Culture Matters in Successful Curriculum Change: An International Study of the Influence of National and Organizational Culture Tested With Multilevel Structural Equation Modeling

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Abstract

Purpose
National culture has been shown to play a role in curriculum change in medical schools, and business literature has described a similar influence of organizational culture on change processes in organizations. This study investigated the impact of both national and organizational culture on successful curriculum change in medical schools internationally.

Method
The authors tested a literature-based conceptual model using multilevel structural equation modeling. For the operationalization of national and organizational culture, the authors used Hofstede's dimensions of culture and Quinn and Spreitzer's competing values framework, respectively. To operationalize successful curriculum change, the authors used two derivates: medical schools' organizational readiness for curriculum change developed by Jippes and colleagues, and change-related behavior developed by Herscovitch and Meyer. The authors administered a questionnaire in 2012 measuring the described operationalizations to medical schools in the process of changing their curriculum.

Results
Nine hundred ninety-one of 1,073 invited staff members from 131 of 345 medical schools in 56 of 80 countries completed the questionnaire. An initial poor fit of the model improved to a reasonable fit by two suggested modifications which seemed theoretically plausible. In sum, characteristics of national culture and organizational culture, such as a certain level of risk taking, flexible policies and procedures, and strong leadership, affected successful curriculum change.

Conclusions
National and organizational culture influence readiness for change in medical schools. Therefore, medical schools considering curriculum reform should anticipate the potential impact of national and organizational culture.

Medical education has seen a rising demand internationally for innovation due to perceived shortcomings of medical curricula: theoretical overload, lack of practical experience, insufficient community orientation, and inefficient teaching methods.[1–3] Although around one-third of all medical schools have adopted integrated and problem-based learning (PBL) curricula in the past decade in response to this demand,[4] there are many schools that continued unaltered or whose efforts in innovation have floundered. Whereas the success of medical curricular reforms has been associated with factors related to national culture,[4,5] the influence of organizational culture on change processes has only been described for business reorganizations.[6–9] Intuitively, it seems to make sense that values, beliefs, and practices of organizations can be expected to derive from national values, beliefs, and behavior.[10] Given the paucity of results from empirical research on the interconnectedness of national and organizational culture,[10–13] this subject deserves further investigation. Available research revealed that organizations in the same country vary because of differences in organizational culture; however, organizations in different countries vary even more because of the additional influence of national culture.[10,13]

Insight into how national and organizational culture influence medical curriculum change may identify issues that schools must address to facilitate curriculum innovation. Because no existing research seemed available, we explored the influence of national and organizational culture on curriculum change in medical schools. After reviewing the literature on the concepts of successful curriculum change and national and organizational culture, we arrived at a definition of these concepts for this study. On the basis of the literature, we hypothesized seven relationships between factors related to national and organizational culture and curriculum change, which we incorporated in a conceptual model (Figure 1).

Background

Successful curriculum change

There exists no universal definition and measure of successful (curriculum) change. Instead, we used two derivates to operationalize successful curriculum change: medical schools' organizational readiness for curriculum change (MORC) and employee resistance.[14–18] MORC consists of two positive dimensions (motivation and capability) and one negatively phrased dimension (extrinsic pressure).[17,18] In addition, employee

