Testing the Consistency of the Moral Growth Mindset Measure across People with Different
Political Perspectives

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Abstract

Although the Moral Growth Mindset (MGM) Measure was tested and validated in general, whether it measures MGM consistently across people with different political perspectives, which are associated with moral foundations, has not been tested. We examined measurement invariance (MI) and differential item functioning (DIF) across different political affiliations to test whether the MGM Measure functioned consistently. We also examined the relationship between MGM, moral foundations, and political affiliation with t-tests and regression analyses. The findings reported that first, at the test level, the strictest MI was achieved, so the measurement structure was consistent between the different political groups. Second, no item showed significant DIF, so the MGM Measure was not biased at the item level. Third, t-tests and regression analyses reported that MGM and its relationship with moral foundations were not significantly associated with political affiliation.

Introduction

The Moral Growth Mindset (MGM) Measure was developed to measure one's moral growth mindset, an implicit belief about whether morals and characters are malleable and thus can be improved through efforts (Chiu et al., 1994; Han, Choi, et al., 2018). MGM has been associated with promotion of motivation to engage in volunteering and other moral and positive psychological indicators (Han et al., 2020; Han, Choi, et al., 2018). The previous studies reported good internal consistency, internal structure, and external validity in terms of correlation with relevant psychological indicators (Han et al., 2020; Han, Choi, et al., 2018).

Although the MGM Measure has been tested and validated for its general psychometrical qualities, there have been several concerns about measuring the construct. In particular, a review report on Han et al. (2020) expressed concern about whether the concepts of “morals and characters,” the terms used in the items, were perceived and understood similarly across participants with different perspectives about morality (Warren, 2020). Warren (2020) was specifically concerned about whether the measurement structure would be consistent across participants with different political and moral perspectives. Hence, it would be necessary to test whether the construct, MGM, can be measured consistently across different groups of people who perhaps endorse different concepts of “morals and characters.”

In fact, proponents of the Moral Foundations Theory (MFT) argued that people’s notions on what constitutes the foundations of morality can differ between groups (Graham et al., 2011; van Leeuwen & Park, 2009). They showed that liberals tend to exclusively endorse individualizing foundations (i.e., harm/care, fairness/reciprocity) in moral judgment, while conservatives more strongly endorse binding foundations (i.e., ingroup/loyalty, authority/respect, purity/sanctity) (Graham et al., 2009). In fact, moral psychologists have consistently reported that political perspectives are significantly associated with morality and moral functioning in general (e.g., Han et al., 2021). These previous studies suggest that people with different political perspectives might possess different concepts and notions regarding morality. Hence, people with different political perspectives endorse different moral foundations so, as Warren (2020) was concerned, MGM might also be measured inconsistently across them with the same measure.

As overviewed, people with different political or cultural views are likely to endorse different sets of moral foundations (Graham et al., 2009, 2013). Then, whether it is possible to

measure MGM across such different groups consistently could be an issue. For instance, let us assume that we intend to administrate the MGM measure among liberal as well as conservative people. Although both groups will see the same word, “moral,” depending on foundations that they endorse, they might consider and evaluate the meaning of the concept differently. Then, they may also construe the implication of the growth of the morals that they pursue differently, and such a difference in the construal may affect how MGM is measured across the different groups. Without confirming that MGM is measured consistently across different groups endorsing different moral foundations, the theoretical and practical value of MGM as well as its measure could be limited.

Thus, we examined whether MGM was measured consistently across participants with different political perspectives in the present study. First, we tested measurement invariance (MI) to examine whether the measurement structure in terms of factor loadings, intercepts, and residuals was consistent across participants with different political affiliations at the test level. Second, we tested the differential item functioning (DIF) across the different groups to detect any possible item-level bias. Third, we performed *t*-tests and regression analyses to examine the relationship between MGM, moral foundations, and political affiliation.

Methods

Participants

We recruited 1,064 college students from a Southern United States public university (see Table S1 for demographics). The sample size was determined following the guideline for multi-group invariance testing (Fischer & Karl, 2019). Participants’ political affiliation was surveyed with one question (response options: Republican, Democrat, Independent, Libertarian, Green Party, Other). For MI test and regression analyses, we excluded Libertarians and Green Party

members, because their sample sizes were too small to be suitable for the tests. Because DIF and *t*-tests allow comparing only two groups, only Democrats and Republicans were analyzed in these tests. For the analyses with the Moral Foundations Questionnaire (MFQ), only the data collected from participants who completed both the MGM and MFQ was analyzed. The research design was reviewed by an Institutional Review Board at the University of Alabama (protocol numbers: 18-04-1156, 18-12-1842).

