

A cross-cultural experimental approach to the contribution of health, religion and personal relations to subjective satisfaction with life as a whole

Peter Theuns^{*a}, Barbara Baran^a, Rebecca Van Vaerenbergh^a, Greet Hellenbosch^b, Habib Tiliouine^c

*Vrije Universiteit Brussel, Belgium^a, Plantijn Hogeschool, Belgium^b,
Université d'Oran, Algeria^c*

In cross-cultural research on quality of life, researchers must deal with the fundamental incomparability of subjective wellbeing assessments across cultural groups. This incompatibility most probably results from an identification problem: cultural groups most likely differ in both objective achievements in different life domains as well as in the appraisal thereof. Information Integration Theory provides a framework that allows to better understand the composition of the concept of *satisfaction with life as a whole* across culturally different groups. In three web-based experiments, using Percentile Stimulus Metrics, it was studied how students in Algeria, Belgium and Poland integrate information on various life domains into an appraisal of satisfaction with life as a whole. It was found that different integration models coexist in the 3 studied groups, and that the prevalence of these strategies differs across groups.

Despite a long research history, researchers do not agree about the definition of “Quality of Life” (Veenhoven, 2012). When measuring Quality of Life, it is typically either considered as one subjective, indivisible whole (Bernheim, 1999; Cantril, 1965), or, on the contrary, as a result of satisfaction in several crucial life domains (Cummins, 1996 ; Oishi, Diener, Lucas, & Suh, 1999). Whichever approach is opted for, it seems interesting to investigate how satisfaction in particular life domains

* Acknowledgments: The authors would like to thank Joeri Hofmans for his kind help with the cluster analysis performed on our data. Correspondence address: Peter Theuns, Faculty of Psychology and Education Sciences, Vrije Universiteit Brussel, Pleinlaan 2, 1050 Brussels, Belgium. Tel +3226292056, Email: Peter.Theuns@vub.ac.be

contributes to overall satisfaction with life as a whole (Taillefer, Dupuis, Roberge, & May, 2003). The current study investigates how people from quite similar populations, but living in different countries, combine levels of satisfaction in particular life domains into overall satisfaction with life as a whole.

Different authors have produced lists of important life domains with respect to satisfaction with life as a whole (Chen et al., 2004; Oishi et al., 1999; Sirgy et al., 2006). Satisfaction in each of these domains then constitutes overall satisfaction with life. A current, widely used instrument to measure satisfaction with life as a whole is the Personal Wellbeing Index (PWI) (International Wellbeing Group, 2006), which comprises eight life domains: Standard of living; Personal health; Achieving in life; Personal relationships; Personal safety; Community-Connectedness; Future Security; Religion/Spirituality. For economical reasons not all 8 were studied in this survey; rather 3 life domains were picked: Religion/Spirituality, Personal relationships and Personal health. As explained further, this choice was made because these life domains can be expected to have different significance in the studied groups of participants (Religion/Spirituality and Personal health) or have specific relevance at the age of most participants (Personal relationships).

Several attempts to relate satisfaction in particular life domains to quality of life have been reported and it was found that linear, nor classical non-linear models apply (González, Coenders, Saez, & Casas, 2009; Rojas, 2006; Zanin, 2011) and that more complex models are needed (Theuns, Verresen, Mairesse, Goossens, Michiels, Peeters & Wastiau, 2010).

In the latter study, as well as in the study of Theuns, Hofmans, & Verresen (2007), it was found that the intuitive combination of information on different life domains can be modeled well with rather simple arithmetic such as adding or averaging, but that strong satisfaction or dissatisfaction in a particular life domain may affect the weights attributed to that domain, which is called “differential weighting”. The current study builds on previous work which applied Information Integration Theory (Anderson, 1981) in the field of quality of life research (Theuns et al., 2007 ; Theuns et al., 2010). In particular, it studies cross-cultural differences in the conceptualization of the quality of life concept.

When studying cross-cultural differences, the experimental designs that have been used so far for within-culture studies are not appropriate. In particular, in previous studies participants were presented with textual

descriptions of people¹, and these descriptions may be very culture specific. Moreover, in one study participants found it difficult to imagine their own quality of life in a situation that was instructed to be very different from their actual life (Theuns, et al., 2007). In another study, people found it difficult to imagine an unknown person if no information was provided for that person about life domains other than the ones studied (Theuns, et al., 2010). Because of these reasons, a novel kind of stimuli needed to be developed. To this end we introduce Percentile Stimulus Metrics.

