

Asian Public Concern over the Ethics of Scientists: Predictors and Implications for Research Ethics

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The following two research questions were examined in this study: 1) What is the public's level of concern with ethics in science; and 2) Are religious affiliation, religious involvement, and education predictors of that concern in Asia? The sample includes 7,963 men and women between the ages of 20 and 59 from ten Asian countries. An overall low level of relative concern toward ethics in science was reported. Lower educational attainment was associated with lower odds of concern. Christian religious affiliation and moderate religious involvement were also associated with lower odds of concern. This article highlights the importance of more active research into social perspectives on ethics in science.

Keywords: ethics, research, Asia, religion, education

INTRODUCTION

Ethics in Science

Ethics in science applies to many aspects of research and can include data falsification and fabrication, plagiarism, data management, publication practices, collaboration, mentoring, human and animal subject protection, and social responsibility. Unethical conduct may impede scientific progress through misleading data and contributing to mistrust among scientists, which can hinder collaboration and cause harm to human and animal subjects. Thirty-three

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percent of 3,247 early-career and mid-career scientists reported that they had engaged in questionable behavior in the previous three years (Martinson et al., 2005). A recent meta-analysis of scientific misconduct found that a pooled weighted average of 1.97% of researchers admitted to having fabricated, falsified, or modified data, and up to 33.7% admitted other questionable research practices (Fanelli, 2009). When speaking of other researchers' behavior, the respondents quoted even higher rates of misconduct among peers: 14.12% for falsification and up to 72% for other questionable research practices.

A growing body of literature has examined the predictors of unethical behavior among scientists. Scientists have reported that competition among them for funding, positions, and recognition can contribute to questionable research conduct (Anderson et al., 2007). Among doctoral-level health science students, more experience was associated with a decrease in ethical decision-making (Mumford et al., 2009). Kornfield (2012) examined 146 Office of Research Integrity reports and concluded that the acts of misconduct stemmed from individual psychological traits and circumstance.

Predictors of Unethical Behavior

A more extensive body of work examining the predictors of unethical behavior can be found in business literature. The findings and associated theories are briefly reviewed in this article to provide a broader background for this research. Applied ethics is often conceptualized as either normative ethics, which focuses on guiding how individuals should behave, and empirical ethics, which is concerned with explaining and predicting individuals' actual behavior (Donaldson and Dunfee, 1994; Trevino and Weaver, 2001). This study is mainly concerned with empirical ethics. Rest's (1986) framework for ethical decision-making sets the foundation for most theoretical explorations in ethics and behavior within the business literature. The framework emphasizes the following four steps: 1) identifying the moral nature of an issue, 2) making a moral judgment, 3) establishing moral intent, and 4) engaging in moral action. The effect of various factors on the steps of this framework have been explored, including gender (Fleischman and Valentine, 2003; Christie et al., 2003), education (Deshpande, 1997; Razzaque and Hwee, 2002), religion (Singhapakdi et al., 2000; Vitell, 2009; Lam et al., 2008; Kennedy and Lawton, 1996), age (Deshpande, 1997; Latif, 2000), and nationality (Cherry et al., 2003; Jackson, 2001). Furthermore, the ethical climate of organizations tends to influence moral awareness (VanSandt et al., 2006) and ethical behavior (Weber and Seger, 2002; Verbeke et al., 1996).

Theoretical Frame and Rationale

This study was specifically guided by two frameworks from the health sciences. The theory of reasoned action (TRA), which states that people's

behavior is predicted by their attitude toward the behavior and how they think other people would view them if they exhibited the behavior (Ajzen, 1980; Fishbein and Ajzen, 1975). This theory allows for an examination of a scientist's behavior from a fairly unexplored perspective. As a complement to TRA, Maslow's hierarchy of needs (Maslow, 1954, 1943) is also used to interpret the results.

