Consensus Analysis and Subcultural Variation: Examining the Second Consensus Factor

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ABSTRACT. When one examines typical survey data question-by-question, it is common to find that respondents converge fairly strongly in their answers to some questions, but show considerable diversity with respect to others. Indeed, in light of the range of responses for virtually every question, one might well ask whether there is common cultural understanding of the topic under investigation. To what extent can the diversity of answers among respondents be understood as random deviations from a generally shared culture? Is there a single "answer key" underlying the pattern of responses? These are the familiar research questions that consensus analysis enables us to answer. But, consensus analysis can also be used to identify systematically different understandings, if such exist in one's data. And, if coherent subcultural viewpoints do exist, then we need to identify the substantive topics/issues that differentiate them. In this paper, we review ways that consensus analysis can shed light on subcultural diversity, focusing especially on the second factor extracted. The data come from our research on residents perceptions of tourism in the Turks and Caicos Islands.

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Culture and Consensus

The concept of culture has crossed into the mainstream. In the late nineteenth century, something like its present meaning was known to only a tiny few. Now, everyone "knows" what culture is, and the concept has become crucial in marketing, economic development, and consulting. But what is culture really? We tend to think of it as an invisible "fluid" of values, orientations, beliefs, techniques, etc., in which a group "swims." There is a natural inclination to picture culture as passive (something an individual learns) and as uniform (something everyone has in common). Yet neither would be true of even the simplest, small-scale cultures, say that of a troop of baboons, much less a modern corporation or nation-state. If culture were entirely passive or uniform, possessing it would be far less interesting and useful.

Culture is much more in play than is generally envisioned. Ideas transmitted from one individual to another are not only received, they are modified, even transformed. As a consequence, true uniformity seldom prevails. Members need only share enough in common to be able to cooperate effectively. Cultural diversity is not only natural, it is highly adaptive – the information capacity of the group becomes much greater than that of any individual (Gatewood 1983).

But if on the whole cultural diversity is good, is there not a point at which diversity is too large, where, as Yeats put it, "Things fall apart; the centre cannot hold"? The answer of course is yes. If everyone rides off in their own direction, there is lots of diversity but no coherence; or if strong factions develop, unity of action can easily evaporate into conflict.

Consensus theory is a quantitative approach anthropologists have developed to address this issue. Cultural consensus breaks down if a culture becomes sufficiently disorganized or if it fractures into two or more distinctive subcultures. Consensus analysis provides a useful statistical test to gauge the degree of sharing, to determine whether the inter-individual variation is so great that it would be just wrong to ascribe *a culture* to the group. A culture exhibits consensus when it has a clearly defined central tendency – a single set of "correct" answers (where "correct" belongs in quotes because it really means an answer that is most representative of the group.)

Consensus Analysis: A Brief Explanation

As noted, the degree to which individuals in a society share learned understandings is quite variable. Many aspects of a culture are rather uniformly distributed among virtually all adult members of a society. On the other hand, and especially in societies with a complex division of labour, many areas of substantive knowledge are pretty much restricted to specialists. Attitudes, preferences, and opinions are often much more complexly distributed, enabling survey researchers to make a living by searching for statistically significant correlations. And, where conformity-inducing social control mechanism are lacking, still other areas of life can show almost free variation. Given the variable participation of individuals in their culture's information pool, how can one tell if there is a common culture lurking beneath inter-individual differences?

A solution to this general question was pioneered by Boster's (1980, 1985) study of Aguaruna manioc identifications. The key to his approach lies in realizing that (a) no one knows all of his or her group's culture, and (b) agreement is always a matter of degree. By examining the patterning of agreement among informants, Boster suggested one could detect whether individuals' understandings of a particular domain are uniform, variable in the form of expertise gradients, variable by sub-group affiliation, or random. When individuals' understandings are uniform, of course, there is no question about common culture. However, the second and third patterns also indicate coherent group-level culture, but with socially patterned variations. By contrast, random variation is, well, random.

Romney, Weller, and Batchelder (1986) developed this approach into cultural consensus theory. Consensus theory assumes that "the correspondence between the answers of any two informants is a function of the extent to which each is correlated with the truth" (Romney, et al., 1986: 316) and focuses precisely on the variable extent to which informants converge on the same answers to systematically asked questions.

For example, suppose Mr. Smith gives a multiple-choice test to his class, but arriving home discovered that he has lost the answer key. Could he grade the students' answer sheets anyway? Yes, he could (Batchelder and Romney 1988). Students who do not know the correct answer to a question will just guess, and guessing should produce predictable proportions of agreement across the available answers. On the other hand, when students know the correct answer, then they will converge on the same answer (the 'correct' one) more frequently than expected just by chance. Knowledge – cultural competence in a domain – produces deviations from equal probability, and more knowledgeable individuals will agree with one another more often than less knowledgeable individuals do. The ingenuity of consensus analysis is that it provides a way to estimate the cultural competence of individual informants from the patterning of their agreement.

The formal consensus model (Romney, et al. 1986: 317-318) rests on three assumptions:
1. *Common Truth*. The informants all come from a common culture, such that whatever their cultural version of the truth is, it is the same for all informants.
2. *Local Independence*. Informants' answers are given independently of other informants, i.e., there is no collusion or influence among informants.
3. *Homogeneity of Items*. Questions are all of the same difficulty, such that each informant has a fixed cultural competence over all questions.

If these three assumptions are met, then the eigenvalue of the first factor of a minimum residual factor analysis of a chance-corrected, respondent-by-respondent agreement matrix to a battery of questions will be substantially larger than the eigenvalue of the second factor. When this condition obtains, informants' loadings on the first factor should, generally, all be positive and the mean loading should be between about .50 and .90. For such data, each respondent's first factor loading is his or her relative "competence score." (More precisely, a respondent's first factor loading is a measure of how well that individual represents the entire sample's answers to the battery of questions asked.) When the first factor is very large compared to the second, variation may exist but there is a clearly defined central tendency; the culture is strongly centred around a specific set of beliefs, opinions, and expectations.

Conversely, if the ratio of the first to the second eigenvalues is less than about 3.50, if the average first factor loading is less than .50, or if there are many individuals with negative first factor loadings, then one or more of the three assumptions must not be true of the data. The *local independence* assumption can be upheld during data collection, and the *homogeneity of items* assumption is robust to deviations. Thus, if the ratio of eigenvalues or the average first factor loading indicates a poor fit of one's data with the consensus model, then one is generally safe concluding that the *common truth* assumption has been violated – for example, sub-cultures (systematically different ways of answering) may exist in the sample.

Consensus analysis works well with many kinds of data, but requires that all the questions be of the same type. The formal model (Romney, et al. 1986), which involves chance-corrections to agreement matrices before doing the factor analysis, is appropriate for true-false, check lists, belief-frames, or multiple-choice questions. The informal model (Romney, Batchelder, and Weller 1987), which uses respondent-by-respondent correlation matrices as the input for factor analysis, is appropriate for ratings, rankings, or even proximity matrices. Since the bulk of questions in the TCI survey involve ratings on a 5-point scale ("strongly disagree" to "strongly agree"), we analyzed these using the informal consensus model.

When using the informal model, the questions should be roughly counter-balanced with respect to their item means, i.e., approximately half the item means should be below the midpoint of the response scale, and half above (Gatewood and Lowe 2008). Such counter-balancing creates a more undulating "response profile" across the battery of questions and, thereby, produces more reliable inter-respondent correlations – more reliable in the sense that the effect of measurement error for each item separately is minimized on the obtained respondent-by-respondent correlations.