With Percentile Stimulus Metrics, the different levels of the stimuli are presented as percentile intensities. In the present study, this implies that satisfaction in each of the life domains is presented as a percentage, as can be seen in figure 1. An important advantage of this type of manipulation is that they can conveniently be used in a cross-cultural context, because the levels of satisfaction in the particular life domains no longer depend on material circumstances that are required to achieve them. Cultures differ in defining the exact meaning of domains and have different standards for being satisfied with it (Lu & Gilmour, 2004; Lau & Cummins, 2005; Tafarodi et al., 2011). For example, owning a motorbike could result in very different levels of satisfaction with standard of living in different cultures. However, we assume that subjective satisfaction rather than objective achievements determine quality of life. Hence, owning a motorbike may yield a similar level of subjective satisfaction with standard of living in the one cultural context, as would a car in some other. In this study this level of subjective satisfaction is primed by a percentage rather than by mentioning either the car or the motorbike.

A first research question that is addressed with the present study is whether stimulus presentation with Percentile Stimulus Metrics yields similar results as previous studies that relied on textual descriptions. This is important because critics could argue that the mere format of the presented stimuli in some way would induce a response behavior that would have little external validity. Although there are studies that show that the external validity of Information Integration experiments is good (Gamelin, Muñoz Sastre, Sorum, & Mullet, 2006; Mairesse et al., 2010), this remains an important issue.

¹ One such textual description went: “You usually stay in a comfortable living room, your loan is average and you own about as much as your peers. Besides, you regularly talk to your family, you can count on their support and sometimes you do things together with them. Moreover, your health condition hinders you from time to time (e.g. epilepsy, asthma, migraine...) and you take 1 medicine daily.”

A next research question concerns cross-cultural differences in the composition of the quality of life construct. Although previous work has indicated that the quality of life construct differs across cultures (Theuns, Hofmans, Mazaheri, Van Acker, & Bernheim, 2010), further research is needed to better understand how different life domains contribute to satisfaction with life as a whole. Differences between cultures and groups can result from different situations. One possibility is that each cultural group differs in its conceptualization of subjective wellbeing. Another possibility would be that several different conceptualizations coexist, but that their prevalence differs across cultures. As this latter situation seems most plausible, we put this forth as a first hypothesis:

Hypothesis 1: Different conceptualizations of subjective wellbeing coexist within cultures, with their prevalence differing across cultures.

It seems that the approach aimed at unveiling individual differences in information integration strategies, as introduced by Hofmans and Mullet (in press), may be helpful to address this issue. In case the dominant strategies coincide with the cultural differences, this would substantiate the existence of different conceptualizations of quality of life in different cultural groups (there would be qualitative differences across groups), which would disprove our first hypothesis. If, however, the different strategies are spread across cultures, that would indicate that different conceptualizations of subjective wellbeing have a different prevalence in the different cultural groups (i.e. a quantitatively different distribution of the same qualitatively different conceptualizations across cultures), which would support the first hypothesis.

For the current study it was chosen to consider 3 life domains: Religion/Spirituality, Personal relationships and Personal health. Religion/Spirituality and Personal health were opted for as these life domains may be experienced quite differently in the countries where our participants live. In particular, in Algeria, it was found that religiousness contributes to the wellbeing of Muslim students because of increasing the “Meaning” in their lives (Tiliouine & Belgoumidi, 2009). Likewise, Poland is amongst the most homogenously Catholic countries worldwide, with 95.8% of its population declaring this religion, while Belgium has a greater religious diversity, with 80.9% Catholics followed by 3.8% of Muslims (de Vreese, Boomgaarden, Minkenberg, Vliegenthart, & Claes H. de Vreese, Hajo G. Boomgaarden, Michael Minkenberg, 2009), and a more advanced secularization than in Poland. Hence, Hypothesis 2:

Hypothesis 2: The effect of Religion-/Spirituality on subjective wellbeing will be the greatest in Algeria, less in Poland, and least in Belgium.

The Personal health domain was included in this study because this domain is commonly considered important (Skevington, 2002; Skevington, Sartorius, & Amir, 2004; Tiliouine, 2009; Veenhoven, 2008). As life expectancy differs significantly between Belgium, Poland and Algeria² (Mathers, Sadana, Salomon, Murray, & Lopez, 2001), one can expect that poor health would have a greater impact on subjective wellbeing in Algeria and Poland than it would in Belgium. This leads to our third hypothesis.

Hypothesis 3: The effect of Personal Health on subjective wellbeing is the greatest in Algeria, less in Poland, and least in Belgium.

Personal Relationships was chosen as third life domain because it is highly important to young people, such as students (Tafarodi et al., 2011; Lu & Gilmour, 2004). Given that all participants in this study were students, we should not expect clear differences in the importance of this life domain as such, but rather we can expect that the relative importance of the Personal Relations domain when compared to Religion/Spirituality and Personal Health may differ.

METHOD

Participants. Three hundred and fifty eight, mainly first year bachelor students in psychology at universities in Algeria ($N=146$), Belgium ($N=146$) and Poland ($N=66$) consented to take part in a web-based survey experiment on satisfaction with life as a whole. A brief description of the sample is given in Table 1.

