

# Profiles of tolerance and respect for gender equality among youth. Comparisons across countries

submitted

to

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# Acknowledgements

I want to thank a few people.



# Preface

This is an example of a thesis setup to use the reed thesis document class (for LaTeX) and the R bookdown package, in general.





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# Abstract

The preface pretty much says it all.

Second paragraph of abstract starts here.





# Dedication

You can have a dedication here if you wish.



# Introduction

The development of civic values and attitudes of tolerance and respect for the rights of diverse social groups among youth are essential for sustainable democratic societies. These values are strongly promoted by families, educational systems and international organizations across the world. The measurements and comparison of these attitudes among youth can provide valuable information about their development in different societies and over time.

Same international studies such as the International Civic and Citizenship Education Study (ICCS) provide extensive comparative information regarding these aspects. The ICCS study is a large-scale assessment (survey) applied in more than 25 educational systems during the last three cycles and focused on secondary education (representative samples of 8th graders, 14-year-olds in each country) addressing topics such as citizenship, diversity and social interactions at school. The study produces internationally comparative data collected via student, school and teacher questionnaires. Data from different waves of the ICCS survey is publicly available to researchers. The first time this study was applied was in 1999 to 28 countries and it was called CIVED, the second wave started using the name ICCS and was implemented in 2009 in 38 countries, the last study was performed in 2016 to 24 countries. The next cycle is scheduled for 2022 and 25 countries will participate.

Previous research using ICCS data has been largely focused on average country comparisons of attitudinal measures such as attitudes toward equal rights for immigrants, ethnic minorities and women, norms of good citizenship behaviour and political participation. Most of these studies employed variable-centered analyses. Nevertheless, recent studies started to show the usefulness of person-centered approaches (i.e. latent class analysis, hereafter LCA) aimed at identifying profiles of young people's attitudes. For example, using ICCS 2009 data, (Hooghe, Oser, & Marien, 2016) compare profiles of good citizenship norms across 38 countries and distinguished distinctive subgroups of the population that share a common understanding of what constitutes good citizenship were identified (e.g. who express either engaged or duty-based citizenship norms).

Another study focused their research on changes over time (where the research design and data gathering methods are strictly comparable) (Hooghe & Oser, 2015). For this, CIVED 1999 and ICCS 2009 was used. The scope of the analysis was threefold. First,

distinct profiles of good citizenship norms were identified in both cycles. Second, trends over time were investigated and finally, differences between countries and/over time were analysed in detail. Nevertheless, most of these studies employing LCA with ICCS data focused on patterns within a particular type of attitude described by individual items (e.g. citizenship norms) leaving space for investigations that aim to capture a wider set of attitudinal measures described by scores on different variables.

To address this gap, this research will approach the topic of tolerance and respect for the rights operationalized as a multifaceted set of attitudes toward equal rights for women. This topic was addressed by previous studies aimed at comparing these attitudinal measures mostly in isolation across countries and over time. However, to date, no studies addressed the potential interdependence in these attitudinal dimensions among different subgroups of people (e.g. highly tolerant, highly intolerant regarding all aspects, etc.). Therefore, the current study aims to fill this gap by addressing the following research questions:

1. What profiles of tolerance and respect for the rights of women are observed among adolescents in different countries?
2. Are these profiles comparable across countries and over time?
3. What individual and contextual factors are associated with profile membership? Do they vary depending on the context of the country or the cohort?

# Chapter 1

## Framework

### 1.1 LCA Models

#### 1.1.1 Person center approach

#### 1.1.2 LCA model

#### 1.1.3 Number of classes

Wang & Wang, 2012

- a) Model fit indices (comparing competing models)
- b) Quality of latent class membership
- c) The size of latent classes
- d) Interpretability – theoretical grounding

#### 1.1.4 Measurement invariance - Multigroup Latent Class Analysis

Białowolski, 2016; Kankaraš, Vermunt, & Moors, 2011; Magidson & Vermunt, 2004

1. Completely heterogeneous model, assumes that the only similarity between countries is the number of classes identified and allows that response patterns (conditional probabilities) and class sizes vary among countries. Although the number of classes in all countries may be the same, direct between-country comparisons are not possible in this step because the meaning of latent classes may be substantially different.
2. The partially homogeneous model addresses this issue and restricts the measurement part of the model (conditional probabilities) to be equal in all countries. For each country, the meaning of latent classes is invariant of the country and cross-country comparisons in this respect are meaningful. Yet, the size of the classes (i.e. the relative importance of each class) may still vary. Most applicable and desirable in cross-cultural studies.

3. The completely homogeneous model, further restricts the probabilities of class membership to be equal in both countries (i.e. the percentage of individuals assigned to different classes will be equal in both countries). This last assumption will imply that the identified groups of students with similar scoring patterns are identical in the all the countries with identical numbers of students assigned to each group. Meeting this last assumption ensures the highest level of cross-country comparability but may be difficult to achieve in cross-cultural studies.

### Heterogenous model

$$\pi_{ijklmt|g}^{ABCDE|X|G} = \pi_{t|g}^{X|G} \pi_{it|g}^{A|X,G} \pi_{jt|g}^{B|X,G} \pi_{kt|g}^{C|X,G} \pi_{lt|g}^{D|X,G} \pi_{mt|g}^{E|X,G}$$

- A completely unrestricted multi-group LC model is equivalent to the estimation of a separate 3-class LC model for each group
- The fit of such a model can be obtained by simply summing the L2 values (and corresponding degrees of freedom) for the corresponding models in each group

Here,  $\pi_{ijklmt|g}^{ABCDE|X|G}$  denotes the conditional probability that an individual who belongs to the  $gth$  group will be at level  $(i, j, k, l, m, t)$  with respect to variables A, B, C, D, E, and X. The conditional probability of X taking on level t for a member of the  $gth$  group is denoted by  $\pi_{t|g}^{X|G}$ , which determines the LC ts proportion for the  $sth$  group.  $\pi_{it|g}^{A|X,G}$  is the conditional probability of an individual taking level i of variable A, for a given level t of the latent variable X and for a given group membership s of the grouping variable G. Parameters  $\pi_{jt|g}^{B|X,G}$ ,  $\pi_{kt|g}^{C|X,G}$ ,  $\pi_{lt|g}^{D|X,G}$ , and  $\pi_{mt|g}^{E|X,G}$  are similarly defined conditional probabilities. It should be noted that Equation 14.1 implies that indicator variables A, B, C, D and E are independent from each other, given the value of the latent variable X. This is usually referred to as the assumption of local independence (Lazarsfeld & Henry, 1968). The LC and conditional response probabilities are constrained to a sum of 1:  $\sum \pi_{t|g}^{X|G} = 1$ ,  $\sum \pi_{it|g}^{A|X,G} = 1$ , and so on.

$$\pi_{it|g}^{A|X,G} = \frac{\exp(\lambda_i^A + \lambda_{it}^{AX} + \lambda_{ig}^{AG} + \lambda_{itg}^{AXG})}{\sum \exp(\lambda_i^A + \lambda_{it}^{AX} + \lambda_{ig}^{AG} + \lambda_{itg}^{AXG})}$$

### Partial homogeneity

$$\pi_{ijklmt|g}^{ABCDE|X|G} = \pi_{t|g}^{X|G} \pi_{it|g}^{A|X} \pi_{jt|g}^{B|X} \pi_{kt|g}^{C|X} \pi_{lt|g}^{D|X} \pi_{mt|g}^{E|X}$$

- While it is tempting to interpret class 1 for both samples as representing the ‘ideal’ respondents, this is not appropriate without first restricting the measurement portion of the models (the conditional probabilities) to be equal.
- Latent structures are partially homogenous when across- group equality constraints are imposed on the conditional probabilities.

### Complete homogeneity

$$\pi_{t1}^{X|G} = \pi_{t2}^{X|G}, \text{ for } t = 1, 2, 3$$

- The model of complete homogeneity imposes the further restriction that the latent class probabilities across the groups are identical.

Model	Item thresholds	Class probabilities	Mplus syntax
Unrestricted	Free	Free	<pre> CLASSES = g(2) c(3); model: %overall% c on g; </pre>
Partial Homogeneity	Fixed	Fixed	<pre> CLASSES = g(2) c(3); model: %overall% c ON g; %g#1.c#1% [V1\$1] (1); [V2\$1] (2); [V3\$1] (3); .... %g#1.c#2% [V1\$1] (7); [V2\$1] (8); [V3\$1] (9); .... %g#1.c#3% [V1\$1] (13); [V2\$1] (14); [V3\$1] (15); .... %g#2.c#1% [V1\$1] (1); [V2\$1] (2); [V3\$1] (3); .... %g#2.c#2% [V1\$1] (25); [V2\$1] (26); [V3\$1] (27); .... %g#2.c#3% [V1\$1] (31); [V2\$1] (32); [V3\$1] (33); </pre>

Model	Item thresholds	Class probabilities	Mplus syntax
Complete Homogeneity	Fixed	Fixed	<pre> CLASSES = g(2) c(3); model: %overall% c ON g; %g#1.c#1% [V1\$1] (1); [V2\$1] (2); [V3\$1] (3); .... %g#1.c#2% [V1\$1] (7); [V2\$1] (8); [V3\$1] (9); .... %g#1.c#3% [V1\$1] (13); [V2\$1] (14); [V3\$1] (15); .... %g#2.c#1% [V1\$1] (1); [V2\$1] (2); [V3\$1] (3); .... %g#2.c#2% [V1\$1] (7); [V2\$1] (8); [V3\$1] (9); .... %g#2.c#3% [V1\$1] (13); [V2\$1] (14); [V3\$1] (15); .... </pre>



## 1.2 Large scales assessments - ICCS

### 1.3 Methodological features

### 1.4 Study

Multiple countries had participated in the ICCS study during the last three cycles (detailed participation of the selected countries can be found in Table A.1 in the Annex). Some of the participating countries or regions can be classified by the following grouping:

- a) Nordic: Denmark, Finland, Norway, Sweden.
- b) Western European: Belgium (Flemish), The Netherlands.
- c) Central and Eastern European: Bulgaria, Estonia, Latvia, Lithuania, Croatia, Slovenia.
- d) Southern European: Italy, Malta.
- e) Latin American: Chile, Peru, Colombia, Dominican Republic, Mexico.
- f) Asian: South Korea, Russia, Hong Kong, Taiwan.

Each student participating in the study was received a test tapping into his civic knowledge and skills and obtained a score<sup>1</sup>. Moreover, background questionnaires were administered to capture students' perceptions and attitudes toward civic and citizenship, including attitudes toward equal rights for women. Databases include not only the responses to individual items but also indexes for the scales that were constructed. This research will be focused in the index called in the last cycle as "Attitudes toward gender equality." Each item and the respective construct evaluated is detailed in Table ??, Table ?? and Table A.2 for each cycle.

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<sup>1</sup>Scores were calculated through multiple imputation for ICCS 2009 and ICCS 2016, this means five plausible values are available.



# Chapter 2

## Methods

All cycles of ICCS (CIVED) have been validated through variable-centred analysis, this means that latent constructs and the invariance across countries have been consistently validated thoroughly using CFA. On the contrary, not many research has been done using person-centred approaches, as Latent Profile Analysis (LPA) and Latent Class analysis (LCA).

The latent class model assumes the existence of a latent categorical variable such that the observed response variables are conditionally independent, given that variable. LCA treat a contingency table as a finite mixture of unobserved tables generated under a conditional independence structure of a latent variable (Agresti, 2013). In other words, LCA can directly assess the theory that distinctive groups of people share specific attitudes. Depending on the response variable in the model the analysis is called Latent Profile Analysis if is continuous (Normal) and Latent Class Analysis if the response variable is categorical (Multinomial).

In LCA, studying measurement invariance is necessary to determine whether the number and nature of the latent profiles are the same across the different observed groups (Olivera-Aguilar & Rikoon, 2018). For this, multiple group LCA models are computed, and the relative fit of the unconstrained and semi-constrained models are compared using the LRT, AIC, BIC, and aBIC measures. Also is needed to review any kind of response bias, the most common refers to “a systematic tendency to respond to a range of questionnaire items on some basis other than the specific item content” for example e.g. extreme or agree/disagree (Kankaraš, Vermunt, & Moors, 2011).

In order to assess the cross-national and cross-cohort comparability using CFA, new scales should be created that fit across all countries and cohorts analysed, rather than using the ones already created by the consortium (Barber & Ross, 2020).

Descriptive and main report was performed in R software using poLCA package (Robertson and Kaptein 2016). Most complex analysis was implemented in MPLUS. All syntax used is available in

## **2.1 Sample**

## **2.2 Variables**

## **2.3 Analytical strategy**

# Chapter 3

## Results

- European countries: Belgium (Flanders), Netherlands
- South American countries: Chile, Colombia

### 3.1 By region

Latent class analysis with 1 to 4-class model were performed in order to evaluate the model fit of each one of them. The results are summarized in 3.2.

The model with a single class has the largest AIC (28.445/13.672), BIC (28.474/13.699), and ABIC (28.461/13.686) values for Latin-American and European countries respectively, indicating that this model fits data worse than all other models in both regions. In addition, the P-values of the VLMR test, and LMR in the 2-class model are all  $< 0.0001$ ; this means that both tests reject the single-class model in favor of a model with at least two latent classes. In other words, there exists heterogeneity in the target population in regard to attitudes towards gender equality.

In the 4-class model for both regions, the LMR LR and VLMR are not statistically significant ( $P > 0.05$ ) and the had the lowest AIC values. That is, the two tests are in favor of more then 3 classes.

In contrast, BIC values are all smaller in the 3-class model than those in the 4-class model; thus we consider that the models with more than 3 classes are not preferred. The entropy starts to decrease after including more than 3 classes in the Europe model, this is different for the Latin-American model where the entropy increase with 4 classes, this would suggest that a model with less than 4 classes is preferred.

Together with the percentage of reduction in the log likelihood value, that indicate that by adding two classes to the model the log-likelihood is reduced in a 8.7% in the South America model and 6.9% in Europe model, and this value is only increased in 2.2% and 1.0% respectively, if the model is a 3-class model and finally this value is reduced close to 0 if more than 3 classes are included.

Now, the preferred model must be either the 3-class or the 4-class model considering the residuals of each model in 3.1, where all values are around -1.96 and 1.96 .

Theoretically we tend to determine that the 3-class LCA model is the preferred model in both regions as the fourth class tend to split a small amount of the third class into a new one. We will show later that the classes identified by the 3-class model are interpretable and more representatives for the countries that are being considered in this study. And in particularly that 2-classes can be compared across regions.