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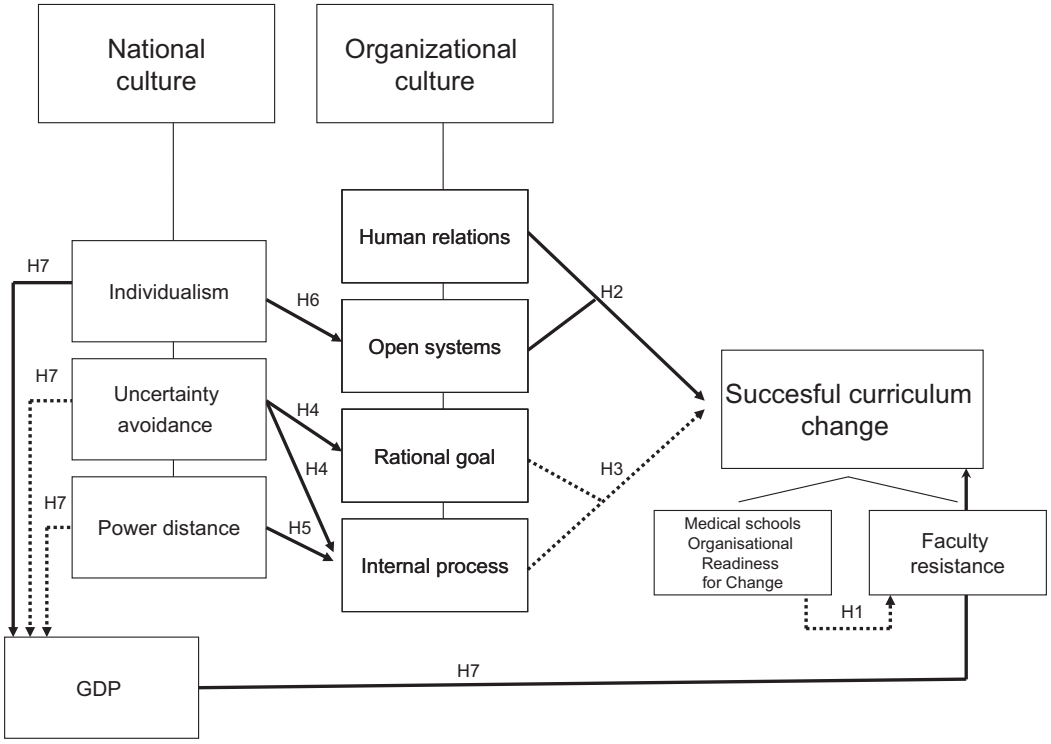

Figure 1 Conceptual model relating national culture, organizational culture, and successful curriculum change, including MORC and faculty resistance, from an international study of the influence of national and organizational culture on curriculum change, 2012. Solid arrows indicate positive relations, and dashed arrows indicate negative relations. MORC consists of two positive dimensions (motivation and capability) and one negatively phrased dimension (extrinsic pressure), but for the simplicity of the figure we have chosen to place one arrow between MORC and faculty resistance where there actually should have been a positive arrow between MORC–extrinsic pressure and faculty resistance and a negative arrow between MORC–motivation/MORC–capability and faculty resistance. Abbreviations: MORC indicates medical schools' organizational readiness for curriculum change; H, hypothesis; GDP, gross domestic product per capita (U.S. dollars).

resistance has been shown to decrease the chance of successful organizational change.[19,20] We expect that organizational readiness for change and a low level of faculty resistance, in general, are positively related to successful change.

Organizational culture

Many definitions[21] and measuring instruments[22] have been developed to advance understanding of organizational culture. The compact and widely used[22] questionnaire developed by Kalliath and colleagues[23] based on Quinn and Spreitzer's[24] competing values framework seemed most appropriate for the setting and purpose of this study. The competing values framework comprises elements of organizational effectiveness sorted along two axes: "flexibility–control" and "internal–external," which results in four competing organizational models (Supplemental Digital Figure 1, http://links.lww.com/ACADMED/A264).[24] For example, medical schools that emphasize belongingness and trust tend to be dominant in the human relations quadrant. The leadership style in such medical schools reflects teamwork, participation, empowerment, and concern for employee ideas. Flexible organizations ("human relations" and "open systems") tend to respond more positively to change than those featuring control-driven policies and regulations ("rational goal" and "internal process").[15,24,25] We expect that flexible policies, in general, are positively related to successful change.

National culture

Among numerous attempts to define and quantify national culture,[12,26–29] Hofstede's[26] model is applied most widely. It distinguishes six dimensions of national culture, three of which are most relevant in relation to curriculum change.[4] Supplemental Digital Table 1 (http://links.lww.com/ACADMED/A264) provides a list of all participating countries with their scores on the different dimensions.

