AI and Ethics
https://doi.org/10.1007/s43681-023-00279-4

ORIGINAL RESEARCH

Personality and demographic correlates of support for regulating artificial intelligence

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Received: 15 November 2022 / Accepted: 20 March 2023

Abstract
The arrival of artificial intelligence (AI) in our society has sparked many hopes and fears, with people having diverging views on the need to strictly regulate AI. The current study investigates how demographic and personality traits are associated with a desire to strictly regulate AI using a representative sample of adults from New Zealand ($N = 47{,}951$ participants). Data revealed that support for strict regulation of AI is positively related with agreeableness, neuroticism, and honesty–humility. However, it is negatively related to openness to experiences. A wide range of demographic factors including gender, age, ethnicity, religiosity, neighbourhood level economic deprivation, living rural, relationship status, and parental status were additionally related to support for regulation of AI. However, all these effects were fairly small suggesting that both personality and socio-demographic factors contribute to support for regulating AI, but other factors beyond these characteristics should also be considered for understanding people's support for regulating AI.

Keywords Artificial intelligence · Personality · Demographic · Regulation · Attitude · National survey

1 Introduction

The widespread incorporation of artificial intelligence (AI) in many domains of everyday life has led to much debate around the need for regulation of this new technology. AI influences how we interact with conversational agents and robots, how our cars drive, who gets a home loan, and the cost of our insurance premiums [1]. Hagendorff [2] pointed out that the ethical frameworks developed to protect our society from privacy breaches, discrimination, and safety risks have no practical consequences. They are often only marketing tools and are considered by AI developers often only as "add-ons". The regulative power of these frameworks are also limited, and this is why there are unsurprisingly concerns about the degree to which AI needs to be strictly regulated.

What factors relate to people's support or opposition for regulating AI? Are certain personality traits more related to support for regulating AI over others? Are certain demographic characteristics more related to a desire for regulating AI? The current research examines the extent to which both personality and socio-demographic factors predict support for the strict regulation of AI.

2 Literature review

Recent research has shown that personality traits play a role in how people react to a social robot [3–6]. There is also considerable research that tries to enable robots and conversational agents to exhibit personality traits [7–9]. However, previous research has not sufficiently explored how personality and demographic factors relate to broader

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Published online: 30 March 2023

support for policies that involve the regulation of such technology, or AI [3].

The European Commission launched its first proposal for an legislative framework for AI in 2021 and it is currently in the consultation phase [10]. In April 2022, lawmakers in the USA introduced the Algorithmic Accountability Act of 2022 [11]. Academics voiced considerable reservations towards this bill [12]. A comparison of the proposed European and American AI frameworks is available and came to the conclusion that the American framework is too modest and is expected to have a limited impact [13].

The Organisation for Economic Co-operation and Development (OECD) set standards for practicable and flexible AI standards already in 2019 [14]. They intend to help member countries put them into practice, but they are of course not legally binding. In addition, the United Nations Educational, Scientific and Cultural Organization (UNESCO) voted in 2021 to adopt the Recommendation on the Ethics of Artificial Intelligence [15].

In the context of the current research (New Zealand), Stats NZ published a report on the use of algorithms [16]. In 2020, an Algorithm Charter was drafted in which government agencies committed themselves to manage their use of algorithms in a fair, ethical and transparent way.[1] Besides these initiatives, there are no legally binding policies on AI in New Zealand yet.

National and international organisations are developing and implementing AI frameworks. Many recommendations are already available, but the first legally binding policies are currently being discussed. While experts in the fields will be aware of these endeavours, they are not likely to have been studied by the general public in detail.

Recently, Matthews et al. [17] pointed out that existing personality models need to be more closely aligned with interactive AI technology. The attitudes that people hold towards the need to regulate AI are likely to be influenced by both personality traits and demographic factors. For example, Sindermann et al. [18] conducted a study with German and Chinese participants and found a positive correlation between neuroticism and general attitudes towards AI. While this recent work is valuable, the authors acknowledged that their study was limited to a convenience sample and the generalisability to the general population is, therefore, limited. Moreover, as their work focussed on general attitudes towards AI rather than policy support for regulating AI, the relationship between personality and policy support for regulating AI is not obvious. Specifically, people can hold generally positive attitudes towards technology without necessarily supporting policies that promote its use, just as people can hold positive attitudes towards a target while opposing policies relating to it. For example, research on the principle-implementation gap demonstrates that people can support a general principle and even have favourable attitudes towards a specific issue while simultaneously opposing policies that achieve the same principle [19]. Therefore, the current research examines how personality factors are associated with public support for the regulation of AI.