Table 3.1: Model fit statistics European models

N Latent Classes	Param	Log- Likelihood	AIC	BIC	aBIC	Entropy	LL Re- duction	VLMR 2*LL Dif	VLMR PValue	LMR Value	LMR PValue
<b>Europe</b>											
1	4	-6832	13672	13699	13686						
2	9	-6358	12735	12794	12766	70.7%	6.9%	947	0	926	0
<b>3</b>	<b>14</b>	<b>-6293</b>	<b>12613</b>	<b>12706</b>	<b>12662</b>	<b>88.3%</b>	<b>1.0%</b>	<b>131</b>	<b>0.016</b>	<b>128</b>	<b>0.017</b>
4	19	-6283	12604	12730	12670	85.9%	0.2%	19	0.247	19	0.251

Table 3.2: Model fit statistics South American models

N Latent Classes	Param	Log- Likelihood	AIC	BIC	aBIC	Entropy	LL Re- duction	VLMR 2*LL Dif	VLMR PValue	LMR Value	LMR PValue
<b>Latin-America</b>											
1	4	-14219	28445	28474	28461						
2	9	-12984	25987	26052	26023	72.0%	8.7%	2468	0	2416	0
<b>3</b>	<b>14</b>	<b>-12693</b>	<b>25414</b>	<b>25516</b>	<b>25471</b>	<b>79.8%</b>	<b>2.2%</b>	<b>583</b>	<b>0</b>	<b>570</b>	<b>0</b>
4	19	-12687	25412	25550	25490	85.3%	0.0%	12	0.394	11	0.398

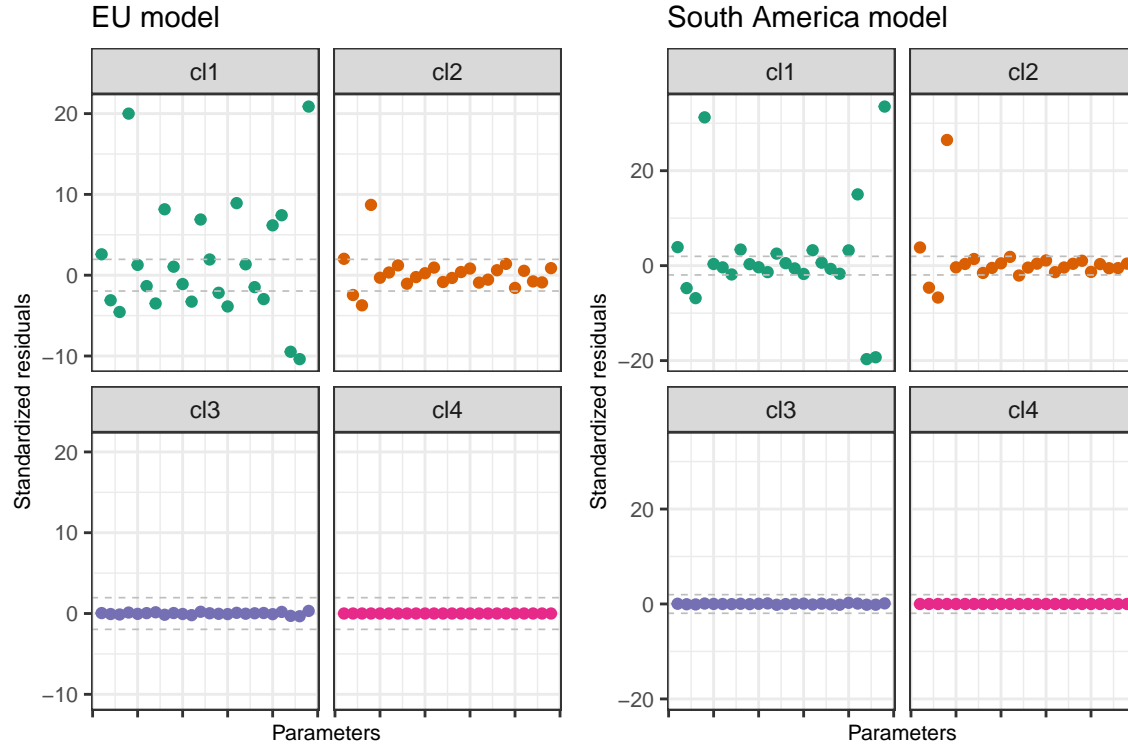


Figure 3.1: Bivariate model fit standardized residuals

### 2-classes models

Two clear classes can be identified in this first model, in the **Fully egalitarian** group the estimated probabilities to agree to the four items *Men and women should have equal opportunities to take part in government*, *Men and women should have the same rights in every way*, *Not many jobs available*, *men should have more right to a job than women* and *Men are better qualified to be political leaders than women* are higher than 0.9. In the second class called **Competition-driven sexism** the estimated probabilities to agree to the first 2 items are higher than 0.8 in the European model and higher than 0.9 in the South American model. For the last two items, the estimated probabilities to agree are not higher than 0.4 in both models.

The final class proportions for the latent classes based on the estimated 2-class model are different in both regions, 82.9% and 62.5% of the individuals are classified in the first class in the European and South American model respectively, meanwhile the remaining 17.1% and 37.5% respectively are classified in the second class. In the table @ref(tab:lca2\_eu) it is possible to observe the results of the model in probability scale of agree to each respective item for the latent classes for the European model and in table @ref(tab:lca2\_la) for the South American model. In figure 3.2, the probabilities of each response category, Disagree and Agree for 2-class model are drawn.

Items that reference to a negative attitude toward women such as *Not many jobs available*, *men should have more right to a job than women* and *Men are better qualified to be political leaders than women* are the ones that the estimated probability to agree to this items are lower than the other items in the second class. Remember that these items were inversely coded in order to evaluate the attitude in favor of woman.



Table 3.3: Probabilities to agree each item 2-class European model

param	Fully egalitarian	Competition- driven sexism
GND1 - Men and women should have equal opportunities to take part in government	<b>0.996</b>	<b>0.891</b>
GND2 - Men and women should have the same rights in every way	<b>0.979</b>	<b>0.821</b>
GND4 - Not many jobs available, men should have more right to a job than women(r)	<b>0.954</b>	<b>0.325</b>
GND6 - Men are better qualified to be political leaders than women(r)	<b>0.914</b>	<b>0.352</b>

Table 3.4: Probabilities to agree each item 2-class South American model

param	Fully egalitarian	Competition- driven sexism
GND1 - Men and women should have equal opportunities to take part in government	<b>0.99</b>	<b>0.958</b>
GND2 - Men and women should have the same rights in every way	<b>0.97</b>	<b>0.929</b>
GND4 - Not many jobs available, men should have more right to a job than women(r)	<b>1</b>	<b>0.375</b>
GND6 - Men are better qualified to be political leaders than women(r)	<b>1</b>	<b>0.393</b>

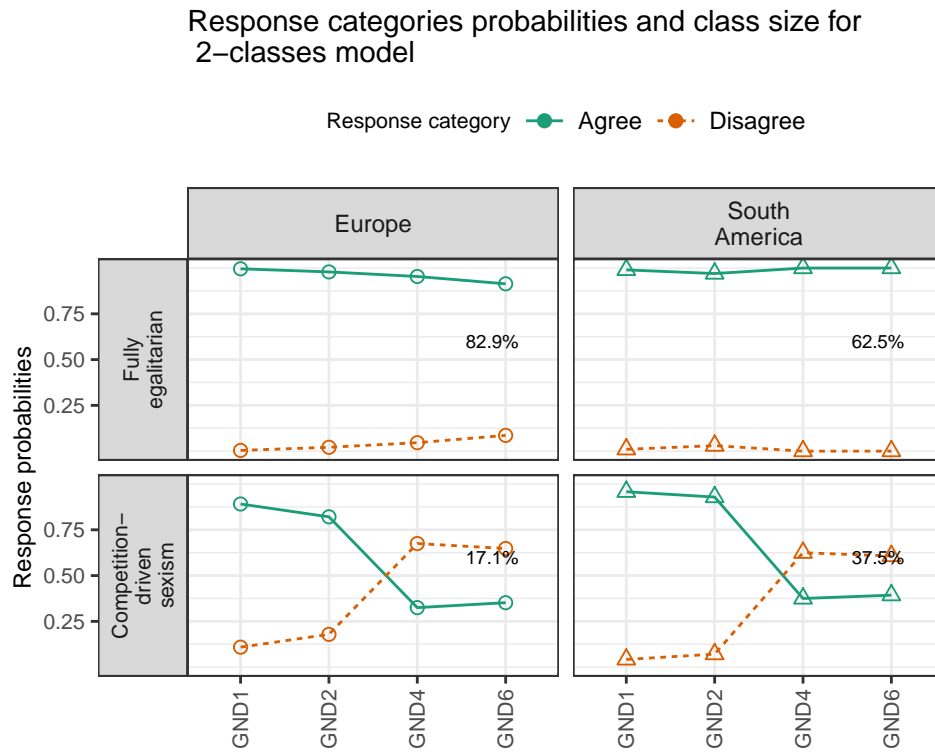


Figure 3.2: Response category probabilities for 2-classes model

## 3-classes models

When 3 classes are incorporated to the model, tables @ref(tab:lca3\_la) and @ref(tab:lca3\_eu), the first class **Fully egalitarian** class remains stable in terms of estimated probabilities for agree to each item. The class estimated sizes increase in both regions, from 82.9% to 89.5% in the European model, and from 62.5% to 67%, as can be seen in ???. The second class previously called as **Competition-driven sexism** class is now clearly divided into new different classes that differ between regions. For the European model a 7.4% of the sample is classified into the Competition driven sexism class, compared to the South American model that had a 31.5% of the remaining sample. The estimated probabilities for this class are similar for the first 2 items between regions, but for the sexist items the estimations of agreeing are much lower in the European model, close to 0 (0.1 and 0.0 for item 4 and 6), meanwhile in the South American model these estimations are around 0.3. The third class is clearly different between regions, in the European model, this class was called as **Not egalitarian in every way**, that indicate that 0.5 probability to agree to most of the items but 0.1 to the item **Men and women should have the same rights in every way**. This class classified the remaining 3% of the sample. On the other hand, for the South American model, the third class called **Anti competition-driven sexism** shows the opposite behavior as the second class, now the sexism items has the highest probabilities to agree, around 0.8. This class contain 1.5% of the sample.

Table 3.5: Probabilities to agree each item 3-class European model

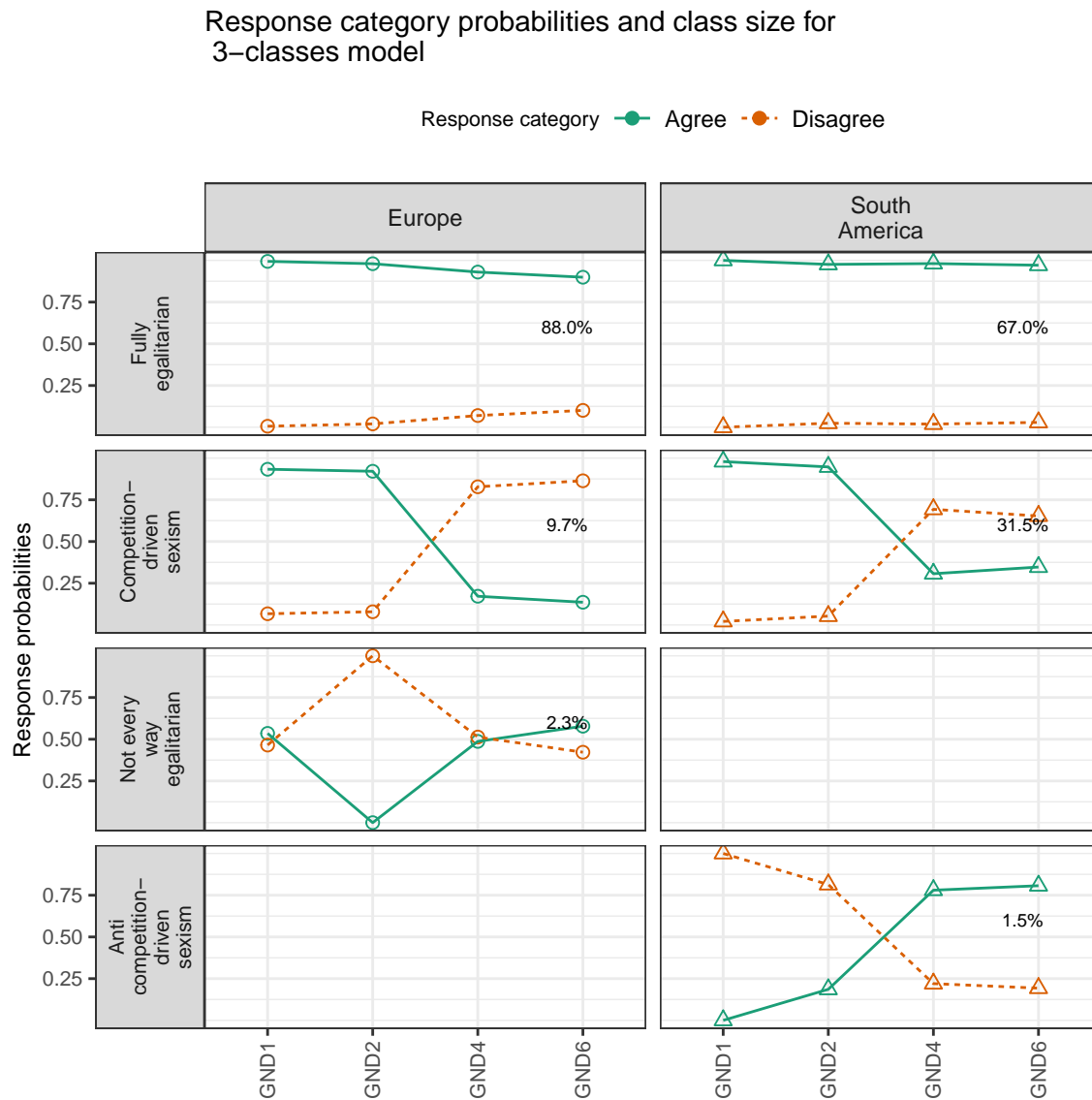
param	Fully egalitarian	Competition- driven sexism	Not every way egalitarian
GND1 - Men and women should have equal opportunities to take part in government	<b>0.994</b>	<b>0.933</b>	<b>0.535</b>
GND2 - Men and women should have the same rights in every way	<b>0.98</b>	<b>0.921</b>	<b>0</b>
GND4 - Not many jobs available, men should have more right to a job than women(r)	<b>0.93</b>	<b>0.172</b>	<b>0.487</b>
GND6 - Men are better qualified to be political leaders than women(r)	<b>0.899</b>	<b>0.136</b>	<b>0.578</b>

Table 3.6: Probabilities to agree each item 3-class South American model

param	Fully egalitarian	Competition- driven sexism	Anti competition- driven sexism
GND1 - Men and women should have equal opportunities to take part in government	<b>1</b>	<b>0.979</b>	<b>0</b>
GND2 - Men and women should have the same rights in every way	<b>0.976</b>	<b>0.947</b>	<b>0.186</b>

Table 3.6: Probabilities to agree each item 3-class South American model (*continued*)

param	Fully egalitarian	Competition- driven sexism	Anti competition- driven sexism
GND4 - Not many jobs available, men should have more right to a job than women(r)	0.981	0.307	0.78
GND6 - Men are better qualified to be political leaders than women(r)	0.971	0.347	0.807



## 4-classes models

As the optimal model according to the model fit statistics, we can identify again the first class **Fully egalitarian** in figure 3.3, for the European model with 81.3% of the sample and 76% for the South American model sample.

The second class identified in both models is the **Competition driven sexism** class with 15% of the sample in the European model but with higher probabilities to agree (around 0.3) to the sexist items compared to the South American model, table @ref(tab:lca4\_eu), where the estimated probabilities to agree to these items is 0.1, with a sample size of 17.4%.

Third class identified previously in the 3-class European model is now identify in the South American model, where a group of individuals that tend to agree with most of the items but **Men and women should have the same rights in every way**, called **Not egalitarian in every way**, with a 2.4% and 2.9% of the sample in the European and South American model respectively.

Last class identified is different in both models. In the European this class called **Not egalitarian** classifies individuals that are more likely to disagree with most of the items, with a 1.2% of the sample. On the other hand, the South American model identifies a class called **Not involved** where most of the individuals are not likely to choose either agreement or disagreement with the items, @ref(tab:lca4\_la), even though a slight inclination to disagree with sexist related items, this class includes the 3.7% of the South American sample.