The public's concern with the ethics of scientists is examined due to its possible implications for predicting the behavior of scientists. TRA is utilized in this research to guide this exploration and is categorized into three factors: 1) attitudes, 2) subjective norms, and 3) behavioral intention. It is the second factor that is most important to this research. Subjective norms address the influence of social environment on behavior. This influence is weighted by the importance the individual places on the opinions of others. It is this balance that affects behavior. Maslow's hierarchy of needs further helps to explain the results of this study. The hierarchy is often illustrated in the form of a pyramid consisting of five tiers. The base of the pyramid is basic physiological needs. The second tier is safety needs: security, order, and stability. The third tier is psychological needs. The fourth tier is success and status. The top of the pyramid is self-actualization; this is where ethics are considered. Once the needs in the lower tiers are addressed, the individual can address those in the higher tiers. If the needs in the lower tiers are not satisfactorily addressed, then those in the higher tiers are unlikely to be given attention.

The purpose of this study was to determine the Asian public's level of concern with ethics in science and the predictors of that concern, while adjusting for key demographic variables. Using the TRA and Maslow's hierarchy of needs, it was hypothesized that the level of concern with ethics in science would be relatively low and that more education and religious involvement would be associated with greater concern with ethics in science. An additional predictor, religious affiliation, was explored in order to assess if concern varied by affiliation. Findings will contribute to the systematic understanding of the public's concern toward ethics in sciences and associated predictors. The findings also have implications for further research into a possible connection between public concern and the behavior of scientists. Possible future interventions needing to be tested could focus on the public with the primary goal being to impact the behavior of scientists.

METHODS

Design

This study is an analysis of the dataset, AsiaBarometer. The collection of this dataset was led by researchers at the University of Tokyo's Institute of

Oriental Culture. AsiaBarometer was designed to capture the physical, psychological, and sociological dimensions of citizens in East, Southeast, South, and Central Asia. Participants were selected by using various forms of multistage, stratified, clustered, national probability sampling depending on the country. The mode of data collection was structured face-to-face interviews. All indentifying markers that allowed the data to be linked to the participants were removed, and therefore, this study is not considered to be human subjects research. The data were collected in 2003. This dataset was selected for this study because it covers matter of opinion that are essential to TRA and Maslow's hierarchy of needs, which is the theoretical frame for this analysis.

Participants

The sample consists of 8,086 participants. The gender breakdown of the participants was 3,907 (49.1%) men and 4,045 (50.9%) women. Participants were between the ages of 20 and 59. The age groups were categorized into four categories: 20–29, 2,436 (30.6%); 30–39, 2,326 (29.2%); 40–49, 1,903 (23.9%); and 50–59, 1,298 (16.3%). Participants were drawn from ten Asian countries: Japan: 848 (10.6%); South Korea: 782 (9.8%); China: 788 (9.9%); Malaysia: 792 (9.9%); Thailand: 799 (10.0%); Vietnam: 803 (10.1%); Myanmar: 800 (10.0%); India: 814 (10.2%); Sri Lanka: 745 (9.4%); and Uzbekistan 792 (9.9%). Further information regarding the characteristics of the participants can be found in Table 1.

Measures

The outcome variable was concern over the ethics of scientists. The survey question read, "Which, if any, of the following issues cause you great worry? Please choose all issues that cause you serious worry . . ." Twenty-nine items followed this prompt. "Ethics of scientists (ethics in science)" was one option among these 29 items. The predictor variables included education, religion, frequency of attending religious services, gender, age, and country. All six of these variables were categorical. The categories for education were middle school or less, high school or vocational school, technical school, and university. The categories for religion were Christian (including Catholic), Muslim (Sunnah), Muslim (Shia), Hindu, Buddhist, Confucian, Jewish, Sikh, Taoism, other, none, and don't know. Due to a low number of Shia (48), these participants were grouped with Sunnis in the Muslim category. Also, due to the low numbers of participants identifying as Confucian (7), Jewish (2), Sikh (10), and Taoist (35), these participants were grouped into the "other" category. Frequency of attending religious services was categorized as at least once a week, once a month, on holidays or less (only on special holy days, once a year, hardly ever), and never.

