaction (OvLS) and of the Satisfaction with various Life Domains (DS). The bottom-up (BU) approach includes considering each DS as a predictor of the OvLS. The top-down (TD) perspective conceives DS as explained by the OvLS (Diener, 1984; Leonardi et al., 2004; Mihalache, 2008). The basic argument for the first approach is that (objectively) fulfilling a specific need will increase the DS, and implicitly, the OvLS. The opposite view states that life satisfaction is due to general personality factors being stable over time. This implies a dependency of any domain satisfaction on a more general and abstract general life satisfaction.

There are attempts to reconcile the two perspectives in an integrated explanatory model (IM), which supposes the interdependency between the OvLS and the DS. Some of these approaches consider each DS-OvLS pair and the lagged impacts (Heady et al., 1991); others focus on explaining a particular DS (Brief et al., 1993) or on predicting the DS both through the objective life conditions and a general factor of life satisfaction (Leonardi et al., 2004).

In our paper, we use structural equation modeling and the EQLS 2003 dataset, in order to test these three approaches, keeping under control the objective fulfillment of specific needs. We show that all the three types of models find similar empirical support.

The paper starts with a short presentation of the three approaches. Then we construct five basic hypotheses, describing our view of the existing conceptual developments. The setting up of the measurement model follows. After the presentation of the results, we conclude the paper with a discussion about the implications of the findings for future research directions.

THREE COMPETING CONCEPTUAL MODELS

Rationales for the bottom-up approach

The simplest understanding of life satisfaction is to conceive it as the result of the objective conditions and situations. A nice neighborhood, a large-enough house, quality furniture, access to comfortable heating, proximity to various public facilities contribute to high housing satisfaction. This DS contributes to and is reflected in the OvLS. Bottom-up theories conceive life satisfaction as a sum of the satisfaction with various life domains (Schimmack et al., 2002; Campbell et al., 1976; Diener, 1984; Andrews and Whitney, 1976). Being satisfied with social relations, housing, health, or family determines a higher satisfaction with life. Previous analyses on life satisfaction using the EQLS 2003 dataset (Delhey, 2004; Böhnke, 2005) implicitly make use of the bottom-up perspective.

Rationales for the top-down approach

Andrews and Whitney (1976) showed that the objective life conditions account for only a few percent of the subjective well-being. This opened the way for questioning the dependency of the OvLS and DS solely on the objective conditions. A set of alternate explanations rapidly converged (Costa and McRae, 1980; Diener, 1984). The top-down approach finds its roots in psychological considerations, often referring to life satisfaction as mainly a personality trait, a general predisposition to be happy, content, and satisfied. This is reflected in relatively stable levels of life satisfaction, regardless of whether the OvLS or the DS is considered, even when controlling for the objective conditions (Schimmack et al., 2002; Rode, 2004; Brief et al., 1993). Changes in the objective life conditions determine certain variations, but overall, the OvLS and DS tend to be relatively stable over time.

Rationales for an integrated BU–TD model of life satisfaction

There are several attempts to establish a midpoint between the TD and BU theories. Brief et al. (1993) and Schimmack et al. (2002) developed such models for the case of health satisfaction. They treat satisfaction with health as simultaneously depending on a more general feeling of life satisfaction and determining it. Leonardi and his colleagues (1999, 2004) propose a constructivist approach that exploits the idea to explain the domain satisfactions through both the objective conditions and personality traits. In a certain way, this is an attempt to develop a limited integrated model in which the effect of the OvLS on the DS is not explicitly stated. Heady et al. (1991) built up separated integrated BU–TD models for several DS, but they did not propose an integrated model to consider all DS.

All these models, at least partially, consider the complementarities between the TD and the BU approaches. They conceive the OvLS as both a construct and a determinant of the DS, as a general life satisfaction that is reflected in the levels of each domain satisfaction, even when controlling for the predisposition towards being satisfied given by personality traits.

Cummins' argument and empirical testing of the normativeness of life satisfaction (2003) brings supplementary reasons to support the complementariness between the TD and the BU approaches. People tend to adjust their life satisfaction around a certain level, depending on the average life satisfaction in their society. The distribution of the life satisfaction in every society tends to have a negative skew. Most of the people tend to adjust their life satisfaction towards the positive values, somehow avoiding long-term cognitive dissonance. This may apply to both the overall life satisfaction and to the domain satisfactions. It implies that both the OvLS and the DS tend towards similar levels of equilibrium, being intercorrelated, as other papers have shown (Lance et al., 1989; Casas et al., 2004; Hsieh, 2008).

The simultaneity model would also solve the problem of precedence (Heady et al., 1991). Instead of searching for the exact answer to the question “Which came first: the OvLS or the DS?” it may assume that both the DS and the OvLS

change when any particular objective life condition changes. This means that when, say, housing conditions improve, this would be reflected in both the OvLS and housing satisfaction, and, as an effect of the change in the OvLS, would also determine some positive changes in each of the DS.