Table 3.7: Probabilities to agree each item 4-class European model

param	Fully egalitarian	Competition- driven sexism	Not every way egalitarian	Strong competition- driven sexism
GND1 - Men and women should have equal opportunities to take part in government	0.997	0.976	0.788	0.543
GND2 - Men and women should have the same rights in every way	0.997	0.972	0.333	0.383
GND4 - Not many jobs available, men should have more right to a job than women(r)	0.922	0.374	0.744	0.004
GND6 - Men are better qualified to be political leaders than women(r)	0.926	0.011	0.819	0.006

Table 3.8: Probabilities to agree each item 4-class South American model

param	Fully egalitarian	Competition- driven sexism	Not involved	Not every way egalitarian
GND1 - Men and women should have equal opportunities to take part in government	0.999	1	0.706	0.622
GND2 - Men and women should have the same rights in every way	0.996	0.967	0.656	0.082

Table 3.8: Probabilities to agree each item 4-class South American model (*continued*)

param	Fully egalitarian	Competition-driven sexism	Not involved	Not every way egalitarian
GND4 - Not many jobs available, men should have more right to a job than women(r)	0.895	0.156	0.379	0.942
GND6 - Men are better qualified to be political leaders than women(r)	0.928	0.007	0.456	0.937

Response category probabilities and class size for 4-classes model

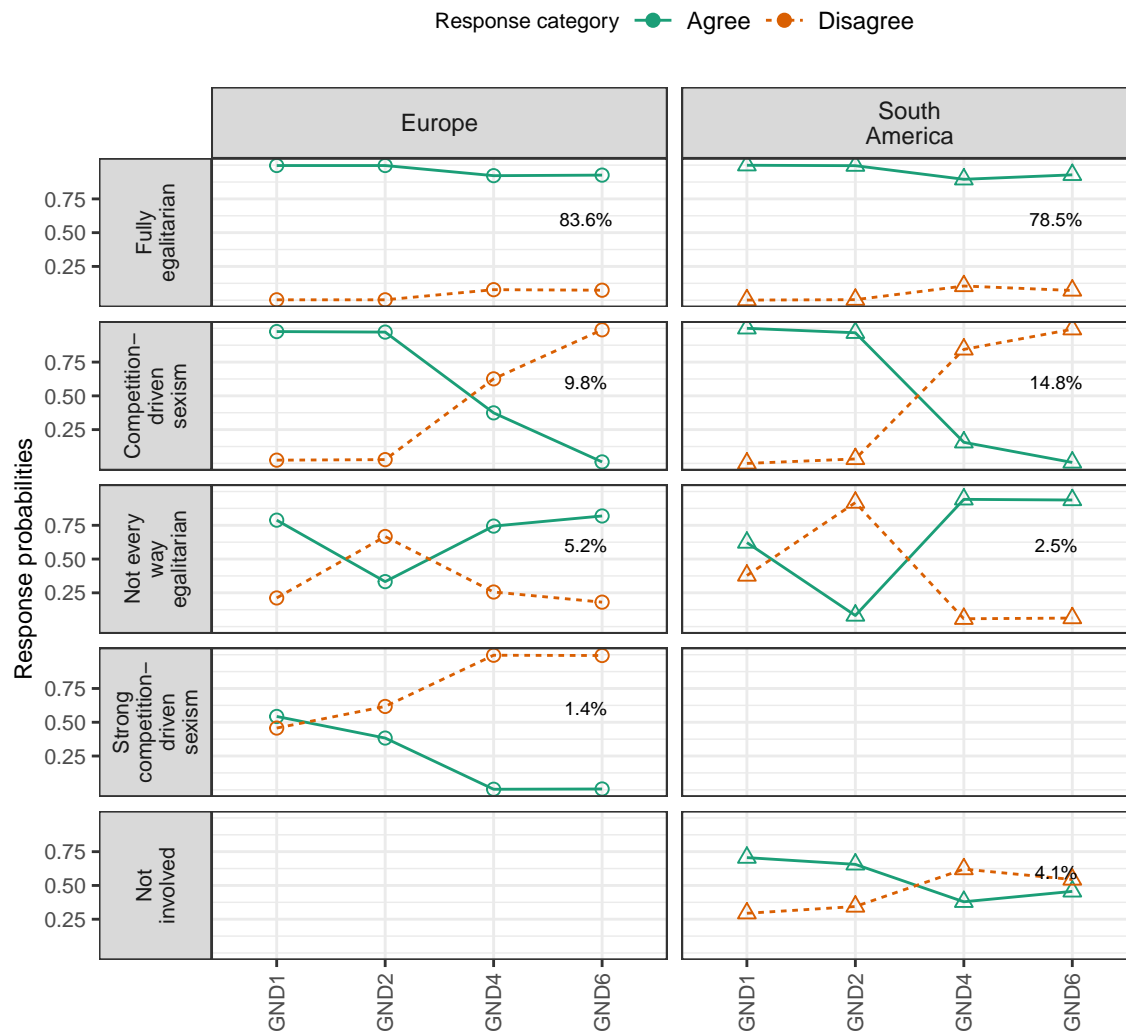


Figure 3.3: Response category probabilities for 4-classes model

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## 3.2 By country

Table 3.9: Model fit statistics by country

N Latent Classes	Param	Log- Likelihood	AIC	BIC	aBIC	Entropy	LL Re- duction	VLMR 2*LL Dif	VLMR PValue	LMR Value	LMR PValue
<b>Europe</b>											
<b>Belgium (Flanders)</b>											
1	4	-2970	5948	5972	5959						
<b>2</b>	<b>9</b>	<b>-2756</b>	<b>5529</b>	<b>5583</b>	<b>5554</b>	<b>81.9%</b>	<b>7.2%</b>	<b>429</b>	<b>0</b>	<b>418</b>	<b>0</b>
3	14	-2738	5504	5588	5544	87.3%	0.6%	35	0.134	34	0.139
4	19	-2736	5510	5623	5563	87.8%	0.1%	5	0.456	5	0.458
<b>Netherlands</b>											
1	4	-3779	7566	7590	7577						
<b>2</b>	<b>9</b>	<b>-3534</b>	<b>7087</b>	<b>7140</b>	<b>7111</b>	<b>63.7%</b>	<b>6.5%</b>	<b>490</b>	<b>0</b>	<b>478</b>	<b>0</b>
3	14	-3484	6996	7079	7034	87.1%	1.4%	101	0.063	98	0.067
4	19	-3477	6993	7105	7045	75.7%	0.2%	13	0.3	13	0.303
<b>South America</b>											
<b>Chile</b>											
1	4	-6797	13603	13629	13616						
2	9	-6055	12129	12187	12159	79.1%	10.9%	1484	0	1450	0
<b>3</b>	<b>14</b>	<b>-5815</b>	<b>11657</b>	<b>11748</b>	<b>11704</b>	<b>85.8%</b>	<b>4.0%</b>	<b>482</b>	<b>0</b>	<b>471</b>	<b>0</b>
4	19	-5803	11644	11768	11708	97.2%	0.2%	23	0.153	22	0.157
<b>Colombia</b>											
1	4	-7403	14815	14841	14828						
2	9	-6891	13800	13860	13831	61.2%	6.9%	1024	0	1001	0
<b>3</b>	<b>14</b>	<b>-6829</b>	<b>13685</b>	<b>13778</b>	<b>13733</b>	<b>81.7%</b>	<b>0.9%</b>	<b>125</b>	<b>0.012</b>	<b>122</b>	<b>0.013</b>
4	19	-6828	13694	13820	13759	71.9%	0.0%	1	0.582	1	0.582



2-classes

Table 3.10: Probabilities to agree each item 2-class model by country

Country	Item	Fully egalitar- ian	Competition- driven sexism
<b>Europe</b>			
Belgium (Flemish)	GND1 - Men and women should have equal opportunities to take part in government	0.998	0.938
	GND2 - Men and women should have the same rights in every way	0.979	0.819
	GND4 - Not many jobs available, men should have more right to a job than women(r)	0.965	0.188
	GND6 - Men are better qualified to be political leaders than women(r)	0.907	0.343
Netherlands	GND1 - Men and women should have equal opportunities to take part in government	0.993	0.861
	GND2 - Men and women should have the same rights in every way	0.978	0.819
	GND4 - Not many jobs available, men should have more right to a job than women(r)	0.941	0.373
	GND6 - Men are better qualified to be political leaders than women(r)	0.916	0.358
<b>South America</b>			
Chile	GND1 - Men and women should have equal opportunities to take part in government	0.979	0.966
	GND2 - Men and women should have the same rights in every way	0.966	0.958
	GND4 - Not many jobs available, men should have more right to a job than women(r)	1	0.318
	GND6 - Men are better qualified to be political leaders than women(r)	1	0.331
Colombia	GND1 - Men and women should have equal opportunities to take part in government	0.997	0.951
	GND2 - Men and women should have the same rights in every way	0.971	0.898
	GND4 - Not many jobs available, men should have more right to a job than women(r)	0.987	0.348
	GND6 - Men are better qualified to be political leaders than women(r)	0.956	0.433

Table 3.11: Estimated class sizes 2-classes model by country

Country	Europe		South America	
	Fully egalitarian	Competition-driven sexism	Fully egalitarian	Competition-driven sexism
Belgium (Flemish)	0.886	0.114		
Netherlands	0.779	0.221		
Chile			0.651	0.349
Colombia			0.660	0.340

Table 3.12: Probabilities to agree each item 3-class European model by country

Country	Item	Fully egalitarian	Competition-driven sexism	Not every way egalitarian
Belgium (Flemish)	GND1 - Men and women should have equal opportunities to take part in government	0.998	0.982	0.734
	GND2 - Men and women should have the same rights in every way	0.979	0.988	0.013
	GND4 - Not many jobs available, men should have more right to a job than women(r)	0.955	0.263	0.218
	GND6 - Men are better qualified to be political leaders than women(r)	0.915	0.237	0.43
Netherlands	GND1 - Men and women should have equal opportunities to take part in government	0.99	0.9	0.465
	GND2 - Men and women should have the same rights in every way	0.979	0.914	0
	GND4 - Not many jobs available, men should have more right to a job than women(r)	0.909	0.168	0.595
	GND6 - Men are better qualified to be political leaders than women(r)	0.889	0.101	0.614

Table 3.13: Probabilities to agree each item 3-class South American model by country

Country	Item	Fully egalitarian	Competition-driven sexism	Anti competition-driven sexism
	GND1 - Men and women should have equal opportunities to take part in government	1	0.983	0.245
	GND2 - Men and women should have the same rights in every way	0.99	0.978	0.129

Table 3.13: Probabilities to agree each item 3-class South American model by country (*continued*)

Country	Item	Fully egalitar- ian	Competition- driven sexism	Anti competition- driven sexism
Chile	GND4 - Not many jobs available, men should have more right to a job than women(r)	1	0.309	0.854
	GND6 - Men are better qualified to be political leaders than women(r)	1	0.327	0.807
	GND1 - Men and women should have equal opportunities to take part in government	1	0.974	0
	GND2 - Men and women should have the same rights in every way	0.967	0.905	0.388
Colombia	GND4 - Not many jobs available, men should have more right to a job than women(r)	0.943	0.157	0.682
	GND6 - Men are better qualified to be political leaders than women(r)	0.906	0.326	0.714

Table 3.14: Estimated class sizes 3-classes Europe model by country

Country	Europe		
	Fully egalitarian	Competition- driven sexism	Not every way egalitarian
Belgium (Flemish)	0.888	0.092	0.02
Netherlands	0.858	0.112	0.03

Table 3.15: Estimated class sizes 3-classes South American model by country

Country	South America		
	Fully egalitarian	Competition- driven sexism	Anti competition- driven sexism
Colombia	0.771	0.216	0.013
Chile	0.634	0.339	0.026

Table 3.16: Probabilities to agree each item 4-class Europe model by country

Country	Item	Fully egalitar- ian	Competition- driven sexism	Not involved	Not every way egalitar- ian
Belgium (Flemish)	GND1 - Men and women should have equal opportunities to take part in government	0.999	0.984	0.152	0.94
	GND2 - Men and women should have the same rights in every way	1	0.884	0.041	0.459
	GND4 - Not many jobs available, men should have more right to a job than women(r)	0.942	0.338	0.007	0.757
	GND6 - Men are better qualified to be political leaders than women(r)	0.922	0.001	0.232	0.989
Netherlands	GND1 - Men and women should have equal opportunities to take part in government	0.991	0.973	0.463	0.692
	GND2 - Men and women should have the same rights in every way	0.999	0.963	0.493	0.002
	GND4 - Not many jobs available, men should have more right to a job than women(r)	0.958	0.473	0.088	0.807
	GND6 - Men are better qualified to be political leaders than women(r)	0.952	0.398	0	0.847

Table 3.17: Probabilities to agree each item 4-class South American model by country

Country	Item	Fully egalitar- ian	Competition- driven sexism	Not involved	Not every way egalitar- ian
Chile	GND1 - Men and women should have equal opportunities to take part in government	0.999	1	0.346	0.476
	GND2 - Men and women should have the same rights in every way	1	0.977	0.604	0
	GND4 - Not many jobs available, men should have more right to a job than women(r)	0.9	0.308	0.416	1
	GND6 - Men are better qualified to be political leaders than women(r)	1	0	0.512	0.931
	GND1 - Men and women should have equal opportunities to take part in government	1	0.978	0.724	0.936
	GND2 - Men and women should have the same rights in every way	0.98	1	0.333	0.574

Table 3.17: Probabilities to agree each item 4-class South American model by country (*continued*)

Country	Item	Fully egalitar- ian	Competition- driven sexism	Not involved	Not every way egalitar- ian
Colombia	GND4 - Not many jobs available, men should have more right to a job than women(r)	0.947	0.346	0.692	0.025
	GND6 - Men are better qualified to be political leaders than women(r)	0.949	0.348	0.768	0.15

Table 3.18: Estimated class sizes 4-classes Europe model by country

Country	Europe			
	Fully egalitarian	Competition- driven sexism	Not every way egalitarian	Strong competition- driven sexism
Belgium (Flemish)	0.863	0.086	0.004	0.046
Netherlands	0.699	0.243	0.021	0.037

Table 3.19: Estimated class sizes 4-classes South American model by country

Country	South American			
	Fully egalitarian	Competition- driven sexism	Not involved	Not every way egalitarian
Chile	0.734	0.223	0.019	0.024
Colombia	0.697	0.232	0.041	0.030