"Uncertainty avoidance" describes the degree of acceptance of uncertainty and a need for predictability, which is often pursued by adherence to written or unwritten rules. In countries with strong uncertainty avoidance (e.g., Belgium and El Salvador), organizations,[30–33] including medical schools,[4,5] tend to be averse to change. Uncertainty avoidance features, such as strict rules and regulations, correspond to the organizational models of rational goal and internal process. Support for the effect of national values on organizational values with respect to uncertainty avoidance was demonstrated by House and colleagues.[12] We expect that national uncertainty avoidance values and control-driven policies, in general, are negatively related to successful change.

"Power distance" describes the degree of acceptance of hierarchical or unequal relationships, which demonstrated diverse effects on different phases of the change process. Low power distance (e.g., in Sweden and Canada) in the initiation phase may invite employees to suggest innovations to their superiors, thus stimulating change.[34,35] By contrast, the implementation phase may benefit from hierarchic control as a result from strong power distance.[30,35–37] Research in medical schools has demonstrated a negative

relation between power distance and the presence of innovative curricula.[4,5] Overall, there seems to be a tendency for a negative relation between power distance and organizational readiness for change.[14,38] Features of power distance, such as a rigid hierarchy, resemble those of the organizational model "internal process." The effect of national values on organizational values with respect to power distance was also demonstrated by House and colleagues.[12] We expect that national power distance values and a rigid hierarchy, in general, are negatively related to successful change.

"Individualism" refers to the degree of emphasis placed on an individual's accomplishment, with the opposite being "collectivism." National levels of individualism were also shown to have contrasting effects on different phases of the change process. High individualism (e.g., the United States and Australia) may increase the tendency to individual distinction and championing of new ideas, stimulating the adoption phase of change.[32,36,39] In contrast, during the implementation phase of change, low individualism, which characterizes emphasis on teamwork and consensus, has been favored.[35,37,40] In medical schools, empirical research has shown a positive relation between individualism and the presence of innovative curricula.[4] Overall, there seems to be a tendency toward a positive relation between individualism and change.[38] Features of individualism, such as growth and innovation, correspond to the organizational model open systems. With respect to collectivism, House and colleagues[12] have also demonstrated a relationship between national and organizational values. We expect that national individualism values and a focus on growth and innovation, in general, are positively related to successful change.

National income

National cultural values frequently showed a relation with national gross domestic product at purchasing power parity levels (GDP).[26,38,41] High individualism, low power distance, and low uncertainty avoidance were associated with higher GDP.[26,41] Intuitively, a lack of financial resources has an inhibiting effect on curricular change. We expect that national income, in general, is positively related to successful change.

Study hypotheses

We derived the following hypotheses, which are all incorporated in our conceptual model and will be analyzed simultaneously (Figure 1).

- Hypothesis 1: Medical schools with more successful curriculum change have higher levels of MORC–capability and MORC–motivation and lower levels of MORC–extrinsic pressure, which will cause lower levels of faculty resistance.
- Hypothesis 2: Flexible policies and procedures (human relations and open systems) have a positive effect on successful curriculum change.
- Hypothesis 3: Control-oriented policies and procedures (rational goal and internal process) have a negative effect on successful curriculum change.
- Hypothesis 4: Uncertainty avoidance has a positive effect on rational goal and internal process and a negative effect on successful curriculum change.
- Hypothesis 5: Power distance has a positive effect on internal process and a negative effect on successful curriculum change.
- Hypothesis 6: Individualism has a positive effect on open systems and a positive effect on successful curriculum change.
- Hypothesis 7: National GDP level has a positive effect on successful curriculum change.

Method

Design

We used data from a questionnaire conducted worldwide among medical schools in the process of curriculum change to test the hypotheses in our conceptual model (Figure 1) by using a multivariate statistical approach.

