

## The Effect of Education on Open Mindset and Attitude Towards Immigration: A Structural Equation Modeling Approach

### Introduction

As time goes on, people tend to become more tolerant of society in general and of other people as they build open minds that are more accepting of differences. The subject of immigration has received a growing amount of attention in recent years, which has enabled us to investigate how people in various geographic regions view the situation that immigrants find themselves in (Michael J. Hiscox, & Jens Hainmueller). Certain individuals have favorable views about immigrants. People who we generally think of as living in sociopolitical environments are more open to diversity, and tend to have a more positive opinion of immigration. This is because immigrants tend to bring new perspectives and ways of doing things to society. They think that immigrants have the potential to make a good contribution, not only to the economic growth of the country, but also to the country's cultural diversity. Communities that place a high value on their traditions and practices are more likely to thrive in nations that encourage diversity and inclusion. This, in turn, may help persons living in these communities to grasp the values held by other cultures and to have welcoming attitudes toward newcomers. However, not everyone has positive views and attitudes toward immigrants. Some people believe that the entry of more immigrants leads to fewer job opportunities and benefits for native-born citizens. And the cultures of other countries clash with their own, which can lead to discrimination as well as other problems. This belief is based on the fact that values such as religion, family, and community integration exist across cultures. The purpose of this study is to investigate the ways in which people in Belgium differ in their levels of education, openness, and opinions about immigrants, as well as the link between these three criteria. This research uses of information collected through the European Social Survey<sup>7</sup> (2014), which draws participants for its sample group from various locations all throughout Europe.

In this paper, I focus on educational level and open-mindedness as potential drivers of views toward immigration in the country of Belgium. To be more specific, I investigate whether the educational level of native Belgians not only directly but also indirectly shapes attitudes toward immigration through the level of people's open-mindedness. In order to study the following perspectives, I use a wide variety of models and analytical approaches: (a) the higher the educational level of an individual, the more open-minded an individual is; (b) there is a positive relationship between an individual's mindset and attitudes toward immigrants; (c) an individual's open-mindedness mediates the relationship between educational level and attitudes toward immigrants, such that educational level increases open-mindedness and, as a result, increases an individual's friendly attitudes toward immigrants.

### Hypothesis

Based on the exploration directions, I propose the following hypotheses:

(1): The more educated people are more open-minded.

- (2): The more open-minded, people have better attitudes toward immigrants.
- (3): Younger people are more open-minded, and willing to accept immigrants.
- (4): Age will impact people's attitudes toward immigration.
- (5): Gender will impact people's attitudes towards immigration.
- (6): The more educated people are more open-minded and have better attitudes towards immigrants.
- (7): Women are more open-minded, and they have better attitudes toward immigrants than men.

## Data

In order to verify the validity of the hypothesis, I decide to use data from the European Social Survey (ESS) (ESS Round 1), specifically the ESS1 2002 Edition.2.2, which is available to the public on January 12, 2018. Data from the ESS1 2002 survey are collected from citizens of Europe aged 15 and older regardless of their native language or nationality from 01-09-2002 to 15-12-2003. In order to provide an explanation for the ethical and societal perspectives of individuals in Europe, these statistics include more than 20 countries and cover a broad variety of subject areas. The following are some of the topics that are discussed: social trust; politics; immigration; health and inequality; well-being; religion; ethnic identity; human values; and socio-demographic characteristics. All of the respondents were adults living in Europe and were at least 15 years old. For the purpose of this study, only data related to Belgium will be used.

## Indicators

In this sample, there are 1800 observations and 13 variables. These variables are *ipudrst* (understanding of others), *ipcritiv* (individual creativity), *ipeqopt* (equality for all), *impfree* (self-determination), *iphlppl* (ability to help others), *imctjob* (effect of immigration on employment), *imbleco* (impact of immigration on taxation), *imwbcnt* (impact of immigration on the country's living environment), *imsmetr* (different race immigrants), *impcntr* (immigrants from poor country), *imueclt* (culture diversity), *agea* (age), *edulvla* (educational attainment), and *gnr* (gender). These predictors are people's judgments of this opinion on a scale from 1 to 10, where 1 represents a significant level of opposition and 10 represents significant agreement with this viewpoint. All the indicator values are ordinal endogenous variables, which belong to categorical data. In further analysis, I will use a certain estimator "WLSMV" to interpret the result.

