

Measurement Invariance of Religious Tolerance Across the Student Groups

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ABSTRACT

Study on the measurement of religious tolerance between two student groups was the analysis on the reliability and the validity of the combined groups, but the analysis result was still doubt because whether the measurement qualities are equivalent to cross the student groups or not. Concept of the religious tolerance consists of perception, attitude, and cooperation dimensions. Each dimension is measured using ten items with Likert's five scale. Data set was collected by online with sample size of 75 students from Universitas Padjadjaran (Unpad) and SKIP Pasundan, respectively. Method are applied confirmatory factor analysis (CFA) for multiple groups. The result point out that the validities and reliabilities of religious tolerance are equivalent across the student groups that is related to the aspects of 'religion spreading' and "worship place", and "celebration", "school" "association" with people of the other religions.

Keywords: *Confirmatory factor analysis, Equivalence, Invariance measurement, Multi groups, Religious tolerance, Validity.*

1. INTRODUCTION

It was not until the 16th century that the German language borrowed the word 'Toleranz'—or tolerance—from the Latin and French, which is why in the context of the Reformation the concept immediately assumed the narrow meaning of toleration of other religious confessions. In the course of the 16th and 17th centuries, religious toleration becomes a legal [9]. Article 29 of the 1945 Constitution guarantees religious freedom, stating that "all persons have the right to worship according to their own religion or belief" and that "the nation is founded on belief in one supreme God." Pancasila, the first tenet of the country's national ideology, also declares belief in a single God. The Indonesian constitution, according to Article, provides a degree of religious freedom, grants "all persons the right to worship according to their own religion or belief," and states that "the nation is based upon belief in one supreme God."

The diversity of religions in Indonesia does not definitely turn into Indonesian people being able to live harmoniously side by side, respect one another,

and have strong religious tolerance. Indeed, various conflicts between religious communities have occurred in various regions, resulting in riots and social unrest.

This study of religious tolerance will not focus on determining "why" religious intolerance has occurred so frequently in Indonesia over the years, but rather on scrutinizing the measurement tool of religious tolerance to see if it can be compared across groups.

In response to this issue, religious tolerance has three dimensions: perception, attitude, and cooperation [18], which were tested on two student groups from Unpad-STKIP Pasundan. The following are the most important questions: (1) Can those dimensions be compared across groups? (2) Could the measurement quality, reliability, and validity be equivalent across groups? These questions make sense because of the differences in cultures, languages, habits, institutions, and so on.

The issue measurement invariance, also known as equivalent, is important in investigating that the measurement is distributed across many respondent

groups or sub-groups (e.g., gender, age, population, culture, and the other). Because the cultures of the respondent groups differ, the measurement could be responded to by each respondent group or by each within group. Measurement invariance is the term for this. Formally, a measure is said to be invariant when respondents from different populations or groups who hold the same position on the construct being measured receive the same observed test score [9]. As a result, a test violates invariance when two identical respondents from different populations or groups score differently on the construct. As a result of invariant deviation, the scores of different groups cannot be compared. For example, the Intelligence Quotient (IQ), which is a measure of human cognitive ability, can have comparable scores between Indonesians and Europeans, indicating that the measurement is invariant.

The purpose of this study is to look into the measurement inconsistency of religious tolerance. Religious tolerance is critical in Indonesia for a pluralistic or multicultural society. For example, the Intelligence Quotient (IQ), which is a measure of human cognitive ability, can have comparable scores between Indonesians and Europeans, indicating that the measurement is invariant. The purpose of this study is to look into the measurement inconsistency of religious tolerance. Religious tolerance is critical in Indonesia for a pluralistic or multicultural society. As a result, measurement tools for religious tolerance awareness must be developed, particularly for the young generation of Indonesian society, which is critical to preserving Indonesia's integrity as a nation. It is based on the concept of religious tolerance, which consists of three dimensions: perception, attitude, and cooperation [18]. The measurement tools of religious tolerance awareness were distributed to a few Unpad and STKIP Pasundan students. The purpose of this study is to determine whether religious tolerance is valid among student groups.