The other predictor variables—gender, age, and country—were categorized in the survey as they are displayed in Table 1.

Data Analysis

Frequency distributions were used to describe the characteristics of the participants. Frequency distributions were also used to answer the first research questions, What is the public's level of concern with ethics in science relative to other concerns? A generalized linear model (GLM) with a logit link was used to answer the second research question, are religious affiliation, religious involvement, and education predictors of the public's level of concern with ethics in science? The GLM was also used to adjust the results for gender, age, and nationality.

RESULTS

Descriptive statistics were used to assess demographics. Participant characteristics are displayed in Table 1.

Frequency distribution provided percent and number of participants selecting the given responses. Participants on average reported that "ethics in science" (4.6%) ranked third to last of 29 issues that concerned them. Unemployment (60.6%) and poverty (56.5%) were ranked first and second. The second to last was "other" (.6%) and the last item of concern was "don't know" (.2%). Table 2 provides further details regarding issues of concern to participants.

A GLM was used to assess the significance of the association of education and religion with concern toward the ethics of scientists, adjusting for age, gender, and country. Compared to those with university education, those with high school or vocational education ($OR = .7$; $p = .004$; 95% CI: .872, .004) and middle school or less education ($OR = .5$; $p = .000$; 95% CI: .342, .670) had 30% and 50% lower odds to be worried about the ethics of science. Compared to those with no religious preference, Christians ($OR = .3$; $p = .012$; 95% CI: .259, .848) had 70% lower odds to worry about the ethics of science. Compared to those who never attended any religious services, those who attended services moderately, defined as "once a month," ($OR = .5$; $p = .015$; 95% CI: .320, .886) had 50% lower odds to be worried about the ethics of science. Table 3 provides further details of the regression analysis.

DISCUSSION

Society's concern for issues such as financial stability takes significant precedence ahead of concern over the ethics of scientists. These other preoccupations

Table 1: Characteristics of Participants (n = 7,963)

Characteristic	n	Percent
Gender		
Female	4,052	50.9%
Male	3,911	49.1%
Age		
20–29	2,436	30.6%
30–39	2,326	29.2%
40–49	1,903	23.9%
50–59	1,298	16.3%
Country		
Uzbekistan	792	9.9%
South Korea	782	9.8%
China	788	9.9%
Malaysia	792	9.9%
Thailand	799	10.0%
Vietnam	803	10.1%
Myanmar	800	10.0%
India	814	10.2%
Sri Lanka	745	9.4%
Japan	848	10.6%
Education		
Middle School or Less	1,959	24.6%
High School or Vocational	3,404	42.7%
Technical School	1,055	13.2%
University	1,545	19.4%
Religion		
Christian	705	8.9%
Muslim	1,252	15.7%
Hindu	854	10.7%
Buddhist	2,929	36.8%
Other	170	2.1%
None	2,053	25.8%
Frequency of Attending Religious Services		
At Least Once a Week	1,725	21.7%
Once a Month	1,058	13.3%
On Holidays or Less	3,723	46.8%
Never	1,457	18.3%

notwithstanding, higher education is associated with higher odds of concern. Christian religious affiliation and moderate religious involvement was associated with lower odds of concern over the ethics of scientists. Greater educational attainment may be linked to a better understanding of research, the importance of research, and the magnitude of ethics in research. Research itself may seem as empowering and a means for improvement in socioeconomic condition. Researchers themselves reported their own sense of “doing what is right” and graduate education experiences, which are more subjective, as the leading drivers when deciding authorship, and listed institutional policies, which are more codified, as least influential (House and Seeman, 2010). However, there are limitations to the educational approach, as was found when examining the outcomes of a graduate responsible conduct of research

Table 2: Concerns of Participants (n = 7,963)

