5.4.3 A Test of Cultural Biases' Additivity

In the previous section I established that cultural biases have effects on an individual level and not only on an aggregate level. Now I intend to study the additive character of the cultural biases, a necessary component of the Synthetic Individual Approach. Without additivity it is hard to imagine how the biases can be synthesized on an individual level.

I will first test for non-additive effects between cultural biases. Then, as an illustration, I will show how the synthetic cultural bias positions influence a respondent's party preference, using examples of multivariate logit analysis of party preference that treat cultural biases as additive. I believe that logit will be the best procedure for separating the effects the cultures because it can be used on discrete variables[1] like parties,

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[1] I prefer logit instead of discriminant analysis because:

> In situations where the independent variables are [...] a mixture of continuous and discrete variables, the linear discriminant function is not optimal (Norusis 1986, p. B31).

Logit analysis will result in a probability; given that the respondent has these characteristics there is X probability that she will prefer party Y. The discriminant analysis will result in a party preference; given these characteristics the respondent will prefer party Y. The discriminant function in its general form is also linear, and the discriminant function gives "hard borders" between the different categories, whereas the logit model will give "smooth borders". I believe that the smooth borders correspond better to reality. It does not seem realistic to expect a respondent to change party preference as a result of an incremental change on one of the cultural biases, just because it happens to cross a "border". This becomes an estimation problem.

> The estimation difficulties created by linear models with discrete dependent variables become unmanageable in situations where outcomes are measured by categorical variables with multiple responses or are the joint outcomes of several separate events. (Hanushek 1977, p.187).

and it takes non-linearity into account[2]. Also, because in logit parameter estimates are solved with Maximum Likelihood Estimation, the estimates answer the question: From which population are we most likely to obtain the observed sample? Therefore the graphs can be interpreted as images of the most likely population (Aldrich & Nelson 1984:49-51). This is much easier to grasp conceptually, and much more useful theoretically (since I am trying to recreate the preferences from the data), than regular regression (OLS) where the estimates minimize the sum of squared errors between the model and the data.

In order to show that the effects between the cultural biases are additive, I first must test that they are not so. There is a infinite number of funtional specifications that involve non-additive interaction effects between cultural biases.[3] A test for non-additivity can be done by comparing a model where cultural biases have only additive effects with a model where they can have both additive and non-additive effects. Party preference is the dependent variable and cultural biases are the independent variables in the first block. In

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[2] If the true relationship is non-linear and a linear model is used Aldrich and Nelson write that

> [...] the incorrect assumption of linearity will lead to least squares estimates which (1) have no known distributional properties, (2) are sensitive to the range of data, (3) may grossly understate the magnitude of the true effects, (4) systematically yield probability predictions outside the range of 0 to 1, and (5) get worse as standard statistical practices for improving estimates are employed. (Aldrich & Nelson 1984:30)

One must though ask, to which degree is discriminant analysis subject for this critique since it yields is multiple discriminant functions. This can be thought of a series of linear approximations to a nonlinear model.

[3] An example of non-additive effect is when two biases together form something new (as in two of the cells in the Table 4.5 describing the combinations for the Sequential Individual). It is theoretically possible to map these new constellations, but not in practice. I could test for some simple effects, like exponential effects, direct interaction (multiplication), etc., but the list of possible tests is impossible to exhaust. One simple and often used test is to divide the sample into subsamples on the basis of values on one of the independent variables. If the regression coefficients for these subsamples are similar, it is reasonable to assume that that non-additive interaction effects are not present (Berry & Feldman 1985:57).

	CULTQC16 (15 dummies) Sign.		Model Chi-Square for 4 cultural biases Chi-Sq	df	Sign.	Improvement in fit by adding CULTQC16 Chi-Sq	df	Sign.
SV	,694		135,5	4	,000	11,7	15	,699
DNA	,017	*	34,8	4	,000	32,6	15	,005
Sp	,809		12,2	4	,016	11,0	15	,752
Krf	,745		16,1	4	,003	12,0	15	,679
H	,225		160,5	4	,000	20,7	15	,145
Frp	,999		68,0	4	,000	18,3	15	,247
Don't Know	,069		5,7	4	,226	26,6	15	,032
Won't Vote	,983		23,5	4	,000	19,4	15	,196

Table 5.6 Test of non-additivity for Cultural Biases by using 16 Clusters to represent the non-additive element in the model.

the second block I added a variable with 15 categories (CULTQC16), which correspond to dummies formed by the 16 clusters made of cultural biases.[4] The test of significance for this variable is equal to the test that the coefficient for all the "dummies" is equal to zero. I can also add credibility to this by cheking if the fit for the model is improved by comparing results of two ^{2}-tests before and after adding the 16 dummies. Complete results from the logit analysis can be found in the Appendix.

In Table 5.6 we see how the results of comparing the logit analyses for prediction of each party preference, both when the clusters are included and when they are not. The coefficients for the clusters are in most cases clearly non-significant (given in the first

[4] This corresponds to the test for non-additivity described in Berry & Feldman (1985:57). This test is grounded on splitting up the sample on the basis of the values of one independent variable. Because I have four independent variables that can interact with each other, and I expect a more complicated pattern of interactions, I use the clusters to represent different conditions. If these clusters do not differ from each other (i.e., their coefficients) then it is quite unlikely that any non-additive interaction effects have significant effect on the analysis. The clusters are the same that I have used earlier in this chapter.

column). This indicates that in most of the cases the effects of cultural bias combinations formed by the clusters are zero; in other words, **there are only minor non-additive effects**. The improvement in fit from adding the 16 clusters to the model is small compared with the high number of degrees of freedom used. The two cases where the clusters are close to being statistically significant, DNA and Don't Know, deserve a closer look.