Ideally, researchers accomplish such counter-balancing by asking two questions for every specific topic – the paired questions being exact opposites of one another. Practically, however, the ideal procedure may not work well for two reasons. First, when the items are entire propositions (rather than, say, adjective-pairs such as used in semantic differential tasks) finding a natural and clear wording for an "opposite" meaning can be problematic. Second, the overall length of a questionnaire must be balanced against the patience of respondents. The final battery of 119 items in the middle pages of our survey instrument reflects a compromise between the methodological ideal and these two practical considerations. In early drafts of the questionnaire, every "question" had both a positive and a negative phrasing. But, in order to keep the questionnaire to 10-pages, we could not include all of these. Thus, in the final version of the questionnaire, about 88 of the items were intended as paired-opposites. The remaining 31 items are unpaired singletons, with roughly half of these being 'anticipated-agreement' phrasings and the other half being 'anticipated-disagreement' phrasings.

Finally, while the findings of consensus analysis are of interest by themselves, the factor loadings for individuals produced by the analysis can also be used as variables for other analyses. An individual's first factor loading is always a measure of how well he or she represents the entire sample across a given battery of questions. For this reason, if everyone has high scores, that indicates a high degree of culture sharing, because everyone well-represents the group. The

second factor, however, simply represents the next largest source of inter-individual variation (see Boster and Johnson 1989), and the most plausible interpretation of the second factor must be determined on a case by case basis. Sometimes the second largest source of variation might be related to sex or age differences; other times it might not correlate with any obvious demographic or behavioural variable. Thus, whether focusing on the first (culture-sharing) factor or the second, one can explore how well different independent variables predict individuals' factor loadings.

Findings from Consensus Analyses[1]

Respondents in the random sample (N=277) show only a marginal degree of cultural consensus across the battery of 119 "core" questionnaire items. The ratio of first to second eigenvalues is indicative of consensus (4.515), but the mean first factor loading is low (.499), and nine respondents (or 3.2% of the sample) have negative first factor loadings. (See top panel of Table 1, and scatterplot of factor loadings in Table 2.)

The marginal nature of the consensus concerning tourism is more apparent in the "Special Sample." (The special sample consists of 29 individuals who were interviewed in Phase I and subsequently completed the questionnaire in Phase II.) For the Special Sample, the ratio of eigenvalues falls short (3.355) of the customary threshold, although the mean first factor loading is acceptable (.584) and there are no negative loadings. (See bottom panel of Table 1.)

Together, the findings suggest there is not strong convergence of opinion, but rather only a weakly-shared understanding of tourism and its impacts among Belongers. There are two rather different reasons the data might show such a marginal consensus: (a) different segments of the sample have systematically different views of tourism across the whole battery of questions, and/or (b) there is consensus on only a sub-set of the questions, but systematically different ways of answering others questions. The remainder of this paper explores these possibilities.

Table 1: Initial Consensus Findings for the Random Sample and Special Sample

RANDOM SAMPLE (n=277) over 119 Items

Factor	Eigenvalue	Percent	Cum%	Ratio
1	80.508	77.5	77.7	**4.515**
2	17.830	17.2	94.7	3.218
3	5.540	5.3	100.0	

Mean 1st factor loading = **.499**, with **9** (3.2%) negative loadings

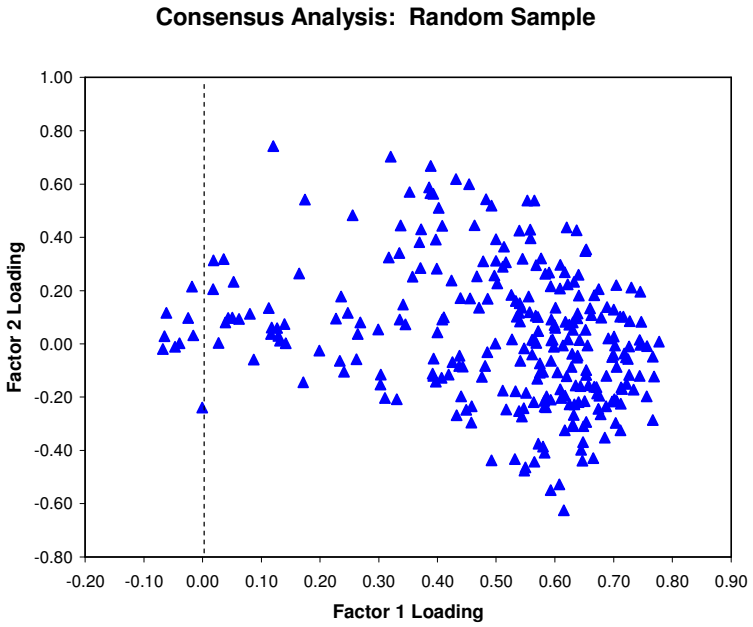
SPECIAL SAMPLE (n=29) over 119 Items

Factor	Eigenvalue	Percent	Cum%	Ratio
1	10.235	72.4	72.4	**3.355**
2	3.051	21.6	94.0	3.593
3	.849	6.0	100.0	

Mean 1st factor loading = **.584**, with **0** negative loadings

[1] All the consensus analyses discussed in this report were done using ANTHROPAC, Version 4.983/X (Borgatti 2002).

Table 2: Random Sample's Consensus Factor Loadings



Given the differences among the islands in Turks and Caicos with respect to their levels of touristic development, we disaggregated the random sample by island-group and performed separate consensus analyses for each. As Table 3 shows, consensus indicators go up sharply for South Caicos, Grand Turk (which includes four respondents from Salt Cay), and Providenciales, but there is no consensus among respondents from North Caicos or Middle Caicos. One might think it is the small number of respondents from Middle Caicos that gives rise to their poor consensus, but as the bottom panel of Table 3 shows, combining the eight Middle Caicos respondents with those from North Caicos does not achieve a cultural consensus, either.

Table 3: Consensus Findings for Each Island-Group Analyzed Separately

SOUTH CAICOS (n=22) over 119 Items

Factor	Eigenvalue	Percent	Cum%	Ratio
1	8.453	81.8	81.8	**7.245**
2	1.167	11.3	93.1	1.642
3	.711	6.9	100.0	

Mean 1st factor loading = **.607**, with **0** negative loadings

GRAND TURK & SALT CAY (n=74) over 119 Items

Factor	Eigenvalue	Percent	Cum%	Ratio
1	25.546	80.5	80.5	**5.978**
2	4.273	13.5	93.9	2.215
3	1.929	6.1	100.0	

Mean 1st factor loading = **.569**, with **0** negative loadings

PROVIDENCIALES (n=141) over 119 Items

Factor	Eigenvalue	Percent	Cum%	Ratio
1	44.938	77.6	77.6	**4.935**
2	9.107	15.7	93.3	2.334
3	3.902	6.7	100.0	

Mean 1st factor loading = **.547**, with **0** negative loadings

NORTH CAICOS (n=32) over 119 Items

Factor	Eigenvalue	Percent	Cum%	Ratio
1	5.022	61.4	61.4	**2.559**
2	1.963	24.0	85.4	1.642
3	1.195	14.6	100.0	

Mean 1st factor loading = **.283**, with **4** (12.5%) negative loadings

MIDDLE CAICOS (n=8) over 119 Items

Factor	Eigenvalue	Percent	Cum%	Ratio
1	.679	52.1	52.1	**1.089**
2	.623	47.9	100.0	- - -
3	- - -	- - -		

Mean 1st factor loading = **.161**, with **2** (25.0%) negative loadings

NORTH & MIDDLE, Combined (n=40) over 119 Items

Factor	Eigenvalue	Percent	Cum%	Ratio
1	5.259	58.8	58.8	**2.305**
2	2.281	25.5	84.3	1.628
3	1.401	15.7	100.0	

Mean 1st factor loading = **.238**, with **8** (20.0%) negative loadings

In summary, taken as a whole, the random sample shows only a marginal degree of cultural consensus, and the degree of shared culture is even weaker among the Special Sample. When the random sample is segmented by island-group, however, the consensus indicators improve markedly, with the exception of North & Middle Caicos, which has none. Collectively, these findings confirm that "place" has a systematic effect on outlooks toward tourism and its impacts – that there are differences among the island-groups with respect to Belonger attitudes toward tourism. The South Caicos sub-sample has the most internally coherent and mutually shared "answer key," followed by respondents from Grand Turk & Salt Cay, then Providenciales. By contrast, respondents from North & Middle Caicos do not converge around a single pattern of responses.

