These extracts are from a book I am writing, titled ***Dimensions of Culture: Using Statistics with the SCCS***, and they draw on some of the exercises for chapters. The book has a CD with the SCCS database, and a freeware version in R of the data and tutorials for statistical analysis. The book uses the single-factor methods (unidimensional scaling) two identify two kinds of components of cultural variation (1) functional clustering of variables, and (2) ideational clustering of variables, e.g., as organized by world religions. It also identifies how warfare (and its converse, trade) alters how the societies in these clusters affect their neighbors, either toward greater similarity or, conversely, and through resistance, toward greater differentiation and adaptive resilience.

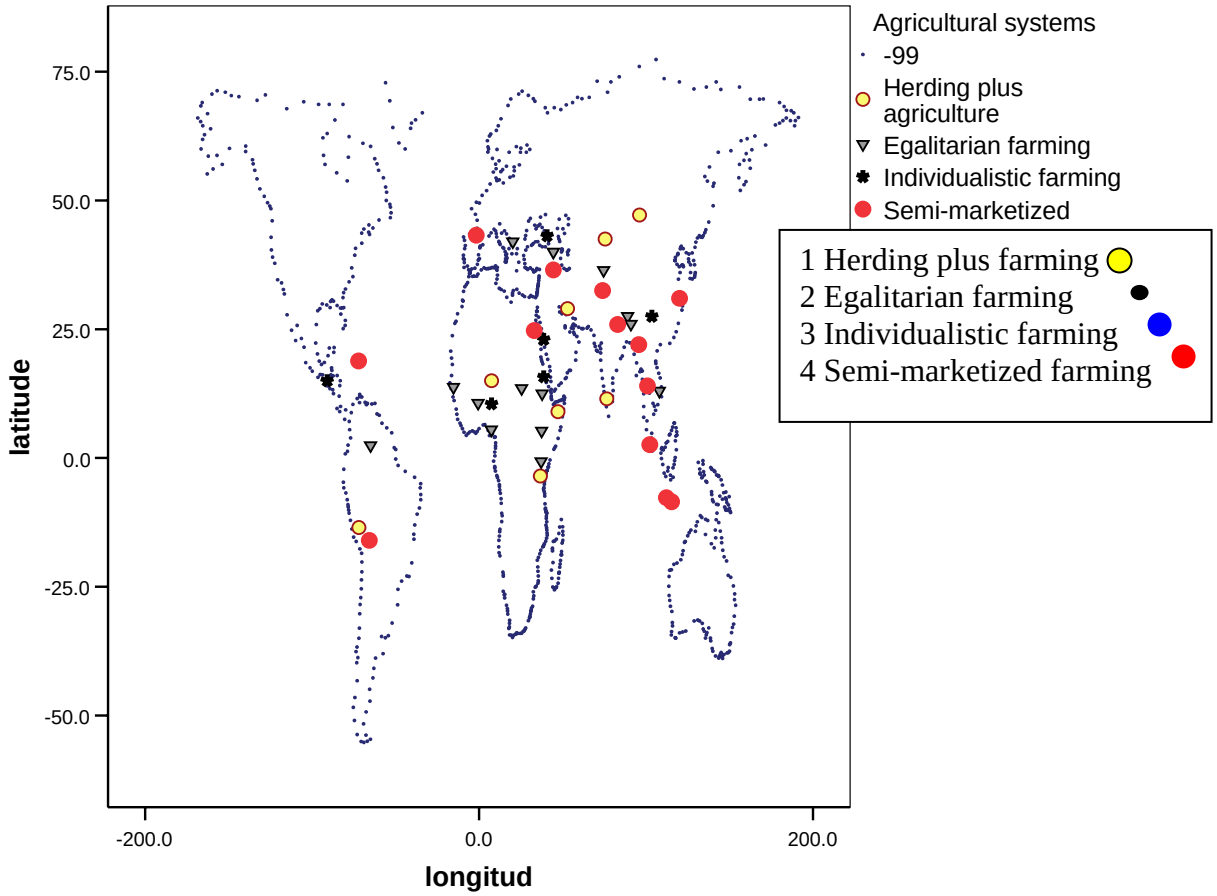
Exercise Sets

There are two related exercises here, and both depend on picking a topic from the list below. Exercise 1 is to map some of the variables, and the variables are found in Exercise 2. For ideas and measures underlying correlations, see http://mathbits.com/MathBits/TISection/Statistics2/correlation.htm (live link!).