For **DNA** the general fit of the model to the data is poor where only the four cultural biases have an additive effect. This is partly caused by DNA being so close to the average on several biases, and by being such a large party that its supporters have a strong effect on the average. Thus, the DNA supporters do not differ from the mean in a significant degree, and using regression does not help us much at all; we could get almost as good results by just using the averages of cultural biases in predicting peoples' preferences. When the 16 clusters are included in the model, the fit for DNA impoves, and the model itself becomes significant. Thus, there are some kind of interactions between the cultural biases that are not only additive; their effect is the result of certain combinations of cultures. In other words, there are combinatory effects (Ragin 1987). Because DNA is such a large party, one has to take these combinatory effects into account, even if the increase in the ^{2} is partly a result of the inevitably low ^{2} for the four-variable model.

For the Don't Know alternative the four cultural biases as an additive model has a poor fit and the model is not statistically significant. By adding the 16 clusters, the ^{2} is

four-folded and the model becomes statistically significant. Part of the explanation as to why the four cultural bias model is not statistically significant is that only Fatalism has an effect, and even its effect is not statistically significant. I have not been able to detect any pattern in the coefficients for the clusters, but I suspect that much of the overall effect of the clusters stems from the 16th cluster HIEF (which of course has been omitted[5]). This would indicate that it is the high number of clusters that increase the probability of not knowing what to vote for. Another interpretation would be that it is not the number of supported biases (as I said, I could not detect any pattern in the coefficients) that leads to the increase in Don't Knows, but that many of these HIEF respondents belong to what cultural theory calls the autonomous culture.

The test of additivity has shown that there are first and foremost additive effects, and that in some cases, like DNA and Don't Know the non-additive effects are more important than the additive. These results are moderated by the fact that for DNA the additive effects are difficult to detect, and for Don't Know, cultural biases have only a very small effect.

5.4.4 Individuals' Party Preference and Cultural Bias - a Logit Analysis

[5] In regression there has to be one dummy less than there are categories (Hardy 1993) otherwise the model is overspecified..

In addition to the test for non-additivity I shall illustrate both additivity and the importance of rejections by examining how party preference is influenced by cultural bias. To make the illustration as real as possible I will include, in addition to the four cultural biases, other background variables (my selection of variables is very similar to Jensen (1994)) which are usually expected to have an effect on party preference. In this way I am also able to control for the effects of variables like age, gender, education, personal income, self-identity (either as labor or middle-class), frequent church attendence and occupation in the agricultural sector.[6] The increase in the fit when the social background variables are added to the four cultural biase model is significant for each of the parties.

In the analysis all effects are additive. Effects of each variable are simply added together. Several of these background variables are dummies and are used to show contrasts between groups in society, for example, farmers vs. the rest of the sample.

I hope to illustrate the additive relation between the cultural biases themselves and the other variables, and to show why cultural biases might give low

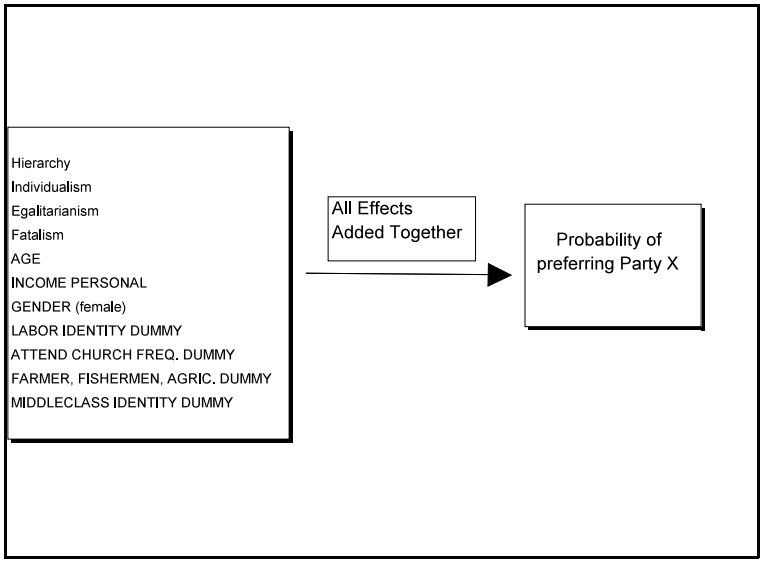

Figure 5.7 A Schematic Overview of Variables in Logit Analysis (used to illustrate Biases additive effect).

[6] See Appendix for more detailed descriptions of the variables.

explained variances when used in additive linear models (even if they actually do have the ability to explain some behavior when the analysis is specified to fit the assumptions). For each party I shall present two cultural biases and the one background variable (from the second block) which has the biggest effect[7]. By this I shall illustrate how cultural biases do not determine indviduals, other preferences, but have an impact given a certain identity (labor) or occupation (farmer). The variables that are not mentioned in the text are controlled for in the estimation by using their averages, 0.5 for gender and zero for the other dummies.