Participants and sampling procedure

Between January and April 2012, we sent e-mails to 1,073 international staff contacts of Maastricht University inquiring whether they were contemplating or implementing changes in their undergraduate or postgraduate medical curriculum and, if so, inviting them to participate in the study. We excluded newly established medical schools and schools where the implementation was completed (i.e., the first students had graduated from the new curriculum). We sent two e-mail reminders. We asked our contacts from schools in the process of change to distribute an anonymous Web-based questionnaire to at least 20 of their colleagues who were actively involved in medical education, preferably representing a mix of professional backgrounds: basic scientists, clinicians, and members of the curriculum committee. If necessary, two reminders were sent to the contact persons.

For every completed questionnaire, we donated €5 to the World Wildlife Fund (www.wwf.org), and we offered to send each participating school the anonymized results for their school.

Measurements

National culture. We used Hofstede's[26] national or regional scores (if no national score was available) on uncertainty avoidance, power distance, and individualism (Supplemental Digital Table 1, http://links.lww.com/ACADMED/A264) to measure national culture.

Organizational culture. Participants were asked to answer the 16 questions related to four types of organizational culture (human relations, open systems, rational goal, and internal process) from the questionnaire developed by Kalliath and colleagues,[23] which were scored on a seven-point Likert scale (1 = not valued at all; 7 = highly valued).

MORC. We measured organizational readiness for change using the 53-item MORC questionnaire,[18] which was scored on a five-point Likert scale (1 = strongly disagree; 5 = strongly agree) (Supplemental Digital Table 2, http://links.lww.com/ACADMED/A264).

Change-related behavior. Change-related behavior was measured using five types of behavior described by Herscovitch and Meyer[20]: active resistance, passive resistance, compliance, cooperation, and championing. Participants were asked to characterize the behavior of the members of their organization in relation to the curriculum change by distributing 100 points over the five types of behavior. For our analysis, we used the percentage

of organizational members showing resistance (both active and passive).

GDP. We obtained current annual data on GDP per capita (U.S. dollars) from the Web site Trading Economics.[42]

Data analysis

The cross-cultural design with participants nested within schools and schools nested within countries required a multilevel approach.[43] In addition, we expected causal relations described in the hypotheses and summarized in our model (Figure 1), requiring structural equation modeling.[44] We therefore used multilevel structural equation modeling to analyze the data.[43] An advantage of this approach is that multiple relations can be tested simultaneously in one model.

We first estimated the reliability of the construct scales. Because the variables were not distributed normally, we performed robust maximum likelihood estimation,[45,46] which produces maximum likelihood parameter estimates and standard errors that are robust to nonnormality. There were no signs of multicolinearity, implying an absence of strong correlations between the predictors (all tolerance values > 0.10). Intraclass correlations (ICCs) computed to examine between-cluster variability (Table 2) were sufficiently large (ICC > 0.05) to justify the use of multilevel structural equation modeling.[47] The conceptual model (Figure 1) was tested by fitting a multilevel structural equation model to the data using Mplus statistical software, version 5.21 (Muthén and Muthén, Los Angeles, California). Observed scores at the individual level were included in the first "within level." We added average MORC, organizational culture, and faculty resistance scores of participants from the same school in the second "between level." Scores at the national level (national culture and GDP) were also included in the second level because the number of schools per country was too low to include these variables in a third level. We assumed random intercepts and fixed slopes across medical schools.[44] The following fit indices and criteria were used: the root mean square error of approximation (RMSEA< 0.08), the comparative fit index (CFI > 0.9), and the standardized root mean square residual (SRMR < 0.08).[48,49]

Ethical considerations

After explaining the aim and purpose of the study, voluntary nature of participation, and confidentiality of the contributions, we obtained digital informed consent from all participants. The study was approved by the ethical review board of the Dutch Association for Medical Education.