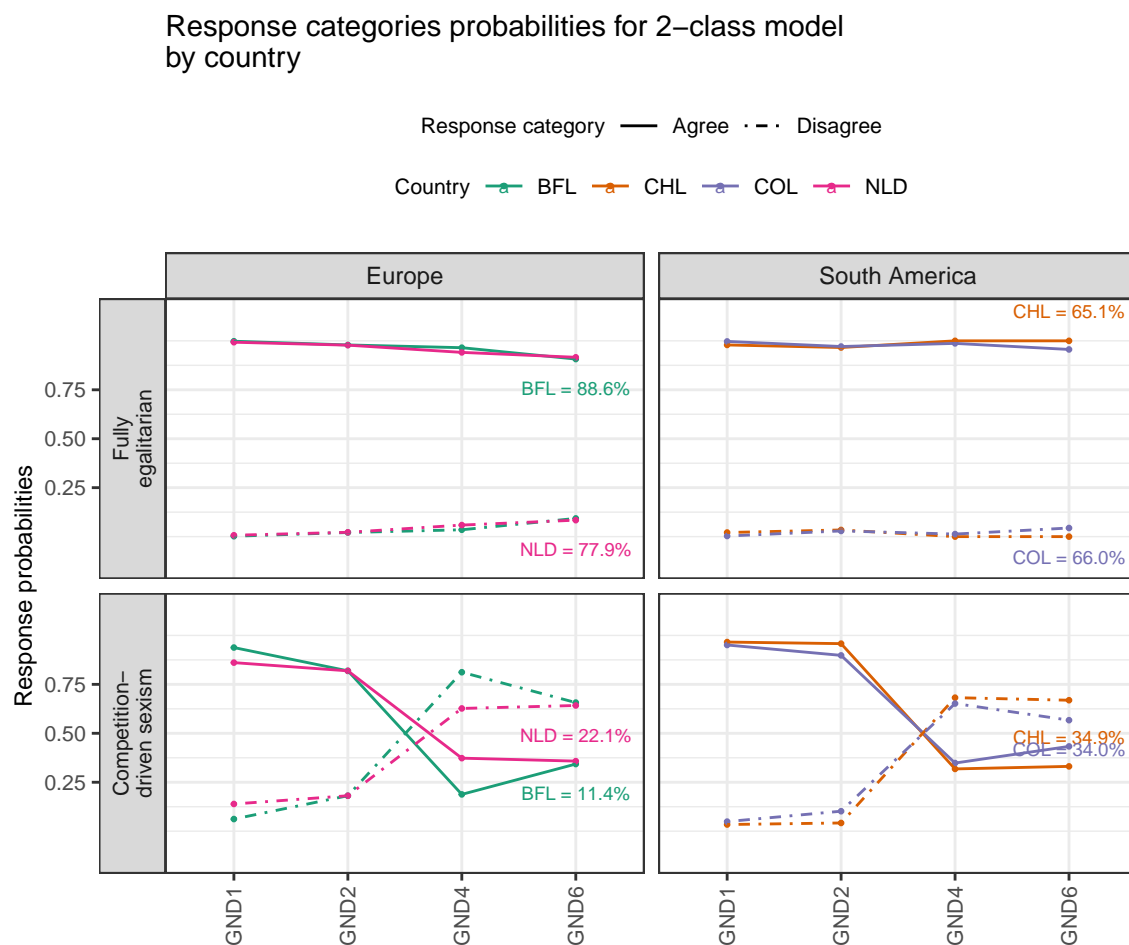


Figure 3.4: Response category probabilities for 2-classes model by country

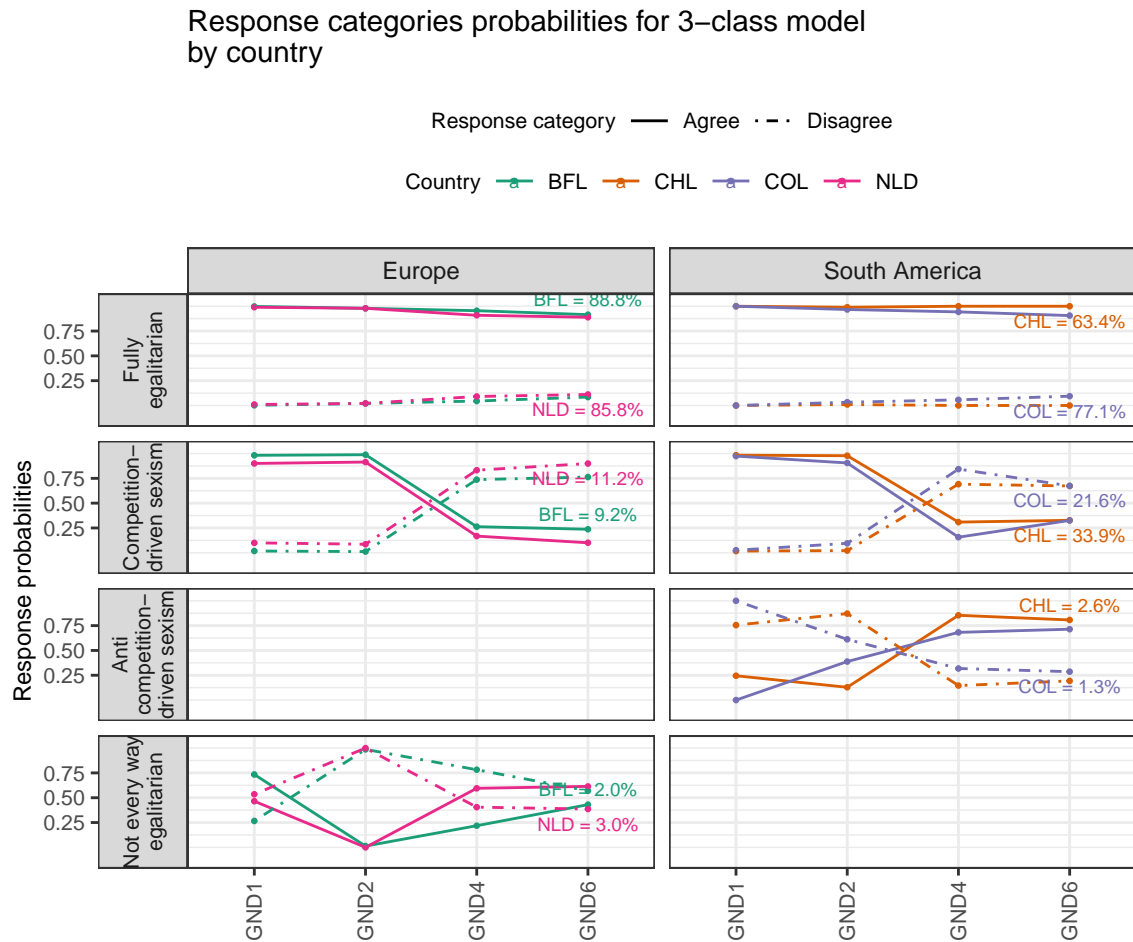


Figure 3.5: Response category probabilities for 3-classes model by country

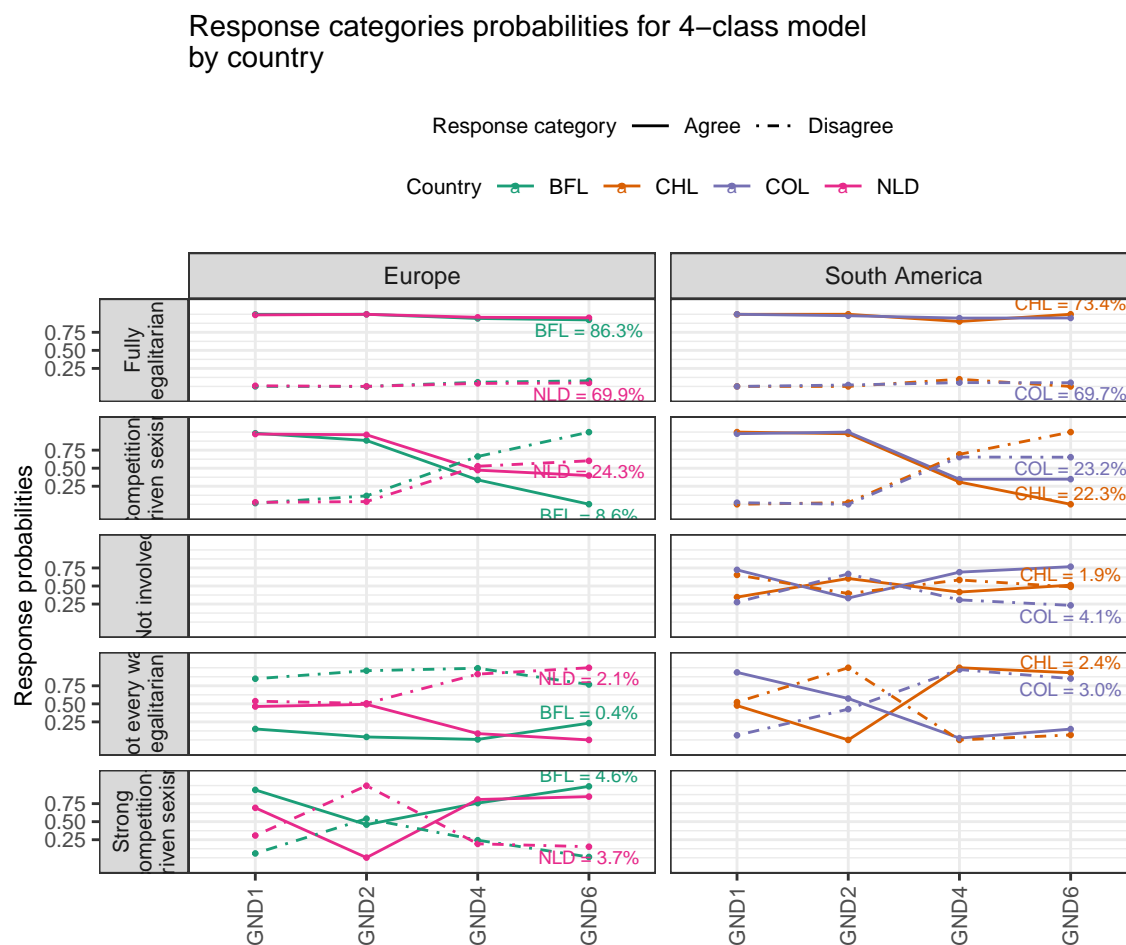


Figure 3.6: Response category probabilities for 4-classes model by country



### **3.3 Multigroup across countries**

Table 3.20: European country multigroup model fit statistics

Type	Ngroups	Param	Log-Likelihood	AIC	BIC	aBIC	Entropy	LL Reduction	$\Delta$ LL	$\Delta$ DF	pvalue $\Delta$
<b>2-classes</b>											
Complete heterogeneity	2	19	-10258	<i>20555</i>	20681	20621	<i>86.4%</i>				
<b>Partial homogeneity</b>	<b>2</b>	<b>11</b>	<b>-10275</b>	<b>20571</b>	<b>20644</b>	<b>20609</b>	<b>83.8%</b>	<b>0.2%</b>	<b>-16</b>	<b>8</b>	<b>0.042</b>
Complete homogeneity	2	10	-10308	20636	20702	20670	85.4%	0.3%	-33	1	0.000
<b>3-classes</b>											
Complete heterogeneity	2	29	-10190	<i>20438</i>	20631	20538	93.9%				
<b>Partial homogeneity</b>	<b>2</b>	<b>17</b>	<b>-10205</b>	<b>20443</b>	<b>20556</b>	<b>20502</b>	<b>87.1%</b>	<b>0.1%</b>	<b>-15</b>	<b>12</b>	<b>0.241</b>
Complete homogeneity	2	15	-10242	20514	20614	20566	94.5%	0.4%	-38	2	0.000
<b>4-classes</b>											
Complete heterogeneity	2	39	-10181	20440	20699	20575	88.6%				
<b>Partial homogeneity</b>	<b>2</b>	<b>23</b>	<b>-10185</b>	<b>20416</b>	<b>20569</b>	<b>20496</b>	<b>88.4%</b>	<b>0.0%</b>	<b>-4</b>	<b>16</b>	<b>0.999</b>
Complete homogeneity	2	20	-10232	20505	20638	20574	92.1%	0.5%	-47	3	0.000

Table 3.21: South America country multigroup model fit statistics

Type	Ngroups	Param	Log-Likelihood	AIC	BIC	aBIC	Entropy	LL Reduction	$\Delta$ LL	$\Delta$ DF	pvalue $\Delta$
<b>2-classes</b>											
Complete heterogeneity	2	19	-20209	<i>40456</i>	<i>40594</i>	<i>40534</i>	85.1%				
<b>Partial homogeneity</b>	<b>2</b>	<b>11</b>	<b>-20256</b>	<b>40535</b>	<b>40615</b>	<b>40580</b>	<b>86.0%</b>	<b>0.2%</b>	<b>-47</b>	<b>8</b>	<b>0.000</b>
Complete homogeneity	2	10	-20257	40534	40606	40575	86.0%	0.0%	0	1	1.000
<b>3-classes</b>											
Complete heterogeneity	2	29	-19897	<i>39851</i>	<i>40062</i>	<i>39969</i>	90.0%				
<b>Partial homogeneity</b>	<b>2</b>	<b>17</b>	<b>-19957</b>	<b>39947</b>	<b>40071</b>	<b>40017</b>	<b>89.5%</b>	<b>0.3%</b>	<b>-60</b>	<b>12</b>	<b>0.000</b>
Complete homogeneity	2	15	-19966	39961	40070	40022	87.6%	0.0%	-9	2	0.011
<b>4-classes</b>											
Complete heterogeneity	2	39	-19884	<i>39846</i>	40129	40005	89.8%				
<b>Partial homogeneity</b>	<b>2</b>	<b>23</b>	<b>-19908</b>	<b>39863</b>	<b>40030</b>	<b>39957</b>	<b>87.9%</b>	<b>0.1%</b>	<b>-25</b>	<b>16</b>	<b>0.070</b>
Complete homogeneity	2	20	-19960	39959	40105	40041	88.1%	0.3%	-51	3	0.000

## Complete heterogeneity

Table 3.22: Probabilities to Agree each item 2-class Europe country complete heterogeneity multigroup analysis

Item	Belgium (Flanders)		Netherlands	
	Fully egalitarian	Competition-driven sexism	Fully egalitarian	Competition-driven sexism
GND1 - Men and women should have equal opportunities to take part in government	0.998	0.938	0.993	0.861
GND2 - Men and women should have the same rights in every way	0.979	0.819	0.978	0.819
GND4 - Not many jobs available, men should have more right to a job than women(r)	0.965	0.188	0.941	0.373
GND6 - Men are better qualified to be political leaders than women(r)	0.907	0.343	0.916	0.358

Table 3.23: Probabilities to Agree each item 2-class, South America country complete heterogeneity multigroup analysis

Item	Chile		Colombia	
	Fully egalitarian	Competition-driven sexism	Fully egalitarian	Competition-driven sexism
GND1 - Men and women should have equal opportunities to take part in government	0.979	0.966	0.997	0.951
GND2 - Men and women should have the same rights in every way	0.966	0.958	0.971	0.898
GND4 - Not many jobs available, men should have more right to a job than women(r)	1	0.318	0.987	0.348
GND6 - Men are better qualified to be political leaders than women(r)	1	0.331	0.956	0.433

Probabilities to agree and size for each 2-class country multigroup  
Complete Heterogeneity

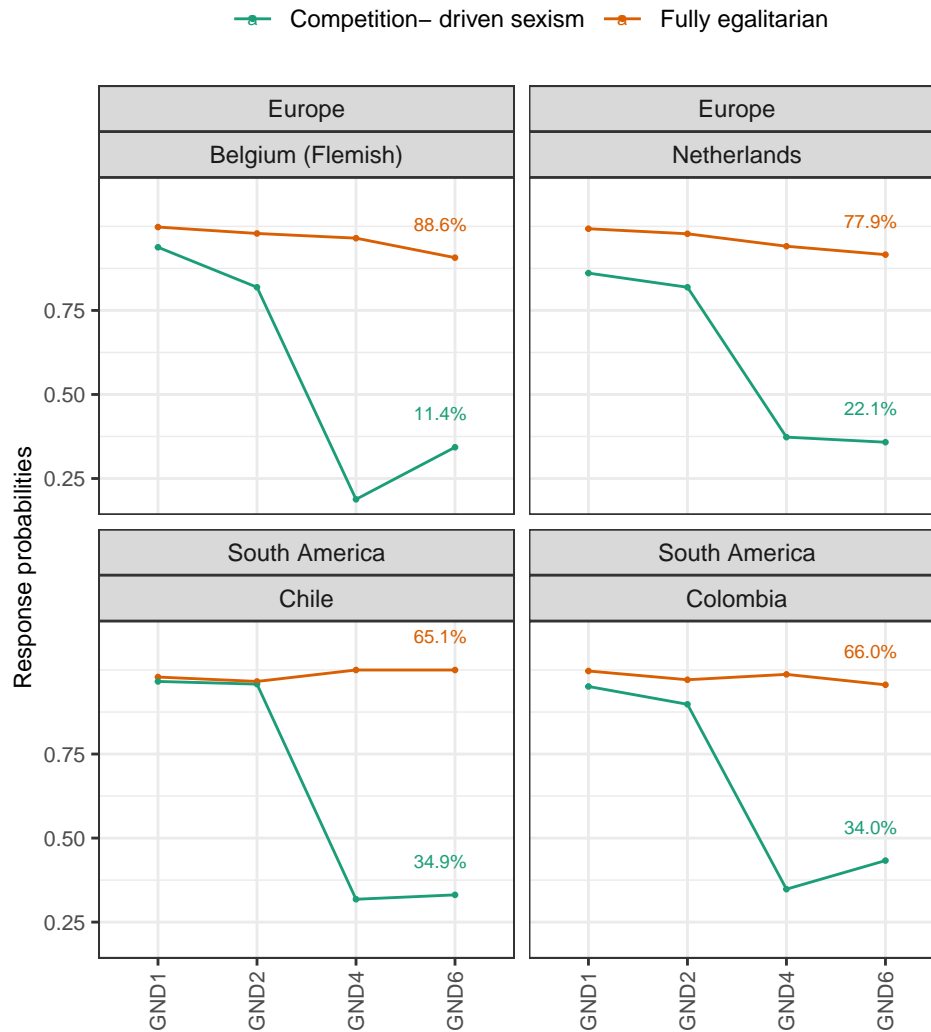


Table 3.24: Probabilities to Agree each item 3-class Europe country complete heterogeneity multigroup analysis