Correlates of the Two Factors from Consensus Analysis

The two factor loadings produced by consensus analysis of the random sample taken as a whole were analyzed with respect to fourteen demographic-behavioural variables. Place of residence

and six other demographic/behavioural variables are statistically associated with the first factor extracted by consensus analysis, but only place of residence has a significant association with the second factor. Table 4 summarizes the relationship between place of residence and respondents' loadings on the first two factors extracted by consensus analysis.

Table 4: Consensus's Factor Loadings by Place of Residence (where registered to vote)

DEPENDENT VARIABLES	INDEPENDENT VARIABLE: Place of Residence (group means)							
	North & Middle (n=40)	South (n=22)	Grand Turk & Salt Cay (n=74)	Provo (n=141)	F	df	signif.	%var.
Consensus factor1	0.216	0.595	0.557	0.534	45.726	3, 273	.000	33.4%
iConsensus [2] factor2	-0.017	0.112	0.096	-0.118	16.453	3, 276	.000	15.3%

As discussed previously, an individual's loading on the first consensus factor always indicates how well he or she represents the entire sample. The higher a person's loading on the first factor, the more typical that person is in the way he or she answered the battery of 119 questions.

The group means for this variable, broken down by place of residence, show a very clear pattern. Respondents from North & Middle Caicos are the least typical; the average first factor loading for this group (mean = .216) is much lower than the other three island-groups. By contrast, the "most typical" group of respondents – the most representative of the sample as a whole – are those registered to vote in South Caicos (mean = .595). Residents from Grand Turk and Salt Cay are next most typical, with those from Providenciales being only slightly less so.

The six other demographic or behavioural variables showing statistically significant relations with the first consensus factor can be summarized as follows, ordered by the strength of the relation:

- How often one thinks about tourism and its impacts explains 9.3% of the variance in the first consensus factor.
  The "once or twice a month" group has the most typical pattern of responses (mean = .566), and the "very rarely" group is the least typical (mean = .376).

- Household income explains 9.1% of the variance in the first consensus factor.
  The "$75K-$99K" group has the most typical pattern of responses (mean = .607), and the "less than $25K" group is the least typical (mean = .437).

[2] The "i" prefix in this variable's label – **i**Consensus factor2 – indicates that re-polarized values were used in the analysis. Multiplying the original second factor loadings by –1 simply inverts positive and negative values, but does not affect the relative position of individuals to one another on the underlying dimension. Re-polarizing a variable this way has no effect on the analysis of variance reported here, but it does make some analyses reported in the next section easier to understand.

- How often one speaks with tourists explains 8.8% of the variance in the first consensus factor.
  The "once or twice a month" group is the most typical (mean = .597), and the "very rarely" group is the least typical (mean = .429).

- Level of formal education explains 6.6% of the variance in the first consensus factor.
  The "some college/technical school" group has the most typical pattern of responses (mean = .563), and the "primary and some secondary school" group is the least typical (mean = .420).

- Age explains 5.2% of the variance in the first consensus factor.
  The "30-39 year old" group is the most typical (mean = .553), and the "60 or older" group is the least typical (mean = .414).

- Whether a family member works in tourism explains 2.4% of the variance in the first consensus factor.
  Respondents who do not have a family member working in tourism are more typical (mean = .523) than those who do have such a family member (mean = .459).

Unlike the first factor, the second factor extracted by consensus analysis has no fixed meaning. It simply reflects the second largest source of variation among respondents after removing the "group representativeness / typicality" variation captured by the first factor. Given the inherent uncertainty with respect to the second factor's substantive meaning, its actual meaning for any particular data set must be discovered through its correlations with other measures.

In this light, the fact that place of residence (where registered to vote) explains 15.3% of the variance in the random sample's second consensus factor loadings is very interesting. On the other hand, and especially since none of the thirteen other demographic-behavioural variables correlate with the second factor, this also means that 84.7% of the variance in this dependent variable remains *un*explained. Thus, there is clearly more to the second factor than just place of residence, and a more complete interpretation of the second factor is provided in the following section.

Sub-cultural Perspectives on Tourism

As noted previously, the mixed nature of the key indicators of cultural consensus in the random sample suggests that a non-trivial degree of variation exists among respondents. While the ratio of first to second eigenvalues (4.515) is acceptable, the rather low mean first factor loading (.499) shows the data only weakly conform to the "common culture" assumption of the mathematical model. The most common reason for such non-conformity is that there are systematic differences in the ways respondents answer the survey questions (or at least some subset of the questions). Under these circumstances, it is especially important to identify the substantive meaning of the second factor from consensus analysis, because the second consensus factor is the main source of variation among respondents after removing similarities due to common culture.

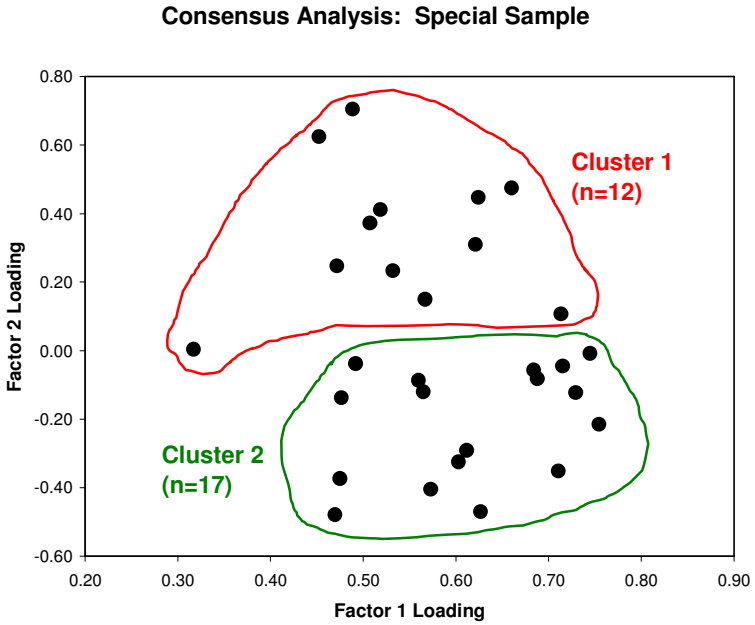
In the existing literature concerning consensus analysis, two main strategies have been used to identify sub-cultural variation. The first approach involves disaggregating one's sample into sub-samples, doing consensus analysis for each sub-sample separately, and repeating the process until one finds the sub-samples that have the greatest degrees of consensus within themselves. The second strategy focuses directly on the residual variation within the original sample, whether this residual variation is calculated the way Ross (2004: 150-151) suggests or measured simply in terms of informants' loadings on the second consensus factor. The basic idea in this approach is to determine whether the residual variation corresponds with variables such as sex, age, income, education, etc. As reviewed in the previous sections, however, neither of these two approaches gets very far with the Turks and Caicos data. Both approaches point to place of residence as a plausible constituent of the second consensus factor, but this demographic characteristic leaves 84.7% of the second factor unexplained. Thus, we hypothesize that the second largest source of variation among respondents is a 'turn of mind' – an attitudinal configuration or general perspective on tourism – that is relatively independent of respondents' other personal characteristics.