Rank	Concern	n (%)
1	Unemployment	4,888 (60.6%)
2	Poverty	4,551 (56.5%)
3	Health Issues	3,672 (45.7%)
4	Crime	3,669 (45.6%)
5	Terrorism	3,512 (43.6%)
6	Wars and Conflict	3,404 (42.2%)
7	Moral Decline	3,304 (41.0%)
8	Environmental Destruction	3,262 (40.5%)
9	Natural Disasters	2,982 (36.9%)
10	Illegal Drugs and Drug Addiction	2,920 (36.1%)
11	Corruption	2,635 (32.6%)
12	Economic Inequality	2,604 (32.2%)
13	Economic Problems Within Country	2,525 (31.2%)
14	Education	2,265 (28.0%)
15	Human Rights	1,451 (17.9%)
16	Overpopulation	1,393 (17.2%)
17	Global Recession	1,347 (16.7%)
18	Social Welfare System in Country	1,301 (16.1%)
19	Aging of Society	1,210 (15.0%)
20	Lack of Democracy	1,006 (12.4%)
21	Religious Fundamentalism	900 (11.1%)
22	Refugee and Asylum Issues	706 (8.7%)
23	Fair World Trade	489 (6.0%)
24	Fast Pace of Change	538 (6.7%)
25	Threat of Industry Power	507 (6.3%)
26	Globalization	459 (5.7%)
27	Ethics of Scientists	362 (4.6%)
28	Other	49 (.6%)
29	Don't Know/NA	20 (.2%)

(RCR) course: Knowledge of RCR can increase without an increase in moral judgment (Schmaling and Blume, 2009). Furthermore, the pedagogy guiding the educational efforts may be a substantial variable when examining RCR, as interactive sessions of RCR have been reported to be more effective than traditional coursework (Antes et al., 2009).

Religious affiliation may indicate the extent to which the various world religions address and prioritize science. Furthermore, religious involvement may be correlated with the extent to which a person is concerned with ethics and/or concerned with “worldly matters.” The participants who were highly involved in religion may be less concerned with worldly matters, and participants who were least involved with religion may be less concerned with ethics, since religion can be the primary source of ethical guidance for many people. Religious involvement would tend to be in the higher tiers of Maslow’s hierarchy of needs. Much of Table 2 is aligned with Maslow’s hierarchy of needs. Ethics are located at the very top of the hierarchy, and according to Maslow, they are important only when the more fundamental needs below have been addressed. Most human subjects research addresses the base of the hierarchy

Table 3: Summary of GLM Predicting Concern over Ethics in Research (n = 7,963)

Variable	B	SE	OR	Lower 95% CI	Upper 95% CI	P
Education						
Middle School or Less	-.737	.1714	.479	.342	.670	.000
High School or Vocational	-.423	.1457	.655	.493	.872	.004
Technical School	-.340	.2005	.712	.480	1.054	.090
University	-	-	-	-	-	-
Religion						
Christian	-.757	.3026	.469	.259	.848	.012
Muslim	-.464	.3007	.629	.349	1.134	.123
Hindu	-.055	.4351	.946	.403	2.220	.899
Buddhist	.269	.1893	1.309	.903	1.896	.155
Other	.320	.3629	1.378	.676	2.805	.377
None	-	-	-	-	-	-
Frequency of Attending Religious Services						
At Least Once a Week	.264	.2408	1.302	.812	2.087	.273
Once a Month	-.631	.2602	.532	.320	.886	.015
On Holidays or Less	-.300	.1820	.741	.518	1.058	.099
Never	-	-	-	-	-	-
Gender						
Female	-.115	.1111	.892	.717	1.109	.302
Male	-	-	-	-	-	-
Age						
20-29	-.318	.1715	.727	.520	1.018	.063
30-39	-.272	.1698	.762	.546	1.063	.109
40-49	-.244	.1751	.783	.556	1.104	.163
50-59	-	-	-	-	-	-
Country						
Uzbekistan	1.166	.3781	3.210	1.530	6.735	.002
South Korea	.091	.3903	1.095	.510	2.353	.816
China	1.667	.3079	5.299	2.898	9.688	0
Malaysia	.587	.3975	1.799	.825	3.922	.14
Thailand	.937	.3428	2.552	1.304	4.998	.006
Vietnam	2.435	.2940	11.411	6.413	20.304	0
Myanmar	-.159	.4261	.853	.370	1.967	.709
India	.713	.4982	2.040	.768	5.416	.152
Sri Lanka	1.005	.3541	2.732	1.365	5.469	.005
Japan	-	-	-	-	-	-

