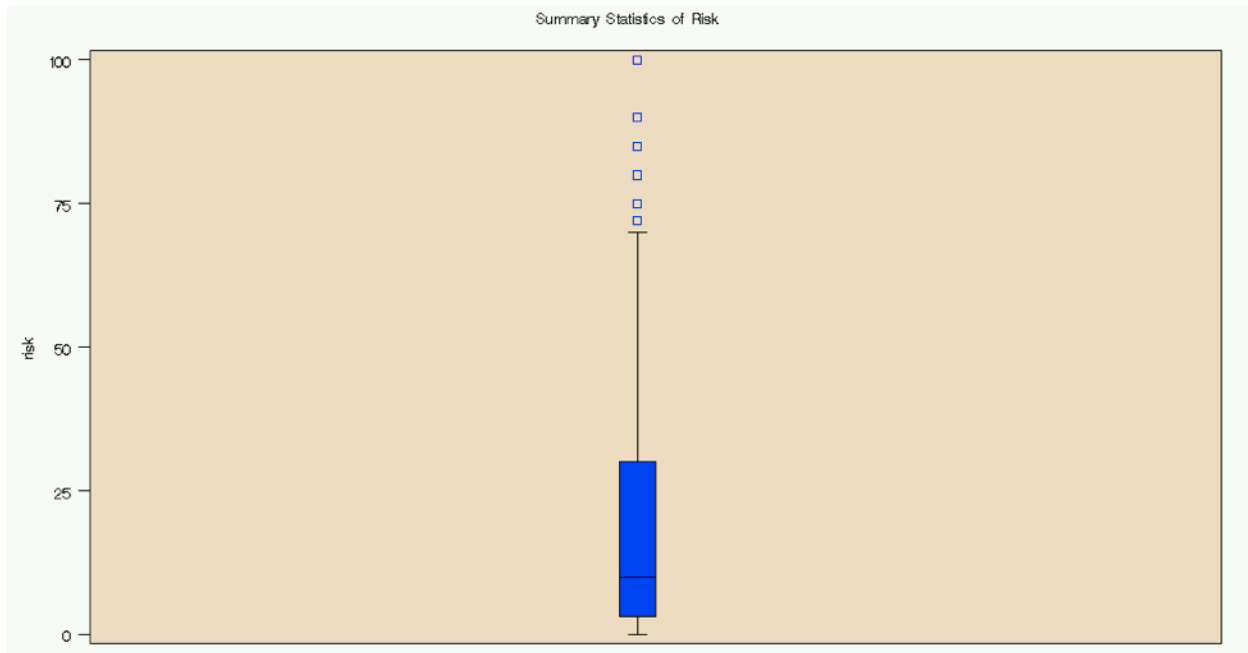


STA4202 Project

Jeremy Harper
27.02.2011

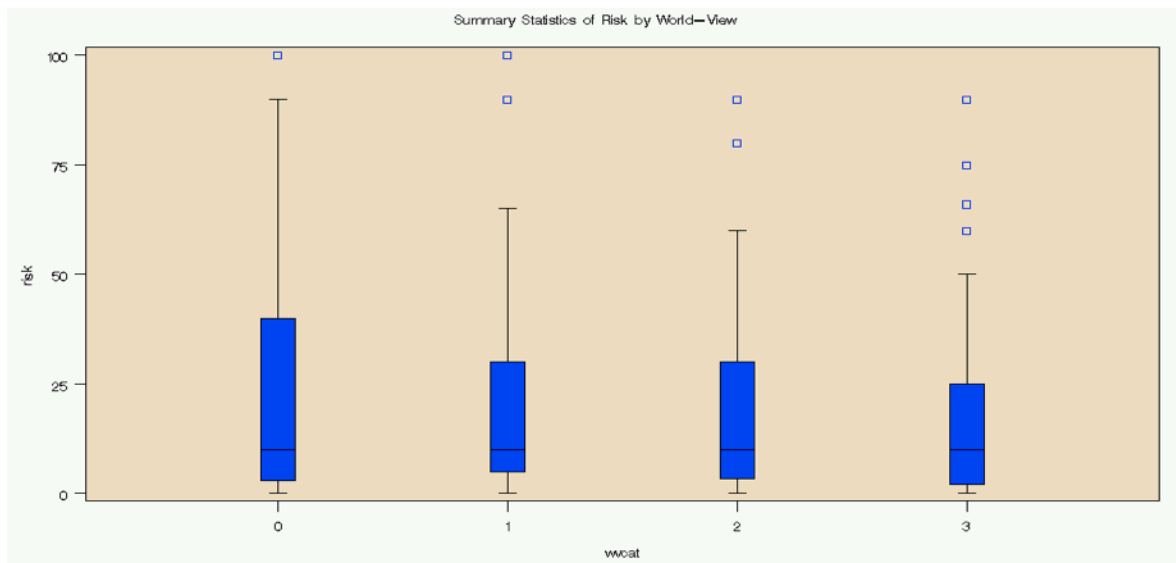
1. The current study was performed to measure risk-taking in a laboratory task. The psychology of risk is one that is important to many facets of human behavior and interaction, and is often cited as a possible factor in addiction. To better understand how humans evaluate and execute risky behaviors, we must figure out how different groups and ideologies play into this complex process. One can investigate if there are significant differences between groups, or do humans generally process risks in a similar fashion. It is possible that differing groups (e.g., gender or ethnic background) judge risks differently, and that one model may be inadequate for another group. I hypothesized that there will be significant differences between gender and ethnicity, but 'worldview' may not be a good measure of one's overall ideology, so it may not show significance.
2. The data was collected by administering a questionnaire that categorized the participants' worldview, which was classified as individualistic, hierarchical, egalitarian, and unclassifiable. Basic demographics were also collected, including gender (0=Female, 1= Male), ethnicity (Caucasian [1], African-American [2], Mexican-American [3], and Taiwanese-American [4]), and age. Risk was measured on a 0-100 scale on a laboratory task which involved investing money in an ounce of silver. Gender, ethnicity, and worldview can be thought of as random effects, since we are attempting to generalize risk-taking behaviors to the greater population. The participants in this study are taken as representatives of the population, and we are assuming that we can make meaningful interpretations between groups that will apply to all people. The data is from http://www.stat.ucla.edu/projects/datasets/risk_proj.txt, and was previously analyzed by comparing subjective and objective measures of risk-taking, but was not analyzed in the way presented here. See "Evaluating the Simplified Conjoint Expected Risk Model: Comparing the Use of Objective and Subjective Information", Carlstrom et al. (2000) for more information on their analyses.
3. Presented below are the summary statistics for risk, and risk by gender, worldview, and ethnicity. The range of risk runs from 0 to 100, with the mean around 21. From the box-plot, we can identify six possible outliers, but I do not think they should be of concern since they reflect an individual's risk score and not an artifactual anomaly.

Summary Statistics of Risk				
Mean	Std Dev	N	Minimum	Maximum
20.7906574	23.5830209	578	0	100.0000000