Results

Of the 1,073 contact persons from 345 medical schools in 80 countries we invited to administer the MORC questionnaire at their schools, 708 (66%) agreed. We were not informed how many colleagues each of the contact persons invited to complete the MORC questionnaire. The questionnaire was completed by 991 staff members from 131 medical schools in 56 countries (Supplemental Digital Table 1, http://links.lww.com/ACADMED/A264). The average age of the participants was 47 years (range 21–84), and 475 (47.9%) were male. All characteristics of participants are presented in Table 1. Supplemental Digital Table 3 (http://links.lww.com/ACADMED/A264) shows the means, standard deviations, and intercorrelations (Pearson) of all variables. On the basis of the generalizability analysis of MORC in a previous study, schools with fewer than 5 participants should have been excluded.[18] However, to maintain a sufficient number of schools while conforming to the minimum of 2 participants per cluster as required for two-level modeling, we excluded 37 schools with only 1 participant. Exclusion of 7 medical schools from 3 countries for which no data on national or regional culture were available resulted in a total of 911 respondents from 87 medical schools (on average, 10.5 respondents per school) in 48 countries. Missing values and nonapplicable answers were below 10% of the total number of observations and replaced by the item means.[50]

Cronbach alphas of the organizational culture subscales (0.80–0.87) suggested reliable replication in our population (all above 0.67) (Table 2). The process of validation of MORC for our population is described in a previous study.[18]

Our initial two-level structural equation model showed a poor fit with the data (CFI = 0.91, Tucker–Lewin index [TLI] = 0.70, RMSEA = 0.12, standard root mean square within [$SRMR_W$]= 0.05, standard root mean square between [$SRMR_B$] = 0.21) (Table 3). The modification indices suggested strong significant effects between underlying MORC dimensions (MORC–capability on MORC–motivation and vice versa) as well as direct effects of all four organizational types on resistance to change. As we considered it plausible that perceived capability and motivation would impact each other and organizational types would not have only an indirect, but also a direct effect on resistance to change, we applied the modifications (between MORC–capability and MORC–motivation and between open systems organizations and resistance to change). This yielded a reasonable fit (CFI = 0.96, TLI = 0.87, RMSEA = 0.08, $SRMR_W$ = 0.02, $SRMR_B$ = 0.21), which means that with the two adaptations the model gives an acceptable representation of the data. Therefore, the causal paths within the model may be interpreted (Table 3). Figure 2 presents a summary of the results from fitting our two-level model to the data. This final model fully supported hypothesis 1 (a positive effect of MORC–extrinsic pressure on faculty resistance and a negative effect of MORC–capability and MORC–motivation—via MORC–capability—on faculty resistance) and fully supported hypothesis 2 (a positive effect of human relations and open systems on successful curriculum change). Partial support was found for hypothesis 4 (an expected negative effect of uncertainty avoidance on successful curriculum change and an unexpected negative effect of uncertainty avoidance on rational goal). Partial support was also found for hypothesis 5 (expected positive effect of power distance on internal process and an unexpected positive effect of power distance on successful curriculum change).

Discussion

Our findings revealed a reasonable fit of our conceptual model with the data after two plausible modifications, necessitating further research to test the adapted conceptual model. Nevertheless, the findings revealed significant effects of national and organizational culture on the success of medical curriculum change. The influence of national culture on medical education has been demonstrated previously.[4,5,51–53] However, the impact of

Table 1

Characteristics of the Individual Respondents, Their Medical Schools, and the Change Processes in Their Schools, From an International Study of the Influence of National and Organizational Culture on Curriculum Change, 2012

Variable	No. of respondents (% of 991)
Gender	
Male	475 (47.9)
Female	369 (37.2)
Missing	147 (14.8)
Age	
20–35 years	124 (12.5)
36–50 years	374 (37.7)
51–65 years	310 (31.3)
65–85 years	29 (2.9)
Missing	154 (15.5)
Participation	
Active in the change process	527 (53.2)
Not active in the change process	324 (32.7)
Missing	140 (14.1)
Type of respondents	
Medical specialist	363 (36.6)
Basic scientist	133 (13.4)
Management and administration	68 (6.9)
Other (including educationalist and general practitioner)	197 (19.9)
Missing	230 (23.2)
Size of medical school	
< 50 students/year	53 (5.3)
51–100 students/year	168 (17.0)
101–200 students/year	322 (32.5)
> 200 students/year	306 (30.9)
Missing	142 (14.3)
Object of change	
Undergraduate curriculum change	774 (78.1)
Postgraduate curriculum change	62 (6.3)
Missing	155 (15.6)
Type of change	
All students in completely new curriculum	602 (60.7)
Some students in completely new curriculum	195 (19.7)
Exams only	8 (0.80)
Skills only	23 (2.3)
Missing	163 (16.4)
Phase of change	
Preparation	422 (42.6)
Implementation (first two years)	284 (28.7)
Implementation (after the first two years)	284 (28.7)

organizational culture on change has only been demonstrated in business and health care organizations.[6–9] To our knowledge, our study is the first to demonstrate this effect in medical schools.