In addition, we examine how various socio-demographic factors within the general population relate to public support for the regulation of AI. In order to fully understand how demographic factors relate to support for regulating AI, it is necessary to consider the influence of these factors within a diverse and wider population. For example, to understand the role of education in support for regulating AI, it is important to sample the entire range of the population with varying levels of education and not a limited demographic group such as university students. The same applies to understanding the role of socioeconomic background, age, ethnicity, among other demographic factors. Therefore, it cannot be overstated that to understand reactions to AI, including public support for regulating it, we must examine how society at large responds to AI. This means examining regulation of AI at a population level and not just using convenience samples of undergraduate students or online Mechanical Turk samples [20].

The current research advances the above goal by analysing support for regulating AI within the framework of the longitudinal New Zealand Attitudes and Values Study (NZAVS). The NZAVS[2] is a 20-year longitudinal survey of a national probability sample of adult New Zealanders that began in 2009. This questionnaire includes several hundreds of questions on a variety of topics. Using the NZAVS allowed us to not only build on a nationally representative sample, but also to connect attitudes towards the regulation of AI to a large number of socio-demographic and personality factors.

3 Methods

3.1 Participants

Participants in this study are annually contacted to complete the NZAVS survey and were recruited for the study using the NZ electoral roll which maintains a registry of all adults who are citizens or permanent residents living in New Zealand. All adults who are citizens or permanent residents

[1] https://www.data.govt.nz/toolkit/data-ethics/government-algorithm-transparency-and-accountability/algorithm-charter/.

[2] https://www.psych.auckland.ac.nz/en/about/new-zealand-attitudes-and-values-study.html.

are required by law to register to vote; therefore, using the electoral roll allows us to recruit from all sections of society. Details about the NZAVS sampling procedure are available here [21].

For the current study, data from the 10th wave (Time 10) of the NZAVS was utilised as it was the only wave that included the key measure of interest for the present research. The Time 10 survey ran from late 2018 to mid 2019 and included 47,951 participants (62.6% female, 37.1% male) between the ages of 18–99 years ($M = 48.59$; SD = 13.86). Of these participants, 88.6% indicated having European ancestry, 9.8% reported having Maori ancestry, 2.2% having Pacific heritage, and another 5.3% reported having Asian descent (note that participants can report more than one ancestry, so total adds up to more than 100%).

The NZAVS was approved by The University of Auckland Human Participants Ethics Committee (Ref Number: 014889). Details about the sampling procedure, measures, and operations of the NZAVS can be found here online.[3]

3.2 Measures

3.2.1 AI regulation

Using a 7-point measure from 1 = Strongly Oppose to 7 = Strongly Support, participants indicated their support or opposition to the following policy item about AI regulation:

> "Strict regulation limiting the development and use of Artificial Intelligence"

No further explanation of what is meant by AI was provided to the participants. Hence, participants indicated their support or opposition to the regulation of AI in whatever way they understood AI similar to people's voting on many issues. AI is a general term that does encompass a huge variety of software methods and techniques. While participants might not always use a technically accurate definition of AI, it does capture the overall sentiment that people have towards AI. The survey also did not specify any specific legal AI regulations as discussed above.

3.2.2 Personality measures

Participants completed 24 items assessing personality across six dimensions (4 items for each dimension) including neuroticism, extraversion, agreeableness, conscientiousness, openness to experience, and honesty–humility. These items were taken from the mini-IPIP6 (International Personality Item Pool) that provides a shortened set of items of the Big Five personality model, and an additional sixth factor of personality, Honesty–Humility [22, 23]. This additional factor of personality was added based on the establishment of the HEXACO model [24] that revealed an additional facet of personality beyond the traditional Big Five factors in the form of Honesty–Humility in what is often referred to as the Big Six model of personality [25]. The specific measure of personality used in this study has been successfully validated in previous work in New Zealand where the current research is conducted [25, 26]. The full personality inventory used in the NZAVS has been published [25]. More specific information about the inventory is available [27].