Topics:

A1. Fraternal Interest Groups
A2. Religion and Expressive Culture
A3. Combinations (e.g., A1, A2)
B. Gender and Politics
C. Warfare, Violence, Crime
D. Modernization, Complexity, and Human Rights
D1. Modernization
D2. Political Integration
E. Small Scale Loyalties and Compliance with Norms

Exercise 1: Maps. After picking a topic, make Maps for some of the main variables. Use the file SCCSdata_MapCoords.sav. Double click the initial map and double click to alter the properties of how the different colors and sizes for your variables and for the continent outline should be shown. Use the smallest possible nodes for continent outlines. This about highlighting the contrast between the extremes in the variable you are representing, e.g., highest category RED and LARGE, lowest category YELLOW and LARGE also so the contrast will show. Intermediate nodes between red and yellow might follow the color spectrum red-purple-blue-green-yellow, with SMALL size for the middle category. Add a black border to each of the light nodes so they will show in black and white printing.



For the outline to show on the map use recode into same variables (recode system missing=-99(with conditional selection (if) outlinefill=-99). You can repeat this recode for every variable you want to map.

Exercise 2: Factor Analysis. Also known as principal component analysis. Read both this and the Multi-Factor and Multiple Regression sections below before starting. The idea here is to use the SCCS data file with Spss commands /Analyze/Data Reduction and select appropriate variables under a single topic to test the idea of a *single factor structure*. You may want to look http://en.wikipedia.org/wiki/Principal_component_analysis or factor analysis advantages at http://en.wikipedia.org/wiki/Factor_analysis#Advantages_2

Single Factor Topics. The basic idea here, for our concern, is to input a series of measures that you think are not only related to one another, but *that all measure the same thing*. In that case Spss /Data Reduction will return only a single component of correlated variation. If you get two or more components there is not a single factor. Once you find a single factor, however, you can enter an additional variables that measures something quite different, you can see how this new variables correlates with the main factor. Note that if you continued to add one or more additional variables, Spss /Data Reduction would begin to identify multiple factors.

A1. Fraternal Interest Groups

This topic entails the pre-state variables from Paige and Paige, which is in the reading list. The theory is that in pre-state societies with valuable fixed resources like agricultural land large domesticated animals, groups related males tend to form with common interests in

issues of legitimacy of their children as heirs. These common fraternal interests extend to the fecundity of their wives given that children in a pre-state society are both an important source of productivity through their contributions to the extended family and that they automatically inherit from their parents given the absence of written wills. (To test whether the theory also works for state-level societies some of their main variables about fraternal interest groups need to be reconstructed from other studies. I will not do that here.) You can begin by seeing if you can replicate my results for the following seven variables (those numbered in the second table). For seven variables there are seven components, but as shown in the first table output by Spss /Data Reduction, the first component or factor accounts for 57% of the co-variation in all seven variables, and the other factors show only random variation. Variation is random when the "Total" column under Initial Eigenvalues shows a number less than or equal to 1. The components of variation are ranked in order of those numbers. The output shows that only the first factor (right side of the top table) has Explained variance (in this case 56.827%)

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.978	56.827	56.827	3.978	56.827	56.827
2	.861	12.303	69.130			
3	.702	10.035	79.165			
4	.572	8.173	87.338			
5	.489	6.983	94.321			
6	.297	4.242	98.563			
7	.101	1.437	100.000			

Component Matrix(a)

(you can add a label here, such as FIC dimension)	Component 1
562 Circumcision	.730
564 Husband Involvement Scale (Couvade)	-.662
568 Compensation Demands	.726
569 Fraternal Interest Group Size	.808
570 Fraternal Interest Group Strength	.903
571 Resource Base	.830
572 Residence Pattern	.568

Extraction Method: Principal Component Analysis.
a 1 components extracted.

Now try adding v626 "**Belief that Women are generally Inferior to Men**" and you should find that this bundle of highly correlated strongly male orientations has no correlation whatever with this belief (see topic F below, Modernization, for a surprise). Try 860, Cultural Basis of Polyyny, and we see another component of the Fraternal Interest Complex (FIC), one which might go with 752, husband and wife eating apart (probably in separate parts of the polygynous housing complex). v765, low impact of communal decisions on people's lives, goes with the FIC. Try 891-893 (warfare variables) or 669 (Male aggression) and you should find they do not correlate highly on the FIC dimension. And so forth. Test

variables you think will go with or opposite to (negative loadings, like Couvade) the FIC dimension, without adding a new principal component (795 for example).