The Z-axis (vertical) gives the probability that the respondent will prefer the party in question. This probability is comparable to the percentage of respondents preferring the party, which simplifies interpretation of the graph[8]. The sides of the floor are formed by two cultural bias variables.[9] The additivity is an inherent part of the graphs: to find the probability that a respondent will prefer SV, one has to use both biases in the graph, for example, a individual with high support for Individualism **and** rejection of Egalitarianism has a very small probability of voting for SV. The effects of Individualism and

[7] The actual results from the logit analysis are in the Appendix. I used a block-wise regression, in which I first used the cultural bias variables and then added the background variables. I shall here present only the graphical interpretations of the results after all the background variables are included. See Jensen (1994) for an explanation of logit analysis.

[8] Unfortunately, the estimation techniques available in common statistical analysis programs do not allow for estimating multinominal logit models, either. Thus, logit can be estimated for a choice of one party against all others, but not for a choice between all parties simultaneously. Therefore, the sum of probabilities for one individual from the different analyses will not be equal to one.

[9] I use the following ranges for the cultural biases to accomodate for the limited range available in the data: Hierarchy: [-2,+1.5], Individualism [-2, +1.5], Egalitarianism [-2, +1,5], Fatalism [-2, +2]. Predictions outside these ranges are not valid.

Egalitarianism are added together to produce the probability of preferring SV.

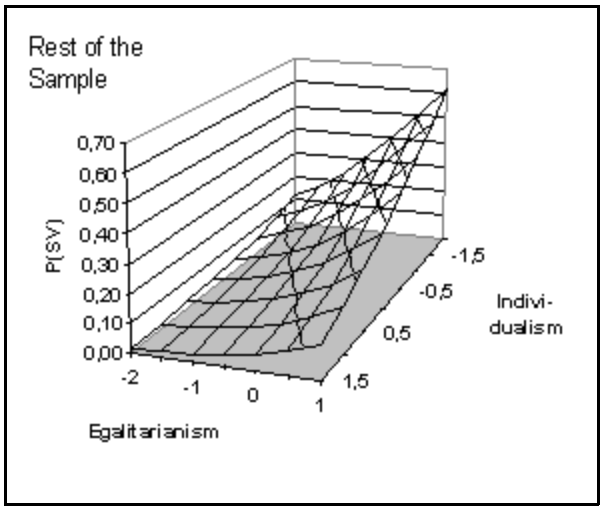

Figure 5.8 Probability of Preferring SV for Rest of the Sample

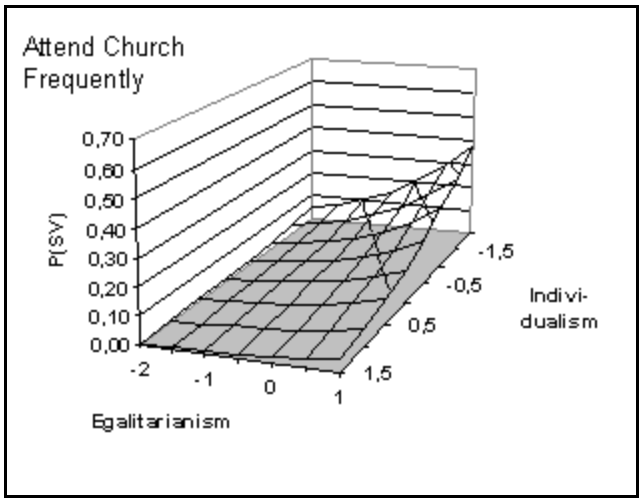

Figure 5.9 Probability of Preferring SV for Respondents who Attend Church Frequently

In Figures 5.8 and 5.9 we can see how Individualism and Egalitarianism effect respondents' SV preference. As expected, respondents who support Egalitarianism are more likely to prefer SV than respondents who do not. What is significant is that the respondents who reject Individualism are also more likely to prefer SV, and further, that rejection of Individualism combined with support for Egalitarianism in a respondent gives the highest probability for SV preference. We can also see by comparing these two figures that respondents who attend church frequently have a much lower likelihood of preferring SV than a respondent with the same cultural bias who does not attend Church frequently.