Using a 7-point scale (1 = very inaccurate and 7 = very accurate), participants indicated the extent to which they felt the items that followed described themselves. These items captured the 6 dimensions of personality including: Honesty–Humility (sample item: "I deserve more things in life"; reverse coded), Neuroticism (sample item: "I have frequent mood swings"), Extraversion (sample item: "I talk to a lot of different people at parties"), Agreeableness (sample item: "I am not interested in other people's problems"; reverse coded), Conscientiousness (sample item: "I like order"), and Openness to experience (sample item: "I have a vivid imagination"). Details including all items relating to the six facets of personality are available in [25].

3.2.3 Demographic variables

Various demographic details about participants were recorded during the survey including participants' age, gender, ethnicity, relationship status, employment status, whether one was a parent or not, whether one lived in a rural or urban setting, whether one was religious or not, and whether one was born in New Zealand or not. In addition, we also recorded the socioeconomic deprivation of one's neighbourhood using the NZdep[4] index that provides an index on the extent to which one's local community is deprived (1 = least deprived areas; 10 = most deprived areas) [28]. We chose to rely on regional deprivation as an index of socioeconomic standing rather than measures of personal income because personal income can misinform our conclusions as someone can have a partner or parents with wealth and high income while reporting low personal income of their own. Instead, the economic deprivation measure used here provides an index of whether one lives in a relatively affluent or deprived area. This specific measure has been widely used in previous work, including those using the NZAVS.

[3] https://www.psych.auckland.ac.nz/en/about/new-zealand-attitudes-and-values-study/nzavs-tech-docs.html.

[4] https://www.otago.ac.nz/wellington/departments/publichealth/research/hirp/otago020194.html.

Table 1 Full model of personality and demographic factors predicting support for strict regulation of AI

Predictor	*B*	Std. error	Beta	*p* value
Honesty–Humility	0.031	0.008	0.022	< 0.001
Neuroticism	0.034	0.008	0.024	< 0.001
Extraversion	− 0.002	0.008	−0.002	0.772
Agreeableness	0.097	0.01	0.058	< 0.001
Conscientiousness	0.024	0.008	0.015	0.004
Openness	− 0.074	0.008	−0.05	< 0.001
Gender	− 0.364	0.019	− 0.108	< 0.001
Age	0.01	0.001	0.078	< 0.001
Ethnicity (1 = European; 0 = non-European)	− 0.141	0.029	− 0.026	< 0.001
Religious (1 = Yes, 0 = No)	0.228	0.018	0.067	< 0.001
Parent (1 = Yes, 0 = No)	0.145	0.022	0.041	< 0.001
Relationship status (1=In a relationship, 0=single)	− 0.084	0.022	− 0.021	< 0.001
Location (0 = Rural, 1 = Urban)	− 0.209	0.022	− 0.05	< 0.001
Born in NZ (0 = No, 1 = Yes)	0.174	0.021	0.044	<0.001
NZ Dep	0.036	0.003	0.059	< 0.001
Education level	0.001	0.001	0.006	0.287
Job security	− 0.015	0.006	− 0.014	0.008

In addition, we also assessed participant's level of education using the NZ Qualifications Framework that ranks education from Levels 1–10 (1 = lowest educational qualifications and 10 = highest educational qualifications).[5] And finally, we also included a measure of job security to test whether those who feel especially insecure in their job were more likely to support strict regulation of AI. Using a 7-point scale where 1 = strongly disagree and 7 = strongly agree, participants responded to the item: "How secure do you feel in your current job?"

3.3 Procedure

Participants completed a series of measures in the annual survey. The items used in the current paper were intermixed within this larger survey that typically takes approximately one hour to complete.

As we rely on data from a large national sample, the analyses reported will use a stricter criteria for evaluating statistical significance by only considering results where $p < 0.001$ as statistically significant.

4 Results

Using multiple regression analyses, we examined the relationship between personality and demographic variables with support for strict regulation of AI. Table 1 reports the full details of the regression analysis including all personality and demographic factors within the same model suggesting that the results presented reflect the unique variance accounted by each personality and demographic factor described while statistically controlling for all other factors.

To unpack the results, however, first we focus on the relationship between personality and support for strict regulations of AI. Data revealed that agreeableness ($\beta = 0.058, p < 0.001$), honesty/humility ($\beta = 0.022; p < 0.001$), and neuroticism ($\beta = 0.024, p < 0.001$) are positively related to support for strict regulation of AI. By contrast, openness to experience is negatively related to support for strict regulation of AI ($\beta = -0.050, p < 0.001$). Both extraversion ($\beta = -0.002, p = 0.77$) and conscientiousness ($\beta = 0.015, p = 0.004$) were not related to support for strict regulation of AI.