² Disability Adjusted Life Expectancies in these countries were 71.6 (Belgium), 66.2 (Poland), and 61.6 (Algeria).

Table 1: Description of the participants from Algeria, Belgium and Poland

	Algeria	Belgium	Poland
Total number of participants	146	146	66
Experiment 1: Religion × Personal Relationships	48	48	19
Experiment 2: Religion × Health	49	48	20
Experiment 3: Personal Relationships × Health	49	50	27
% Females	75.3%	86.3%	83.3%
Average age (SD)	22.7 (3.3)	20.8 (4.2)	22.5 (4.3)
Students of psychology	92.3%	96.5%	90.9%

Procedure. Each participant took part in one of 3 online experiments, each of which had a full-factorial 4 by 4 design in which the contribution of different levels of satisfaction in 2 particular life domains were studied. Three out of 8 life domains discerned by the International Wellbeing Group (International Wellbeing Group, 2006) were picked: Religion/Spirituality, Personal Relationships and Personal Health.

Participants were randomly assigned to one of 3 concurrent experiments, in each of which satisfaction in 2 life domains was manipulated as follows: no-information; 30%; 60%; and 90%. The studied life domains were: Experiment 1 = Religion/Spirituality × Personal Relationships; Experiment 2 = Religion/Spirituality × Health, and Experiment 3 = Personal Relationships × Health. In the first part of each of the 3 experiments, participants were required to assess satisfaction with life as a whole in some unknown person who was introduced to them in each of 16 consecutive stimulus screens such as shown in Figure 1. The second part of the study consisted of a questionnaire about their actual personal wellbeing (PWI) and some demographic information; the data obtained from this second part of the study will be reported elsewhere.

The actual experiment was preceded by a familiarization phase comprising two trial screens. Participants were instructed to focus on the relative importance of the life domains, and not to “compute” their responses.

Imagine an unknown person whose satisfaction during the past 2 weeks in different life domains has been as follows:

	Satisfaction:
their standard of living	60%
their health	60%
what they are achieving in life	60%
how safe they feel	60%
their feeling part of their community	60%
their future security	60%
their religion or spirituality	90%

In your opinion, how satisfied is this person with their life as a whole? Click on the bullet of your choice.

0 1 2 3 4 5 6 7 8 9 10

Figure 1: Sample screen taken from Experiment 1 (Religion/Spirituality × Personal Relationships), when the level of satisfaction with Religion/Spirituality was 90% and the level of satisfaction with Personal Relationships was ‘no information’.

The experiments were constructed using OSuCre (Van Acker, 2007). The introductory text for the experiment and all instructions were translated to Arabic, Dutch and Polish by the researchers working in close collaboration, in order to guarantee functional equivalence of the translations (Bullinger, Anderson, Cella, & Aaronson, 1993).

Analysis. The data-analysis for this study is effectuated as follows: First, different integration strategy clusters are identified using the clustering approach as outlined by Hofmans and Mullet (in press). Next, consecutive ANOVAs are performed to establish the integration rules (adding, averaging, multiplying, or other) that typify each of the identified integration strategies (Anderson, 1981). Statistical analysis was conducted with SPSS 19.0 for Windows and TwoMP, a MATLAB interface developed by Schepers and Hofmans (2009).

RESULTS

Analyses per country have been performed and reported elsewhere (Theuns, Baran, Van Vaerenberg, Hellenbosch, & Tiliouine, 2011). Summarized, both prior manipulation checks and random exit interviews

indicate that the stimulus format with Percentile Stimulus Metrics is well received by participants. Moreover, it was found that respondents integrate the different domains according to adding and averaging strategies predominantly. As such, it was concluded that the Percentile Stimulus Metrics do not result in responses that diverge from those obtained with previous textual stimulus formats.

After confirming linear relationships among the variables prior to the clustering approach, regression analysis was applied as method for imputation of missing data for 10 Algerian participants: as we chose to present each consecutive stimulus screen only a single time, missing values could for example not be imputed by a response obtained from a repetition. The obtained sample sizes did not allow us to include only complete cases.

The approach introduced by Hofmans and Mullet (in press) was used to identify individual differences in information integration strategies. First, raw data were standardized within subjects into linear z -scores in order to eliminate individual differences in response tendencies. Next, a k -means clustering was performed using the TwoMP program (Schepers & Hofmans, 2009). For each number of clusters (we fitted models ranging from 1 to 10 clusters), 100 random starts were used to minimize the possibility of ending in a local optimum. Finally, the convex hull procedure (which resembles the well known scree plot) was used to decide on the number of clusters (i.e., k). It was found in all 3 experiments that clusters did not coincide with the countries, but rather all clusters comprised participants from different countries (see tables 2 to 4). This finding supports our first hypothesis.