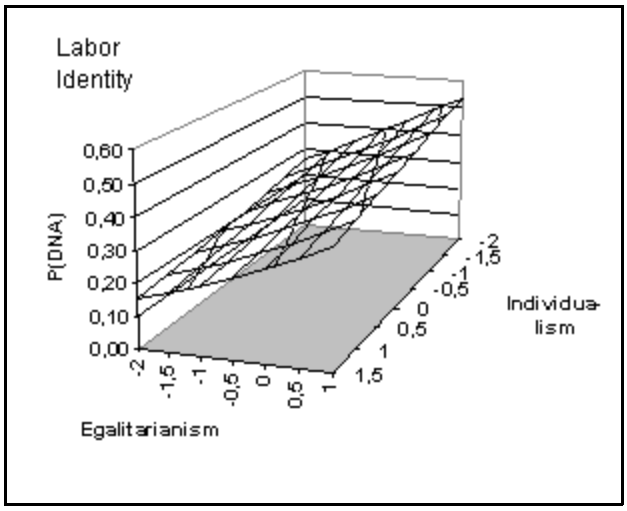

Figure 5.10 Probability of Preferring DNA for Respondents with Labor Identity

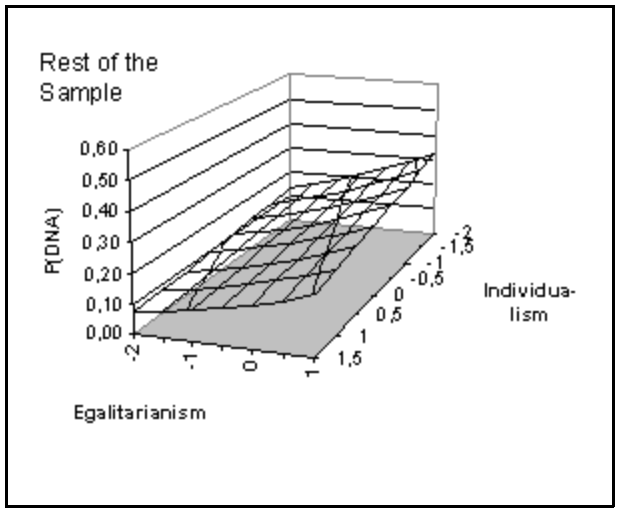

Figure 5.11 Probability of Preferring DNA for Respondents without Labor Identity

In Figures 5.10 and 5.11 we can see probabilities for preferring DNA. As expected, respondents with a labor identity are more likely to prefer DNA (Figure 5.10) than respondents who do not have a labor identity (Figure 5.11); this difference in the level of preference is close to 0.2, comparable to a predicted 20% difference in vote for DNA in a national election. As expected, the prescence of both increasing support for Egalitarianism and decreasing support for Individualism increase the probability of DNA preference. It is interesting to note that the effects of cultural biases are enhanced by the presence of labor identity (the slopes for both Egalitarianism and Individualism are steeper in Figure 5.10). I interpret this as indicating that, for the respondents with labor identity DNA is a natural choice, and this is enforced by a combination of support for Egalitarianism and rejection of Individualism. In the same way, people with labor identity

who have a cultural bias combination which does not support DNA prefer other parties (and show a lower probability for DNA preference, as in Figure 5.10, on the left in the front).

The difference in DNA preference across the range of Egalitarianism is between 0.2 and 0.3 (differences between the left and right edge of the plane), and across the range of Individualism it is between 0.05 and 0.15 (the difference between the front and back edges). The maximum effect of cultural biases is a little bit over 0.3 for the respondents with labor identity (the difference between the highest and lowest point on the plane in Figure 5.10) and for the respondents without labor identity the maximum effect is close to 0.12. Thus, the effect that cultural biases have on DNA preference is twice as large if the respondents have labor identity. I am not trying to make any theoretical point about the connection between identity and cultural biases. I just want to show that the cultural bias variables do have an effect even when controlled for some background variables, and that they are not the only variables having an effect.[10]

[10] From *Cultural Theory* one sometimes gets the feeling that the cultures should explain everything. I think that we should be more sober, treating cultural biases as comparable to any other explanations.

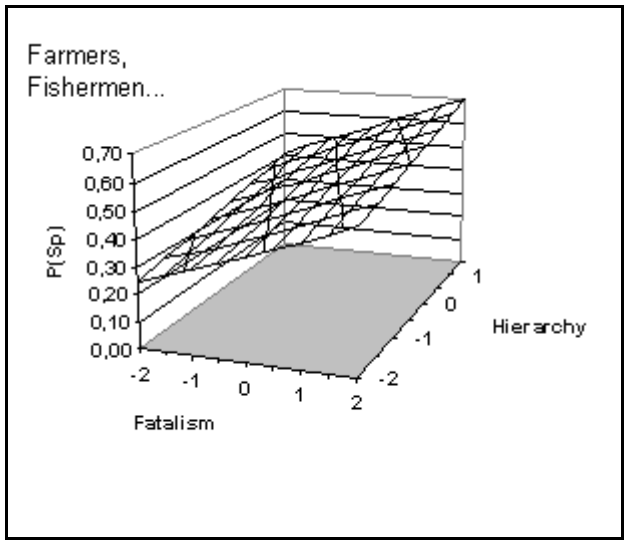

Figure 5.12 Probability of Preferring Sp for Farmers, Fishermen etc.

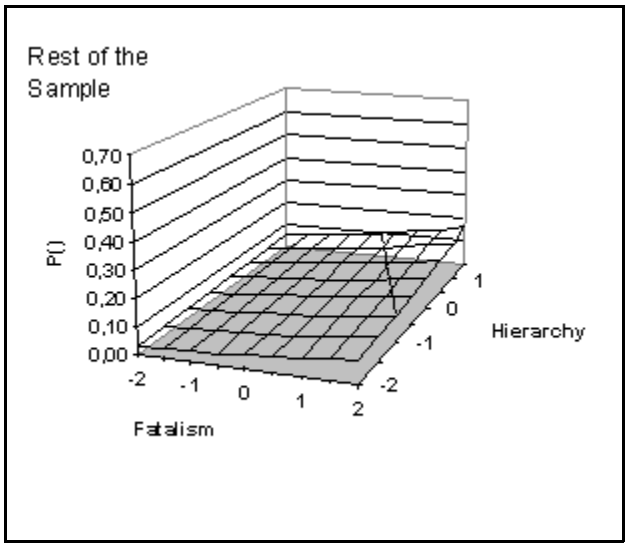

Figure 5.13 Probability of Preferring Sp for the Rest of the Sample

My next example examines the probability of preferring Sp. Figures 5.12 and 5.13 compare the effect Fatalism and Hierarchy has on Sp preference, given that the respondent either has or does not have her main occupation in agriculture, fishing or forestry. It is easy that occupation is practically a necessary cause for Sp preference. There is over a 0.3 difference in the mean probabilities of Sp preference. Cultural biases also show clear effects. I will first refer from the respondents occupied in agriculture or fishing. Cultural biases are able to create a difference of 0.25 to 0.7 in probability of Sp preference. In other words, a respondent with a farm, but the "wrong" kind of attitudes (against Hierarchy and Fatalism) has a 25% chance of preferring Sp, and a respondent with a farm and the "right" kind of attitudes (for Hierarchy and Fatalism) has a 70% chance of preferring Sp. It is difficult to determine why Fatalism would have such an remarkable effect on Sp preference.