Rode's and Near's (2005) bottom-up models seem to offer empirical evidence for the OvLS-DS interdependency. Employing SEM, they allow the error terms of the DS to covariate. The relatively high correlation may indicate the presence of a common factor explaining the variance of the domain satisfactions. In the context of the Rode and Near models, the finding suggests the need to test for the validity of an integrated BU/TD approach.

HYPOTHESES

The BU, TD, and IM approaches all rely on solid conceptual constructions. The main difference between them is related to the causality of the relations between the OvLS and the DS. Structural equation modeling seems to be an appropriate approach for empirically testing their validity.

In particular, the IM approach implies the existence of relatively strong and positive correlations between each DS and the OvLS, as well as within each pair of DS. We expect that (H1) regardless of whether *the BU, TD, or IM approach is considered, and no matter how much one controls for the objective life conditions, the correlations between the DS and the OvLS, as well as within each pair of DS would still be significant.*

This immediately leads to our second hypothesis: (H2) *when running alternative structural equation models for the TD, BU, and IM approaches, these models should similarly fit the data.*

Complementarily, we expect that (H3) *the IM approach better fits the data, being more comprehensive, in terms of the embedded explanations, when compared to the TD or BU approach. The IM actually includes both the TD and the BU explanations. It assumes that the OvLS and the DS are interdependent. We also add that there is interdependency between the domain satisfactions. Satisfaction with one life facet would therefore impact the level of satisfaction in the other life domains. This replicates Cummins' (2003) argument about the tendency of life satisfaction to stabilize around certain levels, from the societal level (in any society, people tend to have a certain range of life satisfaction around the societal average) to the individual level: for each individual, life facet evaluations tend to be similar, even if depending on the objective life conditions, the domain satisfactions tend towards a certain average level, which is jointly determined by all the DS and by the OvLS. The proposed IM approach therefore extends the Bidirectional Models proposed by Lance et al. (1989, 1995) by including not only the interdependencies between the OvLS and the DS, but also the simultaneous interrelations among the life facet satisfactions.*

Life satisfaction does not exist outside the reality. Therefore, we expect to have a better fit for our models when controlling for the various objective life conditions. This hypothesis simply confirms the BU explanation of the impact of the objective conditions on the subjective life satisfaction judgments. However, in the light of the TD approach, (H4) *we expect that the OvLS would be more important than any of the objective life conditions in explaining each DS.*

Finally, as an implication of comparing the average life satisfaction for various collectivities, such as the European countries, we expect that (H5) *when employing various methods to compute an aggregate level of life satisfaction following the BU, TD, or IM logic, the resulting country rankings should be almost the same.* The hypothesis is based on the very similar relations that we expect to find in following any of the TD, BU, or IM approaches. Regardless of the covariances or regression weights, computationally they should lead to similar results.

DATA AND METHOD

Measures

The EQLS 2003 provides single item measures for each domain satisfaction and for the general satisfaction with life. The dataset includes 26 257 cases collected from national samples of the 27 EU member states and Turkey. For some of the countries (Cyprus, Estonia, Malta, Luxembourg, Slovenia), the sample size is about 600, with a minimum of 591 cases in Estonia. For the rest of the countries, the sample ranges from 990 cases (Ireland) to 1 052 (Germany). The large sample size as well as the relatively numerous indicators of the objective life conditions make the dataset suitable for simultaneously testing explanatory models for the seven DS. However, due to the small samples for several countries, it is difficult to run more complex SEM at the country level.

Table no. 1

Average values of the OvLS and DS within the sample

	Mean	Std.dev	Country means		
			Minimum	Maximum	
OvLS	6.75	2.22	4.42 (Bulgaria)	8.40 (Denmark)	
DS	Education	6.70	2.42	4.71 (Turkey)	7.89 (Denmark)
	Present job	7.23	2.09	6.33 (Bulgaria)	8.12 (Denmark)
	Present standard of living	6.61	2.32	4.00 (Bulgaria)	8.32 (Denmark)
	Accommodation	7.41	2.19	5.89 (Lithuania)	8.42 (Denmark)
	Family life	7.86	2.09	6.53 (Latvia)	8.73 (Denmark)
	Health	7.37	2.27	6.03 (Latvia)	8.19 (Denmark)
	Social life	6.96	2.27	4.97 (Bulgaria)	8.46 (Denmark)

The EQLS uses a single-item measure for the OvLS. It consists of a 10-point scale asking: “*All things considered, how satisfied would you say you are with your life these days?*” Some 5-10 minutes later in the interview, the questionnaire includes similar scales (“*On a scale of 1 to 10, how satisfied are you with each of the following items?*”) for the seven domain satisfactions described by Cummins (1996): education, present job, present standard of living, accommodation, family life, health, and social life. Table 1 displays the summaries of these variables. When considering the country means, one may notice that the indicators tend to similarly rank the European societies.