Exploring this possibility further, we devised two additional analytic strategies. The first was to examine in detail the diversity of attitudes evident in the Special Sample (the 29 individuals whom we both interviewed and later surveyed) and then see whether the sub-cultural variation in this small sample could be extrapolated to the larger random sample. The second strategy was to see whether any of the composite attitudinal measures we had developed (using the random sample itself) correspond with the second consensus factor, both in the random sample and the Special Sample.

Diversity in the Special Sample

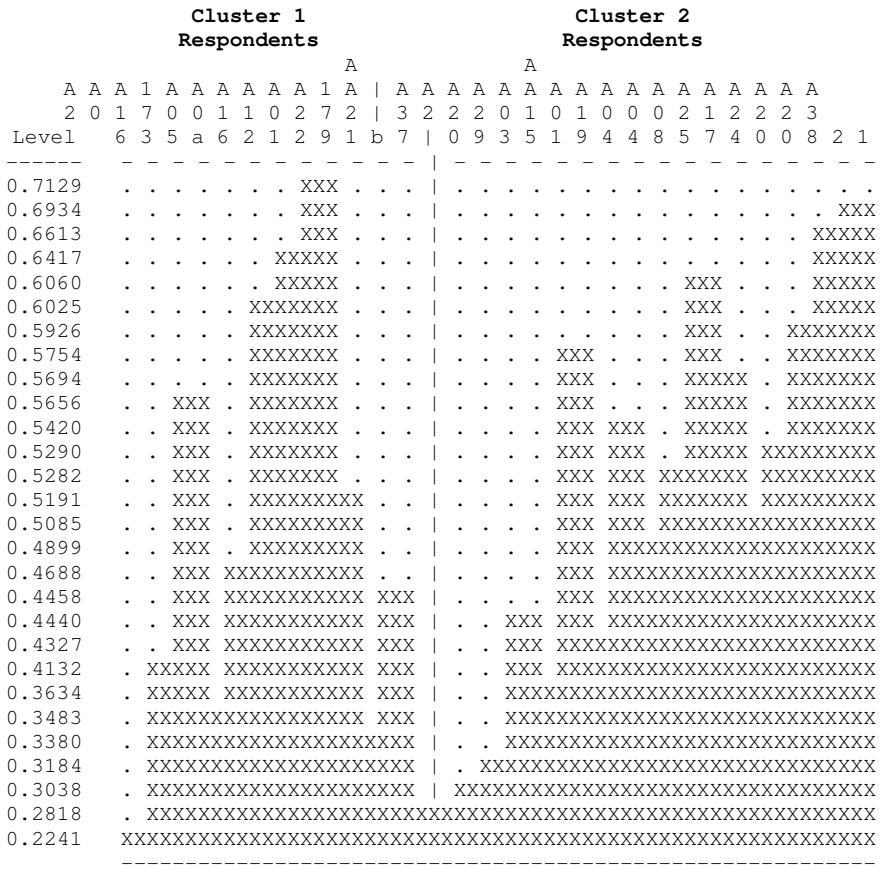
The scatterplot below (see Table 5) shows the first and second factor loadings for each of the 29 individuals in the Special Sample. Because we know more about these people than just how they responded to the survey questions (we conducted ethnographic interviews with each of them), as we identified different individuals in the scatterplot, a fairly clear intuitive interpretation of this sample's second consensus factor emerged. In general, those individuals located toward the top of the graph had been the most ambivalent about tourism during the interviews; conversely, those toward the bottom had been almost completely positive.

Table 5: Special Sample's Consensus Factor Loadings



Our subjective interpretation with respect to the extremes along the second factor was clear enough, but there was no similarly obvious basis for us to assign individuals with middling second factor loadings to one camp or the other. Thus, to identify the sub-group boundaries, we used hierarchical cluster analysis (see Table 6) and, subsequently, confirmed these findings with tabu-search cluster analysis. These inductive, multivariate techniques revealed two large sub-groups, or two "clusters" of respondents within the Special Sample. In this way, the assignment of individuals to one or another of the two clusters was determined by an objective analysis of similarities in the ways they answered the entire battery of 119 core questions. The boundaries of these two clusters are indicated in Table 5 by the line drawings superimposed on the scatterplot of respondents.

Table 6: Hierarchical Clustering of Respondents in the Special Sample



As one might expect, when these two clusters of respondents are analyzed separately (see Table 7), their indicators of cultural consensus are much stronger than for the Special Sample taken as a whole (compare with the bottom panel of Table 1). This means there are at least two sub-cultural understandings of tourism represented in the Special Sample – the individuals in Cluster 1 view tourism a little differently than those in Cluster 2.

Table 7: Consensus Findings for Each Cluster Analyzed Separately

SPECIAL SAMPLE: CLUSTER 1 (n=12) over 119 Items

Factor	Eigenvalue	Percent	Cum%	Ratio
1	5.167	87.6	87.6	**7.061**
2	.732	12.4	100.0	- - - -
3	- - - -	- - - -	- - - -	

Mean 1st factor loading = **.640**, with **0** negative loadings

SPECIAL SAMPLE: CLUSTER 2 (n=17) over 119 Items

Factor	Eigenvalue	Percent	Cum%	Ratio
1	7.399	85.8	85.5	**9.838**
2	.752	8.7	94.5	1.576
3	.477	5.5	100.0	

Mean 1st factor loading = **.653**, with **0** negative loadings

With the main sub-groupings in the Special Sample identified, we checked for group-group differences with respect to the demographic and behavioural characteristics of the individuals comprising each Cluster. There are no significant differences between Cluster 1 and Cluster 2 in these respects. Thus, we conclude that the contrast between the Clusters reflects a 'turn of mind' – alternative frameworks or viewpoints from which people evaluate tourism – that cross-cuts age, sex, education, income, and other demographic-behavioural characteristics. The two viewpoints might be characterized as follows:

- Cluster 1: "Cautiously ambivalent"
  People in this camp tend to see tourism as involving trade-offs between good and bad impacts. They also express some concerns about the long-term viability and consequences of tourism.
- Cluster 2: "Uncritically positive"
  People in this camp are very positive about the changes tourism has wrought. They tend to be very pro-growth and pro-development and almost equate change with progress.

To identify the questionnaire items on which these two viewpoints differ, we did independent samples t-tests comparing Cluster 1 versus Cluster 2 for each of the 119 cultural model items. The results are that the Clusters differ significantly from one another (unadjusted $\alpha \leq .05$) for 47 of the 119 items. (Conversely, of course, the two Clusters do *not* differ on 72 of the items, which is the reason the Special Sample taken as a whole shows the degree of cultural consensus that it does.)

Table 8 provides the full text of the 47 contrastive items, along with the two Clusters' means and the statistical significance of the group-group contrast. The order of items within the list is based on the statistical significance of the group-group difference, i.e., the most contrastive items appear at the top and the less contrastive items appear at the bottom.