The respondents who are not occupied in either fishery, farming or forestry are not prone to prefer Sp. Even if the effects of cultural biases are small, measured in absolute numbers, one can see that the lowest point is on 0.02 and the higest on 0.15 in Figure 5.11. Thus, cultural biases can seven fold the probability of Sp preference across the range of their variation.[11] Therefore, I would expect 15% of the respondents with strong support for both Hierarchy and Fatalism to prefer Sp.

I would interpret these results as indicating that sector interests are a necessary but not sufficient cause for Sp preference, and Hierarchy and Fatalism as neither necessary nor sufficient, but merely modifying the effect of being farmer or fisher. The effect of the cultural biases is remarkable for farmers and small for the rest of the respondents.

[11] This is probably overestimated, since their effect is so large in the other figure. Both figures are drawn on the basis of the same analysis. Farmers are treated as dummy variables, and I have calculated separate estimates for farmes and non-farmers.

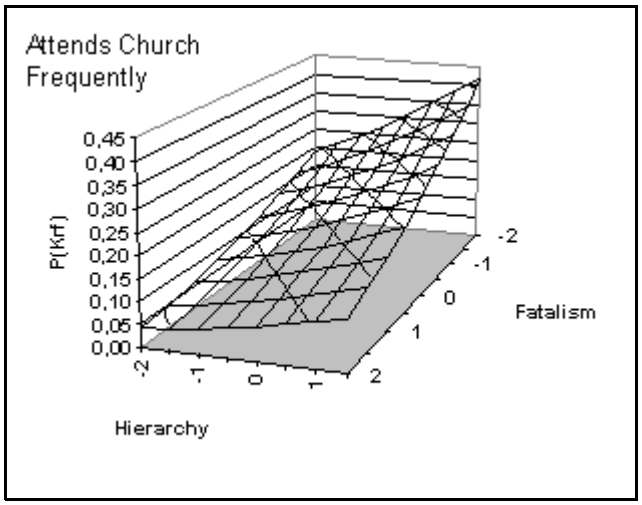

Figure 5.14 Probability of Preferring Krf for Respondents who Attend Church Frequently

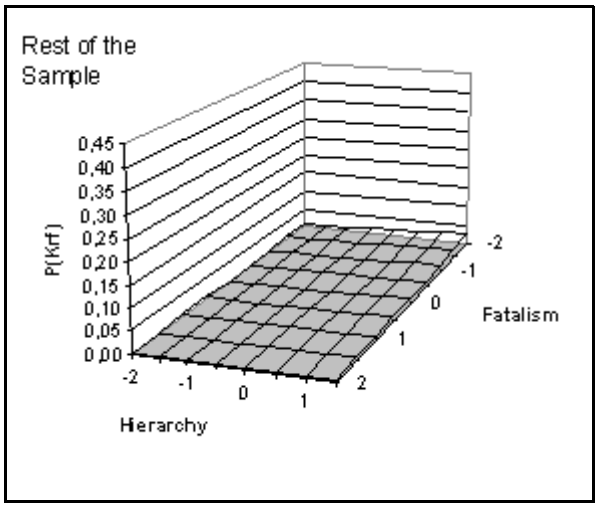

Figure 5.15 Probability of Preferring Krf for Respondents who don't Attend Church Frequently

In Figures 5.14 and 5.15 we see that Krf preference is dependent on Hierarchy, Fatalism, and church attendence. The respondents who attend church at least once a month have a high probability of Krf preference (0.2 in average). If they support Hierarchy and reject Fatalism, their probability for Krf precence increases up to 0.4, or if they would reject Hierarchy and support Fatalism, their probability for Krf preference is reduced to 0.05. The effects of Fatalism are a little stronger than the effects of Hierarchy. The respondents who do not attend church at least once a month have very small probabilites for preferring Krf, regardless of their cultural bias. Church attendence becomes thus a necessary but not sufficient cause for Krf preference, and is modified by Hierarchy and Fatalism.

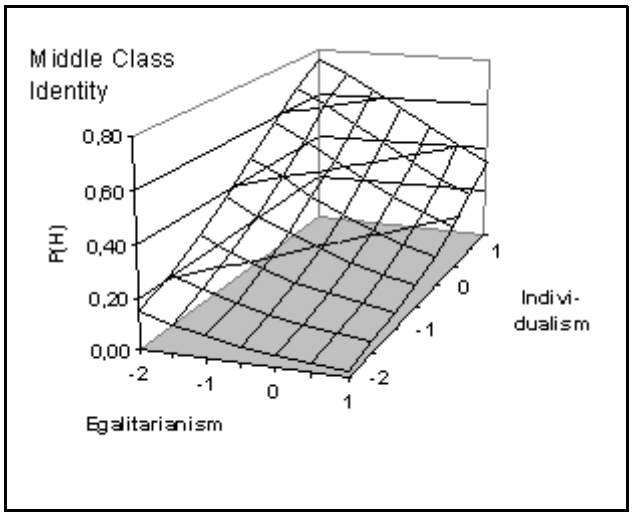

Figure 5.16 Probability of Preferring H for Respondents with Middle Class Identity