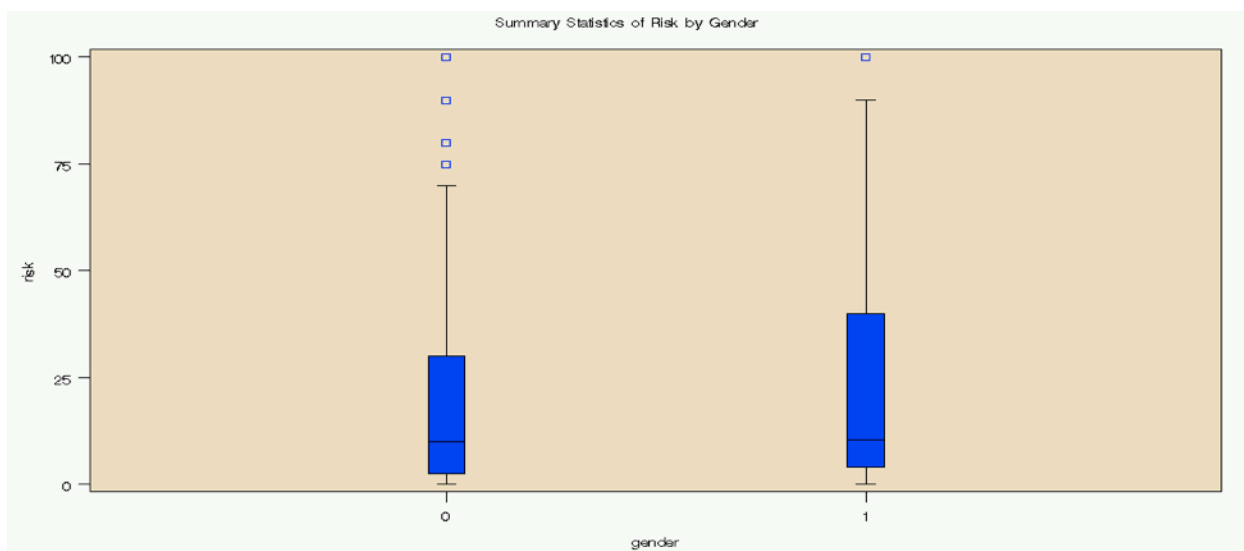
For risk by worldview, the means are generally centered around 20, the ranges are very similar across the groups, and the standard deviations for all world-views fall roughly between 20 and 25. There are many more unclassifiable observations than any other worldview, which may be of concern.

Summary Statistics of Risk by World-View						
wvcat	Obs	Mean	Std Dev	N	Minimum	Maximum
0	384	22.0388889	24.8051715	360	0	100.0000000
1	51	22.3125000	25.8169961	48	0	100.0000000
2	98	18.0978261	19.7217233	92	0	90.0000000
3	78	17.2692308	20.0600871	78	0	90.0000000



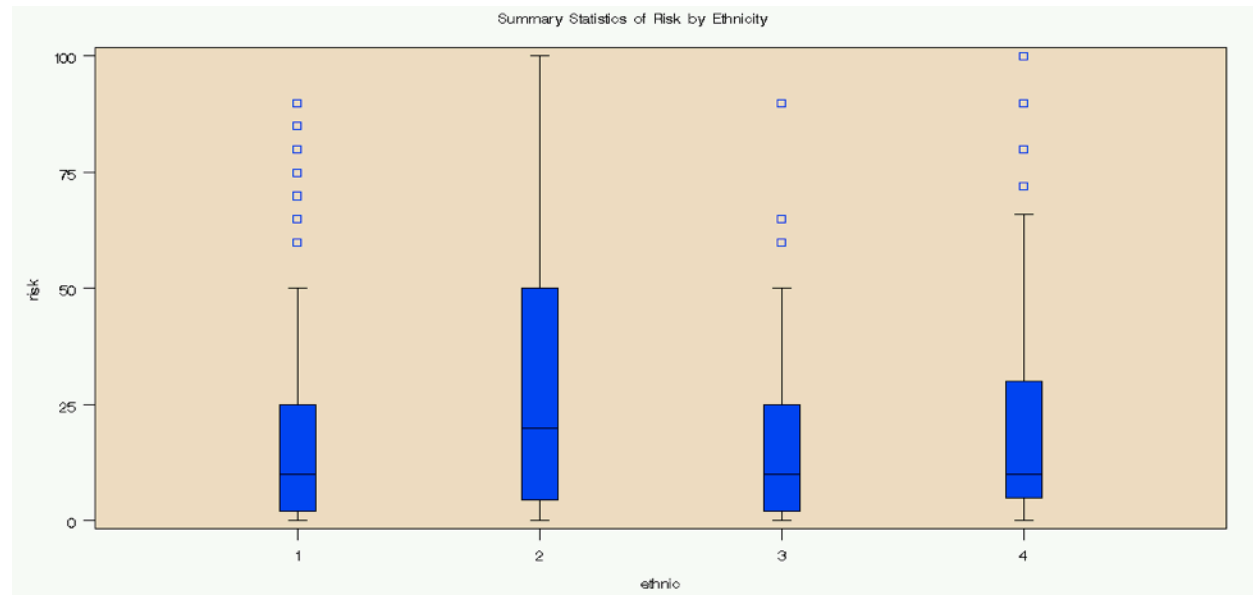
With gender by risk, again we don't observe any strikingly noticeable differences.