In class, correlating variables with factor scores, I thought we found that v597 and v598, having to do with attitudes and restrictions about extramarital affairs for men and women, *correlated with* the factor structure (which would makes sense) but did not fit the one-factor structure itself. But I can't replicate that finding. Checking /Analyze /Correlate as between the factor and variables in the range 500-597 (maximum 100) I found correlations for Indifference of Caretakers (510. Father: Aver.), Control of Caretakers (518. Mother: Girl), and Adolescent Initiations for Grils (530) [first analysis is pairwise missing, last in averages]. Of these, only Adolescent Initiations for Grils (530) OR Control of Caretakers (518. Mother: Girl), BUTY NOT BOTH, fit the factor structure. That is what we are looking for – some of the *correlates* of a given factor, even if they don't fit a single factor structure

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Correlations

		REGR factor score 1 for analysis 1	REGR factor score 1 for analysis 2
REGR factor score 1 f	Correlation	1	1.000(**)
or analysis 1	Sig. (2-tailed)	(correlation with itself)	.000
	N	60	60
REGR factor score 1	Correlation	1.000(**)	1
for analysis 2	Sig. (2-tailed)	.000	(correlation with itself)
	N	60	1261
Control of Caretakers	Correlation	-.842(*)	-.522(*)
-Mother: Girl	Sig. (2-tailed)	.035	.018
	N	6	20
Adolescent Initiation	Correlation	-.101	-.153(*)
Ceremonies,	Sig. (2-tailed)	.446	.038
Occurrence: Girls	N	59	183
Indifference of	Correlation	.540	.376(*)
Caretakers-	Sig. (2-tailed)	.087	.017
Father: Aver	N	11	40

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

A2. Religion and Expressive Culture

Korotayev codes, High gods, and Roberts' games codes (recoded).

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.030	50.498	50.498	3.030	50.498	50.498
2	.901	15.009	65.507			
3	.670	11.166	76.672			
4	.520	8.663	85.336			
5	.484	8.069	93.405			
6	.396	6.595	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix(a)

	Component

	1
1188 Evil Eye Scaled Rating	.732
884 Priest	.601
238 High Gods (moral)	.744
713 Religion (Non-Classical)	-.745
Islam	.756
GamesOfStrategy	.673

Extraction Method: Principal Component Analysis.
a 1 components extracted.

A3. Combinations (e.g., A1 and A2)

It may be the case that two of these topics run together into a single complex. Look for example at the combination and A1 and A2.

Component Matrix(a)

	Component
	1
562 Circumcision	.787
564 Husband Involvement Scale (Couvade)	-.651
568 Compensation Demands	.708
570 Fraternal Interest Group Strength	.860
571 Resource Base	.820
572 Residence Pattern	.572
GamesOfStrategy	.812
Islam	.568

Extraction Method: Principal Component Analysis.
a 1 components extracted.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.645	51.614	51.614	4.645	51.614	51.614
2	.934	10.378	61.992			

Extraction Method: Principal Component Analysis.

Component Matrix(a)

	Component
	1
1188 Evil Eye Scaled Rating	.675
884 Priest	.617
Islam	.601
GamesOfStrategy	.797
562 Circumcision	.806
568 Compensation Demands	.713
570 Fraternal Interest Group Strength	.866
571 Resource Base	.793
572 Residence Pattern	.526

Extraction Method: Principal Component Analysis.
a 1 components extracted.

To proceed further, select cases using v0_StatesPaige=1, use ../Factor/Options/MissingData/ Replace with Mean, /Scores/Save as Variables, then test correlation of this factor with other variables.

Now, using /Analyze/Correlate, including Fact1 (the factor variable), of the first 20 variables, 1, 4, 6-9, 10, 12, and 17 all correlation with p <.001, but these variables do not fit a single factor model. This is a *radix* pattern that suggests that our "Fraternal Interest" group may radiate in as many as four separate directions: trade, agriculture, money, etcetera.

B. Gender and Politics

Begin, for example, with the variables of Peggy Sanday, Marc Ross, and Martin Whyte. E.g., 663 – Female power (but don't use 657 thru 662 which were used to construct it!). Can you find correlates and build a simple component? How about 793 and 794, relating to female participation in public and private domains? What about the following?

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.078	61.561	61.561	3.078	61.561	61.561
2	.955	19.095	80.656			
3	.466	9.323	89.979			
4	.347	6.938	96.917			
5	.154	3.083	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix(a)

	Component
	1
591 Ownership or Control of use of Dwellings	-.543
592 Control of the Labor done by Men	-.804
669 Male Aggression Guttman Scale	.834
793 Female Participation in Public Political Arenas, Relative to Males	.909
794 Female Participation in Private Political Arenas, Relative to Males	.784

Extraction Method: Principal Component Analysis.
a 1 components extracted.