Specific characteristics of national culture (high power distance and/or low uncertainty avoidance) and organizational culture (human relations and/or open systems) had a positive effect on successful curriculum change. Clear positive effects on successful change were a certain level of risk taking and flexible policies and procedures (low uncertainty avoidance/open systems), strong leadership and strict hierarchy (high power distance/internal process), a high concern for new ideas and teamwork (human relations), and focus on growth and innovation (open systems). As expected, a certain level of risk taking and flexible policies and procedures stimulated the introduction of innovative ideas.[12,26,35] Power distance unexpectedly stimulated successful curriculum change, perhaps through the positive impact of centralized command on the coordination of the complex process of curriculum change.[35] Although a certain level of financial investment is required for curriculum change, the level of national wealth (GDP) did not have a significant role in the process of curriculum change, so perhaps the effect of national wealth is much smaller than the effect of national and organizational culture. With regard to organizational culture, teamwork (human relations), especially beyond one's own discipline, is uncommon in medical schools with traditional curricula, but may be advantageous for integrated curricula, such as PBL curricula.[54] Adaptation of the curriculum to the external environment (open systems), including to local community needs, is one of the main challenges for medical schools.[2,55–57] As other (regional) medical schools are facing the same problems, collaborations could serve the exchange of effective solutions.[57,58] Although the rational goal and internal process organizational culture types did not show a direct effect on MORC, they indirectly had a positive effect through open systems and human relations, which indicates that it is important for an organization to aim for more balanced norms and values (congruence) with a strong focus on human relations/open systems and also a reasonable share of values related to internal process and rational goal. Similar findings were described by Quinn and Spreitzer,[24] who argued that emphasis on one organizational type can lead to narrowness and an inability to adapt to a changing environment.

There is a fundamental tension in the relationship between national and organizational culture.[10] Organizations likely feel compelled to conform to existing cultural norms and values on the one hand, while they also have to innovate, which may challenge the cultural norms and values and cause the organizational culture to deviate from

Table 2

Cronbach Alpha and Intraclass Correlations for the Constructs of Organizational Culture (Internal Process, Open Systems, Rational Goal, and Human Relations) and the MORC Dimensions (Motivational, Capability, and Extrinsic Pressure), From an International Study of the Influence of National and Organizational Culture on Curriculum Change, 2012

Constructs	Cronbach alpha (> 0.7)	Intraclass correlations (> 0.05)
Organizational culture–internal process	0.80	0.057
Organizational culture–open systems	0.86	0.057
Organizational culture–rational goal	0.86	0.063
Organizational culture–human relations	0.87	0.059
MORC–motivational	0.82	0.151
MORC–capability	0.93	0.150
MORC–extrinsic pressure	0.67	0.108

Abbreviations: MORC indicates medical schools' organizational readiness for curriculum change.

the dominant national cultural context. In medical schools, the same tension between national and organizational culture exists; for instance, the introduction of PBL requires an open communication style, which seems less feasible in more collectivistic cultures with a strong fear of loss of face.[59,60] Nevertheless, many medical schools in collectivistic cultures have successfully introduced PBL.[52,59] In our model, both national and organizational culture influenced successful curriculum change, making us wonder whether both are equally important. As national and organizational culture are included in different levels in the model, we can only conclude that national culture explained 40% of differences in MORC–capability *among* different medical schools, and organizational culture explained differences *within* different medical schools (27.5% of differences in MORC–capability, 12.3% of differences in MORC–motivation, and 6.5% of differences in MORC–extrinsic pressure, respectively; data not shown).