gender	Obs	Mean	Std Dev	N	Minimum	Maximum
0	385	19.0222222	22.3642810	360	0	100.0000000
1	226	23.7110092	25.2508880	218	0	100.0000000



For ethnicity, it looks like group 2 may differ from the other groups, as the group mean and standard deviation are larger than the other three groups. Groups 1, 3, and 4 do not appear to differ much though. Also, there are no outliers in group 2, even up to the maximum risk (i.e, 100), while the other three groups have at least three outliers each.

Summary Statistics of Risk by Ethnicity						
ethnic	Obs	Mean	Std Dev	N	Minimum	Maximum
1	158	17.6092715	22.0958438	151	0	90.0000000
2	147	28.3046875	28.7819822	128	0	100.0000000
3	140	17.1037037	19.6207604	135	0	90.0000000
4	166	20.8902439	22.1932428	164	0	100.0000000



4. I analyzed the data using a Factorial ANOVA. First, I entered all three variables (gender, worldview, ethnicity) into the model to examine any main effects or two- or three-way interactions.

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	31	33353.3872	1075.9157	2.04	0.0009
Error	546	287550.2824	526.6489		
Corrected Total	577	320903.6696			
ethnic	3	3875.37629	1291.79210	2.45	0.0625
gender	1	988.12340	988.12340	1.88	0.1713
wvcat	3	1337.06118	445.68706	0.85	0.4690
gender*ethnic	3	886.17240	295.39080	0.56	0.6410
wvcat*ethnic	9	5809.74062	645.52674	1.23	0.2763
gender*wvcat	3	899.56182	299.85394	0.57	0.6354
gender*wvcat*ethnic	9	12251.35049	1361.26117	2.58	0.0064

While the overall model and gender*worldview*ethnic interactions are significant, the rest of the main-effects and interactions are non-significant. From the resulting Tukey test, I discovered that there were no differences between world-views. Following this, I decided to remove worldview from the ANOVA to further tease out the differences between groups.

Difference

Simultaneous

wvcat Comparison	Between Means	95% Confidence Limits	
1 - 0	0.274	-8.814	9.361
1 - 2	4.215	-6.315	14.744
1 - 3	5.043	-5.806	15.892
0 - 1	-0.274	-9.361	8.814
0 - 2	3.941	-2.968	10.850
0 - 3	4.770	-2.616	12.156
2 - 1	-4.215	-14.744	6.315
2 - 0	-3.941	-10.850	2.968
2 - 3	0.829	-8.274	9.931
3 - 1	-5.043	-15.892	5.806
3 - 0	-4.770	-12.156	2.616
3 - 2	-0.829	-9.931	8.274

When gender and ethnicity are entered into the model, the interaction between them is non-significant, but the main effects and model are highly significant. The next step was to remove the interaction and hopefully produce a better model.

Sum of					
Source	DF	Squares	Mean Square	F Value	Pr > F
Model	7	14964.0146	2137.7164	3.98	0.0003
Error	570	305939.6550	536.7362		
Corrected Total	577	320903.6696			

Source	DF	Type III SS	Mean Square	F Value	Pr > F
ethnic	3	10930.15043	3643.38348	6.79	0.0002
gender	1	3505.06953	3505.06953	6.53	0.0109
gender*ethnic	3	1089.60690	363.20230	0.68	0.5666

Once the gender*ethnic interaction was removed, the model reached maximum significance, and the main effect of both variables remained significant.