2. THEORETICAL REVIEW

2.1. Concepts of Measurement Invariance

Social researchers commonly assume the equivalence of measurement instruments across groups such as gender, age, languages, and so on [6], but the quality of the measurement, reliability, and validity would be a problem if the measurement instrument was spread out across the groups. Any conclusions about group differences must be based on the validity of this assumption [23] The equivalence of the measurement instrument is critical in crossing the groups. Bias and equivalence are important concepts in cross-cultural research methodology. Bias is a catch-all term for any problem with cross-cultural data

comparability; bias leads to incorrect conclusions. Bias refers to unfavorable factors that jeopardize the validity of instruments used in various cultures. The level of comparability of scores across cultures is referred to as equivalence. Road distances are measured in kilometers in some countries and miles in others. Distances in kilometers and miles cannot be compared directly. A simple formula (1 mile = 1.6 km) allows us to convert one scale to the other. After this conversion, the data are comparable (equivalent), and distances between countries can be compared. Because Indonesia is a multicultural society with many languages, races, mores, or faith groups, survey research must be carefully designed and measurement invariance issues must be considered.

Present a didactic treatment of invariance tests that includes consideration of a hierarchical factor model. There are eight steps to testing and analyzing measurement invariance, but only three are commonly used in analyzing these issues [9], and [23]. The three steps are as follows: (1) configural invariance, (2) metric equivalence, and (3) scalar invariance.

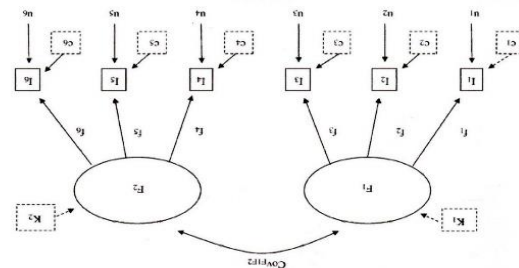


Figure 1 Confirmatory Factor Analysis with Two Factors, F_1 and F_2

Configural invariance requires demonstrating that the same factors and factor loading patterns explain the variance–covariance matrices associated with the groups' responses. This means that the implied factor structure in Figure 1 is the same for two or more groups of respondents. Metric equivalence, the next step, involves a test to ensure that the values of each variable's factor loadings on each factor are consistent across groups. According to Figure 1, the values of the factor loadings for each of the groups being compared are constrained to equality. The demonstration of factor loading equivalence was labeled "strong invariance," whereas configural invariance is sometimes labeled "weak invariance", though the terms "strong" and "weak" have frequently been used to refer to other types of invariance as well [23]. After establishing metric invariance, researchers who are only interested in constructing validity issues or the interrelationships between latent factors can test the invariance of factor variances and covariances. Finally, scalar invariance requires that the intercepts of the regression equations of the observed variables on the latent factors are equivalent across groups. This

would imply that the constants in Figure 1 are equivalent across groups.

2.2 Concepts of Religious Tolerance

Many studies on tolerance had been conducted, one of which was by Bogardus in the years 1925, 1946, 1956, and 2005. His research focused on determining how far an individual accepts others whose social characteristics differ from his or her own. This scale is commonly referred to as the social distance scale. Many researchers have used the measure concept to assess a Bogardus' social tolerance. Bogardus defined social distance as a function of affective distance between members of two groups: in social distance studies, the focus is on people's feelings toward other people and groups of people [9]. Bogardus' scale was given as follows:

- As close relatives by marriage (i.e., as the legal spouse of a close relative) (score 1.00)*
- As my close personal friends (2.00)*
- As neighbors on the same street (3.00)*
- As co-workers in the same occupation (4.00)*
- As citizens in my country (5.00)*
- As non-citizen visitors in my country (6.00)*

Updating the Bogardus's scale is discussed by [22] and their findings indicate that the mean level of social distance towards all ethnic groups, as well as the spread between the groups with the highest and lowest levels of social distance, decreased since 1977.