## Latent variable

### Measures of Open

I take certain variables from ESS1, and based on them, I classify them into one of three categories. The first one is having an open mind (Open). This is based on the Openness section of the Big Five Inventory (John & Srivastava, 1999), which highlights that the broadness of one's mind is dependent on Ideas, Fantasy, Aesthetics, Actions, Feelings, and Values. I pick the

following variables from the data to summarize the latent variable Open based on the six points: ipudrst, ipcritiv, ipeqopt, impfree, and iphlpl.

### Measures of Attitude

The second one is (Attitude) people's perceptions and attitudes toward immigrants. Because when it comes to immigration, people will identify it with many aspects of the country's economy, including employment, culture, and living circumstances, among other things. Then, in order to illustrate these indications for these ideas, I use the latent variable Attitude, which includes imsmetrn, impcntr, imueclt, imwbcnt, imbleco, imtcjob.

### Measures of demographic variables

The final category of variables is demographic, which includes factors such as age, level of education, and gender. Within the context of the MIMIC model, these variables will be used to investigate whether or not they have an effect on the latent variables of Open and Attitudes. I made a distinction between the genders. I classify these individuals as male when gender=1, and female when gender=2 respectively.

## Statistical Methods

There are five major processes that make up the statistical analysis. In order to select the appropriate estimator, I first check whether there exist missing values in the data, and check the normality of the data. Then using the CFA model, the second thing is to determine whether or not each latent variable appropriately contains the relationship between the indicators that it holds and the relationship between latent variables. The MIMIC analysis is the third step, and it is the one that adds demographic factors to the latent variable based on the optimal model that is developed from the CFA analysis. If the findings are significant, then these variables are related to Open and Attitude, and it is likely that several variables have positive or negative impacts on one latent variable. The fourth part is an analysis of the mediation. The structure of the mediation model is developed based on the CFA optimal model, and I generate two tests. In the first test, Education is used as the exogenous variable, while Open is used as the mediator, in order to study both the direct and the indirect link between the two variables. In the second experiment, I switch the focus from Education to Gender while keeping everything else the same. This allows me to study whether or not gender has a direct or indirect association with immigration opinions. The final step is the measurement equivalence and multiple-group analysis. During this step, I separate people based on their gender into two groups: male and female, and I impose various limits. In the metric model, I add constraints to ensure that the loadings are equal across groups, and in the scalar model, I add constraints to ensure that the intercepts and loadings are equal across groups.

## Result

The correlation between each group of predictors are positive since they all assess the same constructs (See Figure 3 in Appendices). In addition, there is a significant degree of correlation

between each of the predictors for the latent variable Open. When checking the covariance between openness and attitude, it is rather low. Age and educational level also tend to have a moderate association with openness and attitude.

## Nomarlity and Missing Value

In order to correctly interpret the results, I first check whether there are any missing data exist. When I use the `is.na()` method, the check reveals that the data set does not have any missing values in it.

The next step is to test for the non-normality of the data. Both Kolmogorov Smirnov (KS) test and Henze Zirkler (HZ) test will be used to determine if the data are normally distributed. If the data are multivariate normal, the D-value in the KS test should be closer to zero and the P-value in the HZ test should be greater than the 0.05 level of significance. Since for all the indicators, Table 1 shows that the p-values in both tests are very close to zero, and the D-values in the KS test are not even close to zero, the conclusion that can be drawn from the data in the table below is that the data do not show multivariate normality. The "MLM" estimator is one of the options that will be considered when modifying the normality of the data. On the other hand, the estimator "MLM" cannot handle ordinal data because the data type is categorical data, the "WLSMV" estimator is more suitable; it is a robust estimator that does not require normally distributed variables and can provide the best solution for modeling categorical data. Therefore, the "WLSMV" estimation will be used in future studies.