Table no. 2

Description of the indicators for objective life conditions: health, education, family

Indicator	Description	% (means, if counts)
Self-rating of health	Five point scale (<i>In general, would you say your health is Excellent, Very good, Good, Fair, Poor</i>).	3.06
Long term illness/disability	Dichotomous (<i>Do you have any long-standing illness or disability that limits your activities in any way?</i>).	22%
(level of) education	Three point scale: primary, secondary, post-secondary.	1.93
Age when education was completed	The actual age where the respondent graduated the highest level of education. It ranges between 0 and 66 years.	18.17
Help from family	Number of situations in which expects help from family member, out of following four: (a) <i>If you needed help around the house when ill</i> ; (b) <i>If you needed advice about a serious personal or family matter</i> ; (c) <i>If you were feeling a bit depressed and wanting someone to talk to</i> ; (d) <i>If you needed to urgently raise XXX* Euro to face an emergency</i> . Range: 0-4. (*the sum varied according to the country).	2.64
Married	Dichotomous (married or living with a partner=1).	59%

Several indicators for the objective life conditions are available. Some of them describe pure objective conditions. Others are rather self-evaluation, at least partly dependent on subjective judgments. Even so, they are reasonable proxies for the objective conditions, particularly in the absence of better information.

Tables 2–4 include a short description of each indicator. The left column contains the same labels we used in the SEM models. Self-rating of health and having a long-term illness or disability may be used for predicting health satisfaction. Perceiving the existence of various sources for social tensions and not having access to networks to provide help in crucial moments may affect the satisfaction with the social life. Having a partner and receiving frequent help from family contribute to predicting the satisfaction with family.

The size of the dwelling relative to the number of household members, and reporting accommodation problems may influence the satisfaction with the housing

conditions. Being deprived of various goods, inability to make ends meet, and the level of income have various impacts on the satisfaction with the standard of life. The education level determines the satisfaction with education.

Table no. 3

**Description of the indicators for objective life conditions:
social life, accommodation, material resources**

Indicator	Description	% (means, if counts)
Social tensions	Number of situation perceiving "A lot of tension" between five groups: (a) <i>Poor and rich people</i> ; (b) <i>Management and workers</i> ; (c) <i>Men and women</i> ; (d) <i>Old people and young people</i> ; (e) <i>Different racial and ethnic groups</i> . Range: 0–5	1.02
No help at all	Number of situations in which expects help from nobody, out of following four: (a) <i>If you needed help around the house when ill</i> ; (b) <i>If you needed advice about a serious personal or family matter</i> ; (c) <i>If you were feeling a bit depressed and wanting someone to talk to</i> ; (d) <i>If you needed to urgently raise XXX Euro to face an emergency</i> . Range: 0–4.	0.24
No. of rooms per household member	Ratio between the number of rooms and the number of household member. Range: 0–15.	1.67
Accommodation problems	Number of reported problems with accommodation, out of four: (a) <i>Shortage of space</i> ; (b) <i>Rot in windows, doors or floors</i> ; (c) <i>Damp/leaks</i> ; (d) <i>Lack of indoor flushing toilet</i> Range: 0–4.	0.55
Deprivation index	Number of things that the household cannot afford, out of six: (a) <i>Keeping your home adequately warm</i> ; (b) <i>Paying for a week's annual holiday away from home (not staying with relatives)</i> ; (c) <i>Replacing any worn-out furniture</i> ; (d) <i>A meal with meat, chicken or fish every second day if you wanted it</i> ; (e) <i>Buying new, rather than second-hand, clothes</i> ; (f) <i>Having friends or family for a drink or meal at least once a month</i> . Range: 0–6.	1.32
Making end meet	Six point scale, ranging from 1 – "very easily" to 6 – "with great difficulty" as answer to the question <i>A household may have different sources of income and more than one household member may contribute to it. Thinking of your household's total monthly income, is your household able to make ends meet...</i>	3.34
Relative income	Ratio between household income and the average household income for the respective society.	1

Job satisfaction depends on various conditions related to work, including the pay, the level of responsibility and the position within the organization, the variety of the work, and the possibility to reconcile work and family responsibilities (Table 4).