The definition of religious tolerance is found implicitly because most religious tolerance delineates an attitude that is mentioned as tolerant. In [2], an act of toleration is an agent's intentional and principled refraining from interfering with an opposed other (or their behavior, etc.) in situations of diversity in which the agent believes she has the power to intervene. An attitude of tolerance, according to [17], is only possible when some action or practice is objectionable to us, but we have compelling reasons to allow that action or practice to take place. According to Webster's New American Dictionary, tolerance means "the freedom to accept the opinions of others and to be patient with others." Tolerance is associated with the Arabic word "tasamuh" [15], which means to allow or facilitate something. In the Indonesian dictionary, tolerance is defined as mutual respect, allowing establishment, opinions, beliefs, or other behavior owned by one person over another, or allowing establishment that is contrary to a person. Tolerance is a modern concept that describes the attitude of mutual respect and cooperation between groups of different communities in terms of ethnicity, language, culture, politics, and religion. In other words, tolerance involves not only the recognition and respect for beliefs, but also the respect for individuals who are members of society

[10]. Tolerance, as a result, necessitates an attitude that is inclusive rather than exclusive [4]. Referring to the definitions that the tolerance is an exception for something that is really not like, yet it remains. According to the aim of this research is to examine the measurement tool of religious tolerance that whether the tool could be cross to the groups or not.

The measurement can be viewed as an operationalization or indicator of the concept of religious tolerance. According to [18], the concept of religious tolerance has three dimensions: perceptions, attitudes, and cooperation. Attitude is a perception dimension that can be viewed as an assessment of a religious group to others, either their communities or what they have done for their communities. Misunderstanding of others is the most common cause of religious intolerance. a settled way of thinking or feeling about someone or something, usually reflected in a person's behavior that deals with real conditions in a real society. An individual's attitude toward other religions can be positive, neutral, or negative. Cooperation with members of other religions is beneficial in allowing religious believers to coexist peacefully. In [18] used the concept to analyze the index of religious tolerance in Bandung, and [4] and [5] used the concept to analyze the religious tolerance of student groups at Universitas Padjadjaran and STKIP Pasundan.

3. METHODS

As previously stated, the concept of tolerance consists of three dimensions: perception, attitude, and "cooperation," and each dimension is operated into ten statements (items), and each item is treated with a Likert type with a 5-scale from disagree to agree. Figure 2 depicts the path diagram relationships between the item and dimension of religious tolerance.

Data was collected from some students from Universitas Padjadjaran and STKIP Pasundan, with a sample size of 75, respectively and the questionnaires were distributed online via the link: <http://bit.ly/KuesionerKebhinekaan>.

As part of structural equation modeling, Figure 3.1 is also known as confirmatory factor analysis (CFA) SEM specifics will be covered in the statistical modeling section. Notations indicate the number of items in each dimension in the box, 's (δ) is a measurement error, and perception, attitude, and cooperation are represented in a circle or an ellipse. The symbols of a double arrow represent a correlation, and the symbols of show a weight. All of the notations

will be discussed in detail during the CFA method section.

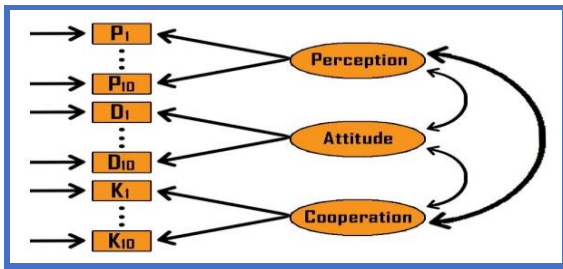


Figure 2 Path Diagram of CFA Model for Regression Tolerance

Confirmatory Factor Analysis (CFA) is a type of statistical multivariate analysis that is a component of structural equation modeling (SEM) or latent variable modeling. CFA is a type of measurement model that includes latent variables, indicator variables, and error measurement[1]. Figure 2 depicts the items or indicator variables on the questionnaire list, dimensions consisting of perception, attitude, and cooperation being latent variables, respectively. A measurement model can express relationships between latent variables, indicator variables, and measurement errors, and the processing of its test is commonly referred to as CFA. As previously stated, data is collected from two student groups, namely Universitas Padjadjaran and STKIP Pasundan, and these groups, referred to as 1 and 2, share the same measurement models, as shown in Figure2. The measurement model [11] can be written in the vector form as follows:

$$x_g = \tau_g + \Lambda_g \xi_x + \delta_g \tag{1}$$

where, g indicates the number of the student groups, x is a vector whose its elements is values of indicator variables, τ shows a vector whose its elements is intercept coefficients (constants), Λ is a matrix whose its elements is a loading factor parameter, ξ is a vector whose its elements is a latent variables, and δ depicts a vector whose its elements is error measurements.

Autocovariance function for Equation (1) is given as:

$$\Sigma_g(\theta) = \Lambda_g' \Phi_g^{-1} \Lambda_g + \Theta_g \tag{2}$$

where, $\Sigma_g(\theta)$ indicates the Autocovariance function in group g , and is θ the vector that contains parameters, Φ_g^{-1} describes the inverse matrix of Φ_g indicates whose its elements is a covariance of latent variables, and Θ_g indicates covariance matrix of the sampling variance.

For configural invariance

$$H_0 : \Sigma_u = \Sigma_s \tag{3}$$

for metric invariance:

$$H_0 : \Lambda^A = \Lambda^B \tag{4}, \text{ and}$$

for scalar invariance:

$$H_0 : \tau_u = \tau_s \tag{5}$$

Equation (3) points out configural invariance, Equation.(4) depicts that validity is equivalent to the groups, and Equation (5) accounts for comparing the dimensions with the groups [13].

Because many formulations are presented here, the test of these hypotheses, estimation method, and statistical index can be seen in detail in [1], [11] and [12] are generally used to guide methods and data analysis on invariant issues [15]. Data processing is used software package of Lisrel 8.54 [11] and [12]. The following general procedures of data processing are as follows: (1) item selection process of each the dimension is carried out from united data using CFA single group and (2) the result of the first procedure is to testing the measurement invariance using CFA multiple groups [16] . [19], and [21].

4. RESULTS AND DISCUSSION

Based on observation that the respondent demography data shows the respondent is dominated by female which is about 60%, Islam is so prominent that is approximately 97%, and Sundanese is about 60%. The percentage numbers are computed from the combined data of the both student groups. Figure 3 is obviously shown that the score averages of items for perception and attitude of both student groups look a highly different, except for the cooperation.

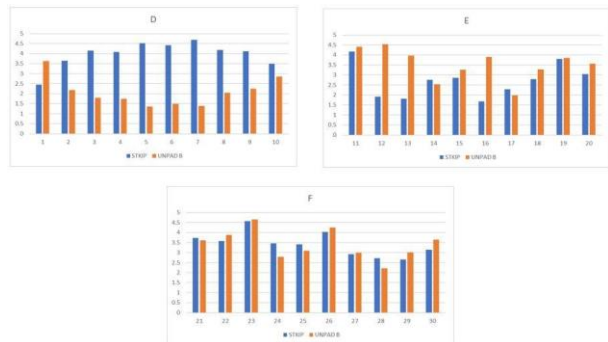


Figure 3 The averages of the item score of UNPAD and STKIP

Table 1. Statistics of goodness of fit test for the item selection of each dimensions cross the student groups.

Statistics	Perception	Attitude	Cooperation
Chi-square	33.98	8.14	16.90
Degree of freedom	30	6	20
P-value	0.28	0.23	0.16
RMSEA	0.042	0.069	0.00
GIF	0.93	0.97	0.94

Table 1. provides statistical measures based on the results of item selections for each dimension via CFA. According to Table 2, all of the statistical measures perform reasonably well based on the permissible thresholds [1] and [10] that fit between the theoretical and empirical models. The item selection shows that six items from the perception (A), P2, P4-P7 are equivalent to both student groups. There are three attitude items, namely D15, D18, and D20, that are selected invariant across the student groups; finally, there are five items, namely, K21-K24, and K29, that are equivalent across the student groups.