Hypothesis 2 is addressed in Experiment 1, where level of satisfaction in Religion/Spirituality and Personal Relationships were manipulated. Four clusters were identified in the data obtained from this experiment (Figure 2). In the first cluster (which comprised 35% of the Algerian sample and few participants from Belgium and Poland, see Table 2) quality of life seems to follow an additive model, which, moreover, is characterized by a strong effect of the level of satisfaction with Religion/Spirituality, while the effect of Personal Relationships is very small. A second cluster of participants (Figure 2-cluster 2) is characterized by an adding model where, other than in the previous cluster, Personal Relationships have a very strong effect while Religion/Spirituality has a very low impact. This model applies to 60% of the Belgian sample, and 35% of the Polish sample, while no one from the Algerian sample responded according to this model. The third cluster (comprising 30% of the Algerian sample, 17% of the Belgian sample, and 5% of the Polish sample) seems to show mainly a pattern of parallelism, with exceptions for

the lower levels of both life domains. The pattern in this figure resembles a linear fan when the null condition for Personal Relationships is not considered, which would support a multiplication model. However, the null condition yields a clearly steeper line than all 3 lines for non-null conditions for the Personal Relationships domain, which supports an averaging model with differential weighting. It seems that in this 3rd cluster, a low satisfaction with Personal Relationships strongly diminishes the compensatory effect of higher satisfaction with Religion/Spirituality on satisfaction with life as a whole. For higher levels of satisfaction with Personal Relationships, the effect of satisfaction with Religion/Spirituality is much larger, as if satisfaction with Personal Relationships is a necessary condition for a strong effect of satisfaction with Religion/Spirituality. Low satisfaction in the Religion/Spirituality domain seems to restrict the compensatory effect of high satisfaction with Personal Relationships. The factorial plot obtained for the fourth cluster (comprising 24% of the Algerian sample, 17% of the Belgian sample, and 50% of the Polish sample) indicates that integration occurred according to an averaging model, as can be seen from the null condition for Personal Relationships, which crosses over the 3 parallel lines, representing the different levels with Personal Relationships. In this cluster Personal Relationships has a much stronger impact on satisfaction with life as a whole than Religion/Spirituality, however, satisfaction in the one domain compensates for dissatisfaction in the other, which is typical for the averaging model. In particular, high satisfaction in Personal Relationships strongly increases the general assessment. When high satisfaction with Personal Relationships is combined with high satisfaction in the Religion/Spirituality domain, it seems that a ceiling effect occurs, as parallelism in this plot would have required higher overall satisfaction in the condition with Religion/Spirituality and Personal Relationships both at 90% satisfaction.

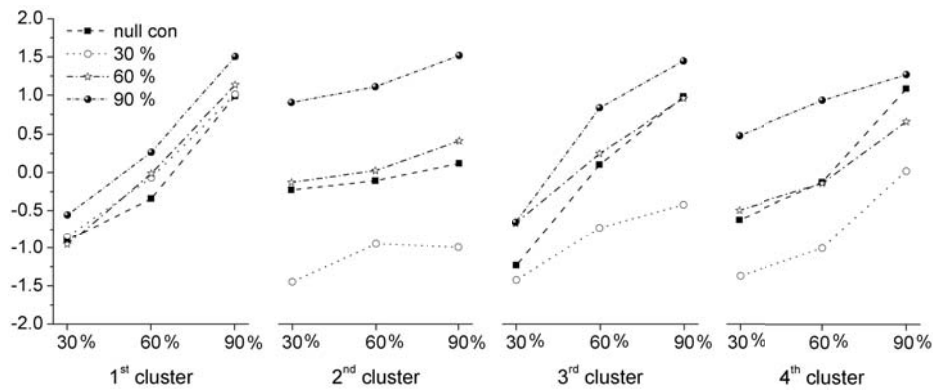


Figure 2: Levels of overall satisfaction with life resulting from manipulated levels of satisfaction with Religion/Spirituality \times Personal Relationships, expressed in z-scores. On the horizontal axis are 3 levels of satisfaction with Religion/Spirituality, and separate lines show 4 levels of satisfaction with Personal Relationships, “null con” denotes the null or no-information condition.

Table 2: Distribution of participants over information integration strategy clusters in Experiment 1

	Cluster				n
	1	2	3	4	
Algeria	39,6%	0,0%	33,3%	27,1%	48
Belgium	6,3%	60,4%	16,7%	16,7%	48
Poland	5,3%	36,8%	5,3%	52,6%	19
Total	23	36	25	31	115

The results from Experiment 1 bring support for our hypothesis 2, which indicates that the relative importance of Religion/Spirituality and Personal Relationships is differently distributed across the studied samples and this in line with the religiosity of the countries.