Table no. 4

Description of the indicators for objective life conditions: work related, age and gender

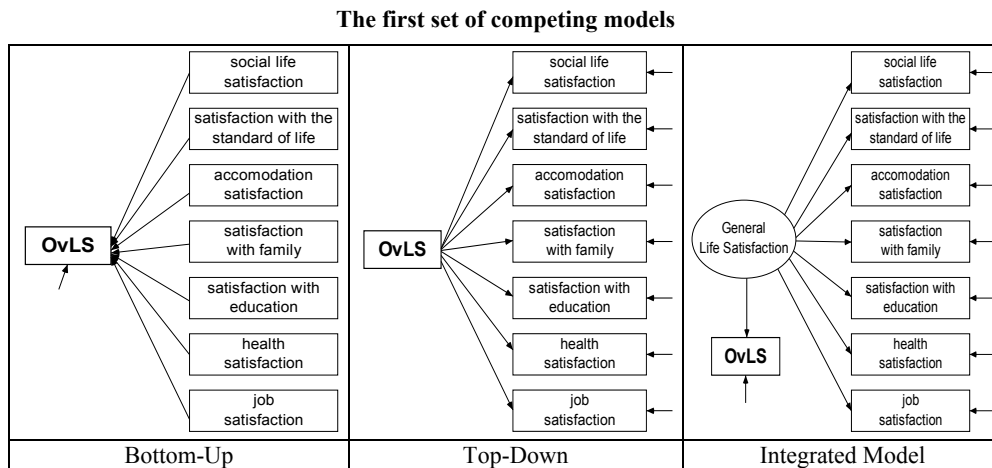
Indicator	Description	% (means, if counts)
Supervises others	Dichotomous (<i>In your main job, do/did you have any responsibility for supervising the work of other employees?</i>)	32%
Good job	Additive index ranging from 0 to 4. Each respondent indicated on a 5-point scale if he/she considers the job as being "well paid", involving "a great deal of influence on deciding how to do the work", "is dull and boring", "offers good prospects for career advancement". If answering "strongly disagree" or "disagree" at the third item, the respondent received a point. Additional points were counted to form the "good job" index if answering "strongly agree" or "agree" at each of the remaining three items. α -Cronbach = 0.723.	2.00
Difficulty work-family	Number of weekly difficulties to reconcile work and family life, out of the following three: (a) <i>I have come home from work too tired to do some of the household jobs which need to be done</i> ; (b) <i>It has been difficult for me to fulfill my family responsibilities because of the amount of time I spend on the job</i> ; (c) <i>I have found it difficult to concentrate at work because of my family responsibilities</i> . Range: 0-3.	0.18
Age	Years (18+)	45.74
Gender	Dichotomous (woman=1).	52%

Method

In order to test the five hypotheses, we have chosen to employ SEM. We built three sets of models, with each set including a model devoted to the TD, BU, and IM approaches, respectively.

The first set of models is basic. It considers only the connections between the OvLS and the DS, without controlling for any other variable (Figure 1). It allows checking of the presence of bivariate relations between the various satisfaction indicators and gives a first hint of the differences in empirical support for the three types of models. The bottom-up model embeds the idea that the DS are factors that determine the level of the OvLS. The top-down approach reverses the causality, with the more general OvLS becoming formative for each particular DS. The integrated model considers both the OvLS and the DS as explained by the same latent orientation and implicitly assumes their interdependency. The domain satisfactions are expressions of a more general life satisfaction that involves interdependency between each of the DS. Both the domain satisfactions and the OvLS become reflective indicators for the general feelings of satisfaction.

Figure 1



The second set of models is built from the basic ones, with various measures added for the objective life conditions as determinants of each of the DS. However, no determinant is considered for the OvLS. A few objective life condition indicators are allowed to covariate or to depend one on each other, respecting well-known relations, such as the connection between income and education. Figure 2 describes the second set of models, using the IM as an example. For the TD and the BU models, we employ the same sets of variables and relations, but we maintain the different shapes of the DS-OvLS employed for the basic models. The second set of models allows checking of the consistency of the relations between the OvLS and the DS. However, since for parsimony reasons we do not include all the possible relations between the exogenous variables, we do not expect to get a very high goodness of fit, particularly when testing against the independence model (IFI, CFI). RMSEA may, however, be used to inform about the distance to the saturated model.

In *the third set of models*, we also include several relations between the objective life conditions and the OvLS. This allows better prediction for the overall life satisfaction.

Several previous studies (Heady et al., 1991, Feist et al., 1995; Christopher and Noll, 2003, etc.) underlined the need to control for various sociodemographic variables when predicting the DS or the OvLS. Our *fourth set of models* considers age and gender as additional controls. These variables were not included in the previous models in order to ease the visualization and the interpretation of findings.

For each set of models, we compare the goodness-of-fit indexes, in order to show that the TD, BU, and IM approaches get similar empirical support, but the IM slightly increases the explanation of the observed variance. We also consider the signs and significance of the relations between the OvLS and the DS, in order to

test the first hypothesis. Finally, we use the unstandardized weights to compute an index of general life satisfaction based on the IM. We use it to check for correlations with the general life satisfaction measures based on the BU and TD approaches.