Table 8: The 47 Items that Differentiate Cluster 1 and Cluster 2

Cluster-differentiating Items	Cluster 1	Cluster 2	signif.
1. Soc11. The country's growing tourism industry has made Turks and Caicos into a land of strangers.	3.83	1.94	.000
2. Econ10. As a result of the country's growing tourism industry, the profits from tourism go to just a few people.	4.17	2.24	.000
3. Soc12. The country's growing tourism industry is breaking down the local sense of community.	3.75	2.00	.000
4. Soc24. The country's growing tourism industry has strengthened Belongers' identity.	2.33	3.59	.000
5. Pace21. The country's economic development is being guided mainly by long-range planning.	2.17	3.59	.000
6. Soc13. The country's growing tourism industry is strengthening the local sense of community.	2.00	3.53	.000
7. Soc06. The country's growing tourism industry has resulted in significantly improved public services (such as police and medical).	2.42	4.12	.000

Cluster-differentiating Items	Cluster 1	Cluster 2	signif.
8. Pace20. The country's growing tourism industry is likely to result in a worse future for Belongers.	2.92	1.76	.001
9. Econ07. As a result of the country's growing tourism industry, opportunities are not likely to get any better for local people.	3.00	1.88	.001
10. Econ09. As a result of the country's growing tourism industry,	2.08	3.35	.001
11. Soc21. The country's growing tourism industry will eventually make native culture disappear.	3.67	2.29	.002
12. Soc23. The country's growing tourism industry has made Belongers lose their sense of identity.	3.50	2.29	.002
13. Work02. Most Belongers feel that tourism work is like being a servant.	3.50	2.24	.003
14. Pace02. Over the past ten years, the country has been changing at just about the right pace.	2.25	3.41	.003
15. Pace14. There is no real limit to how much the tourism industry can grow in Turks and Caicos.	2.33	3.76	.004
16. Env05. The growth of tourism in Turks and Caicos has led to fewer and weaker regulations to protect the environment.	3.08	2.00	.005
17. Soc04. The country's growing tourism industry has put Turks and Caicos on the world map.	4.25	4.76	.005
18. Dev09. Newspapers, magazines, radio, and TV keep people well informed about development projects.	2.83	4.12	.005
19. Soc15. The country's growing tourism industry has led to an increase in social problems such as alcoholism, physical violence, or divorce.	3.50	2.35	.007
20. Env09. The growth of tourism in Turks and Caicos has led to better management of waste and pollution.	2.58	3.71	.007
21. Soc17. The country's growing tourism industry has had a bad effect on the morals of most people.	3.50	2.41	.008
22. Env07. The growth of tourism in Turks and Caicos has led to more laws against building in natural areas.	2.33	3.35	.009
23. Env02. The growth of tourism in Turks and Caicos has led to the destruction of historic sites and old buildings.	2.92	1.88	.012
24. Econ11. As a result of the country's growing tourism industry, there are new business opportunities for native people.	3.25	4.18	.012
25. Work18. Most Belongers see lots of opportunities for themselves in tourism work.	2.75	3.71	.012
26. Env16. The growth of tourism in Turks and Caicos has led to the potential for better environmental conservation.	3.25	4.18	.012
27. Econ16. As a result of the country's growing tourism industry, public services are likely to get worse.	2.75	1.82	.013
28. Soc09. The country's growing tourism industry has made native people more selfish and greedy.	3.25	2.29	.015
29. Char13. Most of the tourists who visit Turks and Caicos are easy-going and laid back.	3.58	4.24	.015
30. Env15. The growth of tourism in Turks and Caicos has led to the potential for a future environmental crisis.	3.92	2.94	.017

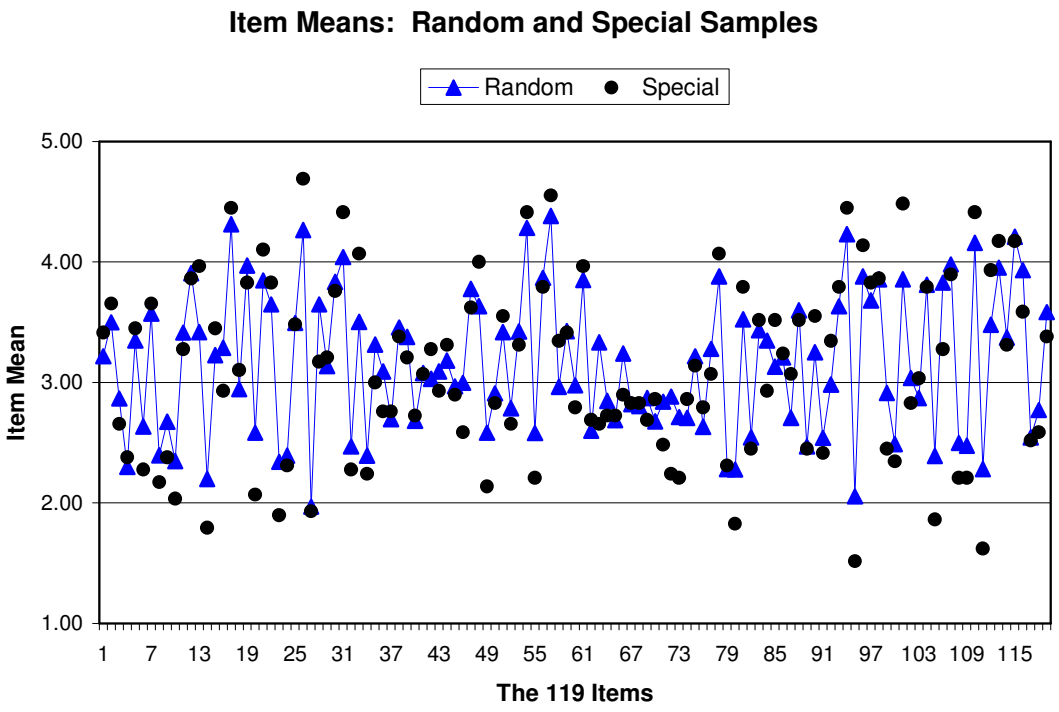
Cluster-differentiating Items	Cluster 1	Cluster 2	signif.
31. Econ05. As a result of the country's growing tourism industry, many different types of jobs are now available.	3.33	4.24	.017
32. Pace17. Tourism in Turks and Caicos still has lots of room for further development.	4.17	4.59	.018
33. Env01. The growth of tourism in Turks and Caicos has led to more preservation of historic sites and old buildings.	3.58	4.41	.018
34. Env11. The growth of tourism in Turks and Caicos has led to greater interest among Belongers in the natural environment.	3.08	3.82	.018
35. Dev10. Word of mouth is more important than public media for keeping people informed about development projects.	3.17	2.06	.021
36. Env13. The growth of tourism in Turks and Caicos has led to better health and nutrition for local people.	3.08	3.88	.022
37. Pace15. Tourism in Turks and Caicos is currently at a cross-rods between good or bad outcomes.	3.83	2.76	.025
38. Pace06. The tourism industry is growing in a slow, regulated way.	1.58	2.41	.025
39. Econ13. As a result of the country's growing tourism industry, all new businesses in the country are now required to have a Belonger partner.	2.75	3.65	.027
40. Econ06. As a result of the country's growing tourism industry, new job opportunities are evenly distributed among the different islands.	1.92	2.82	.027
41. Soc02. The country's growing tourism industry brings mostly the same kind of tourists to the country.	2.67	1.88	.033
42. Pace11. Only some people are benefitting from tourism.	4.00	3.12	.034
43. Dev05. There are not enough legislative controls on new coastal development projects.	4.42	3.59	.037
44. Work13. Most Belongers prefer to leave menial jobs (such as maid or grounds keeper) to immigrants.	4.42	3.71	.039
45. Pace08. Development is leaving many local people behind.	4.33	3.47	.042
46. Pace01. During the past ten years, the country has been changing too quickly.	4.00	3.06	.042
47. Work15. Most Belongers feel they are treated fairly in their applications for tourism jobs.	2.42	3.12	.043

Having identified the main source of diversity within the Special Sample (the two Clusters as well as the specific items on which they differ), the next step was to determine whether a similar viewpoint variation exists in the larger random sample. How well does this attitudinal contrast discovered in the Special Sample "extrapolate" to the larger random sample?