Measures

Moral Growth Mindset Measure

We examined the English version of the MGM Measure developed by Han et al. (2020), which consists of four items (see Table 1 for items). Han et al. (2020) initially employed generic terms, “morals and characters,” instead of more value-specific terms (e.g., “fairness,” “caring,” etc.) as an effort to minimize any bias that could originate from differences in moral and political perspective. Answers were anchored to a six-point Likert scale.

Moral Foundations Questionnaire

We used the MFQ to examine how important each participant considered different moral foundations in moral judgment (see Graham et al. (2011) for the full questionnaire). Five subscale scores (i.e., harm/care, fairness/reciprocity, ingroup/loyalty, authority/respect, purity/sanctity) were calculated to measure each foundation. A total of 30 items (six items/foundation) were employed. Each subscale score was calculated by averaging responses to six items. Responses were anchored to a five-point Likert scale. The internal consistency of each subscale is reported in Table 2.

Procedures

Participants voluntarily signed up for the study via the Educational Psychology and Psychology Subject Pools and were then provided with a link to our Qualtrics survey. Only the participants who agreed to participate in this study were presented with the survey forms. They received course credit as compensation upon completion.

Analysis Plan

Measurement Invariance Test

Before testing the MGM Measure's internal structure, we checked its internal consistency with Cronbach α . Then, we conducted MI test with *cfa* function implemented in an R package, *lavaan*. Because the measure employed a Likert scale, we utilized WLSMV estimator that is suitable for CFA with ordinal data (Muthén & Asparouhov, 2002). MI was tested to examine whether the internal structure of the MGM measure was consistent across different groups in order to use the MGM scores calculated from different groups for further analyses, such as mean score comparisons and regression analysis (Fischer & Karl, 2019). Four different levels of MI (i.e., configural, metric, scalar, and residual invariance) were tested (Putnick & Bornstein, 2016). First, configural invariance only assumed the identical measurement structure across groups. Second, metric invariance requires the equal factor loadings; it should be achieved to use factor scores for correlation or regression analysis. Third, both factor loadings and intercepts should be equal to achieve scalar invariance; it is a minimum requirement for mean score comparison. Fourth, the strongest form of invariance, residual invariance, requires that all factor loadings, intercepts, and residuals are equal.

For the test, we checked changes in RMSEA, SRMR, and CFI across different invariance levels. We examined whether RMSEA and SRMR increased, and CFI decreased between two different levels. We followed the guidelines suggested by Chen (2007), so we considered a

change of $\geq +.015$ in RMSEA, a change of $\geq +.030$ in SRMR, and a change of $\geq -.010$ in CFI

for the threshold as metric non-invariance and a change of $\geq +.015$ in RMSEA, a change of $\geq$

$+0.015$ in SRMR, and a change of $\geq -.01$ in CFI to indicate scalar or residual non-invariance.

Differential Item Functioning Test

We tested the DIF of the MGM items across two major groups, Democrats and Republicans. We utilized *lordif* package to examine both uniform and non-uniform DIFs with the graded response model, which is suitable for testing measures using an ordinal scale (S. W. Choi et al., 2011). DIF occurs when different groups, Democrats vs. Republicans in our case, with similar MGM significantly differently respond to items (Y.-J. Choi et al., 2019). Uniform DIF happens when items equally discriminate Democrats vs. Republicans with the same underlying true MGM. Non-uniform DIF occurs when the DIF between two political affiliations is not constant across true MGM levels (Fischer & Karl, 2019).

lordif examines uniform and non-uniform DIF by comparing three different logistic regression models predicting the cumulative probabilities that the actual item response falls in a specific category or higher with a true ability level and political affiliation (see p. 3 in Choi et al. (2011) for further details about the models). Likelihood-ratio (LR) test was conducted to examine existence of significant total, uniform, and non-uniform DIF. The total DIF was examined by comparing Models 1 vs. 3, and the non-uniform and uniform DIF by comparing Models 1 vs. 2 and Model 2 vs. 3, respectively (see Table 1).

T-tests, Correlation and Regression Analyses

We conducted t-tests, correlation and regression analyses to examine the relationship between MGM, political affiliation, and moral foundations. First, we compared MGM and five

MFQ subscale scores between Democrats and Republicans. We performed frequentist and Bayesian *t*-test (testing whether a resultant Bayes Factor ≥ 3 with *BayesFactor*) for direct hypothesis testing (Han, 2020; Han, Park, et al., 2018; Wagenmakers et al., 2018).