C. Warfare, Violence, and Crime

See esp 669 (Male aggression) and 891-2 (internal and external war)
See index of variables at http://eclectic.ss.uci.edu/~drwhite/courses/stdsvars.html
The way to test the existence of single factor dimensions for these data is to distinguish *external* warfare or violence against other societies from *internal* warfare from (or perhaps including, depending on the results) crime and interpersonal violence. Then the ways that other variables fit into these complexes can be determined by the
Aggression-Individual - Homicide/Assault/Theft/Trespass/Suicide/ 1665,-1675
Aggression- Social - Homicide/Assault/Theft/Trespass/Suicide/ 1675,-1682
Conflict Resolution/Initiation 771, 896,-898
Expansion (factor) 899,1120,900,573,913,870,894,911,912,910,1119,909,1087

External War Attitude (factor) 783,780,907,903,905,1243
External War Frequency (factor) 774,892,1120,1241,1650,-1653,1747
Internal Violence Attitude (factor) 770,781,782,906,1240
Internal Violence Frequency (factor) 768,773,767,666,891,693,679,1116,1117, 1241,1652,-1653,1748,-1750
Internal Violence Organization 1757,1758
Military Institutions (factor) 902,772,895,900,769,894
Military Success 908
Misc: Cowardice, Defense, etc 904, 916, 1118
Misc: Ritual Warfare, etc. 901,914,915
Outcomes regarding land/nonland 1655,-1657, 1658,-1690
Pacification 1654
Prestige 1773
Subjugated Population (factor) 1090,1112,1100,1091,893
Violence against overarching political institution 1739
Violence/Hostility - External groups 1770,1772,1775,-1778
Violence - Internal 1769
Violence: Reaction of adults to children's 1764
Weapons 1779,1780

Some Results (Megan and Nicole): v893, being attacked, correlates but does not fit the one factor structure.

Component Matrix(a)

	Component
	1
774 External Warfare	.828
780Hostility toward other societies	.788
783 Acceptability of violence toward people in other societies	.756
892 Frequency of External War - Attacking	.634
903 Prestige Associated with Being a Soldier or Warrior	.638

Extraction Method: Principal Component Analysis.
a 1 components extracted.

(Colin and Jamie): your variables 757, 915, and 1759 did not fit a single factor and this factor is weak, with the ratio of the first to second “Total” variance explained ratio 1.382/.837 coming out to 2 rather than 3. You can probably find other variables that will load on these to make a stronger factor. Outcome is similar whatever method is used to deal with missing values.

Component Matrix(a)

	Componen t

	1
664 Ideology of Male Toughness	-.697
783 Acceptability of violence toward people in other societies	.705
914 Revenge	.640

Extraction Method: Principal Component Analysis.
a 1 components extracted.
(b. replace missing data with means)

Colin: your next try variables 1675 1776 1770 form another triple like that above, but with some higher correlations for two of the variables.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.618	53.917	53.917	1.618	53.917	53.917
2	.881	29.373	83.290			
3	.501	16.710	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix(a)

	Compo
	1
1760 Frequency of Interactions Between Boys (early childhood) and Male Adults	-.521
1675 Corporal Punishment of Boys in Late Childhood	.804
1776 Socially Organized Homicide	.836

Extraction Method: Principal Component Analysis.
a 1 components extracted.

So lets's try combining this set with one or more from the earlier set:

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.924	48.096	48.096	1.924	48.096	48.096
2	.793	19.823	67.919			
3	.709	17.713	85.632			
4	.575	14.368	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix(a)

	Compo
	1
1760 Frequency of Interactions Between Boys (early childhood) and Male Adults	-.521
1675 Corporal Punishment of Boys in Late Childhood	.804
1776 Socially Organized Homicide	.836
664 Ideology of Male Toughness	.715

Those four variables give you a nice single factor structure with a ratio of 1.924/.793 which is almost 3:1. Some nice crosstabs between 1776 Socially Organized Homicide and both the first two variables. Try the third as well as a crosstab. Build and map these with factor scores… and try correlating the factors scores with 783 914 and other candidate variables.

Jennifer and Ryan(?): Five variables are 1 factor with listwise deletion of missing values, only four with pairwise (below). Variables that dont work in either case are 772, 774, 769, 899, 1775. So this seems to be state-level war, hostility, success.