Sum of					
Source	DF	Squares	Mean Square	F Value	Pr > F
Model	4	13874.4077	3468.6019	6.47	<.0001
Error	573	307029.2619	535.8277		
Corrected Total	577	320903.6696			

Source	DF	Type III SS	Mean Square	F Value	Pr > F
ethnic	3	10889.35391	3629.78464	6.77	0.0002
gender	1	3282.37486	3282.37486	6.13	0.0136

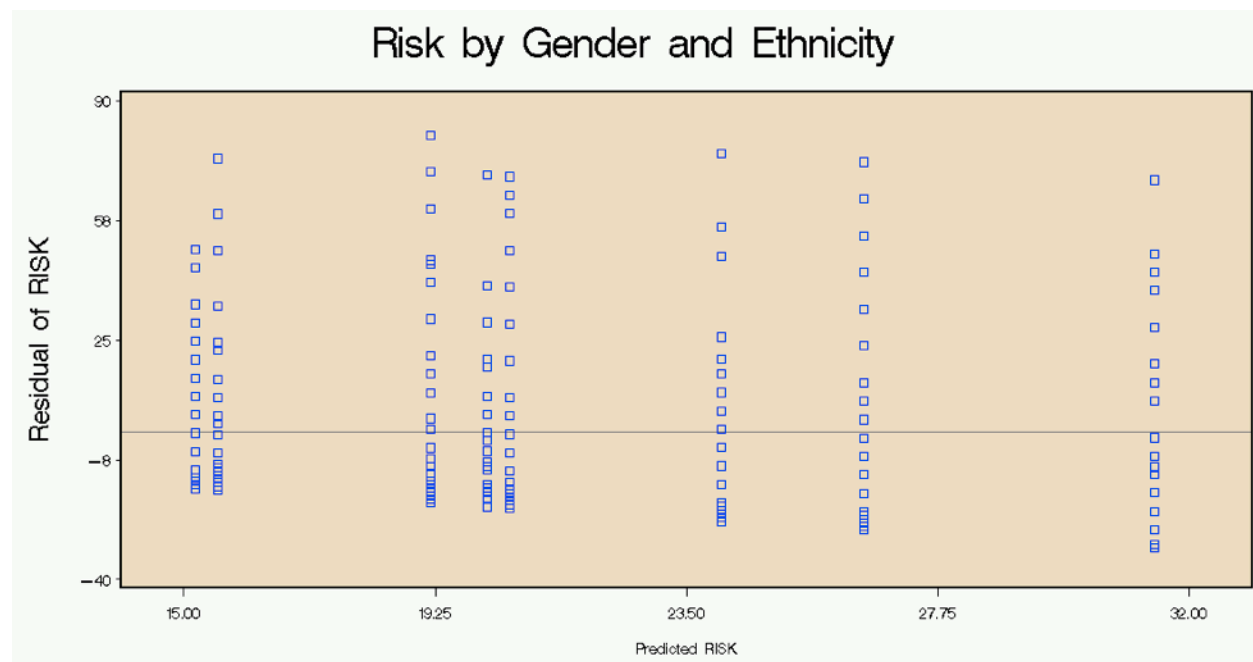
The Tukey test showed that there is a difference between genders, and that group 2 differed from all other groups, but there is no difference between the other groups.

ethnic Comparison	Between Means	Simultaneous 95% Confidence Limits		
2 - 4	7.414	0.440	14.389	***
2 - 1	10.695	3.590	17.801	***