Second, we conducted correlation and regression analyses to examine the relationship between the variables. We first performed both frequentist and Bayesian correlation analyses to examine the association between MGM and each moral foundation variable. For regression analysis, the three regression models presented in Table 3 were compared in terms of AIC, BIC, Bayes Factors (with *brms*), and results from LR tests. If Model 2 is best, which contains both main and interaction effects, this would suggest that the relationship between MGM and moral foundations becomes different across two groups.

Results

The results from the psychometrical tests suggested that the MGM Measure performed consistently across Democrats and Republicans. The strictest invariance, residual invariance, was supported by data (see Table 4). Also, we could not find any significant DIF in any item from all LR tests (see Table 1).

T-tests and regression analyses also supported the measurement consistency. First, Democrats more strongly endorsed fairness/reciprocity foundation (see Table 2) while all binding foundations were more strongly endorsed by Republicans. We could not find any significant difference in harm/care foundation or MGM. Second, the results from both frequentist and Bayesian correlation analysis demonstrated that harm/care, fairness/reciprocity, and purity/sanctity foundations were positively associated with MGM (see Table S2). Third, among three regression models, Model 1 without the interaction effect was the best model (see Table 3) in terms of the lowest AIC and BIC, and the highest Bayes Factor. Moreover, LR tests indicated

that Model 1 was better than Model 0, $\chi^2(5) = 80.75, p < .001$; however, Model 2 was not better than Model 1, $\chi^2(18) = 24.47, p = .14$.

Discussion

We examined whether the MGM Measure performed consistently across participants with different political affiliations closely associated with moral foundations. The results suggest that the MGM Measure can measure MGM consistently across different participants endorsing different moral foundations. The findings from the *t*-tests indicated that the MGM score was not different across Democrats and Republicans. Given that the pattern of Democrats' responses to the MFQ was similar to that of liberals (i.e., endorsing fairness/reciprocity) while Republicans showed the similar pattern with conservatives (i.e., endorsing binding foundations) reported in Graham et al. (2009), we assume that we properly compared MGM responses between liberals versus conservatives while using political affiliation as a proxy for political perspective. The regression analysis showing that the best model did not include the interaction effect between moral foundations and political affiliation supports that the relationship between moral foundations and MGM was not altered by political affiliation.

The findings suggest that the MGM measure measures MGM consistently across people with different political affiliations, who endorse different sets of moral foundations. Regardless of which foundations are importantly considered, the MGM measure consistently measures one's belief in their growth of morals. The validated MGM measure was not biased across political or moral views, so it does not significantly over or underestimate one's MGM due to their political or moral views. Hence, the measure can be used by researchers who are interested in examining MGM across people with diverse political or moral orientations, without any significant concern regarding whether the measure is likely to produce biased outcomes.

Although we found evidence supporting the validity of the MGM across different political perspectives, several limitations warrant further investigations. First, most responses were collected from young, white, female participants, so more old adult, non-white, male participants need to be recruited in future studies. Second, we mainly compared Democrats versus Republicans, so the political context examined in our study might be US-specific. Cross-national as well as cross-cultural investigations are required to address this issue associated with potential limited generalizability. Previous research on moral foundations has reported significant cross-national and cross-cultural differences in endorsement of moral foundations (Graham et al., 2013). Thus, it would be necessary to examine whether the MGM measure performs consistently across different nations and cultures as people living in different nations and cultures are likely to possess different conceptions and views on morality, which may influence how to perceive one's growth belief in the moral domain.

Open Science

We report how we determined our sample size, all data exclusions (if any), all data inclusion/exclusion criteria, whether inclusion/exclusion criteria were established prior to data analysis, all measures in the study, and all analyses including all tested models. If we use inferential tests, we report exact p-values, effect sizes, and 95% confidence or credible intervals. All data files and analyses scripts for this study can be found under this link: <https://osf.io/f4vpn/>. The study was not preregistered.