In setting up the models, we had to overcome an important challenge: how to treat job satisfaction, since about half of the sample is not part of the active population. These 13, 890 respondents have no score for the job satisfaction item. We found three possible solutions, which led us to build three alternative series of models. The first series refers to the entire population, but does not include job satisfaction and its determinants. The second series of models also include the whole sample, but the non-active respondents received the theoretical mean for the job satisfaction score. The simple reason for proceeding in such a way is that, since they have no job and are not looking for one, they are neither satisfied nor dissatisfied. The third series of models is identical to the first, but is limited to the subsample of working respondents, including those who are currently employed and those who are on leave (i.e., they have a job, but are temporarily not working).

We therefore have three series, each consisting of four sets of models. Each set includes three models testing for the BU, TD, and IM approaches. In the presentation of the findings, we proceed with discussing the results for the first series of models, the ones that include the whole population. In the end we integrate these with the findings from running the other two series of models.

Our idea to test both the BU and TD approaches using the same dataset is not new. Feist et al. (1995) employed a similar method to test for the BU and TD approaches in terms of their psychological meaning. Thus, they compared the impact of several personality traits to the OvLS as well as the reverse effects. Our goal is to test for the interactions between the OvLS and the DS, but our method is almost identical to theirs. The novelty resides in alternatively testing the three types of explanations (TD, BU, and IM), by simultaneously predicting the variation in each of the domain satisfactions. Lance and his colleagues (1989, 1993) use similar techniques, but their bidirectional model does not consider interdependencies between the domain satisfactions as moderated through the OvLS, and they control for only a few objective life conditions (Lance et al., 1995) for only a few life facets (Lance et al., 1993).

Using panel data, Heady et al. (1991) also employed SEM to test for the TD and BU effects of the OvLS and the DS. Their results indicate that both theories may find empirical support. However, they did not test for all the effects between the DS and the OvLS simultaneously, but for each DS separately. On their turn, Rode (2004), and Rode and Near (2005) included all the DS-OvLS relations in the same model, but tested only for the BU approach, and all the DS other than job satisfaction were described by only one aggregate indicator. Other studies also consider the interdependency only in relation to a specific DS (Brief et al., 1993; Schimmack et al., 2002). Lucas (2004) proposes an integrated approach, but only

health satisfaction and income satisfaction are considered along with the OvLS. However, since such interdependency may exist between any DS and the OvLS, then any change in a particular DS should be reflected in changes in the OvLS levels. This immediately determines some effects of the other DS. Therefore, there is a need to simultaneously analyze the relations, regardless if these are BU or TD, or between all the DS and the OvLS.

RESULTS

The simple models (Set 1)

Table 5 displays the goodness-of-fit indexes for each of the $3 \times 4 \times 3 = 36$ models that we have run. The Delta 2 IFI and the RMSEA are the ones that we report on. The Incremental Fit Index (IFI) compares the model to the independence model rather than to the saturated model. Higher values indicate better empirical support for the theoretical model. The Root Mean Square Error of Approximation (RMSEA) estimates the lack of fit compared to the saturated model.

The basic models from the first set include only the indicators of life satisfaction and the relations between the DS and the OvLS. The BU model does not fit the data, being rejected by both the IFI and RMSEA goodness-of-fit indexes. The TD is also rejected, but the theoretical model is closer to the data compared to the bottom-up model. The IM displays better goodness-of-fit indices. Both the Delta 2 IFI and the RMSEA are close to the acceptance thresholds.

No matter which model is used, OvLS, respectively General Life Satisfaction, are strongly related to each DS. All regression weights are significant and positive. In the IM, their standardized values are similar, but the satisfaction with the standard of life is a little higher. The same findings are seen in the TD model.

In the BU model, the satisfaction with the standard of life continues to be the strongest predictor, but this time it contributes 5 to 10 times more than the other DS to explaining the OvLS variation. On the other hand, the satisfaction with accommodation and the satisfaction with education contribute much less than the other domains to explaining the overall life satisfaction.

Controlling for objective life conditions (Set 2)

The second set of models adds controls for the objective life satisfaction when predicting each of the domain satisfactions. For instance, the satisfaction with social life is predicted through the deprivation index, which includes items related to the development of social relations through the perceived quality of society (social tensions) and the individual's belonging to help networks. In the IM model pictured in Figure 2, these controls add to the explanation given by the latent general life satisfaction, which contributes to explaining all DS and the OvLS. In

the TD model, the OvLS is the one that contributes to the explanation of each DS, while in the BU model, the objective life conditions are the only determinants of the domain satisfactions (see Figure 2).