Item	Belgium (Flanders)			Netherlands		
	Fully egalitarian	Competition-driven sexism	Not every way egalitarian	Fully egalitarian	Competition-driven sexism	Anti competition-driven sexism
GND1 - Men and women should have equal opportunities to take part in government	0.998	0.988	0.729	0.991	0.904	0.5
GND2 - Men and women should have the same rights in every way	0.979	0.985	0.136	0.98	0.917	0.169

Table 3.24: Probabilities to Agree each item 3-class Europe country complete heterogeneity multigroup analysis (*continued*)

Item	Fully egalitarian	Competition- driven sexism	Not every way egalitarian	Fully egalitarian	Competition- driven sexism	Anti competition- driven sexism
GND4 - Not many jobs available, men should have more right to a job than women(r)	0.938	0.29	0.218	0.901	0.109	0.592
GND6 - Men are better qualified to be political leaders than women(r)	0.917	0	0.43	0.884	0.013	0.612

Table 3.25: Probabilities to Agree each item 3-class South America country complete heterogeneity multigroup analysis

Item	Chile			Colombia		
	Fully egalitarian	Competition- driven sexism	Anti competition- driven sexism	Fully egalitarian	Competition- driven sexism	Anti competition- driven sexism
GND1 - Men and women should have equal opportunities to take part in government	1	0.983	0.245	1	0.974	0
GND2 - Men and women should have the same rights in every way	0.99	0.978	0.129	0.967	0.905	0.388
GND4 - Not many jobs available, men should have more right to a job than women(r)	1	0.309	0.854	0.943	0.157	0.682
GND6 - Men are better qualified to be political leaders than women(r)	1	0.327	0.807	0.906	0.326	0.714

Probabilities to agree and size for 3-class country multigroup analysis  
Complete Heterogeneity

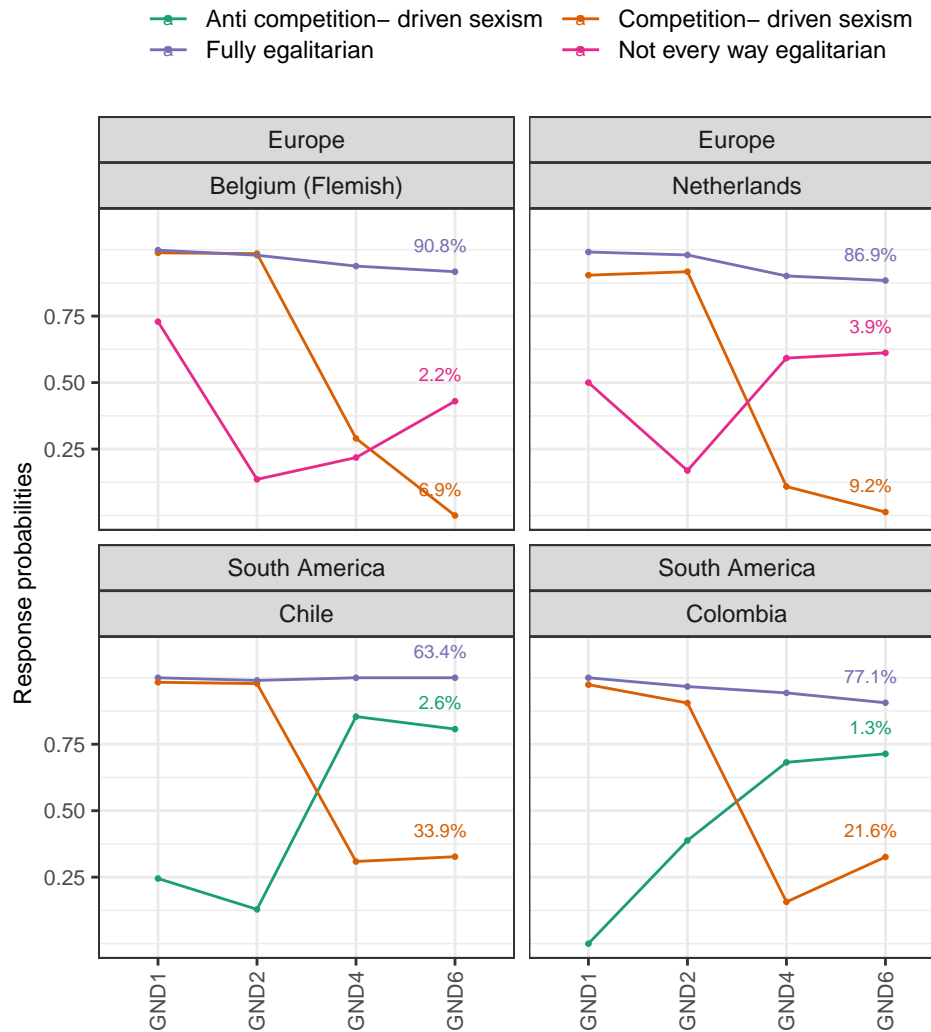


Table 3.26: Probabilities to Agree each item 4-class Europe country complete heterogeneity multigroup analysis

Item	Belgium (Flanders)				Netherlands			
	Fully egalitarian	Competition-driven sexism	Not every way egalitarian	Strong competition-driven sexism	Fully egalitarian	Competition-driven sexism	Not involved	Not every way egalitarian
GND1 - Men and women should have equal opportunities to take part in government	0.998	0.994	0.644	0.939	0.997	0.989	0.118	0.702
GND2 - Men and women should have the same rights in every way	1	0.969	0.181	0.149	1	0.911	0.532	0.392

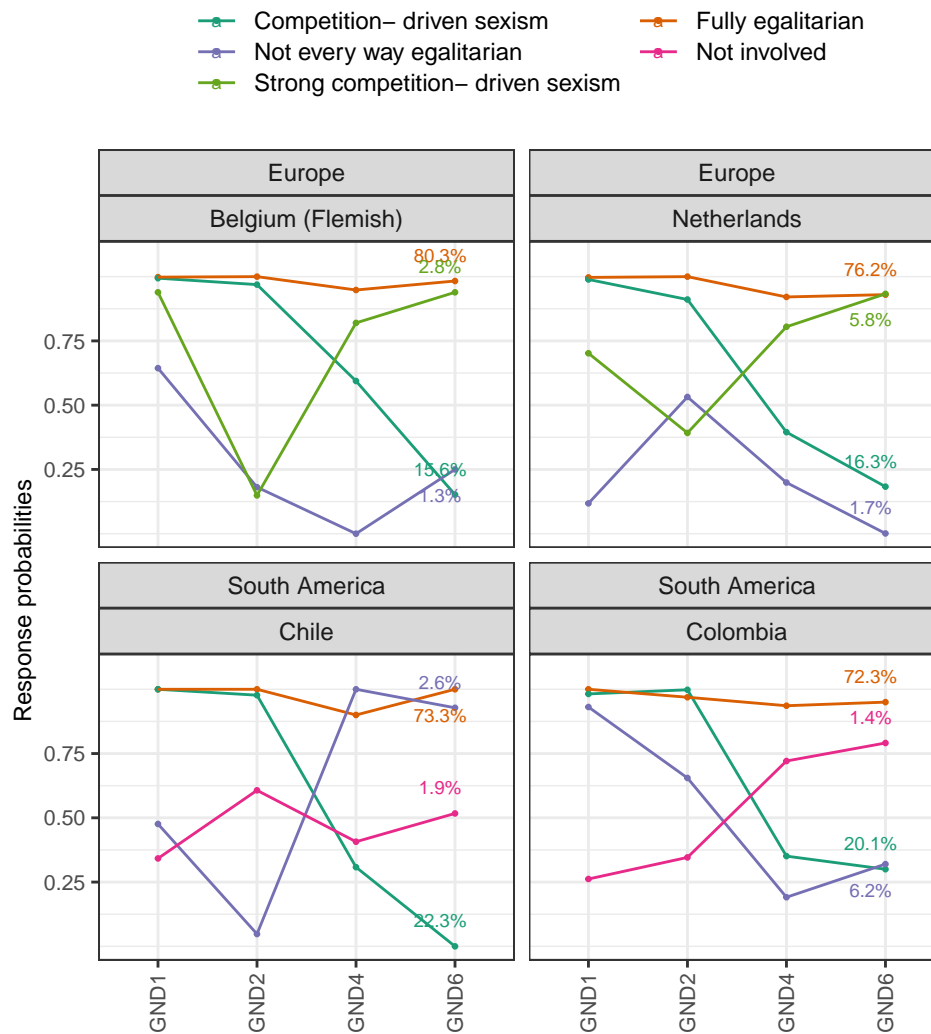
Table 3.26: Probabilities to Agree each item 4-class Europe country complete heterogeneity multigroup analysis (*continued*)

Item	Fully egali- tarian	Competition- driven sexism	Not every way egali- tarian	Strong competition- driven sexism	Fully egali- tarian	Competition- driven sexism	Not in- volved	Not every way egali- tarian
GND4 - Not many jobs available, men should have more right to a job than women(r)	0.948	0.594	0	0.82	0.921	0.395	0.199	0.805
GND6 - Men are better qualified to be political leaders than women(r)	0.983	0.152	0.25	0.939	0.93	0.183	0.001	0.933

Table 3.27: Probabilities to Agree each item 4-class South America country complete heterogeneity multigroup analysis

Item	Chile				Colombia			
	Fully egali- tarian	Competition- driven sexism	Not in- volved	Not every way egali- tarian	Fully egali- tarian	Competition- driven sexism	Not in- volved	Not every way egali- tarian
GND1 - Men and women should have equal opportunities to take part in government	1	1	0.342	0.476	1	0.982	0.262	0.931
GND2 - Men and women should have the same rights in every way	1	0.977	0.607	0.048	0.969	0.998	0.346	0.655
GND4 - Not many jobs available, men should have more right to a job than women(r)	0.9	0.308	0.407	1	0.936	0.351	0.721	0.191
GND6 - Men are better qualified to be political leaders than women(r)	1	0	0.517	0.928	0.95	0.3	0.791	0.32

Probabilities to agree and size for 4-class country multigroup analysis  
Complete Heterogeneity





## Partial homogeneity

Table 3.28: Probabilities to agree each item 2-class, country partial homogeneity multigroup analysis

Item	Europe		South America	
	Fully egalitarian	Competition-driven sexism	Fully egalitarian	Competition-driven sexism
GND1 - Men and women should have equal opportunities to take part in government	0.998	0.895	0.99	0.958
GND2 - Men and women should have the same rights in every way	0.981	0.832	0.97	0.929
GND4 - Not many jobs available, men should have more right to a job than women(r)	0.964	0.365	1	0.375
GND6 - Men are better qualified to be political leaders than women(r)	0.92	0.4	1	0.392

Probabilities to agree and size for 2-class country multigroup analysis  
Partial Homogeneity

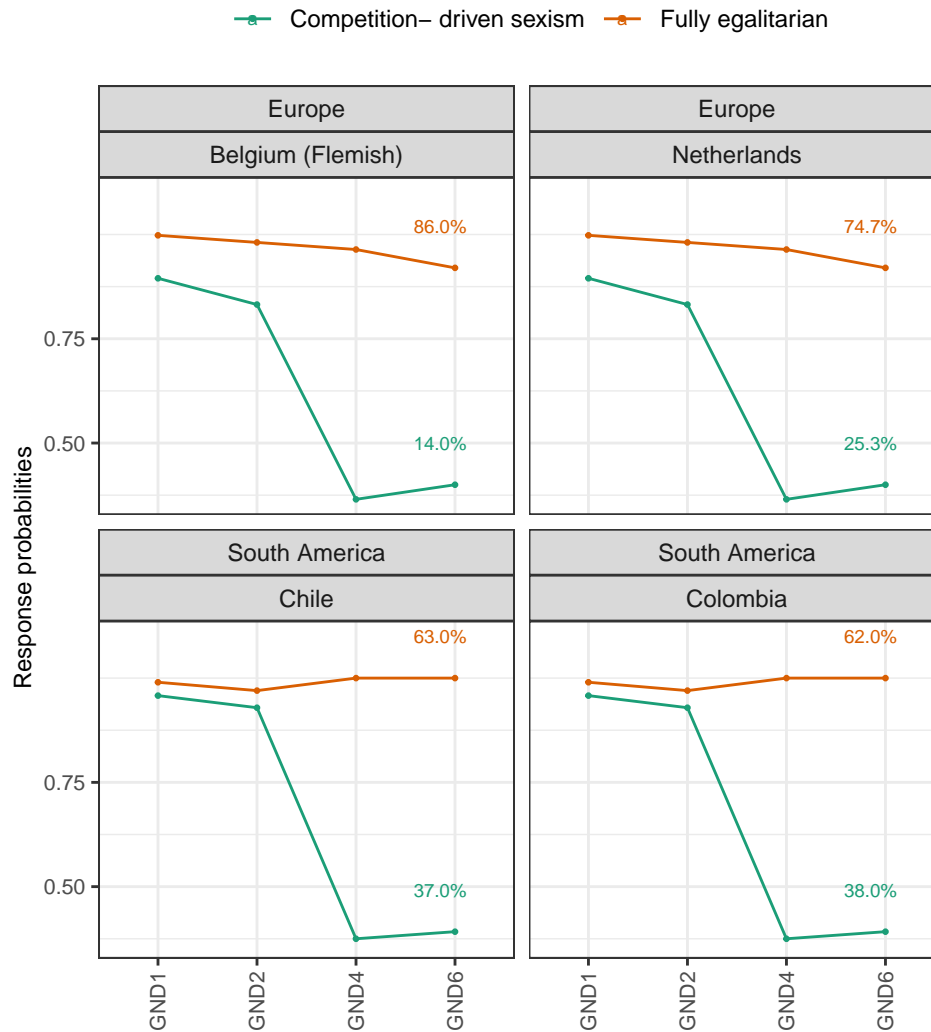


Table 3.29: Probabilities to agree each item by Class, country partial homogeneity multigroup analysis

Item	Europe			South America		
	Fully egalitarian	Competition-driven sexism	Not every way egalitarian	Fully egalitarian	Competition-driven sexism	Anti competition-driven sexism
GND1 - Men and women should have equal opportunities to take part in government	0.997	1	0	0.998	0.977	0
GND2 - Men and women should have the same rights in every way	0.979	0.904	0.445	0.977	0.949	0

Table 3.29: Probabilities to agree each item by Class, country partial homogeneity multigroup analysis (*continued*)

Item	Fully egalitarian	Competition-driven sexism	Not every way egalitarian	Fully egalitarian	Competition-driven sexism	Anti competition-driven sexism
GND4 - Not many jobs available, men should have more right to a job than women(r)	0.995	0.37	0.465	1	0.363	0.788
GND6 - Men are better qualified to be political leaders than women(r)	0.927	0.474	0.467	0.999	0.383	0.81