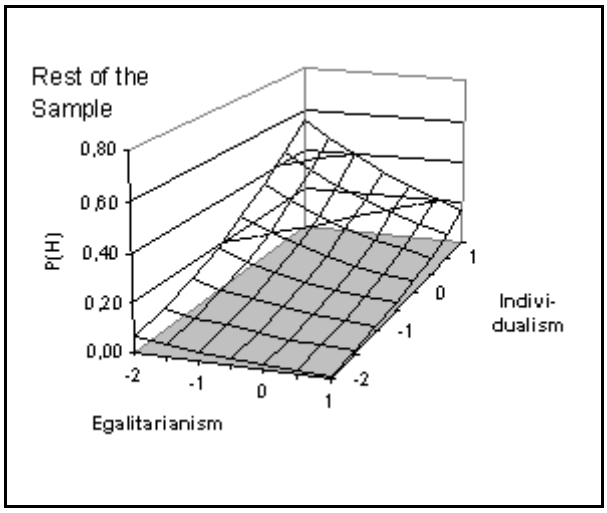

Figure 5.17 Probability of Preferring H for Respondents without Middle Class Identity

Egalitarianism and Individualism are related to the left-right scale. Leftist attitudes correspond with rejection of Individualism and support for Egalitarianism. Attitudes typical of the right are rejection of Egalitarianism and support for Individualism. Thus, left-right dimension corresponds to an imaginary line on the floor of the figure (grey) from the right front to the left back corner.[12]

Preference for H is closely connected to the left-right dimension. We can see how an increase in H preference follows the same direction from front right to left back corner. The change in H probability is both larger in magnitude and more closely connected to the cultural biases than it was for the parties already presented. The change in probability for H preference across the range of cultural biases is from 0 to 0.55 for non-middle class respondents, and from 0 to 0.75 for the respondents who identify themselves with the

[12] Grendstad, Gunnar og Selle, Per: **"Comparing Theories of Political Culture in Explaining Environmental Attitudes"**, 1994.

middle class. Here a certain cultural bias combination is both a necessary and a sufficient cause for H preference[13]. A respondent who rejects Individualism and supports Egalitarianism will not vote for H; the probability of H preference is very low for these respondents. When the support for Individualism increases there is a corresponding rise in the H preference, and especially so if Egalitarianism is rejected. The description over applies both for respondents with and without middle class identity. Having a middle class identity advances the point where support for Individualism and rejection of Egalitarianism start increasing H preference, so that the difference in the maximum level of support is close to 0.2.

H preference seems to have a stronger connection to the cultural biases than does DNA preference, reflected in the steeper regression plane. This could result from the fact that DNA is so close to the sample average on several cultures.[14] The effect of identity is in the same magnitiude (0.2), difference is first and foremost in DNA having at least some support from all cultural bias combinations.

The effects of Individualism and Egalitarianism seem to be additive on both DNA and H preference formation. Rejection of cultures is also clearly involved. Respondents who reject Individualism are not likely to prefer H. Neither are respondents who reject

[13] This is, of course, only given if I have all relevant variables in my model, and if the model specification is correct.

[14] Logit is a regression technique, and, as with other regression techniques, phenomena (in this case DNA) close to the means are not well described by the regression. In other words, because DNA voters are numerous and close to the sample mean, it is difficult to separate them from the rest of the sample.

Egalitarianism likely to prefer DNA.

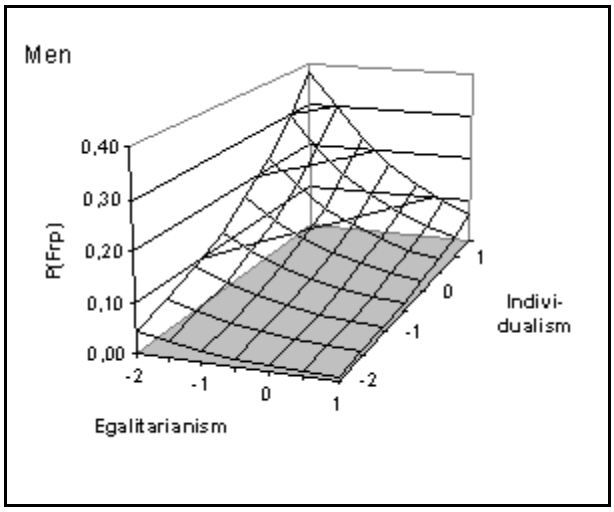

Figure 5.19 Probability of Preferring Frp for Men

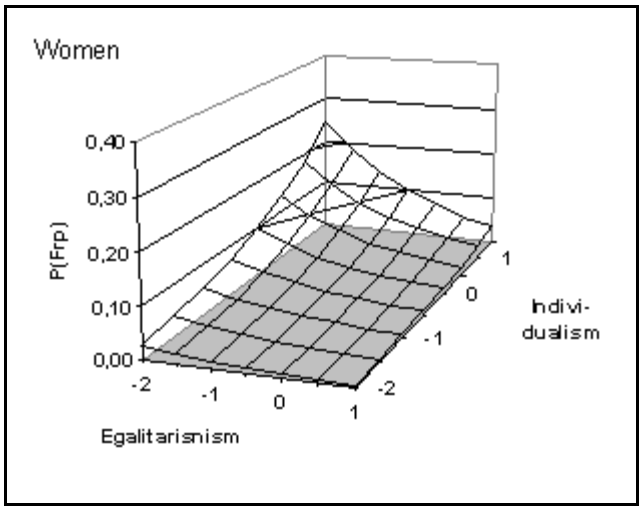

Figure 5.18 Probability of Preferring Frp for Women

My next example involves preference for Frp as compared for men and women. As for SV, DNA, and H, Egalitarianism and Individualism are also here the two cultural biases with biggest predictive ability. We can see how the pattern of support closely resembles the one for H, but with one major difference: the steep incline starts later. This means that one has to more strongly support Individualism and reject Egalitarianism before the probability of Frp votes starts to increase. In other words, Frp as a party is probably more anti-egalitarian and pro-individualistic than H is. In addition to this quite expected relation between Individualism and Egalitarianism, there is a difference between men's and women's preferences. Men are more inclinded to vote for Frp than women when both have the same cultural bias combination.