Component Matrix(a)

	Component 1
908 Military Success: Is Political Community/ Cultural Unit Winning or Losing in the Long	.402
895 Decision to Engage in War	.643
1770 Attitude Towards Physical Violence Against Members of Other Ethnic Groups	.692
1772 Hostility Towards Other Ethnic Groups	.806
900 Military Expectations II (SUBJUGATION, TRIBUTE)	.599

Extraction Method: Principal Component Analysis.
a 1 components extracted.
(b. replace missing data with listwise)

Component Matrix(a)

	Component 1	2
908 Military Success: Is Political Community/Cultural Unit Winning or Losing in the Long Run	.459	.669
895 Decision to Engage in War	.529	-.148
1770 Attitude Towards Physical Violence Against Members of Other Ethnic Groups	.749	-.191
1772 Hostility Towards Other Ethnic Groups	.662	-.548
900 Military Expectations II (SUBJUGATION, TRIBUTE)	.612	.452

Extraction Method: Principal Component Analysis.
a 2 components extracted.
(b. replace missing data with pairwise)

In sum, a very interesting contrast to simple frequency of aggressive external war, including prestate (Megan and Nicole) and to toughness/revenge war (Colin and Jamie). You also have one of the variables, 908 of Yasaman. How different are these two factors; is there a way to distinguish between pre-state and state-level warfare?

Yasaman: very nice! Your variables include Military Expectations I which are those of Military Expectations II *plus* Land - fields, hunting/fishing territory, pastures (911)
Trophies and honors (including captives for sacrifice) (913)
(those are variables, 911, 913, which would be interesting for both your and Jennifer and Ryan(?)'s study.
You also have one of their other variables, 908. How different are these two factors; is there a way to distinguish between pre-state and state-level warfare?

Component Matrix(a)

	Component 1
899 Military Expectations I	.729
908 Military Success: Is Political Community/ Cultural Unit Winning or Losing in the Long Run	.702

1725 Possibility of Peaceful Territorial Expansion	-.197
1773 Prestige of Warriors	-.774

Extraction Method: Principal Component Analysis.
a 1 components extracted.

Jacob: this is a start, you just need more variables. That is a high correlation.

Component Matrix(a)

	Component
	1
v774 External Warfare	.822
v905 Rewards (Special Gifts, Praises, or Ceremonies, not including ritual purification for a man who killed an emeny)	.822

Extraction Method: Principal Component Analysis.
a 1 components extracted.

Nick Stong & Yasaman Javadzadeh

Good factor, ratio 2.112/.886 is about 2.2, getting close to 3. You can probably find some more variables that might correlate, but very interesting that this correlates with class stratification and socialization of boys violence

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.112	52.810	52.810	2.112	52.810	52.810
2	.886	22.152	74.963			
3	.654	16.347	91.309			
4	.348	8.691	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix(a)

	Component
	1
v902 Leadership During Battle	.792
v774 External Warfare	.694
v270 Class Stratification	-.685
v1764 Reaction of Socializing Agents Towards Violent Behavior of Boys in Late Childhood	-.732

Extraction Method: Principal Component Analysis.
a 1 components extracted.

Multi-Factor Topics. The idea here is to take a basic concept, like modernization, and the variables used to measure it, and to observe the number of principal components of variation, or factors, that it contains. Once that is done you may enter additional variables to see how they relate to the original factors and whether they generate new factors.

D. Modernization, Complexity, and Human Rights

Read the Trevor Denton article on Modernization (Complexity Revisited): http://ccr.sagepub.com/cgi/content/abstract/38/1/3
This topic is especially interesting because of the article called "Measurement of Cultural Complexity" that presented these variables and constructed a sum of these variables as a single measure of societal complexity. Inside the article, however, the authors identified their choice of variables on the basis of ones whose rank order categories brought us closer to modernization, without any necessary rise in complexity. Denton's article takes off from there.

Reproduce the following with Spss commands /Analyze/Data Reduction/ (then select variables 149-158 and under options exclude cases pairwise) plus AgricSystemPryor and "Statehood Index." You can explore how other variables fit this pattern adding them to the list. For example, now add v626 "**Belief that Women are Generally Inferior to Men**" and you will find that the "No such belief" category 2 of this variable has a positive loading (r=.619) on factor 2 along with money, urbanization and density of population. The variable has a negative loading on factor 1 (r=-.426), however, meaning "Yes, such a belief" is correlated with this aspect of modernization. So women are penalized in the rural areas where modernization variables are present!

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.542	54.519	54.519	6.542	54.519	54.519
2	1.552	12.930	67.449	1.552	12.930	67.449
3	.882	7.353	74.802			

Component Matrix(a)	Component	
	1	2
149 Writing and Records	.723	-.437
150 Fixity of Residence	.668	.649
151 Agriculture	.731	.479
152 Urbanization	.697	.132
153 Technological Specialization	.719	-.090
154 Land Transport	.620	-.565
155 Money	.709	-.048
156 Density of Population	.752	.425
157 Political Integration	.793	-.161
158 Social Stratification	.789	-.191
AgricSystemPryor	.792	.143
"Statehood Index"	.841	-.315

Extraction Method: Principal Component Analysis.
a 2 components extracted.