Table no. 5

Goodness of Fit Indexes for the tested models

Model	BU		TD		IM	
	IFI	RMSEA	IFI	RMSEA	IFI	RMSEA
Series 1: All sample, no job satisfaction						
Set 1. Basic models: no controls	0.265	0.339	0.636	0.239	0.933	0.106
Set 2. With controls for the objective life conditions	0.624	0.130	0.648	0.126	0.736	0.109
Set 3. Set 2 + objective life conditions as predictors for OvLS	0.748	0.109	0.820	0.092	0.892	0.071
Set 4. Set 3 + additional controls for age and gender	0.750	0.104	0.817	0.089	0.885	0.072
Series 2: All sample, job satisfaction is included						
Set 1. Basic models: no controls	0.222	0.324	0.604	0.231	0.927	0.101
Set 2. With controls for the objective life conditions	0.687	0.085	0.730	0.096	0.830	0.076
Set 3. Set 2 + objective life conditions as predictors for OvLS	0.691	0.085	0.777	0.088	0.856	0.071
Set 4. Set 3 + additional controls for age and gender	0.678	0.088	0.759	0.090	0.834	0.075
Series 3: Only employed subsample						
Set 1. Basic models: no controls	0.222	0.324	0.604	0.231	0.927	0.101
Set 2. With controls for the objective life conditions	0.664	0.085	0.689	0.094	0.825	0.073
Set 3. Set 2 + objective life conditions as predictors for OvLS	0.669	0.102	0.761	0.087	0.851	0.069
Set 4. Set 3 + additional controls for age and gender	0.665	0.099	0.754	0.085	0.840	0.069

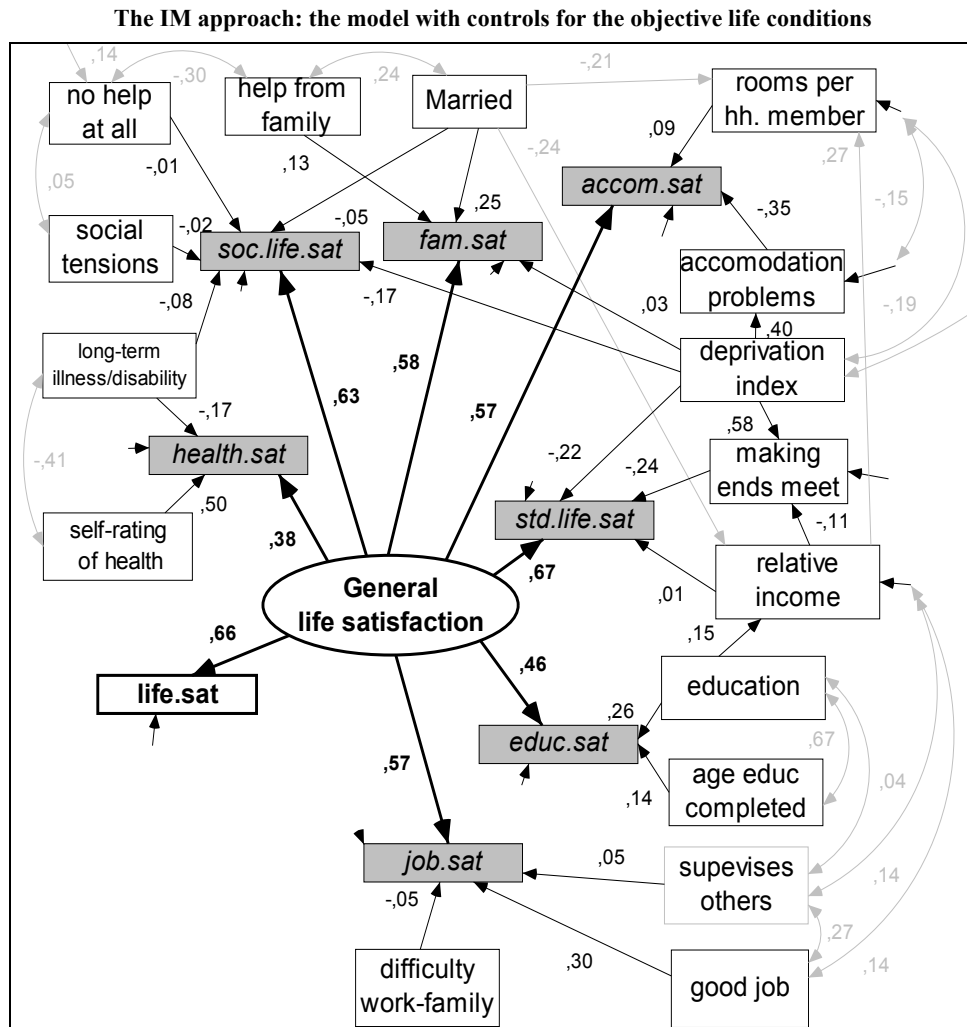
An additional table of chi squares and degrees of freedom for each model is available from the authors.

The objective life conditions have the expected impact on each of the DS. All the regression weights are significant at $p = 0.05$ (most of them are significant at $p = 0.001$), and they have the expected sign.