Kolmogorov_Smirnov test			
variables	Indicators in Open	Indicators in Attitude	Demographic indicators
D_value	>0.2	>0.2	>0.2
P_value	0	0	0
Henze-Zirkler's test			
HZ	13.815	P_value	0

Table 1: Normality test result for ESS7 data

## CFA

I estimat a 2-factor CFA model with two variables, Open and Attitude respectively, in order to investigate whether or not open-mindedness and attitudes towards immigrants are related to one another and whether or not the relationship is a positive one. From the result of the model (Table 2), the model is rejected by an absolute goodness of fit test with Chi-square=75.54, df=43, and p=0.002. However, since the sample size is large (n=1769), the test has strong statistical power to identify small deviations between the ideal model and the fitted model. Thus, it is more appropriate to see the values of fit measures. Looking at the modified fit

measurements, the Comparative Fit index (CFI=0.969) and Tucker-Lewis index (TLI=0.961) are sufficiently close to 1, the Root Mean Squared Error of approximation (RMSEA) equals 0.021 and the Standardized Root Mean Square Residual (SRMR) equals 0.063 which meet the cut-off criteria. Thus the conclusion can be drawn that the CFA model satisfies the goodness of fit.

	Chi-square	DF	P-value	CFI	TLI	RMSEA	SRMR
Model 1	75.540	42	0.002	0.969	0.961	0.021	0.063

Table 2: fit measurements for the CFA model

The loadings can then be examined to reveal information that is relatively important for the components. Figure 1 explains how the initial model is constructed, the value of loadings between latent variables and predictors, correlations between latent variables, also the error variance of each predictor. The fact that all factor loadings are highly significant and correlate to the latent variables, (see Figure 1) indicates that openness and attitude had a major impact on the variables, especially since some of the loadings in Attitude are above 8. The relationship between openness and attitudes is correlated with attitudes by 0.26, and while this relationship is positively skewed, it still suggests that if people are more open-minded, their acceptance of immigration would grow gradually.

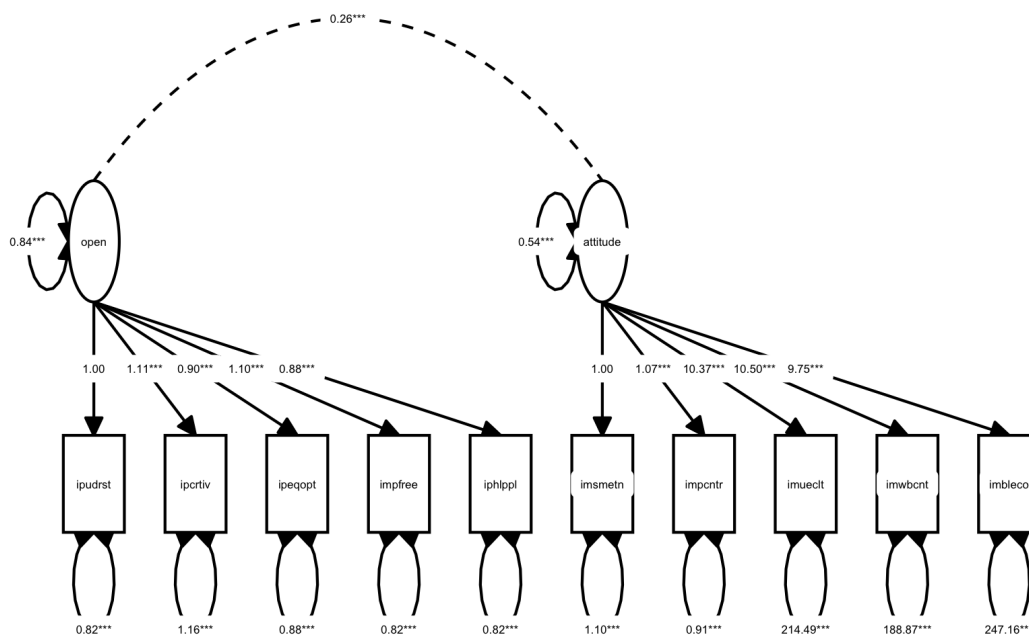


Figure1: CFA path structure of Model1

Then checking the modification indices to see if there are any correlations between predictors. Most of the modification indices values are small, on average below 3. The highest MI value is 27.582 which indicates the relationship between races and living standards

(`imsmetn~~impcntr`), if adding this relationship into the model, the Chi-square would decrease 27.582. After modifying the model, the fit measures are improved to a nearly perfect model. The covariance between race and living standards is significant, with a coefficient equal 0.615 and P-value smaller than 0.05. Thus it can be kept in the model for further analysis.