For the discussion of additivity and rejection, it is relevant to note that support for Individualism and rejection of Egalitarianism seem to be necessary factors for Frp

preference. This enforces my belief in the importance of both rejection and additivity.

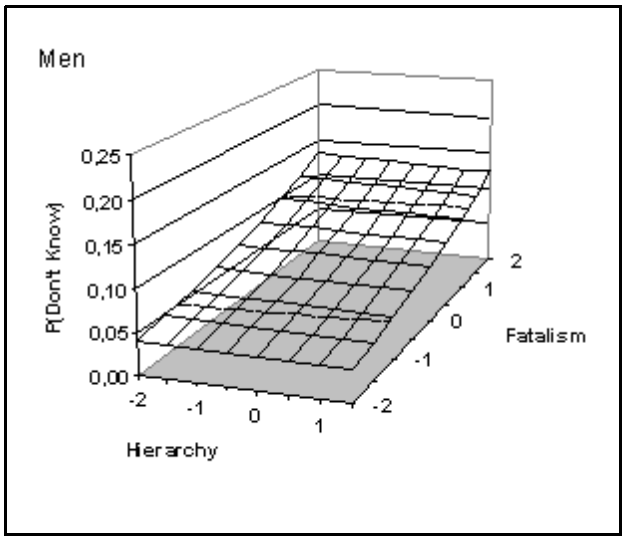

Figure 5.21 Men's Probability of Not to Know to vote

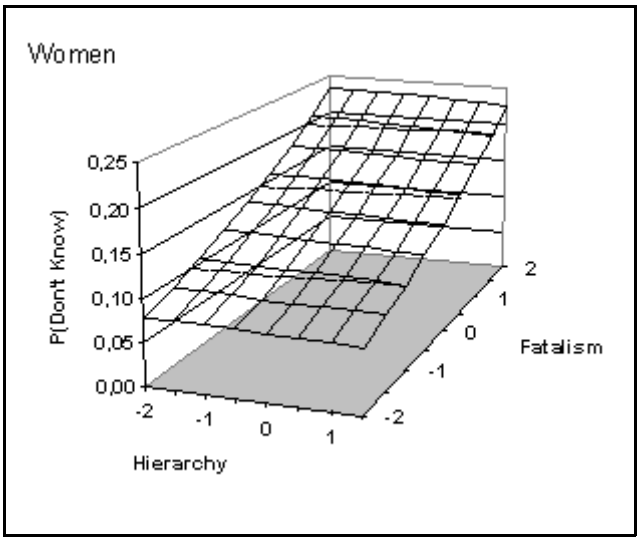

Figure 5.20 Women's Probability of Not to know what to vote

In addition to the respondents who know what they would vote for, there are some respondents who cannot make up their minds. These respondents who do not know what to vote for are only little effected by Hierarchy (the regression plane is almost flat across the range of Hierachy), but Fatalism has an considerable effect. For men the probability of not knowing what to vote for increases from a low 0.04 to a high 0.13 when Fatalism changes from rejection to support. For women the general level of not knowing what to vote for is higher and it changes from the low 0.07 to the high 0.23 when Fatalism changes from rejection to support. For both genders, fatalists do not know what to vote for almost three times as often as non-fatalists.

Cultural theory predicts that fatalists have a clear tendency to not to vote, and this is probably reflected here, too. If one is fatalistic, the differences between the parties do not

matter, since for a fatalist politics is something one cannot do anything about anyway. In this case, there are no additive effects between the biases visible because the other biases have practically no effect.