Profile-Matching Approach

Just because the "cautiously ambivalent" to "uncritically positive" attitudinal gradient is an adequate interpretation of Special Sample's second consensus factor does not mean it is also the second largest source of inter-individual variation in the random sample. Thus, as a preliminary to more in-depth analyses, we compared the item means from the two samples (Special and random) across the whole battery of 119 questionnaire items (see Table 9, below).

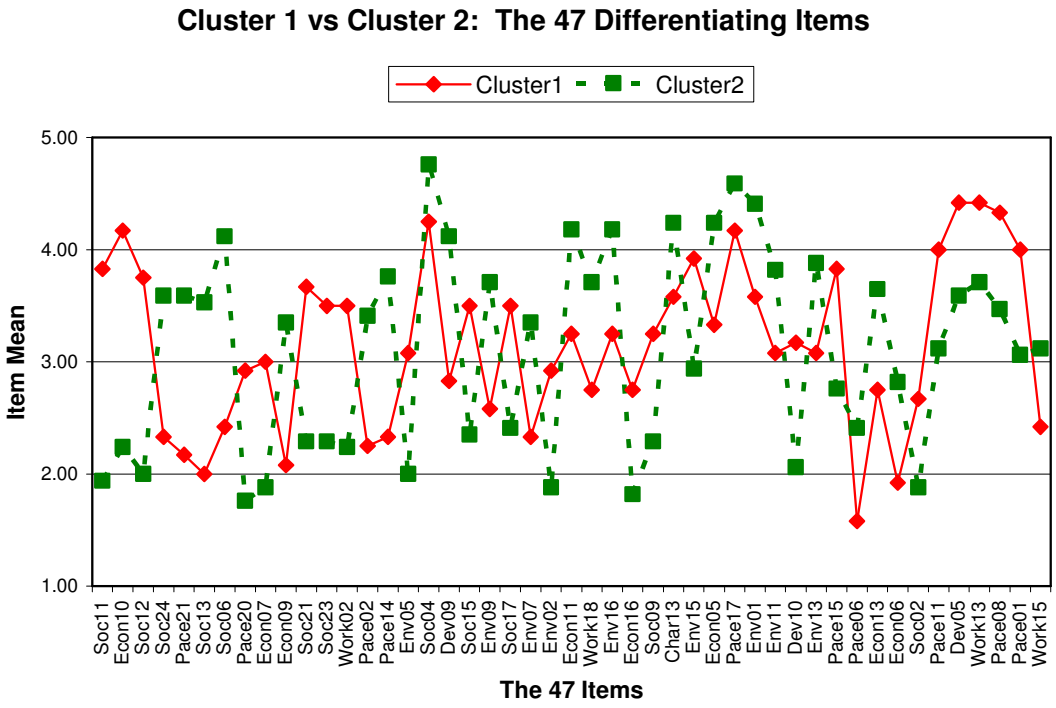
Table 9: Item Means for both the Random and Special Samples



As Table 9 shows, the random sample's pattern of responses across all 119 items is very similar to the Special Sample. Indeed, the correlation between the two samples' sets of means is extraordinarily high (r = +.938). It is perhaps worth noting that the Special Sample's means tend to be a little more emphatic than the random sample – more deviant from "neutral," more toward either the "strongly agree" or "strongly disagree" poles. But, the overall patterning of responses is remarkably similar between the two samples.

In view of the overall similarity between the two samples, 'profile-matching' seems an appropriate way to extrapolate our understanding of diversity within the Special Sample to the larger random sample. The first step is to compare each respondent in the random sample to both of the Cluster profiles from the Special Sample. The line graphs in Table 10, below, show the item means for Cluster 1 and Cluster 2, respectively. As one can easily see, the two Clusters have distinctive 'response profiles' across the 47 contrastive items. So, the question is: Are respondent X's own answers to the 47 contrastive items more similar to Cluster 1's response-profile or to Cluster 2's?

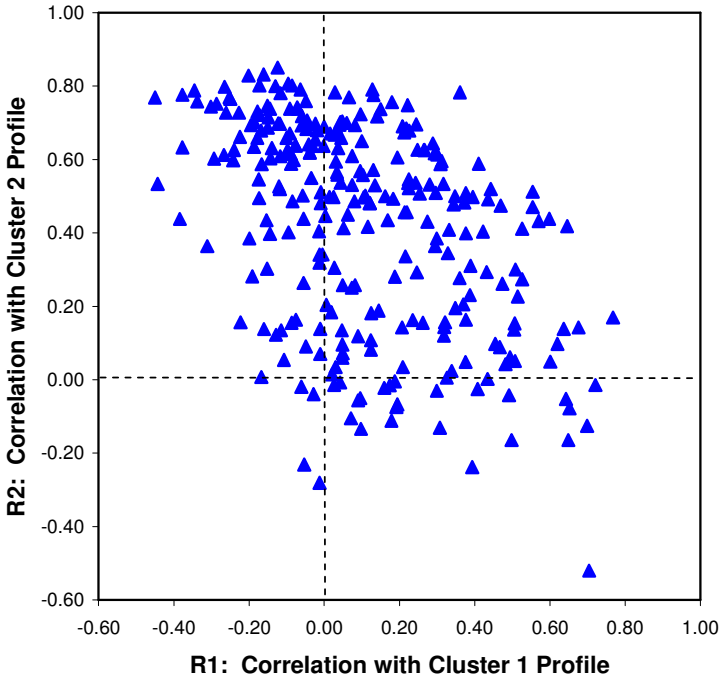
Table 10: Response Profiles of the Two Clusters across the 47 Contrastive Items



Initially, we calculated two different similarity measures: (a) Pearson r, which is a measure of pattern similarity [similar pattern of up's and down's]; and (b) tolerance, which is the percentage of the 47 items for which a respondent matched a cluster's mean scores [with a "match" defined as being within .49 of a cluster's item mean]. The first measure of profile similarity – Pearson r – showed higher correlations with other measures, so that is what we report here.

"R1" stands for the correlation coefficient between a respondent's answers and Cluster 1's item means. "R2" stands for the correlation coefficient between a respondent's answers and Cluster 2's item means. Table 11, below, shows the scatterplot of these two variables for all 277 respondents in the random sample.

Table 11: Scatterplot of Random Sample Respondents with respect to their Profile-Matching Correlation Coefficients

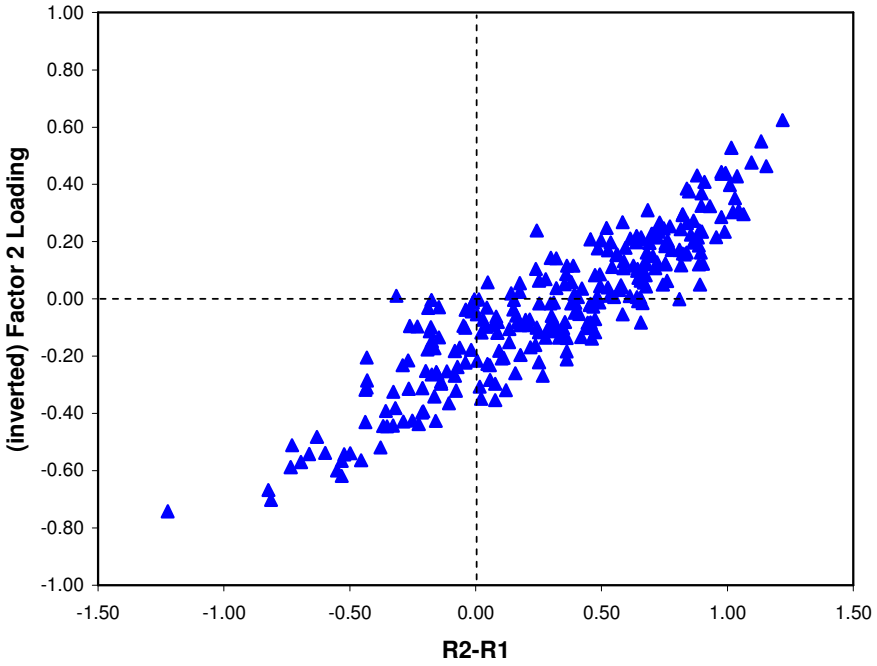


The sign of the calculated variable, R2–R1, indicates whether a particular respondent's answers to the 47 cluster-differentiating items are more similar to Cluster 1 or Cluster 2. When R2−R1 yields a positive number, the respondent is more similar to Cluster 2, the "uncritically positive" viewpoint. When the subtraction yields a negative value, the respondent is more similar to Cluster 1, the "cautiously ambivalent" viewpoint. In the random sample, R2–R1 yields positive values for 206 respondents, and 71 respondents have negative values. Thus, we estimate that, during the summer of 2007, the "uncritically positive" camp outnumbered the more "cautiously ambivalent" camp by about 3-to-1.