	Chi-square	P-value	CFI	TLI	RMSEA	SRMR
Model 2	47.907	0.246	0.994	0.993	0.009	0.048

Table 3: fit measurements of modified model

## MIMIC Analysis

Multiple Indicators Multiple Causes (MIMIC) modeling is used to examine the impact of covariates on factor structure with the assumption that the covariates are not measured with error. Covariates which are the demographic predictors include: age of the respondent, the respondent's highest level of education, and the respondent's gender (with 1 representing a male and 2 representing a female) of individuals. I would test if the demographic predictors have an effect on the latent variables Open and Attitude.

To begin, I construct a model to investigate if increased levels of education and/or age are associated with a more open mindset. The fit measurements of the model are acceptable, but lower than the CFA model. It is clear from the findings that there is a positive association between Open and education, as education increases one level, the open-mindedness value will increase 0.018 (See Table 4). Hence, I am able to draw the conclusion that those with higher levels of education tend to have more open minds. In addition, age is another factor that will affect Open. As people age grows, they gain more experience, which enables them to make their own decisions, as well as assist others. However, gender does not have the same effect as age and education.

On the other hand, if open-mindedness is a factor in determining people's attitudes toward immigrants, and if education has a positive relationship with the level of open-mindedness that respondents have, then education may also have a positive relationship with people's attitudes toward immigrants. Then I add the effect of education, gender and age on Attitude based on the first MIMIC model. According to the findings of the second model, the correlations between educational level, gender and age are shown to be positive which are 0.009 and 0.162, and 0.010 respectively (See Table 3). Surprisingly, education is not one of the effect on Attitude since it is not significant. This finding gives support to the hypothesis that the differences in gender will result in different attitudes toward immigration, and people in different ages will have different opinions about immigration, regardless of the countries from which they come or the professions they pursue.

	Education	Age	gender
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Open	0.015	0.007	Not significant
Attitude	Not significant	0.010	0.162

Table 4: regression coefficient of Education and Age on the two latent variables

Since immigrants' perceptions of multiculturalism, job opportunities, and economic development are included in the category of "attitudes" variables, variable Open includes predictors such as people's willingness to help each other and innovative ideas to make autonomous decisions. The findings of Model 2 provide support for the statement (see Figure 2) that people of different age groups or with different education levels imagine different ideas, which affects whether they can decide something on their own, whether they are adventurous, and whether they are willing to try new things. Attitudes toward immigration depend on people's gender and age, and are not strongly related to education.