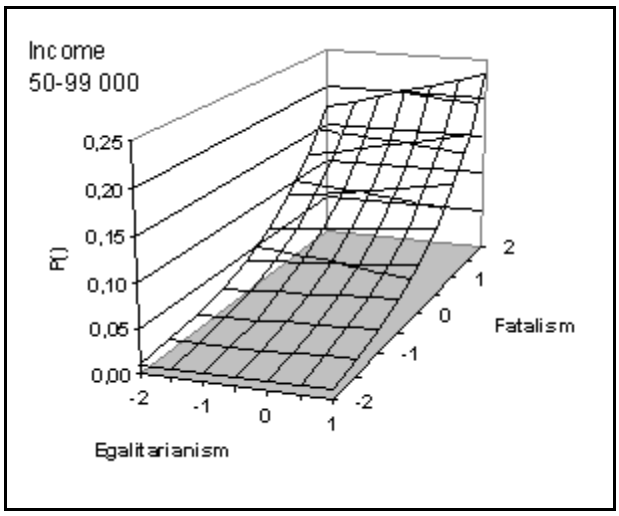

Figure 5.22 Probability of Not Voting for Low Income Respondents

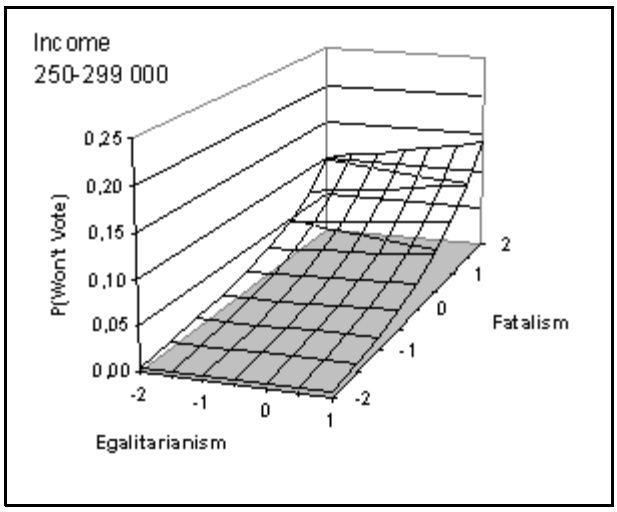

Figure 5.23 Probability of Not Voting for High Income Respondents

The last group I am presenting are the non-voters; i.e., respondents who say that they would not vote if there were an election tomorrow. In both figures above, we can see the strong effect Fatalism has on non-voting. Respondents who reject Fatalism, also tend to reject non-voting as an alternative. For the respondents who support Fatalism and have low income there is a estimated probability around 0.2 for non-voting. For respondents who have high incomes and support Fatalism there is an estimated probability between 0.15 and 0.2 for non-voting. Increases in income either directly increase the probability of voting or lower the effect of Fatalism.

Fatalism seems here to be a necessary but not sufficient cause for non-voting. Acording to the analysis, there should not be respondents who decide not to vote who also reject Fatalism. For the non-voters and for the respondents who don't know what to vote for, there are clear signs that rejection or support of Fatalism is important for understanding their behavior. There have been no signs of additivity between cultural biases for these two groups.

There have been **some common tendencies** in all of these party preference analyses. First, there were very few surprises. The combinations of cultural biases produced patterns of party preference that fit well with my descriptions of these parties in chapters three and four. Second, in every graph where there were two cultural biases that had effects, the additive effects were sensible. In the two cases that lacked additivity, only Fatalism had an effect. I consider this as showing support for the assumption of additivity. If the biases were not additive in their nature, we would not have seen patterns that are so pure. Third, in several cases cultural biases only have effect when some other characteristic is present. For example, cultural biases alone do not make people vote for Sp, but if you are a farmer, you use cultural biases either to choose or reject Sp as a party. In the same way, if you do not attend church frequently Krf is not an option, but if you do you probably use cultural biases to choose or reject Krf as your party of preference. I think, this support the view of cultural biases, presented by Selle and Grendstad (1994:427), in which cultural biases are not necessarily causing actions, but determine

how you legitimize them. Lastly, the commonly used left-right scale is visible in several analyses. The effects of Egalitarianism and Individualism were most important for parties that have a clear position on the left-right scale (SV, DNA, H, and Frp) For these parties using left-right scale instead of cultural biases to predict party preferences would probably lead to equally satisfying results. Cultural biases have still an advantage over the left-right scale, since they are also able to successfully predict preference for parties that have less clear relation to the left-right dimension (Sp, Krf, and Won't Vote).

5.5 Summary

In my analyses the Synthetic Individual Approach receives empirical support. The effects found for age in the Sequential Individual (number of supported biases increases with age) can also be explained in the Synthetic Individual Approach. In the Synthetic Individual Approach, increasing age increases the general level of support for cultural biases. Education has the opposite effect and decreases the amount of general support for cultural biases. When age and education are combined, their effects can still be separated; the increase in support for cultural biases is clearest for respondents over 50 years. Education has a decreasing effect on the number of cultural biases supported by all age groups, but the effect weakens with increasing age. There is also a difference in these variables' effects on specific cultural biases: age increases Hierarchy, and education decreases Individualism. Most significant, though, is that age increases support for

cultural biases in general, which can be explained if cultural biases are interpreted as being a result of life experience.

There seems to be several indications of support for the additivity of the cultural biases. By treating them as additive on the aggregate level, it is possible to predict coalition patterns for parties which seem to correspond to the common coalitions in Norwegian politics. It is also possible to show that the effects are present on the individual level by looking at party preferences for different clusters formed by the cultural biases. A test of non-additivity showed that for the most part the additive effects dominate, but in some situations the non-additive effects between the cultural biases become significant. It is also possible to build models - in which cultural biases are treated as additive and having a non-linear effect on party preference - to predict individuals' party preferences with a satisfying level of precision. This analysis also shows that while cultural bias seems to be only one of the many charateristics that effect party preference, in many cases this effect is remarkable.

All of these signs taken together indicate that there is additivity between the cultural biases, a necessary assumption for the Synthetic Individual Approach.[15] I find it also quite clear that rejections of cultural biases help to explain phenomena found in the data. The analyses of coalitions, clusters, and the illustration based on logit all rely on rejection of

[15] I have not made any rigorous attempt to find out more about non-additive properties of cultural biases. It would have been interesting to examine under which conditions certain cultural biases, when put together, form something new that could not be predicted from the cultural biases themselves. I am thinking of, for example, extremist movements, or terrorists; Do they base their opinions on different cultural biases than most people, or do they use the same biases but combine them in a different manner?

cultural bias.

FIGURES:

TABLES:

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