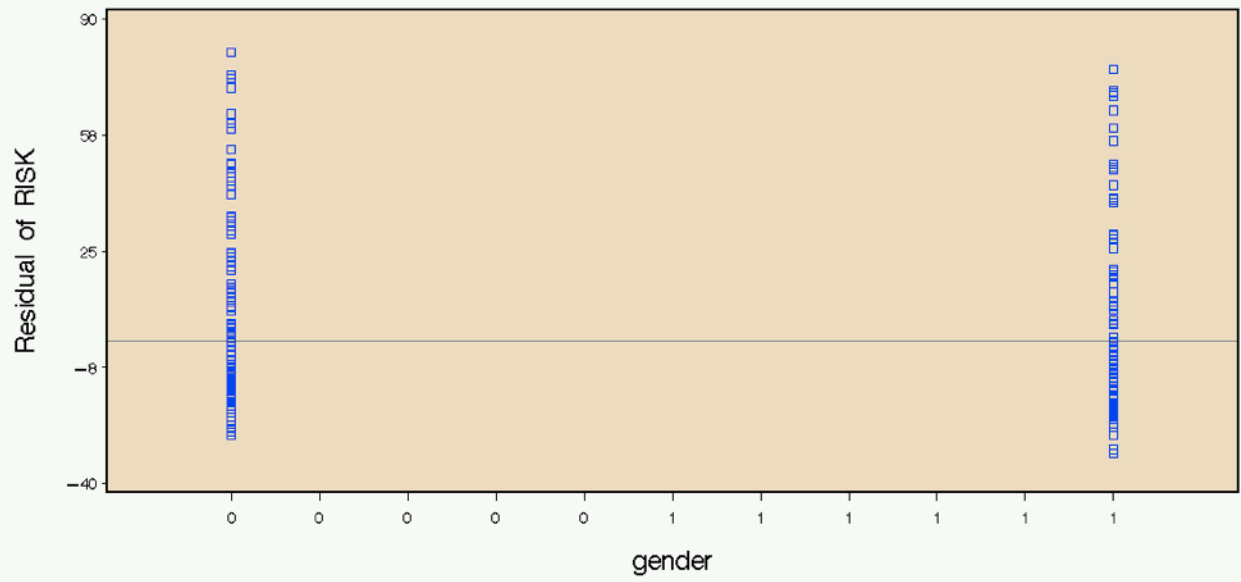
2 - 3	11.201	3.905	18.497	***
4 - 2	-7.414	-14.389	-0.440	***
4 - 1	3.281	-3.389	9.951	
4 - 3	3.787	-3.086	10.659	
1 - 2	-10.695	-17.801	-3.590	***
1 - 4	-3.281	-9.951	3.389	
1 - 3	0.506	-6.499	7.510	
3 - 2	-11.201	-18.497	-3.905	***
3 - 4	-3.787	-10.659	3.086	
3 - 1	-0.506	-7.510	6.499	

Tukey Grouping Mean	N	gender
A	23.711	218 1
B	19.022	360 0

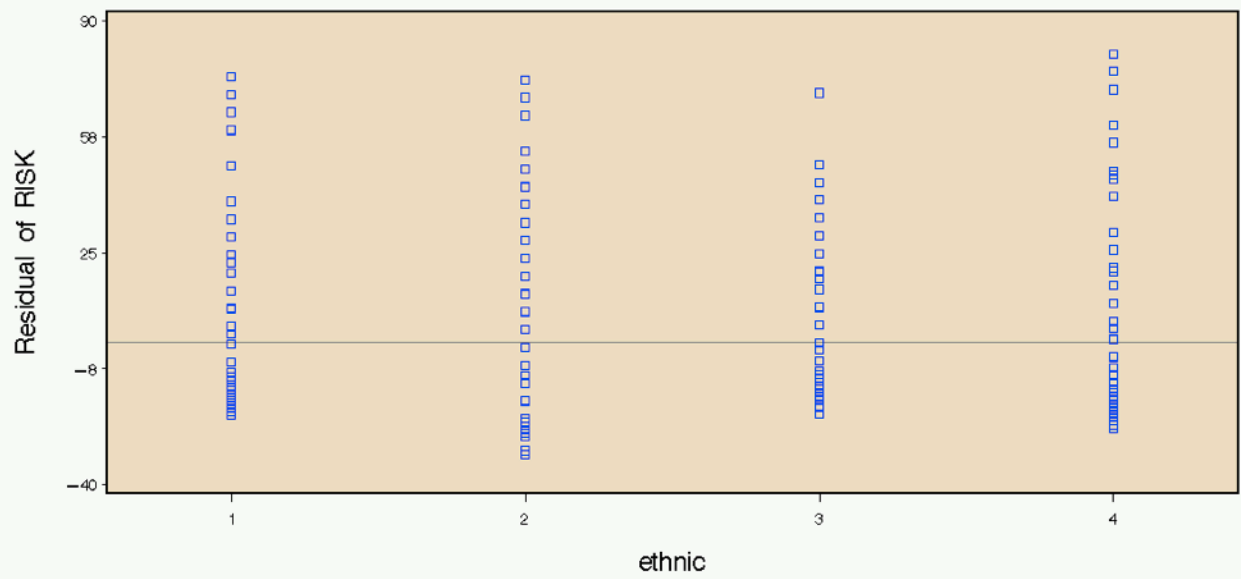
A residual analysis was then conducted. All analyses met the ANOVA assumptions of independent and constant variability, although the normal probability plot shows some outliers and non-normality at the extremes.