National and organizational culture factors should be taken into account by medical schools in the process of curriculum change. Because it may be impossible to change national culture, it may be more efficient to anticipate its effects. In a culture that is risk-averse, the leader of a change project could mitigate the feeling of risk taking by explaining which efforts are made to minimize them. In a culture with high power distance, the leader of a medical school could use the centralized organizational structure and top-down decision making to make the required fast decisions after communicating the rationale behind the decisions to the organizational members.

For the operationalization of national culture, we used Hofstede's dimensions, which has its own limitations—for instance, with regard to the study population of IBM employees only.[61] Unfortunately, the absence of Hofstede's index scores for some countries forced us to use regional scores and exclude participants from three countries without national or regional scores (Supplemental Digital Table 1, http://links.lww.com/ACADMED/A264). Although objections to this procedure may be valid, a separate analysis in which missing country scores were substituted for mean dimension scores had no significant effect on the fit indices of the multilevel structural equation model (data not shown).

Although we studied a relatively large cross-national sample, the relatively low number of respondents and especially the limited number of medical schools per country with respect to the large number of parameters may explain the initial poor fit indices of our conceptual model. In addition, because of this limited number of medical schools per country, we had to include observed scores on the national level in the second level, preventing analysis of variance in MORC between different countries. Another limitation is the inability to provide a response rate of the invited participants. Because it was left to the contact persons of Maastricht University to invite faculty members in their medical schools, we have no insight into how many individuals were eventually invited to participate. Further research to test the adapted model would benefit from a larger randomly selected sample.

ICCs of both organizational culture and MORC scores showed that the between-group variance was small compared with the within-group variance, suggesting that perceptions of organizational culture and MORC may differ between members of the same medical school. In addition, members from the same school reported their school to be in a different phase of change (i.e., preparation or implementation phase). Perhaps perceptions of members of the same team or department may be more homogeneous than perceptions within the school as a whole, which would

Table 3

Overview of Goodness-of-Fit Measures From Multilevel Structural Equation Modeling, From an International Study of the Influence of National and Organizational Culture on Curriculum Change, 2012[a]

Model	*df*	CFI (> 0.09)	TLI (> 0.9)	RMSEA (< 0.08)	$SRMR_W$ (< 0.08)	$SRMR_B$ (< 0.08)
Initial model	25	0.905[b]	0.696	0.118	0.050[b]	0.213
Additional two paths:	23	0.963[b]	0.871	0.077[b]	0.019[b]	0.208
1. MORC–motivation and MORC–capability						
2. Open systems and resistance						

Abbreviations: *df* indicates degrees of freedom; CFI, comparative fit index; TLI, Tucker–Lewin index; RMSEA, root mean square error of approximation; $SRMR_W$, standardized root mean square residual within; $SRMR_B$, standardized root mean square residual between; MORC, medical schools' organizational readiness for curriculum change.

[a]Table 3 reports the root mean square error of approximation (< 0.08), the comparative fit index (> 0.9), the Tucker–Lewin index (> 0.9), and the standardized root mean square residual within and between (< 0.08).

[b]Within range. The initial model poorly fitted the data. Addition of two plausible paths between MORC–motivation and MORC–capability, and between open systems and resistance, increased the fit of the data to the model to an acceptable level.