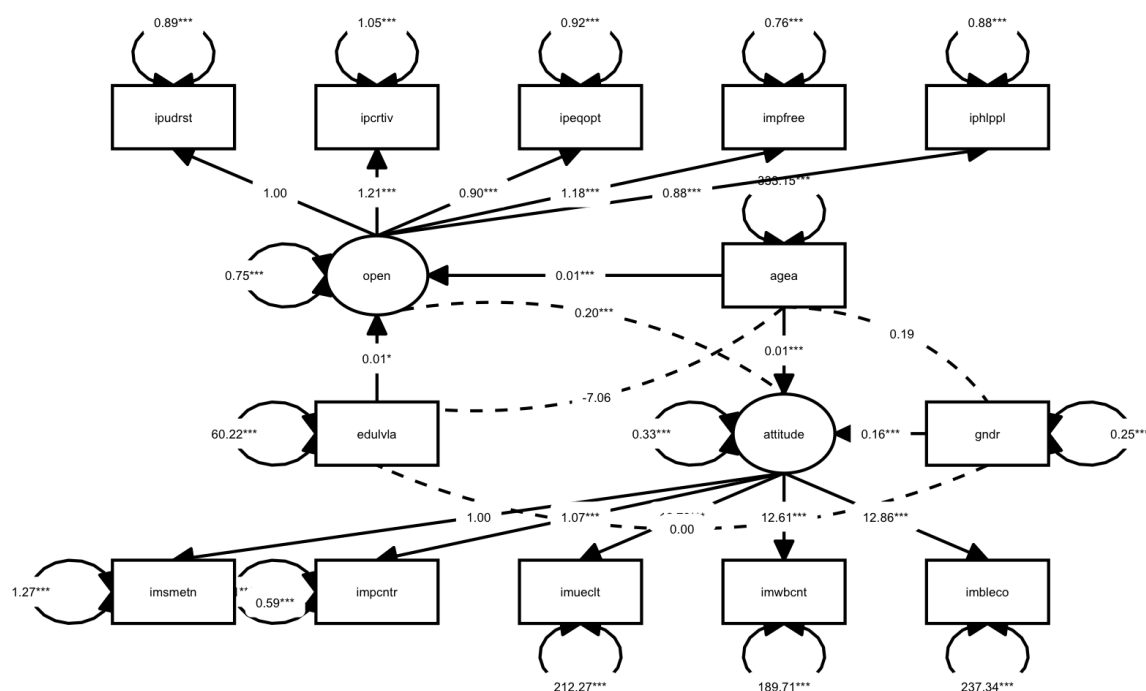


Figure 2: MIMIC model, with Age and Education effect on the latent variables

## Mediation Analysis

The assumption that will be tested in the mediation analysis is whether or not having an open mindset (Open) is a mediator between educational level and attitudes toward immigration. It is necessary to have both indirect and direct regression relationships in order to specify the



mediation model. The direct effect, denoted by  $a$ , occurs when Education has an impact on Attitude. Whereas the indirect effect, denoted by  $b*c$ , occurs when Education has an impact on Attitude through Open. The relationships between the latent variables that I specify in the model can be seen illustrated by the equations and graph below.

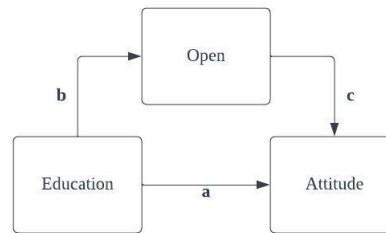
$$Attitude = a * Education$$

$$Open = b * Education$$

$$Attitude = c * Open$$

$$Indirect\ effect = b * c$$

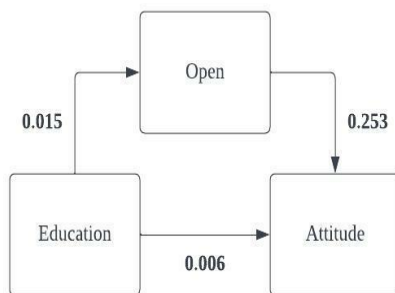
$$Total\ effect = a + b * c$$



Education has a huge impact on the mindset of individuals, which in turn has an impact on the attitudes of people of all ages and genders towards immigration. The mediation model is put into practice so that the underlying hypothesis could be tested. First, to determine if the model meets the goodness of fit requirements, the following fit indicators are presented in the table. The chi-square value of 114.377 and the p-value of 0.000 indicate that the model should not be accepted. However, in the table, the values of CFI and TLI are both greater than 0.94, and SRMR and RMSEA similarly meet the cutoff requirements. The model has satisfied the goodness-of-fit requirement. As can be seen in the figure below and in the equation, the value of the direct effect is small ( $a=0.006$ ) and the direct effect of education on immigrant attitudes is not particularly significant (the p-value of the direct effect is greater than 0.05). The next step is to check the regression coefficients. The indirect effect is better than the direct effect ( $b=0.015$ ,  $c=0.253$ ), and the p-value of the indirect effect is very close to zero, indicating that it is highly significant (See Appendices Figure 5).

	chi-square	p-value	CFI	TLI	RMSEA	SRMR
mediation	113.307	0.001	0.968	0.959	0.019	0.047

Table 5: fit measurements of mediation model



$$indirect\ effect = b * c = 0.004$$

$$total\ effect = a + b * c = 0.011$$

The model investigates both the direct and indirect effects that educational attainment has on the attitudes of immigrants. part of the hypothesis is supported by the observation that education does not have a directly significant



and high effect on attitude. However, education does have an indirect effect on attitude via Open, and that effect is very significant, and the relationship between education and attitude is favorable. Therefore, it is reasonable to draw the conclusion that attaining a higher level of education has a direct influence on the way a person's mindset, which results in a friendlier and more accepting attitude toward immigrants.