References

- Chen, F. F. (2007). Sensitivity of Goodness of Fit Indexes to Lack of Measurement Invariance. *Structural Equation Modeling: A Multidisciplinary Journal*, 14(3), 464–504.
<https://doi.org/10.1080/10705510701301834>

- Chiu, C., Hong, Y., & Dweck, C. S. (1994). Toward an integrative model of personality and intelligence: A general framework and some preliminary steps. In R. J. Sternberg & P. Ruzgis (Eds.), *Personality and Intelligence*. (pp. 104–134). Cambridge University Press.
- Choi, S. W., Gibbons, L. E., & Crane, P. K. (2011). lordif: An R Package for Detecting Differential Item Functioning Using Iterative Hybrid Ordinal Logistic Regression/Item Response Theory and Monte Carlo Simulations. *Journal of Statistical Software*, 39(8), 1–30. <https://doi.org/10.18637/jss.v039.i08>
- Choi, Y.-J., Han, H., Dawson, K. J., Thoma, S. J., & Glenn, A. L. (2019). Measuring moral reasoning using moral dilemmas: evaluating reliability, validity, and differential item functioning of the behavioural defining issues test (bDIT). *European Journal of Developmental Psychology*, 16(5), 622–631. <https://doi.org/10.1080/17405629.2019.1614907>
- Fischer, R., & Karl, J. A. (2019). A Primer to (Cross-Cultural) Multi-Group Invariance Testing Possibilities in R. *Frontiers in Psychology*, 10. <https://doi.org/10.3389/fpsyg.2019.01507>
- Graham, J., Haidt, J., Koleva, S., Motyl, M., Iyer, R., Wojcik, S. P., & Ditto, P. H. (2013). Moral foundations theory: The pragmatic validity of moral pluralism, *Advances in Experimental Social Psychology*, 47, 55-130. <https://doi.org/10.1016/B978-0-12-407236-7.00002-4>
- Graham, J., Haidt, J., & Nosek, B. A. (2009). Liberals and conservatives rely on different sets of moral foundations. *Journal of Personality and Social Psychology*, 96(5), 1029–1046. <https://doi.org/10.1037/a0015141>
- Graham, J., Nosek, B. A., Haidt, J., Iyer, R., Koleva, S., & Ditto, P. H. (2011). Mapping the moral domain. *Journal of Personality and Social Psychology*, 101(2), 366–385. <https://doi.org/10.1037/a0021847>

- Han, H. (2020). Implementation of Bayesian multiple comparison correction in the second-level analysis of fMRI data: With pilot analyses of simulation and real fMRI datasets based on voxelwise inference. *Cognitive Neuroscience*, 11(3), 157–169.
<https://doi.org/10.1080/17588928.2019.1700222>
- Han, H., Ballard, P. J., & Choi, Y.-J. (2021). Links between moral identity and political purpose during emerging adulthood. *Journal of Moral Education*, 50(2), 166–184.
<https://doi.org/10.1080/03057240.2019.1647152>
- Han, H., Choi, Y.-J., Dawson, K. J., & Jeong, C. (2018). Moral growth mindset is associated with change in voluntary service engagement. *PLOS ONE*, 13(8), e0202327.
<https://doi.org/10.1371/journal.pone.0202327>
- Han, H., Dawson, K. J., Choi, Y. R., Choi, Y.-J., & Glenn, A. L. (2020). Development and validation of the English version of the Moral Growth Mindset measure [version 3; peer review: 4 approved]. *F1000Research*, 9, 256.
<https://doi.org/10.12688/f1000research.23160.3>
- Han, H., Park, J., & Thoma, S. J. (2018). Why do we need to employ Bayesian statistics and how can we employ it in studies of moral education?: With practical guidelines to use JASP for educators and researchers. *Journal of Moral Education*, 47(4), 519–537.
<https://doi.org/10.1080/03057240.2018.1463204>
- Muthén, B., & Asparouhov, T. (2002). *Latent Variable Analysis With Categorical Outcomes: Multiple-Group And Growth Modeling In Mplus*.
<https://www.statmodel.com/download/webnotes/CatMGLong.pdf>
- Putnick, D. L., & Bornstein, M. H. (2016). Measurement invariance conventions and reporting: The state of the art and future directions for psychological research. *Developmental Review*,

41, 71–90. <https://doi.org/10.1016/j.dr.2016.06.004>

van Leeuwen, F., & Park, J. H. (2009). Perceptions of social dangers, moral foundations, and political orientation. *Personality and Individual Differences*, 47(3), 169–173.