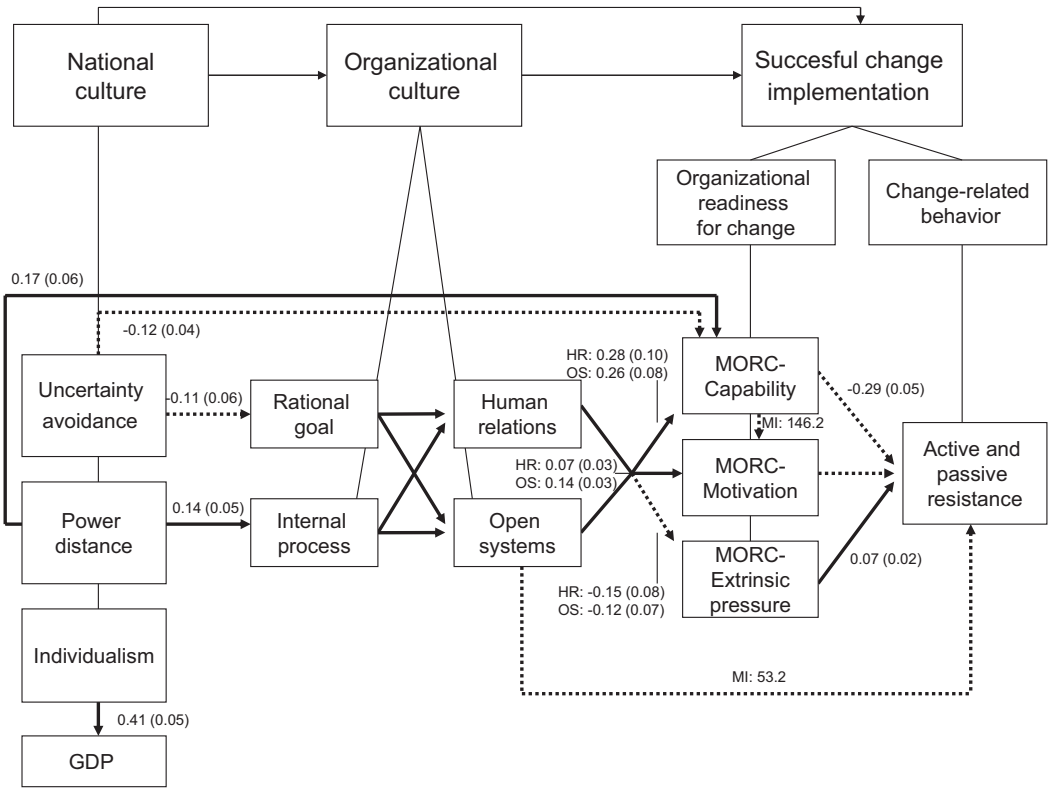

Figure 2 Summary of results from fitting a two-level model to the data: estimates (and standard errors) on the arrows for the "within level" (individual MORC scores) and "between level" (average of MORC scores by individuals from the same medical school, organizational culture scores, national culture scores, and GDP levels), from an international study of the influence of national and organizational culture on curriculum change, 2012. Only significant relations are shown. Heavy solid arrows indicate negative relations, and dashed arrows indicate positive relations. The two arrows starting with MI indicate the adopted modifications. Abbreviations: MORC indicates medical schools' organizational readiness for curriculum change; GDP, gross domestic product per capita (U.S. dollars); HR, human relations; OS, open systems; MI, modification indices.

require further analysis of variance of the perceptions of readiness for change within teams and departments. Additionally, individual readiness for change may differ between organizational members on the basis of their previous experiences, their level of involvement in the change process, and their personal preferences, all of which can influence individual perceptions of a medical school's readiness for change.[25] Unfortunately, the software Mplus did not allow us to insert the variables of Table 1 (e.g., gender, age, context of change, and size of the medical school) as covariates. We expect these aspects to have an influence on the change process as well, which indicates the need for future expansion of this research.

In a future study, it would be illuminating to use cluster analysis to investigate interactions between the different organizational types by comparing the effect of different organizational culture profiles on successful curriculum change.[24] It would also be interesting to explore whether medical schools show similar profiles of organizational culture across countries. If confirmed, this might indicate the presence of a medical-school-specific macro-culture, similar to specific hospital cultures reported in other studies.[10,62]

Conclusion

Our findings show that change is influenced by national and organizational culture characteristics such as flexible policies and procedures, interdisciplinary teamwork, adaptation to local community needs, and by collaboration with regional schools. Medical schools contemplating or implementing curriculum change should consider the potential impact of cultural factors in designing strategies to deal with potential sources of resistance. As it may be impossible to change national culture, it may be more efficient to anticipate its effects.

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