



## **Ethical Reasoning and Moral Foundations among Engineering Students in China**

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## Abstract

To better understand the influences of culture, education, and moral dispositions on ethical reasoning among engineering students, the Engineering and Science Issues Test (ESIT) and Moral Foundations Questionnaire (MFQ) were administered at the beginning and end of a course on engineering ethics taught at a university in Shanghai, China. Preliminary results indicate that 1. differences in ethical reasoning between native- and non-native-English-speaking students are better explained by cultural than language differences 2. engineering ethics education can increase ethical reasoning abilities, and 3. ethical reasoning is positively associated with an emphasis on care, and negatively associated with an emphasis on loyalty. Shortcomings of the current study and directions for further research are also discussed.

## Introduction

This paper presents the motivations for and results of a preliminary study exploring the influences of culture, education, and moral dispositions on ethical reasoning among engineering students in China. Previous research has examined the effects of engineering ethics education on ethical reasoning, but this work has tended to take place with participants from Western Educated Industrialized Rich Democratic (WEIRD) cultures, which have been found to be outliers on a number of psychological dimensions.[1]–[8] Since engineering and technology are increasingly cross cultural and international, it is important to expand empirical research on engineering ethics beyond these narrow samples. Further, a growing body of work has called into question the extent to which ethical judgments and behaviors result primarily or exclusively from ethical reasoning, a prominent and influential example of which is Moral Foundations Theory (MFT).[9]–[11] According to MFT, ethical judgments result primarily from intuitions, associated with suites of fast-acting, informationally encapsulated, and evolved cognitive systems.[9], [12] This study adds to a growing body of work examining ethical reasoning and moral foundations among participants from across cultures, as well as the relation between ethical reasoning and moral foundations.[13]–[21]

### *Ethical reasoning and the Engineering and Science Issues Test*

Engineering ethics education has emphasized ethical understanding and reasoning as educational outcomes, using instruments such as the Defining Issues Test (DIT) and DIT2 to assess the abilities of engineering students to reason ethically and, therefore, the effectiveness of engineering ethics education.[2], [3], [5] However, it is unclear that these instruments adequately assess ethical reasoning about engineering and science specifically, so tests have been developed that better discern the effects of ethics education on reasoning about engineering and science related ethical dilemmas.[1], [2], [7], [22] These have been developed and used primarily in US universities, with US participants.[1], [3], [23]–[25] Since culture affects ethical reasoning, and engineering is more cross cultural and international than ever before, an initial goal of this study was to assess the use of one of these instruments, the Engineering and Science Issues Test (ESIT), with engineering students at an educational institution outside the US, with non-US participants.[13], [26]–[29]

The ESIT was developed by Jason Borenstein and colleagues at Georgia Tech University. This instrument is based on neo-Kohlbergian understandings of ethics – named after the work of developmental psychologist Lawrence Kohlberg – where ethical judgments result from ethical reasoning, using different schema, ways of conceiving and judging issues of right and wrong – the preconventional, conventional, and postconventional.[16], [30] The preconventional schema involves making judgments based on self-interests, conventional schema on maintaining social order, and postconventional on moral ideals. The ESIT includes six ethical dilemmas related to engineering and science, in response to which participants are asked to make a choice. For each dilemma, participants then rank the relevance of twelve considerations to their decisions, and then pick and rank the four most important considerations. Each of the twelve considerations correspond to the preconventional, conventional, or postconventional schema, or a nonsense category, included as a check to ensure participants are considering and completing the ESIT in earnest. Rankings are analyzed to determine the prevalence of postconventional reasoning, measured by the P-score, and prevalence of postconventional relative to preconventional reasoning, measured by the N2 score.[1].

Borenstein and colleagues found no significant differences in pre- and post-course P or N2 scores based on age, major, gender, or educational level, and they reported that students with previous ethics education received higher pre- and post- N2 scores, all of which are evidence the ESIT is valid.[1] Research by Borenstein's team, as well as another lead by Heather Canary, found that non-native-English speaking students received lower scores, and that their scores were less affected by ethics education. It is unclear if this effect results from language or culture – for instance, that students fail to adequately comprehend and respond to ESIT items and ethics education because of lower-levels of English-language proficiency (language), or arrive at ethical decisions in a manner different from that informing the neo-Kohlbergian perspective on which the ESIT is based (culture).[1], [25] Results of using the ESIT to assess ethics education have been mixed: Borenstein and Canary's teams reported significantly higher N2 scores after educational interventions that focused on engineering/professional ethics specifically – versus more general courses in philosophical ethics or technology and values – although not higher P scores. However, using the ESIT with freshman and seniors over two years, Melodie Selby found no significant differences on either P or N2 scores.[23]

Based on these findings, the first objective of this study was to use the ESIT with a sample of largely non-native-English-speaking participants outside the US, to better understand the use of this instruments. The second objective was to further assess the effects of ethics education on ethical reasoning.