Hypotheses 2 and 3 are studied in Experiment 2, where satisfaction with Religion/Spirituality and Personal Health were manipulated. Only two clusters emerged. In the first cluster (comprising 76% of the Algerian sample, 35% of the Belgian sample, and 50% of the Polish sample, see Table 3) participants seemed to respond according to an averaging model, which is mostly dominated by the effects of satisfaction with Religion/Spirituality. Although the second cluster (24% of the Algerian sample, 65% of the Belgian sample, and 50% of the Polish sample) too can be characterized by averaging as integration rule, these participants seem to value satisfaction with Health more than satisfaction with Religion/Spirituality.

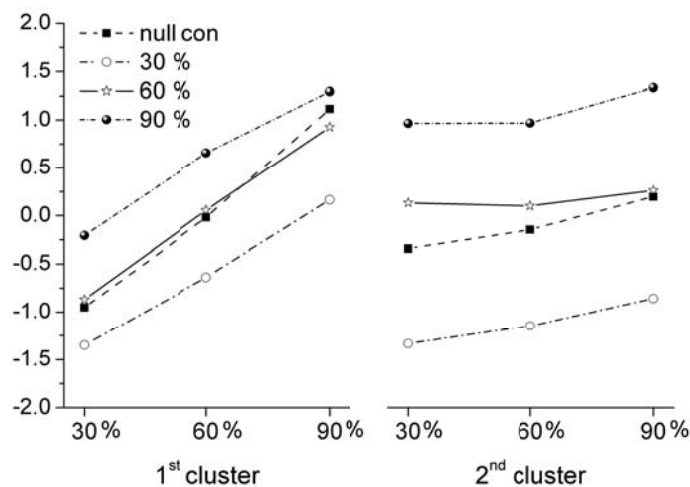


Figure 3: Levels of overall satisfaction with life, expressed in z-scores, resulting from manipulated satisfaction with Religion/Spirituality × Health. On the horizontal axis are 3 levels of satisfaction with Religion/Spirituality, and separate lines show 4 levels of satisfaction with Health, “null con” denotes the null or no-information condition.

Hypotheses 2 and 3 both would predict a larger group of participants from Algeria to endorse an information integration strategy where both religion and health show large effects, which is validated by the 75.5% of Algerian participants showing in cluster 1. The same logic would predict more Belgian participants to adopt an integration strategy with relatively small effects for both life domains. However, a majority (64.6%) of Belgian participants integrated the information about religion and health with a high

weight for health and a small weight for religion. It seems that health still is considered to be an important issue by Belgian participants.

Table 3: Distribution of participants over information integration strategy clusters in Experiment 2

	Cluster		n
	1	2	
Algeria	75,5%	24,5%	54
Belgium	35,4%	64,6%	48
Poland	50,0%	50,0%	20
Total	64	53	117

Hypothesis 3 is investigated with Experiment 3, where satisfaction with Health and Personal Relationships were manipulated, and which resulted in 3 clusters. The first one (39% of the Algerian sample, 46% of the Belgian sample, and 37% of the Polish sample, see Table 4) uses the averaging method but here the effect of low satisfaction with Health on QOL cannot be compensated for by satisfaction with Personal Relationships. This is an example of differential weighting with a higher weight for Health if satisfaction therewith is low. The second cluster (18% of the Algerian sample, 48% of the Belgian sample, and 48% of the Polish sample) also shows an averaging model in which satisfaction with Personal Relationships seems more of an issue than satisfaction with Health. The third cluster comprised 43% of the Algerian sample, while only 6% of the Belgian and 15% of the Polish sample appeared in this cluster. This cluster again shows that integration occurred according to an averaging model. However, in this cluster, satisfaction with Personal Relationships has only a minor impact on satisfaction with life as a whole, whereas satisfaction with Health is more important and especially lower satisfaction with Health strongly reducing subjective wellbeing. It seems that satisfaction with one's health is of major importance for almost half of the participants from Algeria, not so much for Polish and Belgian participants.

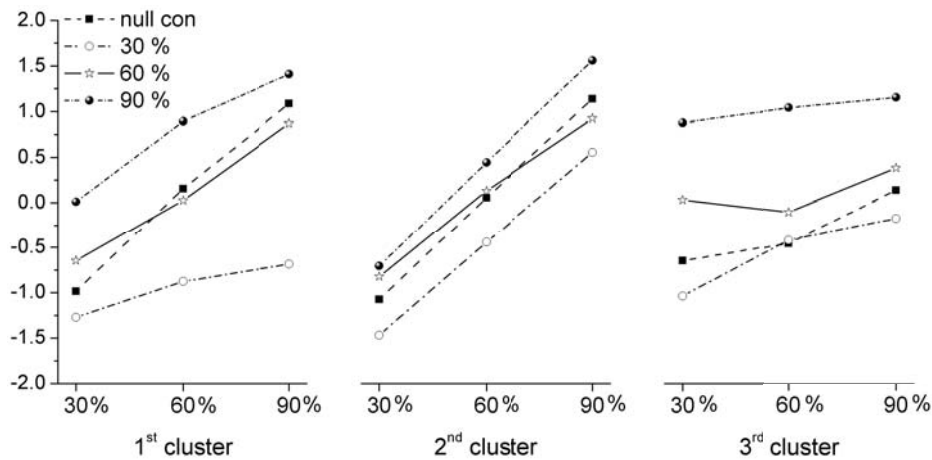


Figure 4: Levels of overall satisfaction with life, expressed in z-scores, resulting from manipulated satisfaction with Personal Relationships \times Health. On the horizontal axis are 3 levels of satisfaction with Personal Relationships, and separate lines show 4 levels of satisfaction with Health, “null con” denotes the null or no-information condition.