In addition to estimating these relative proportions, however, the real purpose behind calculating R2–R1 is to determine the extent to which it is related to the random sample's own second consensus factor. And, the main finding in this regard is that the correlation between R2–R1 and the random sample's own second factor loadings is very high: r = +.903.[3] Table 12 shows the scatterplot of this relationship.

[3] This relationship is +.903, rather than −.903, because we inverted the original second factor loadings before computing this coefficient. Multiplying respondents' second factor loadings by −1 does not affect the strength of the relation; it just makes the correlation positive rather than negative, and this makes subsequent discussions of the second factor 's relationships with other variables easier to understand.

Table 12: Scatterplot of Random Sample's (inverted) Second Factor Loadings by R2–R1 (r = +.903)



Thus, the conclusion from the profile-matching approach is that the "second largest source of variation" among respondents in the random sample is very similar to the attitudinal gradient substantively identified in the Special Sample.

Thematic Indices Approach

The second novel strategy for interpreting the meaning of the second consensus factor does not try to extrapolate insights from the Special Sample to the larger random sample, but rather focuses on coherent themes among the survey questions themselves and how well different additive indices of specific attitudes correlate with the second consensus factor. The strength of these correlations indicates how accurately one has identified the substantive meaning of the second factor, because the constituent questionnaire items for each index are already known.

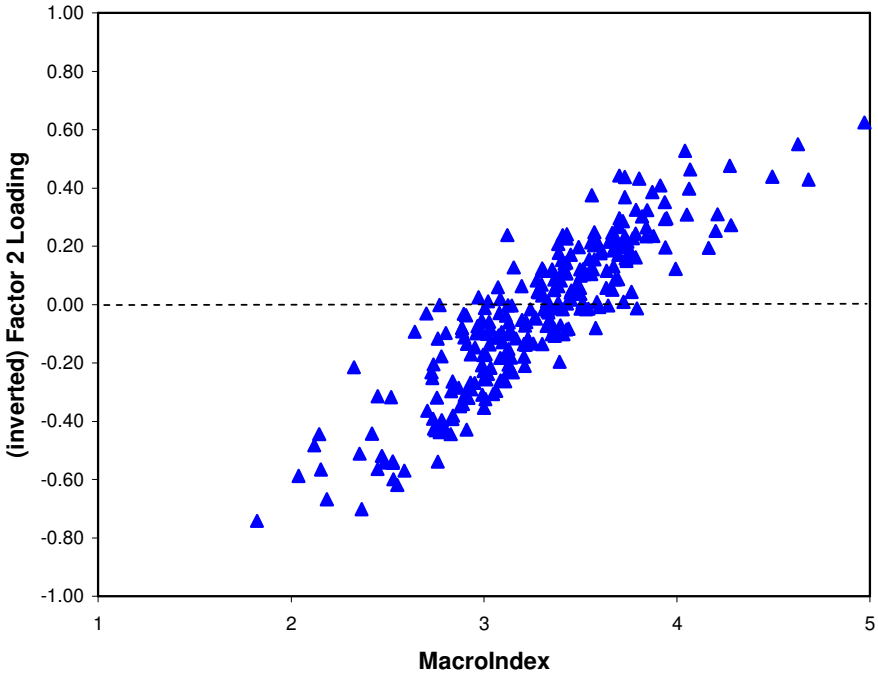
In Chapter 4 our of lengthy research report, we developed seven specific attitudinal indices using the random sample's data, as well as a second-order Macro-Index constructed from six of those specific indices. Table 13, below, shows the correlations between the seven specific thematic indices and the second factor loadings for both the random sample and the Special Sample.

Table 13: Correlations of (inverted) Second Consensus Factor Loadings with Specific Attitudinal Indices

THEMATIC INDICES	Random Sample (n=277)		Special Sample (n=29)	
	r	%var.	r	%var.
GenInd: General Pro-tourism	.567	32.1%	.804	64.6%
WrkInd: Orientation to Tourism Work	.603	36.4%	.598	35.8%
HerInd: Heritage Optimism	.668	44.6%	.773	59.8%
SocInd: Social Impacts of Tourism	.755	57.0%	.852	72.6%
EnvInd: Environmental Impacts of Tourism	.684	46.8%	.753	56.7%
FinInd: Financial Impacts of Tourism	.666	44.4%	.760	57.8%
ChrInd: Characteristics of Tourists	.238	5.7%	.415	17.2%
Macro-Index: Second-order Composite of Six Specific Indices (all of the above except ChrInd)	.922	85.0%	.975	95.1%

All the specific attitudinal indices correlate significantly with the second consensus factor, and for both samples. Furthermore, except for ChrInd (characteristics of tourists), all explain more of the variance in the second factor than any demographic or behavioural variable. The key finding, however, is the extremely high correlation between respondents' Macro-Index scores and their second factor loadings: r = +.922 for the random sample, and r = +.975 for the Special Sample. Indeed, respondents' Macro-Index scores are even more predictive of second factor loadings than the R2−R1 variable from the profile-matching approach. The scatterplot below (see Table 14) shows the relation for the random sample.

Table 14: Scatterplot of Random Sample's (inverted) Second Factor Loadings by Macro-Index (r = +.922)



Thus, the Macro-Index measure – comprised of 33 questionnaire items combined in two-stages – is virtually identical to the variation picked up by the second consensus factor for the Special Sample and is very, very close to the second factor in the random sample. Systematic differences in the way Belongers answer this particular subset of questions (see Table 15 for complete list of items) constitute the main way their perceptions of tourism differ from one another. And, it is important to remember that Belonger opinions on these matters form a normally distributed gradient, not a polarized or bimodal distribution. Here we have presented evidence that the attitudinal gradient measured by Macro-Index virtually *is* the main sub-cultural variation among respondents, and this is true for both the random sample and the Special Sample.