Justin and Namanh: 17 variables! Modernization – so as you know, you need to avoid variables that are included in sums of variables…. I will let you sort through this since you were ahead of the rest at the start.

Of the variables above, the set that retains the most variables (102) are 149|151-153|155-158|Modernization, dropping v150, v154, AgricSystem and Statehood.

Later I investigated how these related to expressive culture (games) and child training, and got a single factor among the following.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.934	38.674	38.674	1.934	38.674	38.674
2	.994	19.872	58.546			
3	.870	17.403	75.948			
4	.641	12.823	88.772			
5	.561	11.228	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix(a)

	Component
	1
149|151-153|155158| Modernization	.724
GamesOfChance	.707
sexrestr	.503
selfrely	-.607
obedienc	.537

Extraction Method: Principal Component Analysis.
a 1 components extracted.

Most of these proved to be correlates, however, not part of the single factor of modernization. Only obedience fit the factor structure. That factor, however, with this new variable, produced 165 cases in the factor score using pairwise deletion and accounted for 52% of the variance. The Obedience training variable is itself I believe a one-factor variable produced from v522-v525 in the TRAITS INCULCATED IN CHILDHOOD codes by Herb Barry, et al.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.682	52.022	52.022	4.682	52.022	52.022
2	.968	10.760	62.781			
3	.816	9.061	71.843			
4	.635	7.051	78.893			
5	.553	6.140	85.034			
6	.455	5.057	90.091			
7	.374	4.160	94.250			
8	.277	3.074	97.325			
9	.241	2.675	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix(a)

	Component

	1
Writing and Records	.721
Agriculture	.709
Urbanization	.697
Technological Specialization	.758
Money	.692
Density of Population	.767
Political Integration	.833
Social Stratification	.807
obedience	.432

Extraction Method: Principal Component Analysis.
a 1 components extracted.

Shielamae: this is an excellent factor, very revealing as well

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.904	58.090	58.090	2.904	58.090	58.090
2	.983	19.668	77.758			
3	.513	10.259	88.016			
4	.338	6.766	94.782			
5	.261	5.218	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix(a)

	Component
	1
1740 Levels of Political Hierarchy	.548
1721 Extent of Burden Caused by Tribute Payments or Taxation	.827
1723 Number of Rich people (wealthy)	.742
1737 Number of Poor	.856
1724 Number of Dispossessed	.798

Extraction Method: Principal Component Analysis.
a 1 components extracted.
(b. replace missing data with pairwise)

Even better is this combination of your variables:

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.638	60.628	60.628	3.638	60.628	60.628
2	.934	15.561	76.189			
3	.549	9.148	85.337			
4	.406	6.758	92.096			
5	.334	5.565	97.661			

6	.140	2.339	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix(a)

	Component
	1
1723 Number of Rich people (wealthy)	.689
1737 Number of Poor	.795
1724 Number of Dispossessed	.802
1721 Extent of Burden Caused by Tribute Payments or Taxation	.832
1738 Presence of Formal Education Within Local Community	.763
711 Societal Complexity (Guttman Scale - Freeman & Winch 1957)	.783

Extraction Method: Principal Component Analysis.
a 1 components extracted.
(b. replace missing data with pairwise)

D2 Political Complexity: State Level Sanctions, Taxes, Food Storage

Variables suggested by Dominic D. P. Johnson **God's Punishment and Public Goods**

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.444	55.554	55.554	4.444	55.554	55.554
2	.987	12.342	67.896			
3	.843	10.533	78.429			
4	.558	6.969	85.398			
5	.517	6.464	91.862			
6	.301	3.758	95.620			
7	.211	2.636	98.257			
8	.139	1.743	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix(a)

	Component
	1
776 formal sanctions and enforcement for community decisions	-.733
777 Enforcement specialists (police, tax collectors)	-.725
784 Taxation paid to community	-.779
237 Jurisdictional Hierarchy Beyond Local Ccommunity	.850
90 Police	.701
19 Perservation and Storage of Food	.455
63 Community Size	.719
158.1 Sum of Cultural Complexity (v149-158)	.915

Extraction Method: Principal Component Analysis.
a 1 components extracted.