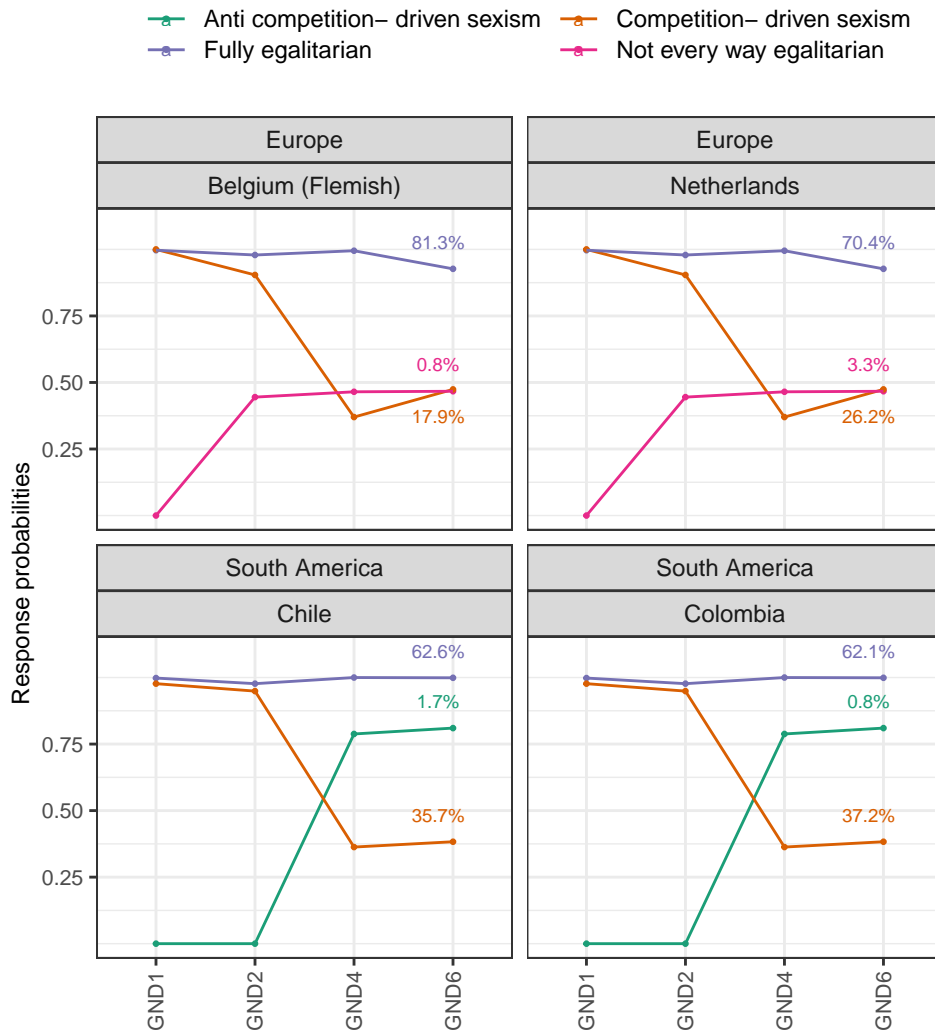
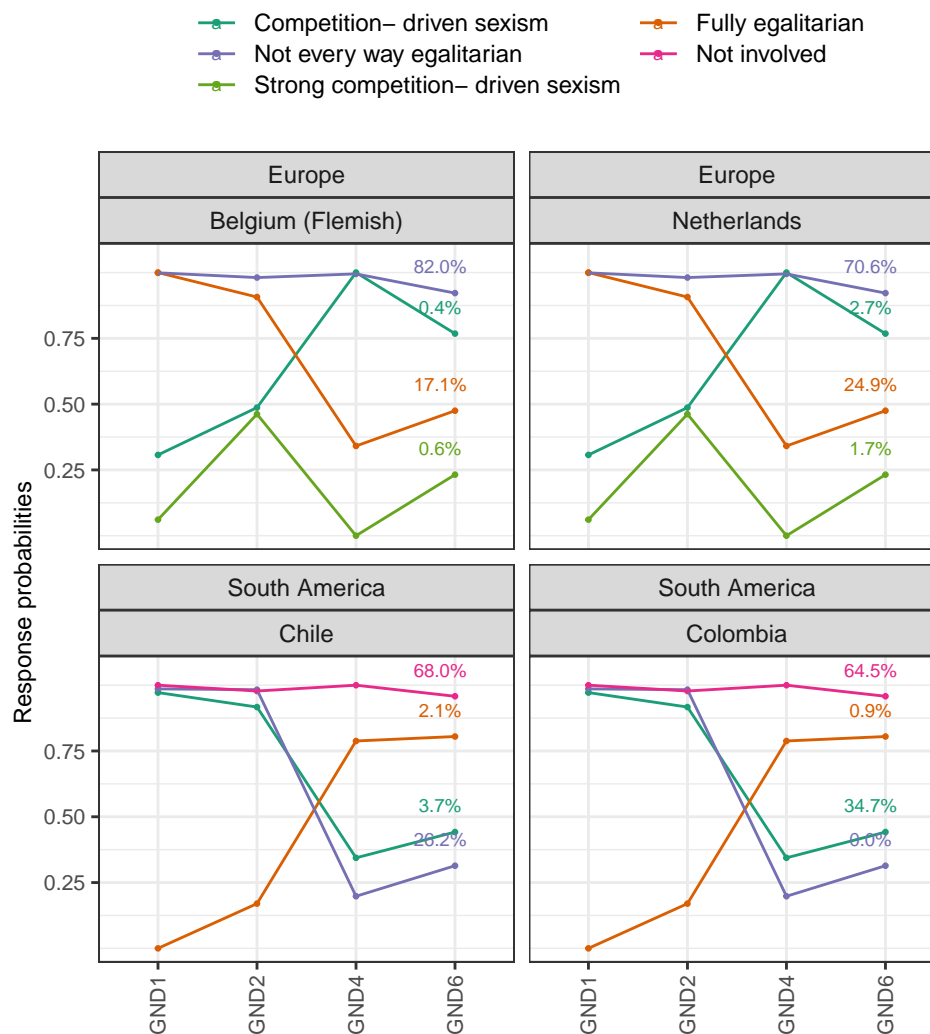
Probabilities to agree and size for 3-class country multigroup analysis  
Partial Homogeneity

Table 3.30: Probabilities to agree each item by Class, country partial homogeneity multigroup analysis

Item	Europe				South America			
	Fully egalitarian	Competition-driven sexism	Not every way egalitarian	Strong competition-driven sexism	Fully egalitarian	Competition-driven sexism	Not involved	e way ita
GND1 - Men and women should have equal opportunities to take part in government	1	0.307	0.999	0.061	0	0.972	0.986	
GND2 - Men and women should have the same rights in every way	0.907	0.487	0.981	0.462	0.17	0.917	0.983	0
GND4 - Not many jobs available, men should have more right to a job than women(r)	0.341	1	0.995	0	0.788	0.344	0.198	
GND6 - Men are better qualified to be political leaders than women(r)	0.475	0.768	0.922	0.232	0.805	0.442	0.314	0

### Probabilities to agree and size for 4-class country multigroup analysis Partial Homogeneity



## Complete homogeneity

Table 3.31: Probabilities to agree each item 2-class, country complete homogeneity multigroup analysis

Item	Europe		South America	
	Fully egalitarian	Competition-driven sexism	Fully egalitarian	Competition-driven sexism
GND1 - Men and women should have equal opportunities to take part in government	0.996	0.891	0.99	0.958
GND2 - Men and women should have the same rights in every way	0.979	0.821	0.97	0.929
GND4 - Not many jobs available, men should have more right to a job than women(r)	0.954	0.325	1	0.375
GND6 - Men are better qualified to be political leaders than women(r)	0.914	0.352	1	0.393

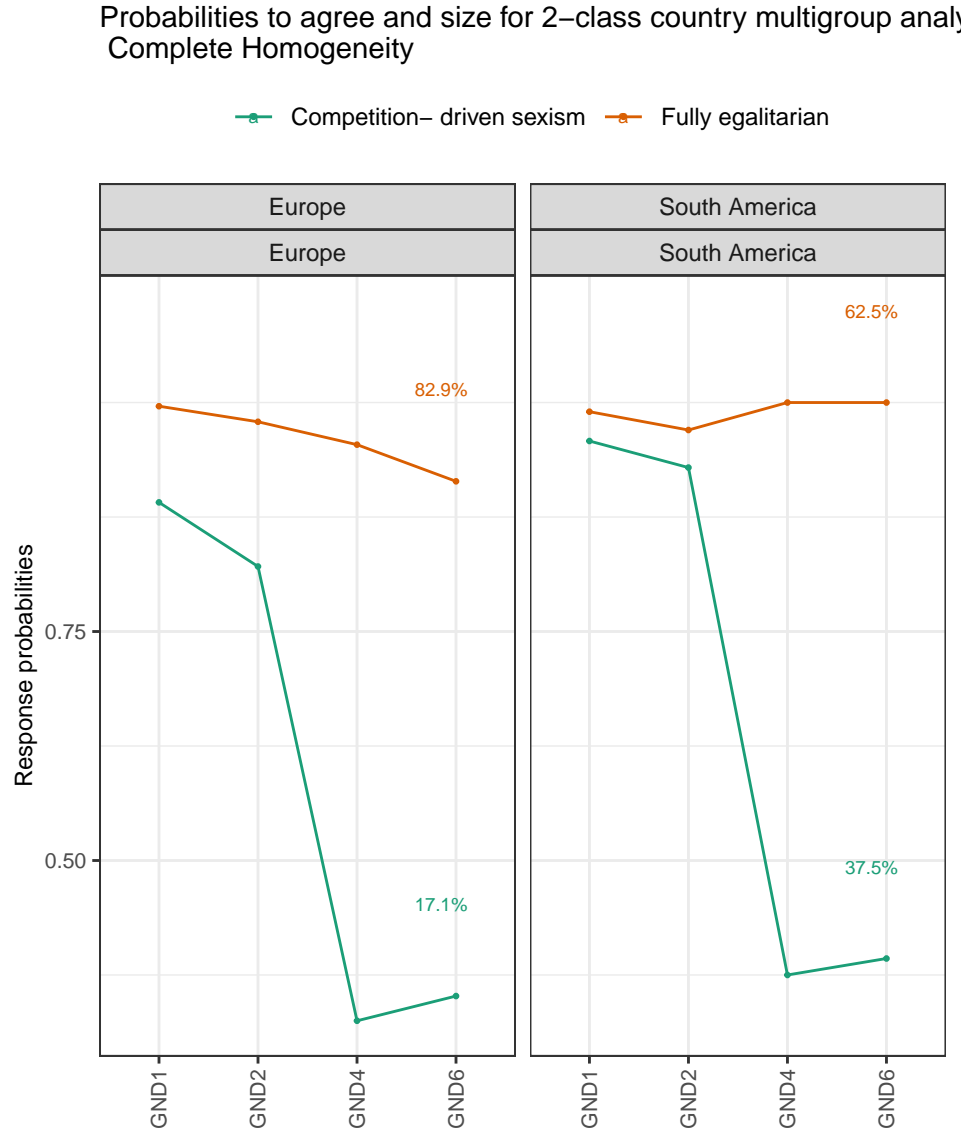


Table 3.32: Probabilities to agree each item 3-class, country complete homogeneity multigroup analysis

Item	Europe			South America		
	Fully egalitarian	Competition– driven sexism	Not every way egalitarian	Fully egalitarian	Competition– driven sexism	Anti competition– driven sexism
GND1 - Men and women should have equal opportunities to take part in government	0.995	0.938	0.572	1	0.979	0
GND2 - Men and women should have the same rights in every way	0.98	0.927	0.173	0.976	0.947	0.186

Table 3.32: Probabilities to agree each item 3-class, country complete homogeneity multigroup analysis (*continued*)

Item	Fully egali- tarian	Competition-Not driven sexism	every way egali- tarian	Fully egali- tarian	Competition- driven sexism	Anti competition- driven sexism
GND4 - Not many jobs available, men should have more right to a job than women(r)	0.92	0.107	0.485	0.981	0.307	0.78
GND6 - Men are better qualified to be political leaders than women(r)	0.894	0	0.575	0.971	0.347	0.807

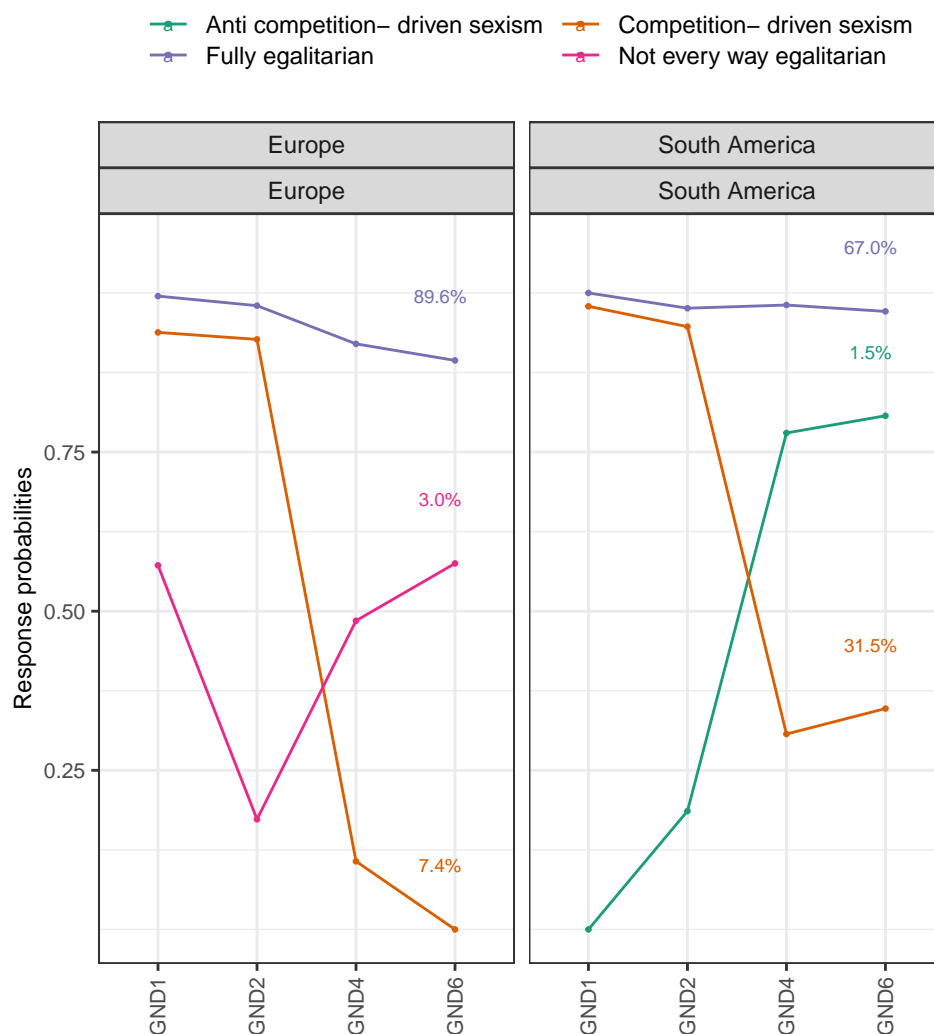
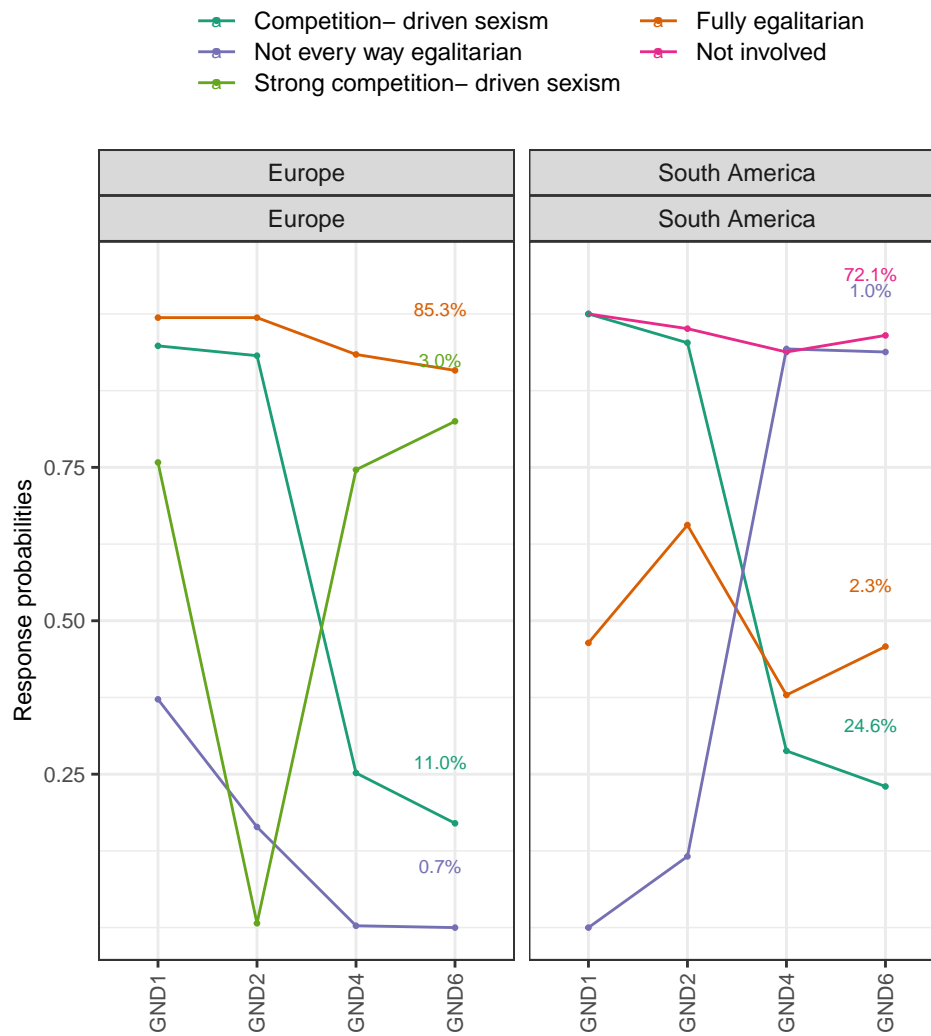
Probabilities to agree and size for 3-class country multigroup anal  
Complete Homogeneity