### *Moral foundations and the Moral Foundations Questionnaire*

Recent work in moral psychology has questioned aspects of neo-Kohlbergian understandings of ethics, specifically, the extent to which ethical judgments result from reasoning, and their pre-, post-, and conventional taxonomies.[9]–[11], [31]–[34] Attempts to demarcate a specifically ethical domain – in contradistinction to convention, prudence, or law – have been based on individualist, Western values that emphasize justice and care alone, to the exclusion of understandings that take into account virtues based on collectivist values related to the importance of groups [9], [35]–[37] Although various alternatives have been proposed, MFT is one of the most prominent and influential of these frameworks.[38]

According to MFT, ethical judgments result from intuitions and are associated with different moral foundations. Likened to mental modules, moral foundations are suites of evolved, fast-acting and informationally encapsulated cognitive processes. These produce intuitions that are closer in nature to emotions than rational thought. Rational thought generally plays only a secondary role, justifying ethical judgments once they have been made.[12] Additionally, unlike (neo-)Kohlbergian theories, MFT is pluralist and non-hierarchical: Ethics is about many things rather than only one.[9], [13], [39] These foundations would be adaptive, fitness enhancing, and naturally and culturally evolved. Evidence has been given for the existence of five moral foundations, although additional foundations have been proposed.[9] Each foundation deals with a specific set of normative concerns, corresponding to and elicited by different contents. These include care, fairness, loyalty, authority, and sanctity, where caring for others is good and harming others is bad, being fair/just is good and being unfair/unjust is bad, being loyal to one's ingroup members is good and betraying them is bad, following sanctioned authority is good and undermining authority is bad, and remaining pure/sanctified – or engaging in purifying/sanctifying behaviors – is good, and the alternative is bad.

Care and fairness have been referred to as the “individuating” foundations, since they protect the individual, whereas loyalty, authority, and sanctity have been referred to as the “binding” foundations, since they bind individuals into groups.[9], [13], [40]–[42] For example, judgments concerning human rights would be based on the individuating foundations, whereas those regarding social obligations would be based on the binding foundations. The former have been associated with post-conventional forms of ethical reasoning in (neo-)Kohlbergian theories and instruments such as the DIT, DIT2, and ESIT, whereas the latter have been associated with conventional reasoning. According to MFQ – and unlike neo-Kohlbergian theories/instruments – none of these foundations are considered developmentally superior or more central to understandings of ethics (non-hierarchical).

Although debate exists, some have argued moral foundations are akin to ethical dispositions, relatively invariant tendencies to conceive of morality and make ethical judgments in a particular manner, based on an interplay between genes and culture, similar to personality types [9], [43]–[46] Since MFT is based on a broader, more inclusive understanding of ethics, it is appropriate for research in the increasingly cross-cultural, international environments of contemporary engineering. Additionally, it helps to explain and address potential conflicts of interests resulting from competing goods, which are central to engineering and other branches of applied and professional ethics.

To assess moral foundations, researchers have developed various instruments and tools.[14], [47] The most widely used and validated instrument is the Moral Foundations Questionnaire (MFQ).[13] The MFQ has been translated into more than thirty-five languages, and administered in over twenty-five countries.[42], [48]–[58] To date, most research using the MFQ has been cross-sectional, examining the relationship between moral foundations, and political orientation and culture, although some work has examined the relations between moral foundations and neural activity, race, and types of reasoning.[19], [47], [59], [60]

Previous research has found that participants who identify as conservative, and those from East-Asian countries, tend to emphasize all the foundations, whereas participants who identify as liberal, and those from Western countries, tend to emphasize the individuating and deemphasize the binding foundations.[13], [29], [40], [50], [51] This same pattern has been observed when participants have been primed for analytic reasoning, but preferences for care have not been predictive of decisions in sacrifice dilemmas [19], [60]. Although this work has generally controlled for the effects of educational levels on study variables, to the best of the author's knowledge, no work to date has examined the effects of ethics education on moral foundations.