Among demographic factors, being female ($\beta = -0.108, p < 0.001$), older ($\beta = 0.078, p < 0.001$), non-European ($\beta = -0.026, p < 0.001$), religious ($\beta = 0.067, p < 0.001$), being single ($\beta = -0.021, p < 0.001$), a parent ($\beta = 0.041, p < 0.001$), living rural ($\beta = -0.050, p < 0.001$), being born in NZ ($\beta = 0.044, p < 0.001$), and living in a more economically deprived region ($\beta = 0.059, p < 0.001$) were all related to support for strict regulation of AI. However, how secure one felt in their current job ($\beta = -0.014, p = 0.008$) and one's level of education ($\beta = 0.006, p = 0.29$) were not significantly related to their support for the strict regulation of AI. As mentioned above, these results represent the unique relationship between each of these personality and

[5] https://www.nzqa.govt.nz/assets/Studying-in-NZ/New-Zealand-Qualification-Framework/requirements-nzqf.pdf.

demographic factors with support for AI regulation while statistically controlling for any shared variance between other factors with the same outcome presented in the model.

5 Discussion

The current research sought to better understand how personality and demographic factors are associated with support for the strict regulation of AI using a large national sample.

As personality was a central focus of this work, we will start by unpacking the different findings relating to personality and support for the strict regulation of AI. First, the positive correlation between neuroticism and support for the regulation of AI can be understood by a potential fear towards AI. As neuroticism is defined by emotional instability and proneness to negative emotions such as anxiety, depression, and irritation [29, 30], our results fit with what one would expect as a reaction to novel technology. Our findings are also in line the results from [18], which reveal a positive correlation between neuroticism and fear towards AI. It is important to point out that [18] distinguished between acceptance of AI and fear towards AI. Both concepts were included in their questionnaire, enabling participants to express positive and negative attitudes at the same time. It is conceivable that people might have positive attitudes towards robots for different reasons than having negative attitudes.

Second, the positive correlation between agreeableness and honesty–humility with support for strict regulation of AI could best be understood together. Honesty–humility is defined by an avoidance of manipulating others for personal gain, a disinterest in lavish wealth and luxuries, and a lack of entitlement to elevated social status [25], while agreeableness is associated with a tendency to be warm, cooperative, and caring for others [29, 30]. A combination of these may indicate that these correlations could reflect a desire to regulate AI to guarantee fairness out of concern for others.

Third, our study found negative correlation between openness to experience with the support for strict regulation of AI. In the literature, openness is characterised by a tendency to prefer novelty, creativity, and a broad rather than narrow range of interests [17, 30]. Therefore, it is perhaps unsurprising that openness is negatively related to support for strict regulation of AI. This result is also inline with the positive correlation of acceptance of AI with openness to experience in the Chinese sample of [18]. AI is certainly a novelty and has the potential to open new interaction methods between people and technology. People who are feel no desire to expose themselves to unconventional new technologies are more likely to also support the strict regulation of such new technology.

Among demographic factors, being female, non-European, living rural, and living in an economically deprived region were all related to support for strict regulation of AI. These factors may collectively suggest that people from more disadvantaged backgrounds may be especially concerned about a lack of regulation around AI, especially as these effects emerge even while controlling for other factors such as education and job security. In addition, older people, those single, religious, and a parent were also related to support for the strict regulation of AI.

It is important to point out that these correlations between personality traits and attitudes towards AI are significant despite the statistical model taking a large number of demographics into account. This means that these relationships emerge over and above the influence of varied demographic differences within the population. With that said, the magnitude of these effects are fairly small. Specifically, all personality factors collectively explained just 1.6% of the total variance in people's support for regulating AI, and therefore, these do not represent major drivers of people's support for regulating AI. However, our entire model including all personality and demographic factors collectively explain just over 5% of the total variance in people's support for the strict regulation of AI suggesting that there are other important factors beyond these personality and demographic factors that explain a large amount of people's support for regulating AI. Future research should delve further into better understanding the drivers of people's support for regulating AI.