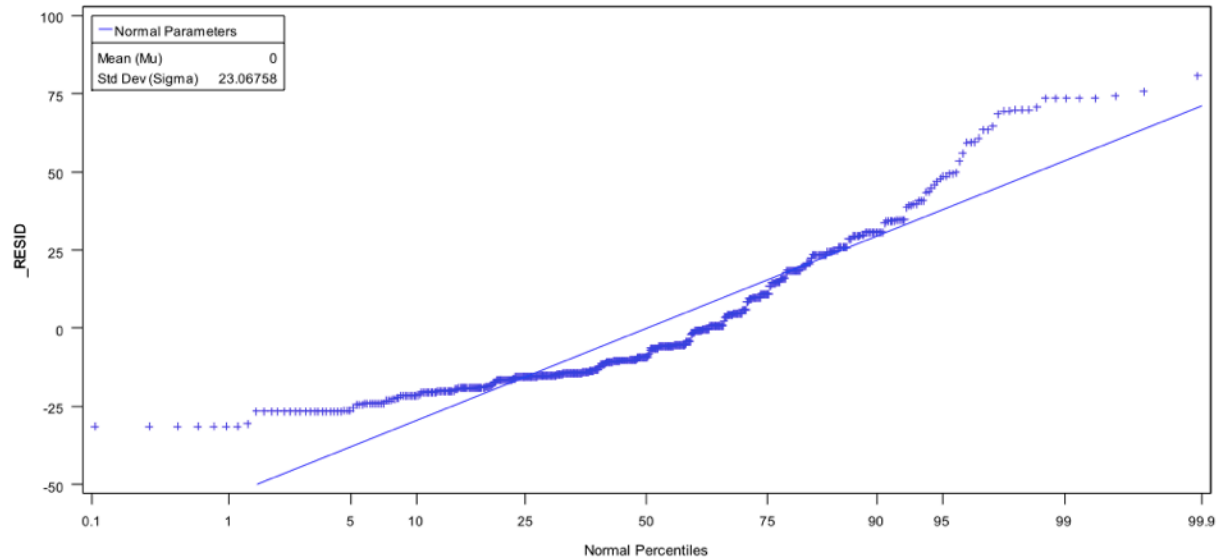
Risk by Gender and Ethnicity



Risk by Gender and Ethnicity



Normal Probability Plot of Residuals of Risk



5. From the analysis, we can firmly conclude that there are differences in risk-taking behaviors between males and females and African-Americans and the other three ethnicities. Males scored higher on the risk task, as did African-Americans. Both of the hypotheses were confirmed: there was no significant difference between world-views, possibly indicating that the measures failed to capture the complete ideology of the participants, but there were meaningful differences between genders and ethnicities.