Table 4: Distribution of participants over information integration strategy clusters in Experiment 3

	Cluster			n
	1	2	3	
Algeria	38,8%	18,4%	42,9%	49
Belgium	46,0%	48,0%	6,0%	50
Poland	37,0%	48,1%	14,8%	27
Total	52	46	28	126

These results support hypothesis 3, indicating more pre-occupation with poor health in Algeria (clusters 1 and 3), and a larger effect of the quality of Personal Relationships in Poland and Belgium. However, a large proportion of participants from all 3 countries are in cluster 1 where quality of Personal Relationships strongly affects subjective wellbeing only if

satisfaction with Health is at 60 or 90%. In this cluster some minimal level of satisfaction with Health is considered to be a condition sine qua non for subjective wellbeing.

DISCUSSION

In general, our results show that adding and averaging are the dominant integration models when assessing satisfaction with life as a whole. However, one multiplicative model has been observed for one of the clusters in the Religion/Spirituality \times Personal Relationships experiment (Experiment 1), which applied to one third of the Algerian and 17% of the Belgian participants (see Table 2). In all three experiments clusters of participants have been identified which group participants from different countries, however, particular clusters did not accommodate similar proportions of respondents from the 3 countries. It seems that, although different integration rules apply to subgroups from each of the included countries, their prevalence is unequal across countries. This suggests that cross-cultural differences in the conceptualisations of satisfaction with life as a whole are reflected in differences in the distribution of these conceptualizations within the cultures.

The first experiment shows that Algerian participants are present in 3 of the 4 clusters. For a majority of Algerian participants the religion/spirituality domain has a great importance for overall subjective wellbeing (clusters 1 and 3). This finding is in line with survey results which indicate that religion is omnipresent in the Algerian society and that it therefore impacts significantly on subjective wellbeing (Tiliouine, Cummins, & Davern, 2009). Sixty percent of the Belgian participants and 35% of the Polish are in cluster 2 where satisfaction with Religion/Spirituality hardly contributes while Personal Relationships has a strong effect. Fifty percent of the Polish participants show in cluster 4 where Religion/Spirituality contributes but clearly less than Personal Relationships, while only 24% of the Algerian and 17% of the Belgian participants are in this cluster. In clusters 2 and 4, comprising mostly European participants, the effect of satisfaction with Religion/Spirituality is clearly smaller than in clusters 1 and 3, which consist mainly of Algerian participants. The effect of Personal Relationships is the largest in cluster 2, which comprises a majority of Belgian respondents. In cluster 3, with a majority of participants from Algeria and some from Belgium, low satisfaction with Personal Relationships overrules the effect of the Religion/Spirituality domain: at the lowest satisfaction level for Personal Relationships, the effect of different satisfaction levels for

Religion/Spirituality is very small, compared to its effect for higher levels of satisfaction with Personal Relationships. This indicates that in this cluster satisfaction with Religion/Spirituality has an important effect on overall subjective wellbeing, but only in case a sufficient satisfaction level is achieved for Personal Relationships. In cluster 4, comprising mainly Polish students, satisfaction with Personal Relationships and satisfaction with Religion/Spirituality both increase the general assessment similarly. In this cluster the crossover of the no-information condition (null condition) for Personal Relationships is striking. This indicates that the integration of information followed an averaging model, which means that satisfaction levels for Religion/Spirituality and Personal Relationships compensate. The second cluster, comprising 60% of Belgian participants and 35% of the Polish, is characterized by a dominant impact of satisfaction in the Personal Relationships domain over satisfaction with Religion/Spirituality, which may coincide with a higher secularization among Belgians and some part of young people in Poland. This is in strong contrast with cluster 1, typifying the largest subgroup of Algerians, where the importance of satisfaction with Religion/Spirituality to contribute to overall subjective wellbeing is much larger than the effect of satisfaction with Personal Relationships. This illustrates the differences between the religious society in Algeria as opposed to the more secularised European societies (Tiliouine et al., 2009). Cluster 4, which accommodates most Polish participants, yields a factorial plot that seems to lie somewhat in-between those for clusters 1 and 2. In this latter cluster satisfaction with Religion/Spirituality and satisfaction with Personal Relationships seem to impact equally on overall subjective wellbeing.