. Pairwise

D2 Combined82: Political Complexity

Murdock Scale and those in Dominic D. P. Johnson **God's Punishment and Public Goods**

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.375	53.129	53.129	6.375	53.129	53.129
2	.972	8.099	61.228			
3	.818	6.813	68.041			
4	.780	6.500	74.541			
5	.701	5.843	80.384			
6	.589	4.907	85.292			
7	.492	4.102	89.393			
8	.420	3.504	92.897			
9	.296	2.463	95.360			
10	.262	2.182	97.543			
11	.205	1.710	99.253			
12	.090	.747	100.000			

Extraction Method: Principal Component Analysis. Pairwise

Component Matrix(a)

D2 Political Complexity	Component
	1
157 Political Integration	.878
237 Jurisdictional Hierarchy Beyond Local Ccommunity	.870
158 Social Stratification	.807
784 Taxation paid to community	-.764
156 Density of Population	.762
90 Police	.722
153 Technological Specialization	.713
151 Agriculture	.712
152 Urbanization	.691
155 Money	.650
777 Enforcement specialists (police, tax collectors)	-.649
19 Preservation and Storage of Food	.417

Extraction Method: Principal Component Analysis.
a 1 components extracted. Pairwise

1740 Levels of Political Hierarchy (=237) correlates at .778 but leaves only 52 cases
1738 Presence of Formal Education Within Local Community correlates at .711 but leaves only 45 cases
711 Societal Complexity (Guttman Scale - Freeman & Winch 1957) correlates at .856 but leaves only 21 cases.

E. Small Scale Loyalties and Compliance with Norms

Variables suggested by Dominic D. P. Johnson **God's Punishment and Public Goods**

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %

1	1.851	46.284	46.284	1.851	46.284	46.284
2	.962	24.062	70.346			
3	.701	17.528	87.874			
4	.485	12.126	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix(a)

	Component 1
779 Loyalty to the wider society	.833
775 Compliance of individuals w/ community norms	.669
778 Loyalty to the local community	.710
63 Community Size	-.454

Extraction Method: Principal Component Analysis.
a 1 components extracted. Pairwise

(exclude 18 below)

Component Matrix(a)

	Component 1
779 Loyalty to the wider society	.827
775 Compliance of individuals w/ community norms	.671
778 Loyalty to the local community	.758
63 Community Size	-.417
18 Credit Source	-.308

Extraction Method: Principal Component Analysis.
a 1 components extracted. Listwise

RECAP OF THIS PROJECT: Spss Instructions for each Step

(from the class notes)
good notes. Some specifics:
When searching for good single factor structures the first factor should have, under "Total Variance Explained," the totals column, at least 3 (the higher the getter), the next 1 or less. If

you have two or more factor components in the results (totals column more than 1) then take out those that are LOW on the first factor, and HIGHER on any other factor.
TRY INTIALLY to get fairly homogeneous variables, not wildly different ones, and low HIGH first factor scores, e.g., .9, .8, .7, .6. Don't accept scores of .1 .2 .3 .4.

ONE YOU GET YOUR MAIN FACTOR constructed, make a factor score (/Data Reduction/Factor (enter variables) but clock SCORES that will be save in the LAST COLUMN of your SPSS *.sav file. You can save this to C:\My documents in a directory of your own making.

To use your MAIN FACTOR in crosstabs, use /Transform /Visual Bander then enter the factor score under the old name. Then click the OLD NAME and you will see all the frequencies of the different scores. Before you proceed you have to provide a NEW NAME in the new name window. Then click Make Cutpoints, enter value of the first, the total number, click that box, adjust, and APPLY. Now you can add LABELS for the new categories. Click OK when done. Your NEW NAME variable will now be at the end of the file.

Now, to make crosstabs, do /Analyze/Descriptive/CrossTabs and enter the NEW NAME factor variable, say as the column variable, and add a whole bunch of other variables ad row variables. Click the box labeled STATISTICS and check [x] Cramer's V and [x} Tau b. If you want a final version click the box labeled CELLS and then click EITHER [x] Row OR [x] column percentages.

You can have LOTS of variables correlated with the factor through crosstabs although if you include them in the factor analysis you have more than one factor. It is the combination of the MAIN FACTOR, its map, and the crosstab tables (or graph;-- instructions below) that you put into your powerpoint presentation (not necessarily Thursday the 25th, it can be the next Tuesday).

To map the factor variable of course, recode missing data to -99 and do /Graphs /Scatterplot, choosing the factor variable and plot.