(physiological and safety needs); therefore, ethics could be more important to the public if the relationship to the base of the hierarchy was conveyed more prominently.

Limitations

A degree of ambiguity is present in how “ethics of scientists” was measured in the dataset. Participants could have attached various meanings to the phrase, such as research misconduct, abuse of human or animal subjects, or scientists accepting research funding from private corporations. The latest

collection of the AsiaBarometer dataset was used for this study; however, this dataset is from 2003. Perspectives may have changed over time as many of the included Asian countries have undergone rapid development.

Implications

The opinions of others have been associated with behavior change. Subjective norms influenced behavior across a variety of contexts, examples include: cigarette smoking among Chinese adolescents (Guo et al., 2007), prenatal screening uptake (Cooke and French, 2008), and driving while intoxicated (Gastil, 2000). Increasing public concern with ethics in science may decrease unethical behavior among researchers. Hackett (1994) suggested that a social control perspective may assist in preventing research misconduct through further developing the public's understanding of scientific research. The author noted that by improving educational attainment and partnerships with faith-based organization, the public's concern regarding the ethics of scientists could be improved, and, in turn, unethical behavior on the part of scientists decreased. Maslow's hierarchy of needs may also be applied to the direct conduct of researchers.

Other personal factors such as mental health problems and poor judgment may contribute to research misconduct, as may situational factors, such as marital problems and financial problems (Davis, 2002). Similarly, a recent review of the institutional review board (IRB) decision-making literature indicates that personal factors such as perceived stigma regarding the risk and personal group affiliation with human subjects influenced IRB decisions (Pritchard, 2011). Aspects of the scientific environment that may also contribute to unethical decision making (Helton-Fauth et al., 2003). Furthermore, scientists who felt treated unfairly by their institution were more likely to report unethical behavior (Martinson et al., 2006; Martinson et al., 2010).

It is important to note that cultural differences may partially account for varying perspectives of research misconduct among researchers (Davis, 2003), and possibly among the public. However, an international code of research ethics, the Nuremburg Code, has been in place since the end of World War II. Further promotions and continued refining of international codes, such as the Singapore Statement, that account for varying perspectives can help move science forward by helping to develop trust among researchers and the public, set standards for the development of local codes, and improve research ethics (Resnik, 2009).

Engaging the public in research has been proposed via a community-based participatory research (CBPR). CBPR may improve research ethics (Simon et al., 2011). Communication problems between researchers and community members have been reported (Simon et al., 2011); however, Guta (2012) reported that researchers have been open to community participation.

The presence of community members on IRBs has provided information on consent form improvement (Lidz et al., 2012). Conversely, more community-based research assistants admitted to research misconduct themselves than did traditional research assistants (True et al., 2011). Further examination of public engagement in discussions of ethics in biotechnological research has also been proposed (Secko et al., 2008). Familiarity with researchers or knowing others participating in the research was reported as a factor in parents permitting adolescences to participate in sexually transmitted infections (STI) research (Ott et al., 2010).

CONCLUSION

The public's low concern over scientists' ethics may lead some researchers to be less concerned with research ethics. Higher educational attainment and partnership with faith-based organizations may improve the public's concern over the ethics of scientists. This research also points to the potential for interventions aimed at the public with the intent of affecting the behavior of scientists. Specifically, the public's concern over the ethics of scientists could possibly be increased by educational effort that communicates the relevance of science to basic human needs. Further research is needed regarding societal concern toward ethics in science and how this may influence the behavior of scientists.

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