To date, only two studies have explored the relation between moral foundations and ethical reasoning as conceived in the neo-Kohlbergian framework on which the DIT, DIT2, and ESIT are based. Galen Baril and Jennifer Wright found that pre-conventional and conventional reasoning were positively related to the loyalty and authority foundations, respectively, and that prioritizing the individuating over the binding foundations was predictive of post-conventional reasoning.[20] Rebecca Glover and colleagues reported that the binding foundations positively predicted conventional reasoning and negatively predicted P and N2 scores.[21]

Based on these findings, the third objective of this study was to use the MFQ in conjunction with the ESIT, to better understand the relation between ethical reasoning and moral dispositions, and a fourth objective was to explore the effects of ethics education on moral foundations.

#### *Analyses and hypotheses*

Given the relative paucity of research involving the ESIT – and absence of research involving the use of the ESIT in conjunction with the MFQ – this study was largely exploratory in nature. Based on previous research, however, and to conduct analyses and organize results, the following analyses were planned and hypotheses posed:

1. Explore potential differences in ESIT and MFQ responses based on gender, age, prior work experience, political orientation, and religious affiliation, and MFQ differences based on previous ethics education.
2. Hypothesize that students with previous ethics education would receive higher P and N2 scores on the ESIT, based on results from [1].
3. Hypothesize that students in this sample would receive lower P and N2 scores on the ESIT than those in [1], since the participants in this sample were non-native-English-speaking students.
4. Hypothesize that students in this study would receive higher N2 scores after completing a one-semester-long, two-credit hour course in engineering ethics, since this course curriculum focused on engineering ethics specifically. No prediction was made about the effects of ethics education on MFQ scores, although this was an area of interest.
5. Hypothesize that higher mean scores on the individuating foundations and lower mean scores on the binding foundations would be associated with higher P and N2 scores on the ESIT, based on prior work involving MFT and the DIT2.[20], [21]

## Method

*Participants.* Participants were undergraduate engineering students at the University of Michigan-Shanghai Jiao Tong University Joint Institute (UM-SJTU JI). The UM-SJTU JI was founded in 2006 and is a US-Chinese joint educational venture based in Shanghai Jiao Tong University (SJTU). It has majors in mechanical engineering (ME), electrical and computer engineering (ECE), and material science (MS), which are modelled on those of the University of Michigan. The UM-SJTU JI's programs in ME and ECE are ABET accredited. Admission of domestic students to the UM-SJTU JI is based on having been first admitted to SJTU, based on Gaokao scores, the Chinese college-entrance exam. SJTU is consistently ranked as one of the top four universities in China, and has top programs in engineering. Tuition for the UM-SJTU JI is much higher than that of SJTU, currently 75,000 RMB (approximately 10,000 USD) per year, so study participants tend to come from more affluent socio-economic backgrounds. The official language of the UM-SJTU JI is English, and all course instruction takes place in English. Although the English-language skills of participants in this study were not assessed, in 2017, the UM-SJTU JI conducted a survey of undergraduate students who took the TOEFL, finding the mean score was 102.45 (N = 186; SD = 6.19). Of undergraduate students who take the TOEFL, this score falls in approximately the 85<sup>th</sup> percentile.[61] As a result, all participants in this sample have high-level English-language proficiency. The average TOEFL score of test takers from China is 79.[61]

The inclusion of responses in this study was voluntary and non-incentivized. Students were given class time at the beginning and end of the Fall 2019 semester, in two sections of the course "Global Engineering Ethics," to complete the ESIT, MFQ, and demographic items. "Global Engineering Ethics" is a 2-credit hour, standalone, required course that students generally take during their junior or senior years, and it fulfills ABET student outcomes 2-5. The course contents and exercises are based on *Global Engineering Ethics*, emphasizing the international and cross-cultural natures of contemporary engineering practice.[62] It is lecture, discussion, and case-study based, with students researching, writing up, and presenting original case-studies about topics or incidents at the intersection of technology/engineering and society, politics, or economics. In some cases, studies focus on work students have done in other courses, research with technical instructors, or internships.