## Measurement Invariance and Multiple Groups Analysis

The next thing is to investigate whether there is measurement invariance based on the CFA and mediation model. In order to test for multiple comparisons across gender, age, and education, several multi-group CFAs are carried out. The purpose of these CFAs was to determine whether or not the factors are equivalent across these three categories in terms of configuration (having the same factor structure across groups), metric (that is, loadings are limited to be equal across gender), and scalar (i.e., both loadings and intercept are constrained to be equal across gender) invariance levels. I evaluate if the constraints imposed by a model with metric or strong measurement invariance are supported by the data by using likelihood ratio tests (LR test) for each model. These tests look at whether or not the model has metric or scalar measurement invariance. In the following table, it shows the results of both the LR test and each individual model.

Regarding gender, since the configural and metric invariance are implemented, which demonstrates that the factor loadings are not equivalent across men and women, the model was shown to be invalid by the Likelihood Ratio Test. In the configural model, it shows that men and women have very different coefficients of indicators in Attitude. The loadings of attitudes are much higher in the female model than in the male model, and attitudes have a strong effect on all its indicators. However, in the male model, the result is the opposite, some indicators are not significant. The fact that the test of the metric and scalar model showed a considerably poorer fit compared to the configural model (chi-square=163.531,  $p < 0.05$ ) demonstrated that the entire scalar invariance hypothesis was not supported.

	DF	Chi-square	Chisq diff	DF diff	P-value
config	105	80.451			
metric	114	156.492	42.349	9	2.837e-6
scalar	123	180.487	70.906	18	3.173e-8

Table 6: Likelihood Ratio Test result of measurement invariance based on CFA model

I use multi-group analysis to test regression paths invariance in mediation model. Similarly to the measurement invariance test before, by selecting gender as the group variable to determine whether the relationship between predictors and response variables varies by group. Based on the likelihood ratio test, the fact that the P-value is negligible suggests that there is no statistically significant difference between the constrained model and the unconstrained model. This indicates that there is relatively little variation in the path coefficients between the groups.

Comparing the fit measurements of the configural and metric models, as the loadings are constrained to be equal, the CFI, and TLI values drop a small amount, but RMSEA and SRMR do not change too much.

	Chisq	P-value	CFI	TLI	RMSEA	SRMR
config	102.458	0.7067	1.0001	1.00964	0.0010	0.04965
metric	156.492	0.00511	0.9597	0.9532	0.0204	0.06595

Table 7: Fit measurements of multi-group result based on Education mediation model.

## Conclusion

In this article, I explore the framework and reasons behind people's thoughts and opinions on immigration. Also considering the various factors that may influence mindset and attitudes, as the distribution of these two factors is not uniform across society. They have different weights depending on the population or experience, such as education level, age, and gender. This article's purpose is to shed light on the structure behind people's mindsets and opinions on immigration. The primary goal of this study is to determine whether or not there is a correlation between the level of education and open-mindedness of Belgians and the degree to which they are critical of immigrants. According to the findings, persons with higher levels of education tend to have more open minds and are more inclined to support immigration. These findings are based on data from the ESS1 survey, which was conducted in 2002. However, education as an exogenous variable only affects people's attitudes about immigration indirectly through open-mindedness rather than directly. Education has no direct impact on people's attitudes. If investigating whether or not age is a criterion, the conclusion is people's thinking and their opinion on immigration are impacted by their age. This is due to the fact that persons who are older tend to have more traditional values. The reported evaluation of measurement invariance tests the effect of multigroup invariance on the estimation of different genders. Using this result, it can be concluded that multigroup invariance has little effect on the estimation of the structural model parameters.