Obviously, none of the models from set 2 include all potential predictors for any domain satisfaction. Our goal is not to fully predict the variation of the DS or the OvLS, but to check for the relations between them when controlling for the objective life conditions in a parsimonious way. Therefore, the goodness-of-fit indexes might rather reject some of the models.

Compared to the basic models, when including controls for the objective life conditions, the Delta 2 IFI substantially increases for the TD and BU models, but decreases for the IM. The RMSEA becomes acceptable for the IM and closer to indicating a fit for the BU and TD models. Overall, the IM has proven to be closer to the empirical data than the TD approach, while the TD better fits the data, as compared to the BU model.

Figure 2



The displayed model is part of the first series of models, being run on the subsample of employed respondents. The numbers represent standardized weights/covariances. All coefficients are significant at $p < 0.05$.

In all the models, the relations between the OvLS and the DS remain significant at 0.001. Their relative strength is also unchanged, with the satisfaction with the standard of life having the strongest relation to the overall life satisfaction.

Additional controls, predictors for the OvLS, and the alternate series of models

The models from the third set, which include a few predictors of the OvLS, better fit the data. There are three determinants that we have allowed to predict the

OvLS: the deprivation index, the perceived quality work (“good job”), and the integration in help networks (“no help at all”). These tap large areas such as work, material resources, and socialization. Regardless of the approach (TD, BU, or IM), they have a significant impact on the overall life satisfaction. Again, IM better fits the data, as compared to the TD approach, which, in turn, is better than the BU approach.

Adding age and gender as predictors for all the DS and the OvLS does not change the goodness-of-fit indexes much. Moreover, in some of the models, these predictors differently affect the values of the IFI and the RMSEA. This is probably due to the need to control for their relations with almost all the objective life conditions. More importantly, when considering age and gender effects, all the relations between the two variables and the life satisfaction indicators have proven to be significant. However, gender has no impact on the overall life satisfaction.

Removing job satisfaction and its determinants from the models does not change the results: all the relations, causal or not, remain almost unchanged. This may indicate the robustness of the models. The same conclusions are valid for the models run only for the subsample of employed persons. The goodness-of-fit indexes also vary around similar values in the three series of models (Table 5).

Aggregate life satisfaction indexes

Many times, describing a phenomenon through more than one indicator may lead to confusion and difficulties in communicating the results to the public, which has less expertise in the respective field. Life satisfaction is no exception. Therefore, searching for a good single-figure descriptive indicator is often the key to effectively presenting the survey results.

The TD, BU, and IM approaches propose different models for such synthesis. The BU approach is usually translated through the mean value of the variables measuring the domain satisfactions. For the TD approach, since the OvLS determines all the DS, its level should be used as a unique indicator. The IM is more complex, supposing to compute aggregate indicators for the general life satisfaction by using the estimates of the factor score weights as resulting from the SEM models.

We have calculated such indicators for the EQLS 2003 dataset. The Pearson correlations are quite high (Table 6), particularly when considering the more discrete variables given by the BU and IM approaches. Since the TD index is a single-item measure derived from a 10-point scale, its variance is lower, and its correlation with more continuous variables is naturally smaller.

The Table 6 indexes may be aggregated for large groups of people to show how the rankings of such groups differ depending on the approach. EQLS respondents naturally cluster in countries. When computing the average country indexes, the lowest correlation between each pair is 0.837. The TD, BU, and IM.set-1 indexes provide almost the same hierarchies. When aggregating the remaining three IM indexes, since they are based on information other than the life

satisfaction indicators, the country averages may suffer due to the number of non-responses. Even so, only four countries out of 28 considerably change their rankings as compared to the hierarchies derived from the first three indicators.

Table no. 6

Pearson correlations between the life satisfaction indicators computed according to various theoretical approaches (the first series of models were employed)

	BU	TD	IM.set-1	IM.set-2	IM.set-3	IM.set-4
BU	1.000					
TD	0.639	1.000				
IM.set-1	0.966	0.765	1.000			
IM.set-2	0.933	0.628	0.916	1.000		
IM.set-3	0.952	0.647	0.938	0.996	1.000	
IM.set-4	0.933	0.628	0.916	1.000	0.996	1.000

Therefore, the estimates for the general life satisfaction are very similar, regardless of whether the BU, TD, or IM perspective is adopted.

DISCUSSION AND IMPLICATIONS FOR FUTURE RESEARCH

In this paper we have discussed the connections between life satisfaction and the domain satisfactions. Irrespective of the model, the relations prove to be very strong. Small increases in any of the domain satisfactions seem to come together, with a tendency to increase in all the other domains, as well in the life satisfaction as a whole.