<https://doi.org/10.1016/j.paid.2009.02.017>

Wagenmakers, E.-J., Love, J., Marsman, M., Jamil, T., Ly, A., Verhagen, J., Selker, R., Gronau, Q. F., Dropmann, D., Boutin, B., Meerhoff, F., Knight, P., Raj, A., van Kesteren, E.-J., van Doorn, J., Šmíra, M., Epskamp, S., Etz, A., Matzke, D., ... Morey, R. D. (2018). Bayesian inference for psychology. Part II: Example applications with JASP. *Psychonomic Bulletin & Review*, 25(1), 58–76. <https://doi.org/10.3758/s13423-017-1323-7>

Warren, M. T. (2020). Peer Review Report For: Development and validation of the English version of the Moral Growth Mindset measure [version 3; peer review: 4 approved].

F1000Research, 9, 256. <https://doi.org/10.5256/f1000research.25564.r62240>

Tables

Table 1

MGM Measure items and results from DIF tests.

	Model 1 vs. 3 (Total DIF)					Model 1 vs. 2 (Uniform DIF)					Model 2 vs. 3 (Non-uniform DIF)				
	χ^2	df	McFadden R^2	Nagelkerke R^2	Cox-Snell R^2	χ^2	df	McFadden R^2	Nagelkerke R^2	Cox-Snell R^2	χ^2	df	McFadden R^2	Nagelkerke R^2	Cox-Snell R^2
No matter who you are, you can significantly improve your morals and character.	.24	2	.00	.00	.00	.14	1	.00	.00	.00	.41	1	.00	.00	.00
To be honest, you can't really improve your morals and character. (R)	.38	2	.00	.00	.00	.20	1	.00	.00	.00	.59	1	.00	.00	.00
You can always substantially improve your morals and character.	.74	2	.00	.00	.00	.60	1	.00	.00	.00	.57	1	.00	.00	.00
You can improve your basic morals and character considerably.	.69	2	.00	.00	.00	.79	1	.00	.00	.00	.41	1	.00	.00	.00

Note. (R) indicates a reverse-coded item. Model 1 (Full Model): $Z = \tau_0 + \tau_1(X) + \tau_2(\text{Group}) + \tau_3(X \times \text{Group})$, Model 2 (1st Reduced Model): $Z = \tau_0 + \tau_1(X) + \tau_2(\text{Group})$, Model 3 (2nd Reduced Model): $Z = \tau_0 + \tau_1(X)$ where Z is a response to an item and X is an IRT ability score.

Table 2

Descriptive statistics of measured variables and the results of t-tests.

Measure	Cronbach α	Whole sample		Democrats		Republicans		t	df	p	95% CI	Cohen's D	Bayes Factor
		M	SD	M	SD	M	SD						
MGM	.92	4.32	1.38	4.32	1.42	4.25	1.36	.67	553.38	.50	[-.13 .28]	.05	.10
MFQ													
Harm/care	.65	4.67	.74	4.73	.76	4.64	.70	1.47	408.81	.14	[-.03 .22]	.13	.28
Fairness/reciprocity	.66	4.55	.70	4.73	.74	4.44	.65	4.73	392.33	.00	[.17 .40]	.42	10,523.35
Ingroup/loyalty	.73	3.90	.88	3.56	.90	4.23	.75	-9.36	377.68	.00	[-.81 -.53]	-.71	1.37E+13
Authority/respect	.71	4.15	.82	3.90	.91	4.44	.67	-7.69	342.87	.00	[-.68 -.40]	-.84	1.83E+18
Purity/sanctity	.75	4.04	.95	3.77	1.08	4.31	.77	-6.41	335.67	.00	[-.70 -.37]	-.60	1.37E+09

Table 3

Tested regression models and the results of model comparison.

Formula	AIC	BIC	log(Bayes Factor) (vs. Model 0)	-2LL
Model 0 MGM ~ 1 (only with an intercept)	2,053.94	2,063.35	-	2,049.94
Model 1 MGM ~ MFQ (only with main effects of moral foundations)	1,983.19	2,015.13	796.80	1,969.19
Model 2 MGM ~ MFQ + political affiliation + MFQ x political affiliation (including both main and interaction effects)	1,994.72	2,112.34	786.74	1,944.72

Note. The best model was indicated with a **bold font**. -2LL : -2 x log of the likelihood

Table 4

The results of MI test.

	RMSEA	SRMR	CFI	Δ RMSEA	Δ SRMR	Δ CFI
Configural invariance	.087	.012	.987	-	-	-
Metric invariance	.049	.020	.991	-.038	.008	.004
Scalar invariance	.049	.024	.987	.000	.004	-.005
Residual invariance	.046	.033	.982	-.003	.009	-.004