5.1 Implications

The results of our study help us to better understand several characteristics of people who support the strict regulation of AI. By addressing their concerns, we can potentially increase support for the adoption of AI in domains where it has the greatest potential to benefit humanity. Developers need to be aware of the role that personality traits and demographic factors play when users directly interact with AI systems.

We also need to discuss the need to regulate AI from a users' perspective. There are several reasons why people might want to regulate AI. For example, people who feel that they may be disadvantaged by AI systems are likely to call for their regulation. For example, our analysis shows that people living is economically deprived areas are significantly more likely to support the strict regulation of AI. This may be because economically disadvantaged individuals in society tend to work in jobs that are especially vulnerable to automation. This fear is not new and has been with us since the industrial revolution, and automation will continue to target repetitive manual labour. These changes

in our economy are ongoing and its easy to understand why people are afraid to lose their jobs. Still, the productivity gains might be worthwhile, and government programmes, including higher education, are necessary in the transition. However, as the results of our study did not show a significant relationship between perceived job security and support for the strict regulation of AI once we accounted for regional deprivation, education, age, and other demographic factors that may relate to this, it may be that people living in economically deprived areas are especially concerned about how such technology can impact their relatively precarious lives regardless of their current job security, while people in wealthier communities may feel more immune to the risks of AI.

One important consideration of this research is that while we examine support for regulation among a large national sample, we do not focus on how people's varied technological understanding and expertise can impact on their perceptions of AI and support for the regulation of AI. For example, engineers and scientists might be aware of the limitations of AI and hence support the strict regulation of AI since they can see the associated dangers. This support of regulations is different from the more diffuse fear towards AI that can be observed from those in less technological occupations in society. AI is a complex collection of technologies that only few fully understand. Still, regulation of AI does not automatically mean that this will hold back a prosperous future. Other areas in our society, in particular medicine and air traffic, is highly regulated. Their strict rules are necessary to protect people in a highly dynamic and dangerous environments. Engineers and scientists should, therefore, not be discouraged by a societal need to regulate AI, but consider it a challenge to create systems that benefit all of society and address public concerns about this novel technology.

5.2 Limitations

While this study utilises a representative sample of adults, it is still limited to New Zealand, a small country in the south Pacific. While New Zealand has much cultural overlap with other English speaking nations such as Australia, the UK, Canada, and the USA, further studies are necessary to be understand the generalisability of these findings to other contexts, especially those outside the Anglo western world. In addition, as New Zealand was ranked 23rd in the global AI Government Readiness Ranking [31], future work would greatly benefit from examining the personality and demographic correlates of public support for regulating AI in countries that rank both higher on the AI readiness index as well as in countries that rank lower on the same index. It may be that in countries that rank higher on the AI readiness index, people's support for regulating AI is more informed by ongoing changes in society and a more concrete understanding of what the technology could mean thereby having a differing relationship with demographic and personality factors. However, future work is needed to better understand this possibility.

Another limitation of the current research is that this study did not define in detail what is meant by "artificial intelligence". Therefore, it is likely that the attitudes that the participants had are based on their general understanding of AI. This understanding might be more based on portraits in popular culture and the news than a full technical understanding. In this regard, the current work encounters several challenges when discussing the view of society on the need to regulate AI. First, AI is a diffuse term that describes a large set of technologies, including neural networks, machine learning, and algorithms. Second, only experts are typically able to fully understand how these technologies work and what are its limitations. Based on these epistemological challenges, it is difficult to focus the views of the general public to the exact technical specifications of AI systems. To gain a more general understanding of the attitudes that the public has on the regulations of AI, therefore, requires the acceptance of the various interpretations that the members of the public each hold. [18] considers this as a "general attitude as the basis of more specific attitudes towards certain AI services". They used the Attitude Towards Artificial Intelligence Scale (ATAI) to gain insights into the fears and hopes that people hold towards AI in general [32]. Future research would benefit from examining the wider population's attitudes and support for the use of AI in more nuanced ways than relying on such a blunt instrument as used here.

And finally, given the high cost of conducting national probability sampling, and the need to reduce participant fatigue by keeping survey length short, it was only possible to include a single item to measure support for AI regulation. However, despite these limitations, the current research provides a useful starting point for future research by examining the relationship between various personality and socio-demographic factors on public support for the regulation of AI.

Funding Open Access funding enabled and organized by CAUL and its Member Institutions. The New Zealand Attitudes and Values Study is funded by a grant from the Templeton Religion Trust (TRT-2021-10418).

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