In the second experiment, 2 clusters emerged, which differ mostly in the importance attributed to satisfaction with Religion/Spirituality. A clear majority of Algerian participants showed up in cluster 1, where satisfaction with Religion/Spirituality contributes to overall satisfaction with life more strongly than the Health domain. This opposes a clear majority of Belgian participants, who value satisfaction with Health much more than satisfaction with Religion/Spirituality (of which the importance seems close to null in cluster 2). The Polish participants are equally represented in both clusters, which indicates that among Polish participants quite fundamentally different conceptualizations of satisfaction with life as a whole seem to coexist. The lesser importance of Health, compared to satisfaction with Religion/Spirituality found in a majority of Algerian participants is striking. Again this illustrates the very central role of religion in the Algerian society (Tiliouine & Belgoumidi, 2009). Although good health may be easier to achieve in Belgium than in Poland or Algeria, the Belgian participants still

seem to highly value the importance of good health for overall satisfaction with life, as do participants from the 2 other countries.

In the third experiment, about half of the Belgian and Polish participants show up in the 2nd cluster where the level of satisfaction with Personal Relationships impacts strongly on overall satisfaction with life, more than satisfaction with Health. Only a minority of Algerian participants occurs in this cluster. The majority of Algerian participants occurs in clusters 1 and 3, where good Personal Relationships can hardly compensate for a bad health condition. This finding may be explained by the poorer development and lesser accessibility of health care in a developing country like Algeria (Tiliouine, 2009).

It is concluded that cultural differences in the conceptualization of overall satisfaction with life exist, and that differences between cultures result from different distributions of these conceptualizations. It is found that the contribution of satisfaction with Personal Relationships, Health, and Religion/Spirituality in overall satisfaction with life is strongly related to the culturally transmitted importance of personal relationships, the development and accessibility of health care, and the importance of religion in one's society. For further research it would be interesting to investigate if similar results would be obtained for non-student participants and to study how other life domains contribute to overall satisfaction with life across cultures.

REFERENCES

- Anderson, N. H. (1981). *Foundations of information integration theory*. New York: Academic Press.
- Bernheim, J. L. (1999). How to get serious answers to the serious question: "How have you been?": subjective quality of life (QOL) as an individual experiential emergent construct. *Bioethics*, 13(3-4), 272-87.
- Bullinger, M., Anderson, R., Cella, D., & Aaronson, N. (1993). Developing and evaluating cross-cultural instruments from minimum requirements to optimal models. *Quality of life research : an international journal of quality of life aspects of treatment, care and rehabilitation*, 2(6), 451-9.
- Cantril, H. (1965). *The pattern of human concerns*. New Brunswick, NJ: Rutgers University Press.
- Chen, H., Cohen, P., Kasen, S., Gordan, K., Dufur, R., & Smailes, E. (2004). Construction and validation of a quality of life instrument for young adults. *Quality of life research : an international journal of quality of life aspects of treatment, care and rehabilitation*, 13(4), 747-59.
- Cummins, R. A. (1996). The domains of life satisfaction: an attempt to order chaos. *Social Indicators Research*, 38, 303-328.