Regardless of whether the active population or the entire population is considered, or whether or not job satisfaction is included in our models, the BU get little support as compared to the TD approaches. The integrated models find better empirical support, particularly when controlling for the objective life conditions. Even for these last models, the goodness-of-fit indexes are not very strong. It is probable that by increasing (a) the number of allowed covariance relations between the variables that describe the objective life conditions and (b) the number of these variables, the IFI indexes would become acceptable. However, our goal was not to completely explain the variation in the variables considered, but to test for the DS-OvLS interrelations, and compare the TD, BU, and IM approaches.

The objective life conditions contribute to explaining the DS and the OvLS, but they are not enough to predict the levels of the satisfaction indexes. For instance, theoretically it is possible for a person who is very deprived from the point of view of housing conditions to report not-so-low housing satisfaction, due to the general satisfaction in the other domains or life as a whole.

Considering the standardized weights in the TD and the IM sets of models, they indicate that the OvLS is the most important determinant for each of the DS,

except for health satisfaction, where the self-rating of health has a stronger influence. Also, in the BU models, the main predictors of the OvLS are to be found among the domain satisfactions. In particular, the satisfaction with the standard of life, the satisfaction with family, and the satisfaction with education contribute to the variation in the overall life satisfaction. In the integrated model, the general life satisfaction is a much more important factor for the OvLS than any of the objective life conditions for which we have controlled.

All these serve as arguments for conceiving each domain satisfaction as part of a dense network of interrelations with the other domain satisfactions. Each DS is strongly embedded in a more general satisfaction that depends on the objective conditions. People tend to adjust their satisfactions not only depending on the objective life conditions, but also as compared to the other satisfactions they experience in other domains. This brings supplementary support for the TD perspective, suggesting the presence of a general life satisfaction that influences each DS.

However, as we have shown, the objective conditions do determine the satisfactions in the life domains to which the respondents belong. Also, the domain satisfactions may determine the general life satisfaction. Both relations are part of a BU chain.

Overall, the analysis provides evidence that lead to the IM approach, with the top-down and bottom-up effects simultaneously determining the levels of both the OvLS and the DS.

The connection between the OvLS and each DS might be spurious, resulting from various other factors (personality traits, for instance) that influence both types of satisfaction (Rode, 2004). However, the relations that we have studied have proven to be very strong. The models remained unchanged even when components, such as job satisfaction and its determinants, were removed from the analysis. Even when controlling for personality traits, the OvLS–DS relations are likely to remain strong. Moreover, the presence of a general life satisfaction does not exclude its dependency on personality traits, such as neuroticism or extraversion.

Our analysis does not directly contribute to the relative domain importance debate (Hsieh, 2003; Wu, 2008; Wu et al., 2009). However, the results implicitly support the option that, when building IM or BU life satisfaction indexes, the DS should not get similar weights. The bottom-up and the integrated models include different regression weights for the relation between the general life satisfaction and each DS. Therefore, the intensity of the connection differs from one domain to another. This suggests that simply summing up the scores for the domain satisfactions might not be the best idea.

The discussion about the complementariness of the TD and BU approaches should probably be extended by considering the shape of the relation (Rojas, 2006; Gonzales et al., 2009). Future research may help to clarifying this question by including non-linear dependency within the IM approach.

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Două tipuri de indicatori sunt, de regulă, utilizați pentru măsurarea satisfacției cu viața la nivel individual. Una dintre opțiuni este de a măsura satisfacția generală față de viață (OVLS). Altă opțiune este considerarea satisfacției față de diferite fațete sau domenii ale vieții (DS). Modele top-down (TD), bottom-up (BU) și integrate pot descrie relațiile dintre satisfacție generală față de viață și satisfacția cu domeniile vieții. Abordarea „Top-down” consideră că OVLS determină DS jucând rolul de intermediar pentru caracteristici de personalitate mai generale, care determină satisfacția cu viața. Explicația „bottom-up” (BU) vede OVLS ca pe un produs al condițiilor obiective de viață, mediate prin intermediul DS. Modelul integrat (IM) caută să reconcilieze cele două perspective, considerând în mod simultan dependența TD și cea BU. Articolul de față testează empiric cele trei abordări, folosind modele cu ecuații simultane pe date provenite din EQLS 2003. Arătăm că BU, TD și IM găsesc suport empiric similar, dar IM lucrează mai bine. Pe de altă parte, indiferent de abordare, fiecare relație DS–OVLS rămâne semnificativă, chiar când sunt controlate condițiile de viață obiective. Datele oferă suport pentru un model în care fiecare domeniu al satisfacției poate fi conceput ca parte a unei dense rețele de interrelații cu toate celelalte DS. Mai mult decât atât, fiecare DS este puternic încorporat în satisfacția generală, de ordin superior, care depinde de condițiile obiective.

Cuvinte-cheie: satisfacția cu viața, satisfacția cu domeniile vieții, top-down, bottom-up, modelele SEM ale satisfacției cu viața.

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