Only the responses of students who read and signed a consent form were aggregated in study responses. In total, 79 survey packets were distributed and collected at the beginning of the semester, of which 68 students consented to have their responses used, and 88 survey packets were given out and collected at the end of the semester, of which 84 students consented to have their responses used. This discrepancy results from the fact that registration at the UM-SJTU JI is open the first two weeks of the semester, such that students dropped out and enrolled in the class after the first day of class and before the last day of class, when the survey packets were distributed and completed. Seven students who completed surveys at the beginning of the year did not complete corresponding surveys at the end of the year, and twenty-two students who completed surveys at the end of the year had not completed surveys at the beginning of the year.

To ensure a high-quality sample of engaged participants, relatively stringent criteria were used to include responses. According to ESIT protocol, responses should be excluded for 1. failing "to

complete 24 or more rating questions,” 2. failing “to complete 9 or more ranking questions,” 3. receiving “a ‘nonsense’ score of 11 or more points” [1, p. 393]. As calculating nonsense scores by hand would be cumbersome, and all responses had to be typed into spreadsheets, the responses of all participants who failed to complete the ESIT or completed the ESIT incorrectly – for instance, filling in multiple responses – were excluded. According to MFQ protocol, responses should be excluded for answering 3 or above on the “math” catch question, and 2 or below on the “good” catch question. The responses of all participants who failed to complete the MFQ, or completed the MFQ incorrectly, were excluded, as well as those who failed to fill in demographic information or did so incorrectly. This resulted in a final sample size of 28 participants.

6 of the 28 participants were female, and the average age was 21 years old (SD = 0.6). All participants were engineering majors, with 1 sophomore, 5 juniors, and 20 seniors. None of the participants were US citizens, and only 2 were native-English speakers. 1 came from Africa, and the rest identified their region of origin as China, Korea, or Japan. Information regarding technical experience, political orientation, and religious affiliation can be found below (Table 1).

**Table 1** Breakdown of political orientation, religious affiliation, and technical experience

Political orientation				
Very conservative	Somewhat conservative	Neither conservative nor liberal	Somewhat liberal	Very liberal
0	4	14	8	2
Religious affiliation				
Participate in organized religious activities at least once per month	Participate in organized religious activities at least once per year	Consider myself spiritual but do not participate in organized religious activities	Do not participate in organized religious activities and do not consider myself to be spiritual	
1	1	5	21	
Technical experience				
One or more semesters as employee/intern in a technical position	One or more semesters as a research assistant in a technical position		No significant experience in a technical position	
8	3		17	

*Materials and procedure.* This study used paper survey packets comprised by the thirty-item, English-language version of the MFQ available on [moralfoundations.org](http://moralfoundations.org), since the thirty-item version has greater internal consistency than the twenty-item version, as well as the ESIT.

The order of the two instruments was counterbalanced, with the ESIT being placed first and the MFQ being placed second in half of the packets, and the MFQ being placed first and the ESIT being placed second in the other half of the packets. No evidence was found of an order effect resulting from completing the ESIT before the MFQ, or vice versa, on ESIT or MFQ item means ( $V = 0.26$ ,  $F(1,7) = 1.02$ ,  $p = .44$ ). A consent form outlining the nature of the research was attached to the first page of the survey packet, and demographic items followed the ESIT and

MFQ. Packets were distributed at the beginning of the first and last days of class, and students were given 45 minutes to complete both. Survey packets were checked and sorted according to the inclusion criteria outlined above, and response information from survey packets was then entered into spreadsheets.

## Results

To explore potential differences in ethical reasoning and moral dispositions related to gender, age, prior work experience, political orientation, and religious affiliation, a series of MANOVA's were conducted, treating those factors as input variables and the pre- and post-course means of ESIT and MFQ items as output variables. None of these were significant.<sup>1</sup>

Three of the four hypotheses listed above were partially supported, according to the following analyses:

To examine the effects of previous ethics education on ethical reasoning and moral foundations, a series of ANOVA's were carried out. None of these provided evidence for significant differences between mean scores on ESIT and MFQ items (Table 2). Therefore, hypothesis one was not supported.