IF IN THE CROSSTAB output you have more than 186 cases, e.g., 1000 or more cases, some with -99 scores, it is probably that you are including the OUTLINE COORDINATES for continents in the crosstab when you only need that for the maps. Go to /TRANSFORM /RECODE and change -99 to missing data for the factor variable at least. LOOK FOR SIGNIFICANCE FROM YOUR CROSSTAB that is LESS than .10 (only 1 chance in 10 of being random) or even better less than .05 (only 1 chance in 20 of being random). If the tau b is almost as high as Cramer's V it means your variable covaries linearly with the factor. Tau can be plus or minus depending on the correlation. If Cramer's V is much greater in absolute value than tau, you have a nonlinear prediction between the variable and the factor. In that case you MUST chart the relationship, which I describe next. Otherwise just report the Tau correlation as plus or minus some value, plus the significance of tau.,

To make a nice chart out of the data in your crosstab data, use /Graphs /Scatterplot (just like a map) then double-click the graph and find and click the button that says "Add Interpolation line" (two axes and an irregular graph). That gives the relation between the variables (best to put the factor scores at the bottom on the x axis). You will see the shape of

the nonlinear or curvilinear relationship to your factor. OPTIONA BUT IF SO DO THIS BEFORE THE INTERPOLATION LINE: If you want to show the number of cases in each of the cells of the crosstab that will be averaged in the interpolation line, then double click one of the open circles, and the property window, and click Point Bins then Bins and also make the size larger, Now do the interpolation.

OPTIONAL: Use of Multiple Regression. To see if the time of observation makes a difference, use /Analyze/Regression, put v626 as the dependent variables, use v158.1 and v1086, date of observation, and it seems not: **Coefficients(a)**

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	4.919	2.654		1.853	.075
	Sum of Cultural Complexity (v149-158)	-.018	.009	-.355	-1.966	.060
	Date of Observation	-.001	.001	-.180	-.998	.328

a Dependent Variable: 626 Belief that women are generally inferior to men

If we add the modernity of the agricultural system, however, *its* effect on women, unlike that of modernization, is positive (p=.001), probably because the lower category is *herding plus agriculture, and herding has a male bias*, but *later dates of observation are negative for women* (p=.004), probably because modern developmental polities overwhelmingly favored men up until recent attempts to counteract this bias among economists and planners. See *Rethinking Economic Systems: A Study of Agricultural Societies*. Fred Pryor. **Cross-Cultural Research** (2005) 39: 252-292. http://ccr.sagepub.com/cgi/content/abstract/39/3/252

Coefficients(a)

Method: Enter Exclude Cases: Pairwise

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	24.352	4.262		5.714	.001
	158.1 Sum of Cultural Complexity (v149-158)	-.067	.011	-1.509	-5.937	.001
	1072 Date of Observation	-.009	.002	-.848	-4.576	.004
	Agric System-Fred Pryor (start of datafile)	.042	.007	1.759	5.985	.001

a Dependent Variable: 626 Belief that women are generally inferior to men

When using /Analyse/Regression/Linear in Spss, click Statistics and [x] Durbin-Watson; then to interpret use http://eclectic.ss.uci.edu/~drwhite/courses/Durbin-Watson.htm

A better correction is Cochrane-Orcutt but this is not available in v14.0 only in v13.0 http://en.wikipedia.org/wiki/Cochrane-Orcutt_estimation

If we ask for Durbin-Watson, we find there is also serial correlation.

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson

1	.691(a)	.477	.395	.355	.097

a Predictors: (Constant), Date of Observation, Sum of Cultural Complexity (v149-158), Agricultural systems
b Dependent Variable: Belief that women are generally inferior to men

Coefficients(a)

Method: Enter Exclude Cases: Pairwise

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	9.602	3.882		2.473	.023
	158.1 Sum of Cultural Complexity (v149-158)	-.048	.012	-1.085	-4.007	.001
	Agricultural systems	.025	.007	1.027	3.695	.002
	1072 Date of Observation	-.002	.002	-.204	-1.170	.256

a Dependent Variable: Belief that women are generally inferior to men

Even dropping 1072 Date of Observation there is still serial correlation. Most likely, this equation is mis-specified, so if you can find a third variable that eliminates serial correlation you might have a better model.

D-W tests for correlation between a residual and the immediately preceding residual.
The ordering of the observations should be: one-dimensional and directed (influence moves in only one direction along the line). For a time series, both of these conditions are met. The SCCS ordering does not meet these conditions. For example, Thonga (3) is preceded by Kung Bushmen (2); but Thonga would be better paired with the culture that follows it in the list, Lozi (4). Contiguity relationships really can't be collapsed to a single order dimension because there are likely to be several cultures defined as contiguous to a given culture.