- de Vreese, C. H., Boomgaarden, H. G., Minkenberg, M., Vliegthart, R., & Claes H. de Vreese, Hajo G. Boomgaarden, Michael Minkenberg, R. V. (2009). Introduction: Religion and the European Union. *West European Politics*, 32(6), 1181-1189.
- Gamelin, A., Muñoz Sastre, M. T., Sorum, P. C., & Mullet, E. (2006). Eliciting utilities using functional methodology: people's disutilities for the adverse outcomes of cardiopulmonary resuscitation. *Quality of life research: an international journal of quality of life aspects of treatment, care and rehabilitation*, 15(3), 429-39.
- González, M., Coenders, G., Saez, M., & Casas, F. (2009). Non-linearity, Complexity and Limited Measurement in the Relationship Between Satisfaction with Specific Life Domains and Satisfaction with Life as a Whole. *Journal of Happiness Studies*, 11(3), 335-352.
- Hofmans, J., & Mullet, E. (in press). Towards unveiling individual differences in different stages of information processing: a clustering-based approach. *Quality & Quantity*.
- International Wellbeing Group. (2006). Personal Wellbeing Index. Melbourne: Australian Centre on Quality of Life, Deakin University.
- Lau, A. L. D., Cummins, R. A., & McPherson, W. (2005). An investigation into the cross-cultural equivalence of the personal wellbeing index, (72), 403-430.
- Lu, L., & Gilmour, R. (2004). Culture and conceptions of happiness: individual oriented and social oriented swb. *Journal of Happiness Studies*, 5(3), 269-291.
- Mairesse, O., Hofmans, J., Neu, D., Dinis, A. L., Cluydts, R., & Theuns, P. (2010). The algebra of sleepiness: investigating the interaction of homeostatic (S) and circadian (C) processes in sleepiness using linear metrics. *Psicológica*, (31), 541-559.
- Mathers, C. D., Sadana, R., Salomon, J. A., Murray, C. J. L., & Lopez, A. D. (2001). World Health Report 2000 Healthy life expectancy in 191 countries, 1999. *The Lancet*, 357, 1685-1691.
- Oishi, S., Diener, E. F., Lucas, R. E., & Suh, E. M. (1999). Cross-Cultural Variations in Predictors of Life Satisfaction: Perspectives from Needs and Values. *Personality and Social Psychology Bulletin*, 25(8), 980-990.
- Rojas, M. (2006). Life satisfaction and satisfaction in domains of life: is it a simple relationship? *Journal of Happiness Studies*, 7(4), 467-497.
- Schepers, J., & Hofmans, J. (2009). TwoMP: a MATLAB graphical user interface for two-mode partitioning. *Behavior research methods*, 41(2), 507-14.
- Sirgy, M. J., Michalos, A. C., Ferriss, A. L., Easterlin, R. A., Patrick, D., & Pavot, W. (2006). The Quality-of-Life (QOL) Research Movement: Past, Present, and Future. *Social Indicators Research*, 76(3), 343-466.
- Skevington, S. M. (2002). Advancing cross-cultural research on quality of life: observations drawn from the WHOQOL development. World Health Organisation Quality of Life Assessment. *Quality of life research: an international journal of quality of life aspects of treatment, care and rehabilitation*, 11(2), 135-44.
- Skevington, S. M., Sartorius, N., & Amir, M. (2004). Developing methods for assessing quality of life in different cultural settings. The history of the WHOQOL instruments. *Social psychiatry and psychiatric epidemiology*, 39(1), 1-8.
- Tafarodi, R. W., Bonn, G., Liang, H., Takai, J., Moriizumi, S., Belhekar, V., & Padhye, A. (2011). What Makes for a Good Life? A Four-Nation Study. *Journal of Happiness Studies*, 1-18. Springer.

- Taillefer, M.-C., Dupuis, G., Roberge, M.-A., & May, S. L. E. (2003). Health-related quality of life models: Systematic review of the literature. *Social Indicators Research, 64*(2), 293–323. Springer.
- Theuns, P., Baran, B., Van Vaerenberg, R., Hellenbosch, G., & Tiliouine, H. (2011). Contribution of life domains to quality of life: A cross-cultural approach. *Paper presented at the Information Integration Theory and Functional Measurement, 3rd international conference, 8-9 August 2011, University of California at San Diego, CA.*
- Theuns, P., Hofmans, J., & Verresen, N. (2007). A functional measurement inquiry on the contribution of different life domains to overall subjective well-being. *Teorie & Modelli, 1-2*, 181-189.
- Theuns, P., Hofmans, J., Mazaheri, M., Van Acker, F., & Bernheim, J. L. (2010). Cross-national comparability of the WHOQOL-BREF: A measurement invariance approach. *Quality of life research: an international journal of quality of life aspects of treatment, care and rehabilitation, 19*(2), 219-24.
- Theuns, P., Verresen, N., Mairesse, O., Goossens, R., Michiels, L., Peeters, E., & Wastiau, M. (2010). An Experimental Approach to the Joint Effects of Relations with Partner, Friends and Parents on Happiness. *Psicologica, 31*, 629-645.
- Tiliouine, H. (2009). Health and Subjective Wellbeing in Algeria: A Developing Country in Transition. *Applied Research in Quality of Life, 4*(2), 223-238.
- Tiliouine, H., & Belgoumidi, A. (2009). An Exploratory Study of Religiosity, Meaning in Life and Subjective Wellbeing in Muslim Students from Algeria. *Applied Research in Quality of Life, 4*(1), 109-127.
- Tiliouine, H., Cummins, R. A., & Davern, M. (2009). Islamic religiosity, subjective well-being, and health. *Mental Health, Religion & Culture, 12*(1), 55-74.
- Van Acker, F. (2007). OSuCre: Online SURvey CREator. Retrieved from <http://osucre.be/>
- Veenhoven, R. (2008). Effects of happiness on physical health and the consequences for preventive. *Psychology, 9*, 449-469.
- Veenhoven, R. (2012). HAPPINESS: Also known as “life-satisfaction” and “subjective well-being.” In K. C. Land, M. J. Sirgy, & A. C. Michalos (Eds.), *Handbook of social indicators and quality of life research*. (pp. 63-77). Dordrecht: Springer Netherlands.
- Zanin, L. (2011). Detecting Unobserved Heterogeneity in the Relationship Between Subjective Well-Being and Satisfaction in Various Domains of Life Using the REBUS-PLS Path Modelling Approach: A Case Study. *Social Indicators Research*.