Table 3.33: Probabilities to agree each item 4-class, country complete homogeneity multigroup analysis

Item	Europe				South America			
	Fully egali- tarian	Competition- driven sexism	Not every way egali- tarian	Strong competition- driven sexism	Fully egali- tarian	Competition- driven sexism	Not in- volved	Not every way egali- tarian
GND1 - Men and women should have equal opportunities to take part in government	0.994	0.948	0.372	0.758	0.464	1	0	1
GND2 - Men and women should have the same rights in every way	0.994	0.932	0.164	0.007	0.656	0.953	0.116	0.976
GND4 - Not many jobs available, men should have more right to a job than women(r)	0.934	0.252	0.003	0.746	0.379	0.288	0.943	0.938
GND6 - Men are better qualified to be political leaders than women(r)	0.908	0.17	0	0.825	0.458	0.23	0.938	0.965

Probabilities to agree and size for 4-class country multigroup analysis  
Complete Homogeneity



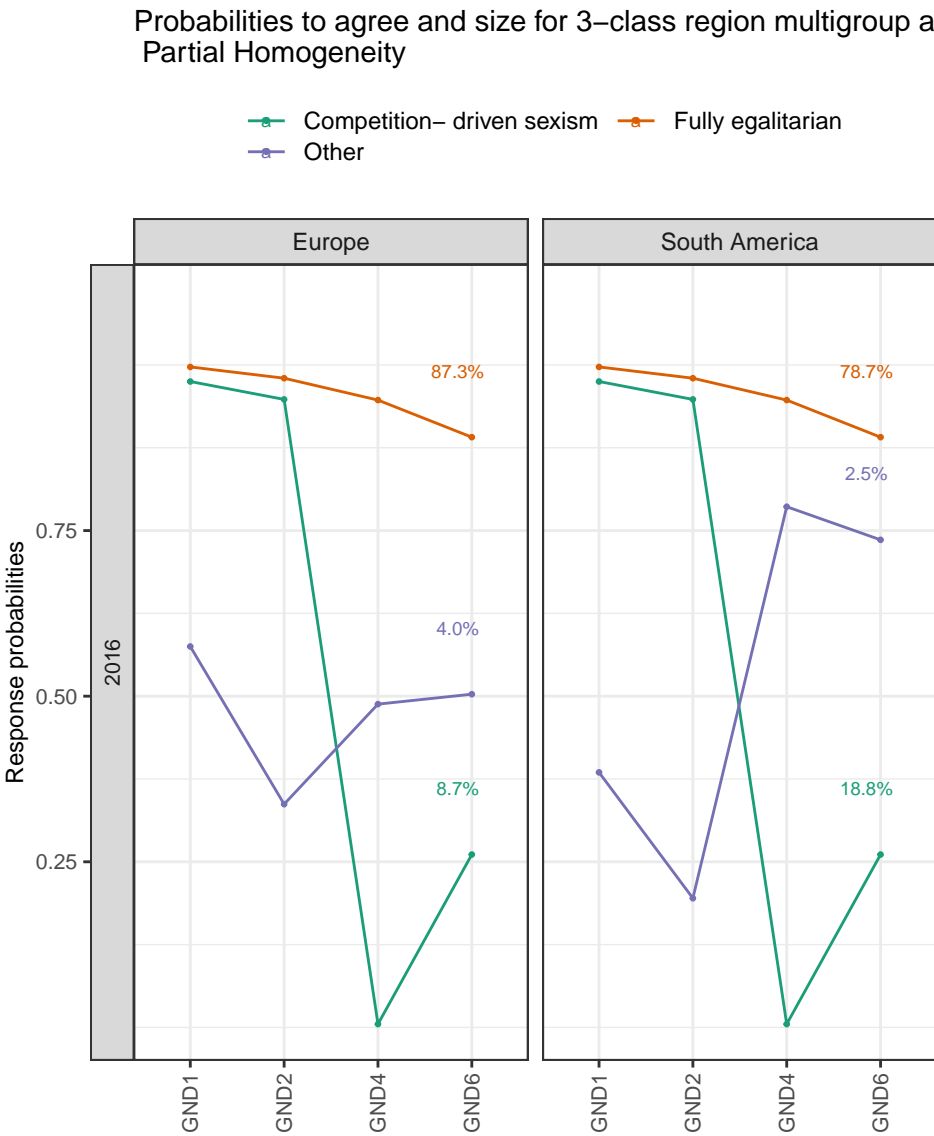
## **3.4 Comparison of LC across region**

Table 3.34: Region multigroup model fit statistics

Type	N Latent Classes	Ngroups	Param	Log- Likelihood	AIC	BIC	aBIC	Entropy	LL Re- duction	$\Delta$ LL	$\Delta$ DF	pvalue $\Delta$
1-Complete heterogeneity	3	2	29	-29950	59957	60180	60088	90.3%				
<b>2-Partial homogeneity - 2 classes equal</b>	<b>3</b>	<b>2</b>	<b>21</b>	<b>-29964</b>	<b>59970</b>	<b>60131</b>	<b>60065</b>	<b>92.8%</b>	<b>0.0%</b>	<b>14</b>	<b>8</b>	<b>0.082</b>
3-Partial homogeneity	3	2	17	-29987	60008	60138	60084	92.5%	0.1%	37	12	0.000
4-Complete homogeneity	3	2	15	-30093	60216	60331	60283	88.9%	0.4%	106	2	0.000

Table 3.35: Probabilities to agree each item by Class, region partial homogeneity multigroup analysis

Item	Europe			South America		
	Fully egalitar- ian	Competition- driven sexism	Other	Fully egalitar- ian	Competition- driven sexism	Other
GND1 - Men and women should have equal opportunities to take part in government	0.997	0.975	0.575	0.997	0.975	0.385
GND2 - Men and women should have the same rights in every way	0.98	0.948	0.337	0.98	0.948	0.195
GND4 - Not many jobs available, men should have more right to a job than women(r)	0.947	0.005	0.488	0.947	0.005	0.786
GND6 - Men are better qualified to be political leaders than women(r)	0.891	0.261	0.503	0.891	0.261	0.736



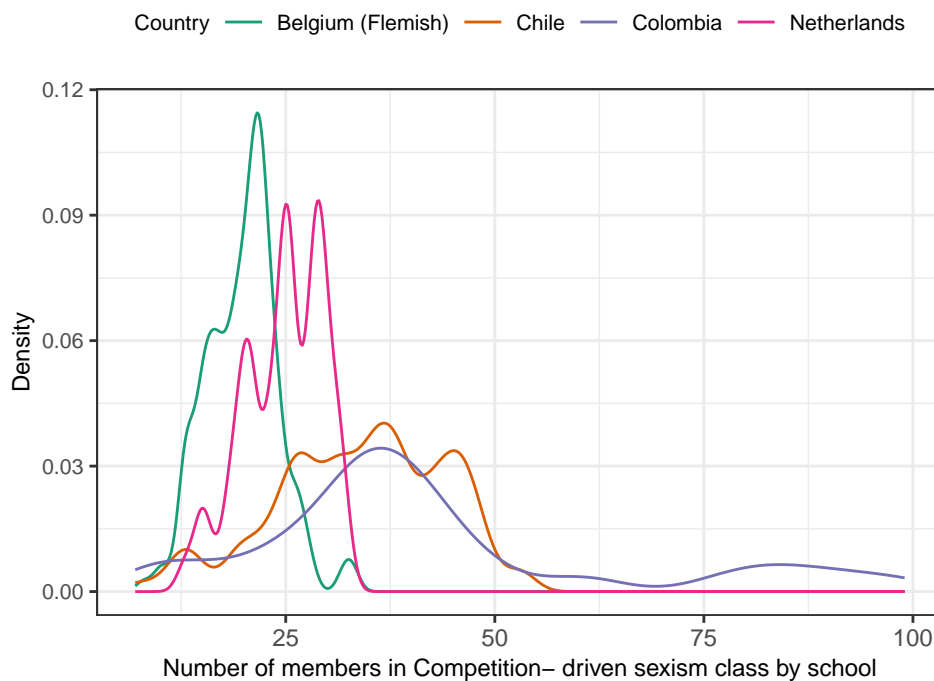
### 3.5 Confirmatory Latent Class Model

The probabilities based on the Partial homogeneity multigroup model with 2 first classes to be equal across regions will be used to obtain the class membership to the 3-class model.

1	2	3	Sum	
1	383	5138	177	5698
2	2317	8002	173	10492
Sum	2700	13140	350	16190

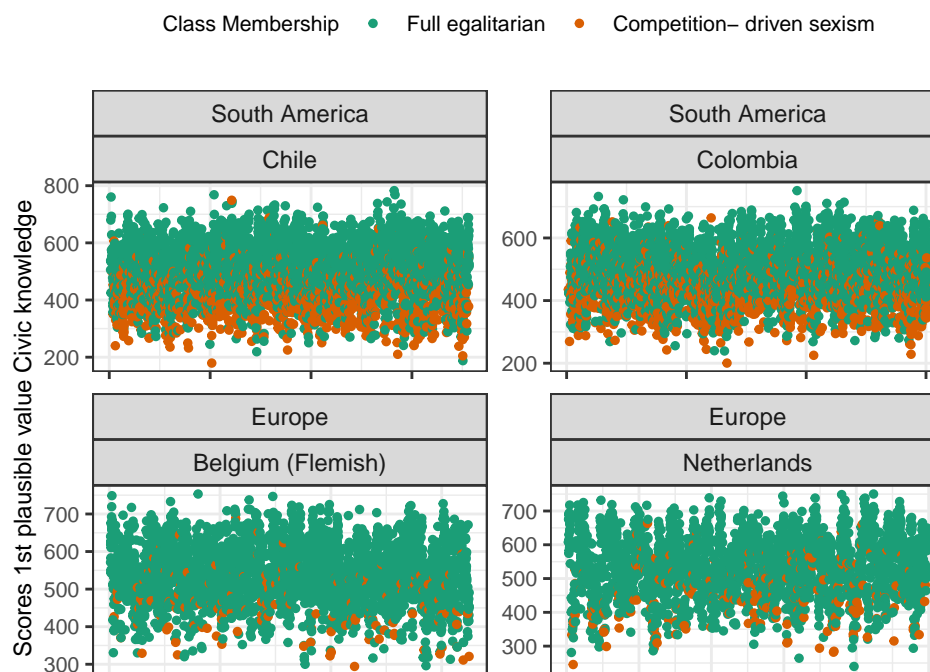
## 3.6 Factors related to Competition- driven sexism class

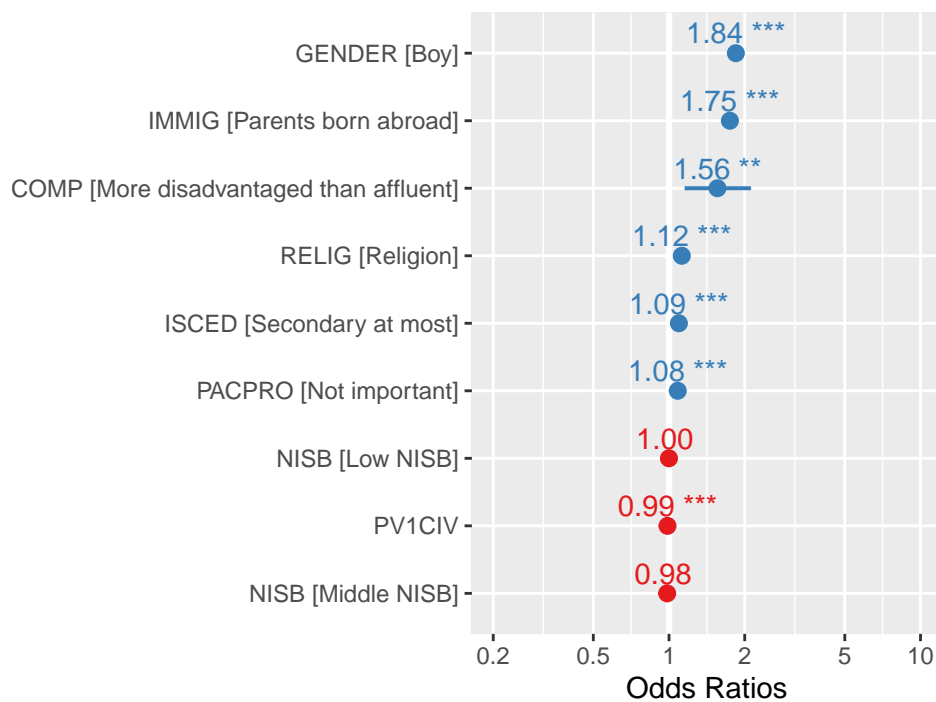
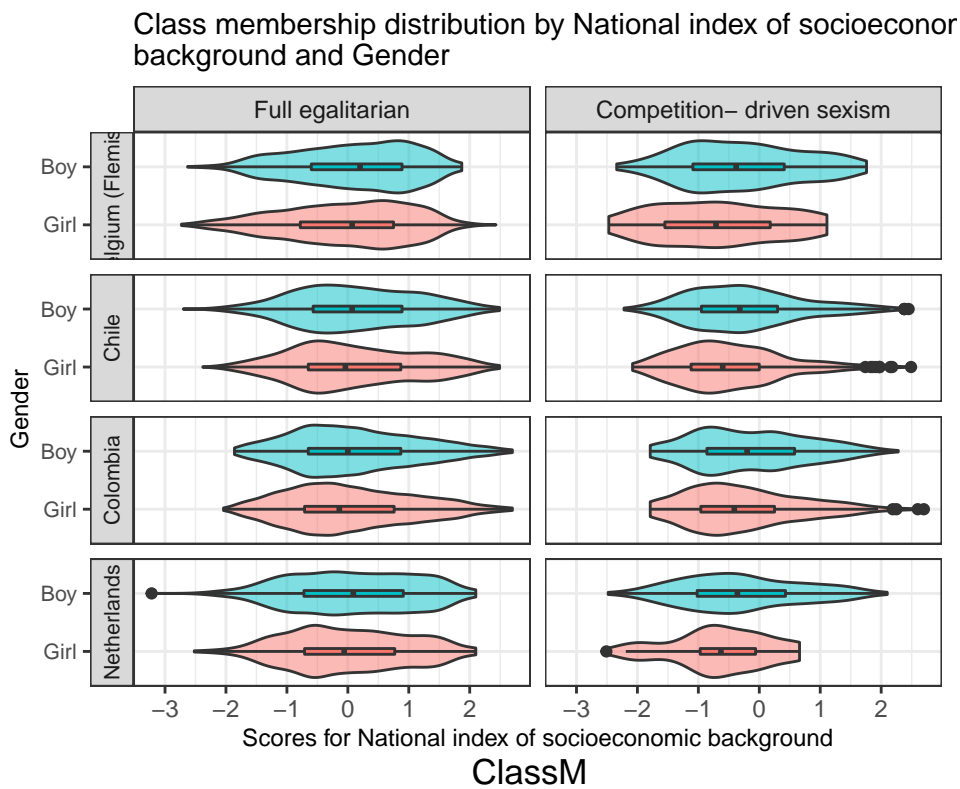
Distribution of number of members in Competition- driven sexism class