Table 15: Macro-Index's 33 Constituent Items (grouped by component indices)

SOCIAL IMPACTS OF TOURISM (SOCIND)
iSoc12 [inverted]. The country's growing tourism industry is breaking down the local sense of community.
iSoc11 [inverted]. The country's growing tourism industry has made Turks and Caicos into a land of strangers.
iSoc15 [inverted]. The country's growing tourism industry has led to an increase in social problems such as alcoholism, physical violence, or divorce.
iSoc17 [inverted]. The country's growing tourism industry has had a bad effect on the morals of most people.
Pace2. Over the past ten years, the country has been changing at just about the right pace.
iSoc9 [inverted]. The country's growing tourism industry has made native people more selfish and greedy.
iPace1 [inverted]. During the past ten years, the country has been changing too quickly.
HERITAGE OPTIMISM (HERIND)
Soc24. The country's growing tourism industry has strengthened Belongers' identity.
iSoc21 [inverted]. The country's growing tourism industry will eventually make native culture disappear.
iSoc23 [inverted]. The country's growing tourism industry has made Belongers lose their sense of identity.
Env1. The growth of the tourism industry in Turks and Caicos has led to more preservation of historic sites and old buildings.
Soc22. The country's growing tourism industry will lead to a revival of native culture.
ENVIRONMENTAL IMPACTS OF TOURISM (ENVIND)
iEnv8 [inverted]. The growth of the tourism industry in Turks and Caicos has led to more garbage build-up and pollution.
iEnv10 [inverted]. The growth of the tourism industry in Turks and Caicos has led to the degrading of the coral reefs and beaches.
iEnv15 [inverted]. The growth of the tourism industry in Turks and Caicos has led to the potential for a future environmental crisis.
Env16. The growth of the tourism industry in Turks and Caicos has led to the potential for better environmental conservation.
iEnv6 [inverted]. The growth of the tourism industry in Turks and Caicos has led to more resort construction in delicate natural areas.
GENERAL PRO-TOURISM (GENIND)
Pace17. Tourism in Turks and Caicos still has lots of room for further development.
Econ14. As a result of the country's growing tourism industry, Turks and Caicos is improving economically, overall.
Pace16. The tourism industry here can only make things better for the country.
Pace3. Most Belongers see tourism as good for the Turks and Caicos.
Dev9. Newspapers, magazines, radio, and TV keep people well informed about development projects.
iPace20 [inverted]. The country's growing tourism industry is likely to result in a worse future for Belongers.
Soc13. The country's growing tourism industry is strengthening the local sense of community.

FINANCIAL IMPACTS OF TOURISM (FININD)
iPace11 [inverted]. Only some people are benefitting from tourism.
iEcon10 [inverted]. As a result of the country's growing tourism industry, the profits from tourism go to just a few people.
Econ9. As a result of the country's growing tourism industry, the profits from tourism trickle down to everyone.
Pace10. Everybody is getting a piece of the tourism pie.
iPace8 [inverted]. Development is leaving many local people behind.
ORIENTATION TO TOURISM WORK (WRKIND):
Work8. Most Belongers see tourism work as good paying.
Work9. Most Belongers are able to get loans to start a business, if they want.
Work18. Most Belongers see lots of opportunities for themselves in tourism work.
Work15. Most Belongers feel they are treated fairly in their applications for tourism jobs.

Summary

The initial and most basic question addressed by consensus analysis is whether there is sufficient similarity in the ways our respondents answered the 119 “core” survey questions to warrant speaking of a single culture with respect to Belonger perceptions of tourism and its impacts. The answer to this initial question is equivocal, because the critical indicators of cultural consensus are mixed. In particular, consensus analysis of the entire random sample yields an adequate ratio of first to second eigenvalues (4.505), but the rather low mean first factor loading (.499) signals that the ‘common culture’ assumption of the mathematical model is not well-met by the survey data.

Since there is not a clear consensus with respect to perceptions of tourism, the focus of attention shifts to identifying the main sub-cultural variation. Analytically, this amounts to discerning the substantive meaning of the second factor produced by consensus analysis, and four approaches to this interpretive task were utilized:

1. Disaggregating the sample into plausible sub-samples, then doing consensus analysis of each sub-sample separately.
2. Determining which, if any, demographic-behavioural variables correlate with the factors produced by consensus analysis.
3. Extrapolating our qualitative interpretation of diversity in the Special Sample to the random sample via profile-matching.
4. Determining which, if any, composite attitudinal measures correlate with the second factor produced by consensus analysis.

The key findings from the first two approaches are convergent, but not particularly satisfying. Breaking the sample into sub-samples based on place of residence does improve consensus indicators for residents of South Caicos, Grand Turk & Salt Cay, and Providenciales, respectively, but not for residents of North & Middle Caicos. Similarly, place of residence (the four island-groups) is the only demographic-behavioural variable that correlates significantly

with the second factor produced by consensus analysis. The convergent conclusion, then, is that where one lives – which island-group – has a statistically significant association with how one views tourism and its impacts. The more important point, however, is that demographic-behavioural variables explain only 15.3% of the variance in the second consensus factor, which leaves 84.7% *un*explained.. Thus, although the first two approaches point in the same direction, they do not take us very far toward identifying the real nature of the sub-cultural variation evident in the random sample. Indeed, the second largest source of variation among respondents appears to be a 'turn of mind' – an attitudinal configuration or general perspective on tourism – that is almost independent of age, sex, education, income, and other such personal characteristics.

The third approach provides a much more specific and powerful interpretation of the main sub-cultural variation among respondents. Because we interviewed the individuals in the Special Sample, we were able to recognize, qualitatively, two general orientations to tourism that lined up pretty well along the gradient formed by this small sample's second consensus factor. Then, dividing the Special Sample into two Clusters ("cautiously ambivalent" versus "uncritically positive"), we identified the specific subset of survey questions that differentiate the two groups and determined the two 'response-profiles' across these items that distinguish the two viewpoints. Every respondent in the random sample was then compared to the two response-profiles from the Special Sample. R1 and R2 are the labels for these two separate measures of similarity, and subtracting one from the other (R2−R1) yields a single measure indicating which Cluster in the Special Sample each random sample respondent most resembles. Finally, to determine the extent to which the substantively-identified attitudinal gradient in the Special Sample corresponds to the sub-cultural variation in the random sample, we calculated the correlation between random sample respondents' profile-matching measure (R2−R1) and their second consensus factor loadings. This correlation (r = +.903) explains 81.5% of the variance in the second factor loadings, *much* more than respondents' demographic-behavioural characteristics.

The fourth approach provides an even better, and much simpler, substantive rendering of the main sub-cultural variation, and its results are quite convergent with third approach. When the demographic-behavioural variables turned out to be such poor predictors of the second consensus factor, we wondered whether one or more of the composite attitudinal indices we had constructed might be associated with the second consensus factor. The strength of the actual correlations, however, is quite surprising. Six of the seven specific attitudinal measures (general pro-tourism, orientation to tourism work, heritage optimism, social impacts of tourism, environmental impacts of tourism, and financial impacts of tourism) have correlation coefficients ranging from +.567 to +.755 in the random sample and from +.598 to +.852 in the Special Sample. Thus, each of these six specific attitudinal indices explains much more of the sub-cultural variance than does place of residence. The most important finding, however, is the extremely high correlation between Macro-Index – comprised of 33 questionnaire items combined in two-stages – and the second consensus factor, both in the random sample (r = +.922) and the Special Sample (r = +.975). These correlations are even higher than the third approach's R2−R1 variable. At the same time, the results of the third and fourth approaches are convergent to the extent that 23 of Macro-Index's constituent items are also in the set of 47 Cluster-differentiating items identified by the third approach.

In conclusion, Belongers show remarkable consensus on many questions dealing with tourism and its impacts, but there is also a strong sub-cultural variation with respect to other tourism-related matters. The specific topics about which opinions differ most systematically are the 33 constituent items of the Macro-Index measure. Thus, as of the summer of 2007, the main systematic diversity among Belongers was an attitudinal gradient ranging from what might be called "cautiously ambivalent" (lower Macro-Index scores) to "uncritically positive" (higher Macro-Index scores). And, although residents from different islands differ a small amount from one another in this regards, individuals' attitudes along this gradient are not predicted by their age, sex, education, income, or other such personal characteristics.

We hope other researchers may find the Profile-Matching and the Thematic Indices approaches useful in studying subcultural variations in their own data. The key is to pay more attention to the second consensus factor, especially when it is large relative to both the first factor and the third.

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