**Table 2** Comparison of ESIT and MFQ pre-course measure means (standard errors) by previous ethics education (N)

Education	P	N2	Care	Fairness	Loyalty	Authority	Sanctity
General ethics/philosophy course (8)	0.478 (0.062)	1.931 (0.349)	2.917 (0.351)	3.666 (0.283)	3.105 (0.386)	2.687 (0.336)	2.4162 (0.379)
Some ethics in other course (11)	0.532 (0.057)	1.966 (0.323)	3.060 (0.325)	3.591 (0.262)	2.953 (0.357)	3.060 (0.311)	2.925 (0.351)
None (9)	0.4766 (0.059)	1.738 (0.334)	2.777 (0.336)	3.111 (0.271)	2.740 (0.369)	2.796 (0.322)	2.628 (0.363)
P-value*	0.56	0.80	0.69	0.13	0.71	0.47	0.38

\*Based on one-way ANOVA, not assuming equality of variance

To explore the effects of culture on ESIT items, and assess the effects of engineering ethics education on ethical reasoning and moral dispositions, a series of independent and dependent t-tests were carried out. The N2 scores of students in this sample were significantly lower – both pre-course ( $t(52) = 6.96, p < 0.01$ ) and post-course ( $t(55) = 8.16, p < 0.01$ ) – than those reported by Borenstein and colleagues, but the P scores in this sample were not significantly lower – either pre-course ( $t(33) = 0.24, p=0.80$ ) or post-course ( $t(35) = 0.31, p=0.75$ ) (Table 3).

<sup>1</sup> MANOVA was chosen to reduce the possibility of type one errors, where outcome variables might be related. Data files are available on request.



This indicates that culture did not significantly impact the proportion of postconventional reasoning (P scores), but that it did affect the proportion of preconventional relative to postconventional reasoning (N2 scores). These results partially support hypothesis two.

Additionally, N2 scores of study participants were significantly higher after a one semester, two-credit hour course in engineering ethics, although not P scores (Table 3). This indicates that, while the curriculum used in this study did not significantly increase the proportion of postconventional reasoning, it decreased the proportion of preconventional relative to postconventional reasoning. These results partially support hypothesis three.

**Table 3** Comparison of ESIT pre- and post-course means (standard errors) by samples (N) Borenstein et al. sample (319)[1] Current sample (28)

	P	N2	P	N2
Pre-course	0.505 (0.008)	2.972 (0.084)	0.499 (0.023)	1.883 (0.132)
Post-course	0.534 (0.008)	3.406 (0.085)	0.541 (0.021)	2.151 (0.128)
Difference	0.029	0.434***	0.042	0.268***

\*, \*\*, and \*\*\* denote statistical significances at the 10%, 5%, and 1% levels, respectively

Means scores on the care and loyalty foundations were significantly higher post-course, indicating these took on increased importance (Table 4).

**Table 4** Comparison of MFQ pre- and post-course means (standard errors)

	Care	Fairness	Loyalty	Authority	Sanctity
Pre-course	2.929 (0.133)	3.459 (0.115)	2.928 (0.147)	2.869 (0.129)	2.685 (0.147)
Post-course	3.222 (0.132)	3.727 (0.107)	3.399 (0.131)	2.970 (0.128)	2.506 (0.164)
Difference	0.291***	0.268	0.470***	0.100	-0.178

\*, \*\*, and \*\*\* denote statistical significances at the 10%, 5%, and 1% levels, respectively

To examine the relationship between ethical reasoning and moral foundations, and between different types of moral foundations, mean pre- and post-course ESIT and MFT items were calculated, as well as Pearson product-moment correlations between items (Table 5).

**Table 5** Pearson product-moment correlations (p values) between the means of pre- and post-course ESIT and MFT items

Item	M (SE)	P	N2	Care	Fairness	Loyalty	Authority
P	0.520 (0.016)						
N2	2.017 (0.122)	0.248 (0.20)					
Care	3.074 (0.123)	0.312 (0.10)*	0.035 (0.85)				
Fairness	3.593 (0.086)	0.002 (0.98)	-0.094 (0.63)	0.449 (0.01)***			
Loyalty	3.164 (0.129)	-0.062 (0.75)	-0.299 (0.12)	0.402 (0.03)**	0.579 (<0.01)***		

Authority	2.920 (0.113)	-0.089 (0.64)	-0.044 (0.15)	0.364 (0.05)*	0.108 (0.58)	0.551 ( $<0.01$ )***	
Sanctity	2.596 (0.146)	0.074 (0.70)	-0.222 (0.25)	0.551 ( $<0.01$ )***	0.295 (0.12)	0.554 ( $<0.01$ )***	0.619 ( $<0.01$ )***

\*, \*\*, and \*\*\* denote statistical significances at the 10%, 5%, and 1% levels, respectively

The care foundation was significantly correlated with P scores at the 10% level, and the loyalty foundation was negatively correlated with N2 scores, at a level that approached significance (Table 5). Therefore, hypothesis four was partially supported.