## Reference

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## Appendices

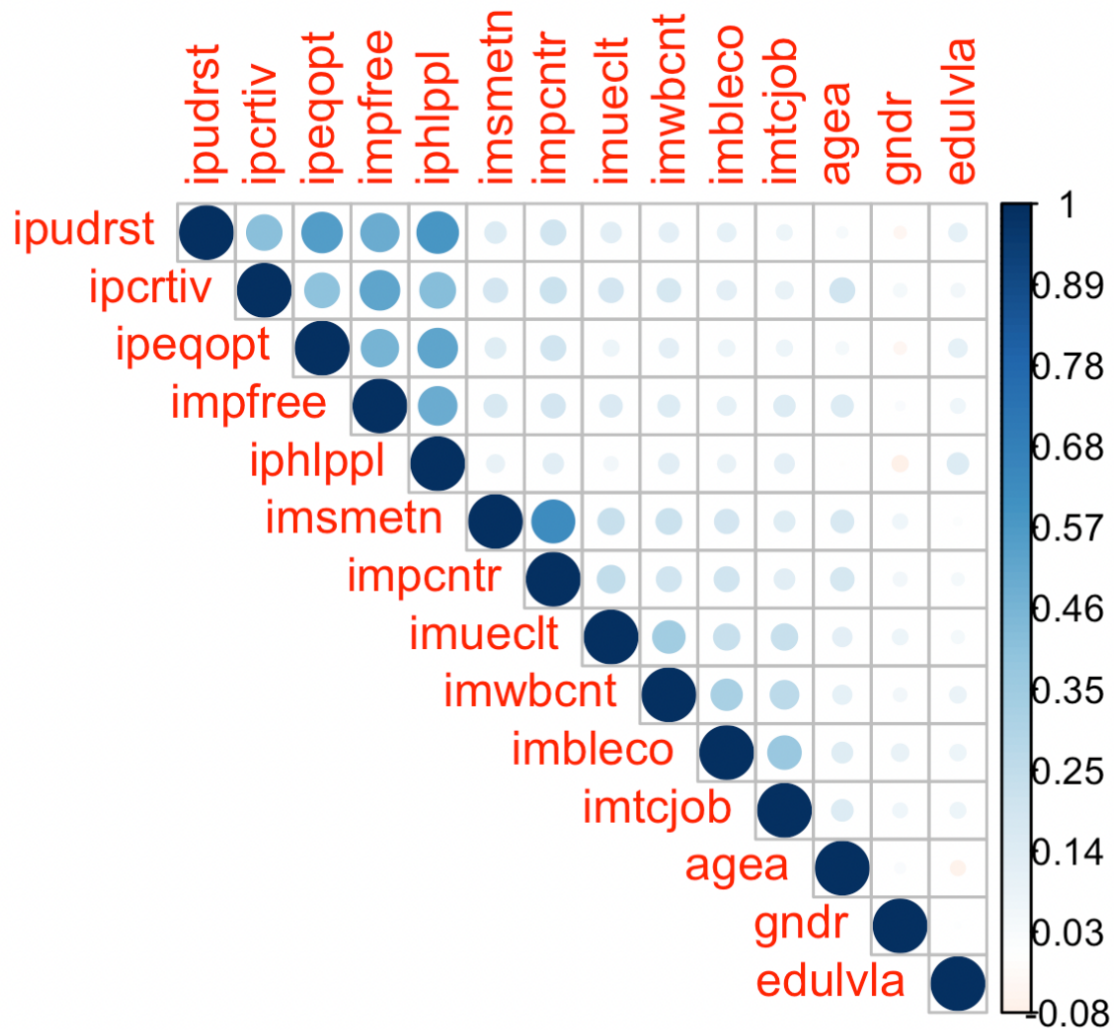


Figure 3: correlation and covariance matrix for ESS1 data

## Regressions:

		Estimate	Std.Err	z-value	P(> z )
open ~					
agea		0.007	0.002	4.164	0.000
attitude ~					
agea		0.008	0.001	6.160	0.000
gndr		0.161	0.037	4.336	0.000
edulvla	(a)	0.006	0.006	1.114	0.265
open ~					
edulvla	(b)	0.015	0.007	2.011	0.044
attitude ~					
open	(c)	0.253	0.056	4.533	0.000

## Defined Parameters:

	Estimate	Std.Err	z-value	P(> z )
indirect	0.004	0.002	1.832	0.067
total	0.010	0.007	1.473	0.141

Figure 4: estimates of mediation analysis model