Table 2. Statistics of goodness of fit test for the united data

Statistics	Values
Chi-square	106.05
Degree of freedom	87
P-value	0.081
RMSEA	0.041
GIF	0.89

In [8] accounts that the results of the data processing in Table 3.is frequently called it as the configural invariance, which can be interpreted as the same structure in the groups. Subsequently, the configural invariance implies the same number of dimensions in each group and the same pattern.

Table 3. The Chi-square Statistics contribution of the student groups to the global chi-square Statistics

Contribution	Chi-square Statistics	Chi-square Statistics (%)
Unpad	54.15	51.06
SKIP Pasundan	51.90	49.94
Global	106.05	100.00%

Table 3. delineates how far the contribution of chi-square statistics for each student group is to the global group (Unpad and STKIP Pasundan). Percentages of chi-square statistical contributions for each student group to the global group are slightly different, namely: 51% and 49%. Therefore, it makes sense that the measurement is the equivalent to cross groups. Figure 3. also shows the all patterns of each dimensions are generally the same, except for perception dimension which give a stronger evidence of the measurement equivalence.

Aside from the contribution it will be discussed on the correlation between the dimensions, perception, attitude, and cooperation that is stated in Table 4.

Table 4. Correlation between the dimensions

Dimension	Perception	Attitude	cooperation
Perception	1.00	-	-
Attitude	-0.55	1.00	-
cooperation	-0.20	0,62	1.00

Table 4. accounts that the correlations of perception and attitude and perception and cooperation are a negative sign, but the correlations of cooperation and attitude have a positive sign. These results are appropriate to [18], that mostly, occurrence of the religious intolerance due to wrong appraisalment to the others. The correlations of cooperation and attitude have a positive sign that normally occurs.

Table 5. The validity values of the global group

Dimension	Item	Validity
Perception	P2	0.18
Perception	P4	0.96
Attitude	D15	0.26
Attitude	D20	0.39
Cooperation	K21	0.76
Cooperation	K22	0.89
Cooperation	K23	0.40
Cooperation	K24	0.49
Cooperation	K29	0.21

Table 5. shows the pattern of factor loadings in the theory of the measurement invariance, and the loadings are known well as validity coefficients of the dimensions using a structural approach [10]. All the validity coefficients in Table 6 are significant (P-value < 0,05), and the others are not significant. P2 and P4 describe ‘religion spreading” and “worship place”, respectively, P15 and P20 depict on “ celebration” and “school” , and K21, K22, K23, K24, and K29 are generally delineated “association” with people of the other religions.

Based on the respondent demography data can be accounted that a large number of respondents come from Islam and Sundanese. Therefore, the result only prevails for the religious tolerance from Muslim people towards people of the other religions.

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cooperation and attitude have a positive sign. These The result is appropriate to [18], that mostly, occurrence of the religious intolerance due to wrong appraisal to the others. The correlation between cooperation and attitude have a positive sign that normally occurs.

5. CONCLUSIONS

5.1 Conclusions

Based on the results, it can be concluded that the validities and reliabilities of religious tolerance are equivalent across the student groups that is related to the aspects of ‘religion spreading’ and ‘worship place’, and ‘celebration’, ‘school’ ‘association’ with people of the other religions.

5.2 Recommendation

The meaning of the group could be age, race, gender, language, community, religion, culture, country, or anything can be classified as the group. In a survey that the group can be determined by design and by empirical. Forming this group is fixed before doing survey such as Islam, Kristen, Hindu, and Buda, which is frequently called it by design. By empirical means that the group is categorized after completing the survey. Both of the designs have advantage and susceptibility, but i am strongly recommended using by design if the purpose research of religious tolerance is explicitly stated the groups.

AUTHORS’ CONTRIBUTIONS

The author 1, 2, and 3 play a significant contribution to this research. Feniawati Darmana gave contribution to the concepts of religious tolerance, Adriza prepared facilities of computer, printer, and place, and Achmad Bachrudin contributed to data processing.

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