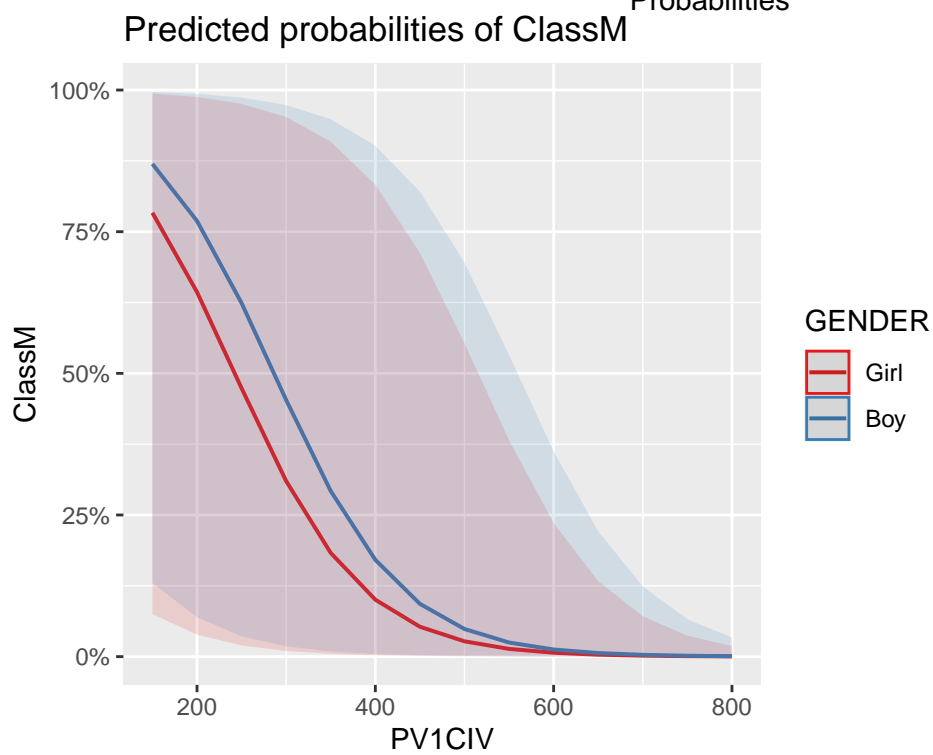
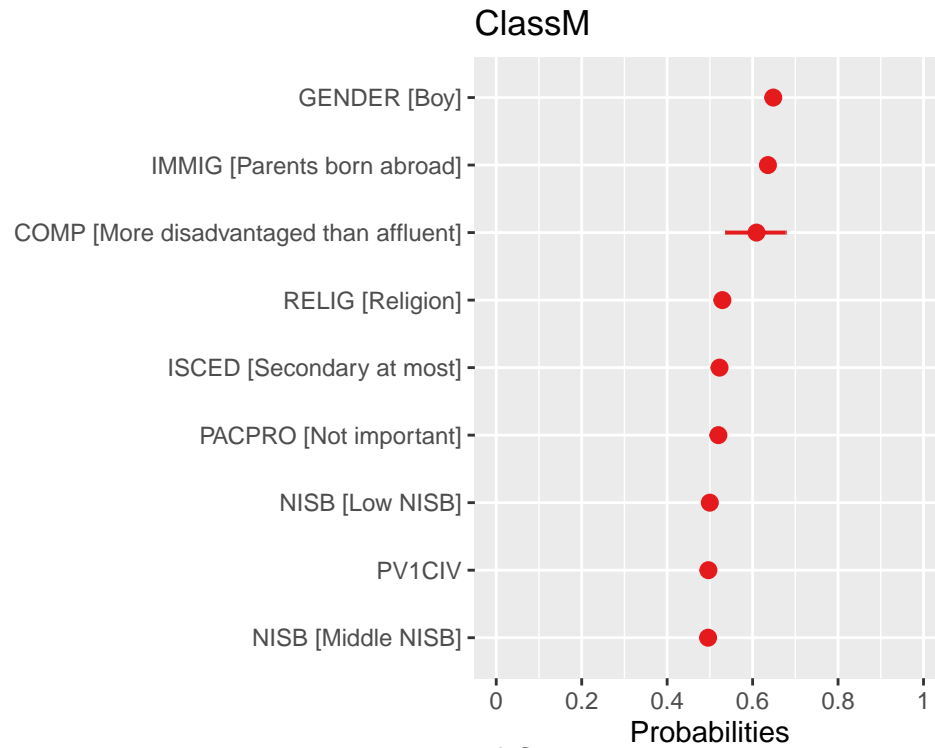
S\_GENEQL

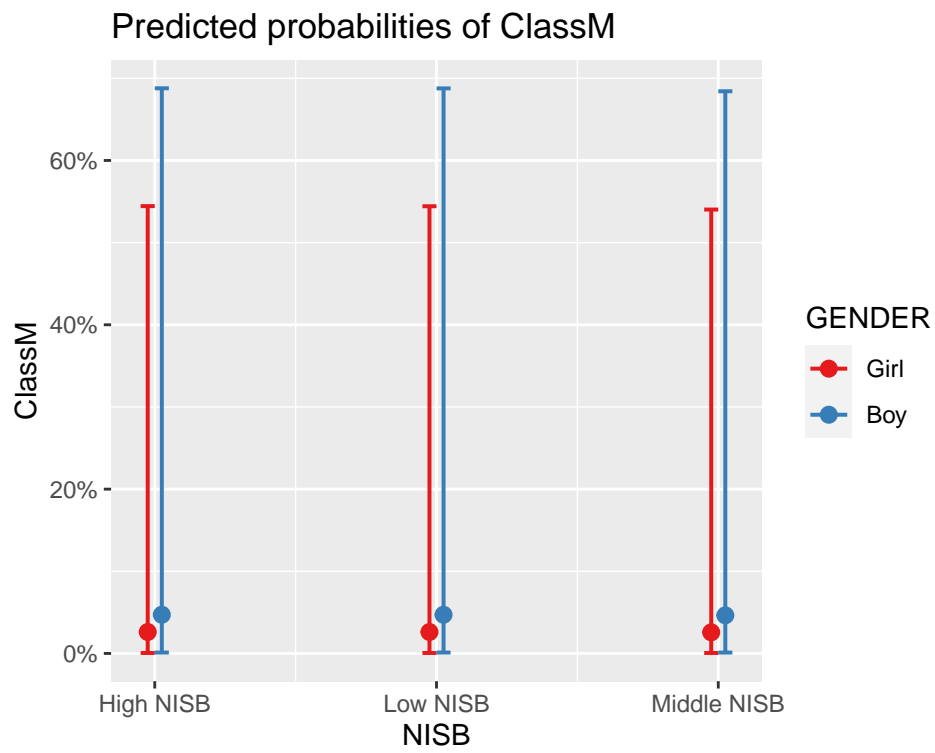
Class membership distribution across civic knowledge











# Conclusion

If we don't want Conclusion to have a chapter number next to it, we can add the `{-}` attribute.

## **More info**

And here's some other random info: the first paragraph after a chapter title or section head *shouldn't be* indented, because indents are to tell the reader that you're starting a new paragraph. Since that's obvious after a chapter or section title, proper typesetting doesn't add an indent there.



# Appendix A

## Complementary tables

Table A.1: Countries sample sizes included in the analysis

	2016
Belgium (Flemish)	2931
Chile	5081
Colombia	5609
Netherlands	2812

Table A.2: Items attitudes towards gender equality. ICCS 2016

ICCS 2016	Description question	Resp categories
<b>S_GENEQL</b>	<b>Attitudes toward gender equality</b>	
IS3G24A	Roles women and men/Men and women should have equal opportunities to take part in government	
IS3G24B	Roles women and men/Men and women should have the same rights in every way	
IS3G24C	Roles women and men/Women should stay out of politics	
IS3G24D	Roles women and men/Not many jobs available, men should have more right to a job than women	
IS3G24E	Roles women and men/Men and women should get equal pay when they are doing the same jobs	1-Strongly disagree 2-Disagree
IS3G24F	Roles women and men/Men are better qualified to be political leaders than women	3-Agree 4-Strongly agree
IS3G24G	Roles women and men/Women's first priority should be raising children	



# Appendix B

## Syntax

### Packages used

```
library(thesisdown)
library(plyr)
library(tidyverse)
library(knitr)
library(kableExtra)
```





# References

- Agresti, A. (2013). *Categorical data analysis* (3rd ed). Hoboken, NJ: Wiley.
- Barber, C., & Ross, J. (2020). Profiles of adolescents' civic attitudes in sixteen countries: Examining cross-cohort changes from 1999 to 2009. *Research in Comparative and International Education*, 15(2), 79–96. <http://doi.org/10.1177/1745499920910583>
- Białowolski, P. (2016). The influence of negative response style on survey-based household inflation expectations. *Quality & Quantity*, 50(2), 509–528. <http://doi.org/10.1007/s11135-015-0161-9>
- Bolzendahl, C. I., & Myers, D. J. (2004). Feminist attitudes and support for gender equality: Opinion change in women and men, 1974-1998. *Social Forces*, 83(2), 759–789. Retrieved from <http://www.jstor.org/stable/3598347>
- Davidov, E., Schmidt, P., & Billiet, J. (Eds.). (2011). *Cross-cultural analysis: Methods and applications*. New York: Psychology Press, Taylor & Francis Group.
- Dotti Sani, G. M., & Quaranta, M. (2017). The best is yet to come? Attitudes toward gender roles among adolescents in 36 countries. *Sex Roles*, 77(1), 30–45. <http://doi.org/10.1007/s11199-016-0698-7>
- Hagenaars, J. A., & McCutcheon, A. L. (Eds.). (2002). *Applied latent class analysis* (1st ed.). Cambridge University Press. <http://doi.org/10.1017/CBO9780511499531>
- Hallquist, M. N., & Wiley, J. F. (2018). MplusAutomation: An r package for facilitating large-scale latent variable analyses in mplus. *Structural Equation Modeling: A Multidisciplinary Journal*, 25(4), 621–638. <http://doi.org/10.1080/10705511.2017.1402334>
- Hancock, G. R., Haring, J., & Macready, G. B. (Eds.). (2019). *Advances in latent class analysis: A festschrift in honor of c. Mitchell dayton*. Charlotte, NC: Information Age Publishing, Inc.
- Hooghe, M., & Oser, J. (2015). The rise of engaged citizenship: The evolution of citizenship norms among adolescents in 21 countries between 1999 and 2009. *International Journal of Comparative Sociology*, 56(1), 29–52. <http://doi.org/10.1177/0020715215578488>

- Hooghe, M., Oser, J., & Marien, S. (2016). A comparative analysis of ‘good citizenship’: A latent class analysis of adolescents’ citizenship norms in 38 countries. *International Political Science Review*, 37(1), 115–129. <http://doi.org/10.1177/0192512114541562>
- Invariance analyses in large-scale studies*. (2019). (OECD Education Working Papers No. 201). Retrieved from [https://www.oecd-ilibrary.org/education/invariance-analyses-in-large-scale-studies\\_254738dd-en](https://www.oecd-ilibrary.org/education/invariance-analyses-in-large-scale-studies_254738dd-en)
- Isac, M. M., Palmerio, L., & Werf, M. P. C. (Greetje). van der. (2019). Indicators of (in)tolerance toward immigrants among european youth: An assessment of measurement invariance in ICCS 2016. *Large-Scale Assessments in Education*, 7(1), 6. <http://doi.org/10.1186/s40536-019-0074-5>
- Kankaraš, M., Vermunt, J. K., & Moors, G. (2011). Measurement equivalence of ordinal items: A comparison of factor analytic, item response theory, and latent class approaches. *Sociological Methods & Research*, 40(2), 279–310. <http://doi.org/10.1177/0049124111405301>
- Kaplan, D., & Publications, S. (Eds.). (2004). *The sage handbook of quantitative methodology for the social sciences*. Thousand Oaks, Calif: Sage.
- Kasumovic, M. M., & Kuznekoff, J. H. (2015). Insights into sexism: Male status and performance moderates female-directed hostile and amicable behaviour. *PLOS ONE*, 10(7), e0131613. <http://doi.org/10.1371/journal.pone.0131613>
- Miranda, D., & Castillo, J. C. (2018). Measurement model and invariance testing of scales measuring egalitarian values in ICCS 2009. In A. Sandoval-Hernández, M. M. Isac, & D. Miranda (Eds.), *Teaching tolerance in a globalized world* (Vol. 4, pp. 19–31). Cham: Springer International Publishing. [http://doi.org/10.1007/978-3-319-78692-6\\_3](http://doi.org/10.1007/978-3-319-78692-6_3)
- Mukhopadhyay, P. (2016). *Complex surveys: Analysis of categorical data* (1st ed. 2016). Singapore: Springer Singapore : Imprint: Springer. <http://doi.org/10.1007/978-981-10-0871-9>
- Nylund-Gibson, K., & Choi, A. Y. (2018). Ten frequently asked questions about latent class analysis. *Translational Issues in Psychological Science*, 4(4), 440–461. <http://doi.org/10.1037/tps0000176>
- Olivera-Aguilar, M., & Rikoon, S. H. (2018). Assessing measurement invariance in multiple-group latent profile analysis. *Structural Equation Modeling: A Multidisciplinary Journal*, 25(3), 439–452. <http://doi.org/10.1080/10705511.2017.1408015>
- Robertson, J., & Kaptein, M. (Eds.). (2016). *Modern statistical methods for HCI*. Cham ZG: Springer.
- Rutkowski, L., Davier, M. von, & Rutkowski, D. (2014). *Handbook of international large-scale assessment background, technical issues, and methods of data analysis*.

Boca Raton: CRC Press.

Vermunt, J. K. (2014). Latent class model. In A. C. Michalos (Ed.), *Encyclopedia of quality of life and well-being research* (pp. 3509–3515). Dordrecht: Springer Netherlands. [http://doi.org/10.1007/978-94-007-0753-5\\_1604](http://doi.org/10.1007/978-94-007-0753-5_1604)

Wang, J., & Wang, X. (2020). *Structural equation modeling: Applications using mplus* (2nd ed.). Hoboken, NJ: Wiley.