Correlations between MFQ items are somewhat in line with previous research findings, with high correlations between items associated with the individuating (harm and fairness) and binding (loyalty, authority, and sanctity) foundations – for example, fairness and care, and loyalty and authority – and an absence of correlations between individuating and binding items – for instance, fairness and authority. However, items associated with fairness and loyalty, and care, loyalty, and sanctity, were also highly correlated.

## Discussion

The absence of differences in ESIT scores based on demographic information – such as gender, political orientation, and religious affiliation – lends support to the use of the ESIT as an instrument unbiased by these factors. The absence of differences based on previous ethics education might be construed as evidence against the ESIT’s validity – in other words, how accurately it assesses the impact of ethics education. However, neither this study nor previous ones closely examined the nature of reported previous ethics education – for instance, what was taught, in which classes, and how. Since this study and previous ones discovered differences in ethical reasoning based on engineering ethics education, however, it provides support for the use of the ESIT as a valid instrument to assess the impact of engineering ethics education. In other words, the ESIT is capable of discerning gains made in ethical reasoning after an educational intervention meant to increase ethical reasoning.

Study results seem to support cultural rather than linguistic explanations of ESIT differences between native- and non-native-English-speaking students. In the study conducted by Borenstein and colleagues, only 15 non-native-English-speaking students were included in the experimental condition, and their levels of English-language proficiency were not indicated. This study included 26 non-native-English-speaking participants, all of whom have high English-language proficiency.

Lower N2 scores among participants in this sample could be taken as evidence of cultural difference. These results are similar to those reported in an earlier study using the DIT with Chinese participants, finding they scored high on both pre- and post-conventional reasoning.[63] Since N2 scores measure postconventional relative to pre-conventional reasoning, and there were no significant differences between the mean P scores of this sample and that of Borenstein and colleagues, lower N2 scores within this sample indicate greater pre-conventional reasoning. However, qualitatively, participants in this study made pre- to post-course gains similar to those of native-English speakers in Borenstein and colleagues’ study, both samples beginning and ending with similar P scores but ending with higher N2 scores, indicative of decreased

preconventional reasoning. These results undermine a linguistic explanation of differences, that students simply failed to understand ESIT items and/or course contents. If that were the case, then the qualitative results pattern in this study should have been the same as that of non-native-English speakers in the study by Borenstein and colleagues, but it was not.

These results provide further evidence for a growing body of research about the positive effects of engineering ethics education on ethical reasoning. Higher post-course N2 scores indicate greater postconventional relative to preconventional reasoning. As with previous findings, the course used in this study addressed engineering ethics specifically, rather than more general topics, such as philosophical ethics or technology and values. Corresponding MFQ results indicate that engineering ethics education was related to a greater concern with both care and loyalty. The current study provides only initial evidence of the relation between moral dispositions and ethical reasoning. Only a concern with harm, as measured by the MFQ, was significantly related to P scores – a concern with loyalty was marginally, negatively related to N2 scores.

### **Conclusion and future research**

The current study provides initial evidence for the effectiveness of using the ESIT to assess engineering ethics education outside the US and among non-native-English-speaking participants. Further, it shows that engineering ethics education can increase ethical reasoning abilities, and that ethical reasoning is related to moral dispositions. Since this study was only preliminary and exploratory in nature, it suffers from shortcomings that will be addressed in future work.

The sample size was relatively small, given the large number of survey items used. This resulted from the stringent criteria used to include participant responses, greater than those used in previous studies. This ensured a higher quality sample, that participants whose responses were included had thoughtfully completed survey materials. But this likely made it more difficult to discern significant relations between study items, based on the smaller sample size. To address this shortcoming, future research will use e-versions of study materials, to ensure participants fill in all information and do not mark multiple responses, and reduce the work involved in manually imputing data.

Interestingly, although ethics education resulted in a greater concern with loyalty, loyalty was negatively related to N2 scores. Additionally, many MFQ items were associated in unexpected ways. At present, the author is not sure how to explain these results, but they will be further addressed by future research.

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