Analyzing Barriers to Small Modular Reactors Acceptance: Factors Behind Support and Opposition in South Korea

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Abstract

After the Korean government announced the construction of four more nuclear power reactors, including small modular reactors, apprehension about adopting this new technology continues to grow. In this regard, this study aims to investigate the factors contributing to people's support or opposition to this novel technology in light of demographic, social, and psychological dynamics. A total of 315 people from South Korea participated in the research. The t-test and multiple regression analysis revealed that supporters had greater trust in authorities while opponents had greater environmental awareness. The t-test revealed no significant difference in cognitive dissonance between supporters and opponents. The multiple regression analysis revealed that marital status, risk tolerance, trust in authorities, cognitive dissonance, temporal discount, cognitive closure, and environmental awareness were statistically significant predictors of support for SMRs. Policymakers and authorities must be mindful of these characteristics when strategizing their approach to promoting SMRs in society.

Introduction

Because of the increasing energy demands fueled by the adoption of electric vehicles, the exponential volume of online and mobile activities, and artificial intelligence, many nations are expanding their nuclear power sources. While nuclear power sources can cause disastrous outcomes—such as the Chernobyl disaster in 1986 or the Fukushima meltdown in 2011—if they are not managed properly, the global policy changes about carbon emission control leave few choices for countries on their table. While sustainable energy sources like wind, solar power, and

hydroelectric power are desirable, they are nowhere close to meeting the increasing energy demands. As a result, many countries are constructing nuclear power plants, despite strong opposition from environmental activists who argue that SMRs may still pose long-term risks, including challenges with managing radioactive waste.

Consequently, scientists have worked to develop a safer alternative to conventional nuclear power plants: small modular reactors (SMRs). SMRs provide simpler, standardized, and safer modular systems while requiring much less capital investment and shorter construction time. Even better is that SMRs are small enough to be transported and used in isolated locations without complex power grids (Vujić, Bergmann, Škoda, & Miletić, 2012). However, there exists a serious public reservation for the adoption of SMRs. One of the primary reasons comes from Not in My Backyard (NIMBY), a social phenomenon where individuals or communities oppose developments, projects, or facilities near their homes even when they recognize the broader benefits. The NIMBY phenomenon is more likely to occur when the government attempts to build infrastructure like SMRs, as people fear the catastrophic consequence that technological failures could have on their livelihood.

Public dissent is the byproduct of complex factors much bigger than emotional unease. Existing research says that people's perception of risks and trust in authorities play a critical role in shaping public opinions regarding nuclear technology (Siegrist, 2000; Poortinga & Pidgeon, 2006). More specifically, trust in authorities can essentially reinforce positive views on technology, which will translate into adoption. By contrast, people's concern for environmental harm and the possibility of nuclear disaster can negatively impact their adoption of SMRs.

Recently, the Republic of Korea announced the plan to construct four more nuclear power plants, including SMRs, which will add up to a total of 30 nuclear power plants by 2038. Just like in the past, various interest groups and residents in the regions where these power plants will be constructed are mobilizing to voice their opposition, displaying concerns over potential risks such as becoming targets of North Korean missile attacks or facing disasters like the Fukushima nuclear meltdown. While some research has been conducted to analyze the people's fear and risk perception towards nuclear power plants, there is little research that can inform policymakers and authorities about what constitutes this risk perception and other factors for support or opposition.

In this respect, this research aims to investigate how public perception of SMRs risk is formulated and what constitutes the support or opposition.

Moreover, this research will evaluate latent psychological constructs to play into the opinions about SMR construction. Through the analysis, the result might help the government and policymakers better strategize how best to introduce SMRs while alleviating public fear and concerns.

Literature Review

Public Perception of Risk and Trust in Authorities

Several studies have shown that the public's perception of risk and their level of trust in authority greatly influence the acceptability of nuclear energy (Siegrist, 2000; Portinga & Pidgeon, 2006; Ryu, Kim, & Kim, 2018; Greenberg & Truelove, 2011; Bronfman & Cifuentes, 2003). Siegrist (2000) provided a fundamental model by suggesting that trust, risk, and acceptance are causally related. He suggested people's assessments of the advantages of new technology might be positively impacted by their faith in institutions, which is comparable to their trust in authorities. This increased acceptance of innovative technologies is the result of people's perceived benefits of new technology. Adding to this structure, Poortinga and Pidgeon (2006) presented a causal model of trust, positing that individuals' preexisting attitudes impact their assessment of governmental intentions, then influencing their trust in regulations, and ultimately leading to acceptance. Although their causal model has not been empirically tested, it offers a valuable insight into the dynamics of trust and technological advances. Despite a lack of extensive testing in risk studies, this model provides an insightful viewpoint on the dynamics of trust and technological acceptance.

Building on this framework, Ryu, Kim, and Kim (2018) created another causal model that distinguished between trust in regulations and trust in government to explain the viability of nuclear power energy. They argued that the perceived risk is determined by the reliability of information sources, which influences trust and, ultimately, nuclear energy acceptance. This model demonstrates the complex relationship that exists between perceived risk and trust in influencing public opinion toward nuclear energy. Their research focuses on nuclear energy as a whole, offering limited insights into public perception of SMRs. Additionally, public attitudes may have shifted due to the changes brought about by the pandemic.

Furthermore, Greenberg and Truelove (2011) examined the demographic components affecting nuclear energy support. Their study, which involved surveying 3,200 Americans, discovered that the majority

of nuclear power supporters were wealthy, educated white men, whereas the majority of people who supported fossil fuel energy were poorer, less educated Latina and African American women. This study demonstrates how public support or opposition to energy sources is influenced by demographic traits, risk perception, and trust in authority. Their research primarily compared ethnic groups in terms of support for nuclear energy. However, this focus holds limited relevance for ethnically homogenous countries like Korea.

The analysis of Chilean citizens by Bronfman and Cifuentes (2003) provides a more specific empirical study. They discovered that genetic engineering and nuclear energy were the main causes of public concern. However, as the government encountered a shortage of electricity, the public's interest in nuclear energy intensified. The relationship between technological adoption and trust in authority was theorized by Bronfman and colleagues (2008). They argued that although trust can lead directly to acceptance, it is frequently mediated by the public perception of the benefits or risks of technology. To resolve public concerns about nuclear energy, this trust-based mechanism for technology adoption is essential.

Cognitive Dissonance and Social Influence in Decision-Making on Nuclear Technologies

Cognitive dissonance is "the subjective perception of incompatibility between two self-relevant cognitions" (Fischer et al., 2008). It plays a major role in shaping public attitudes toward the adoption of new technologies, including nuclear power energy. Marikyan, Papagiannidis, & Alamanos (2023) explored how cognitive dissonance can lead to both positive and negative outcomes, particularly through emotions like anger, guilt and regret. Their study found that when expectations are unmet, dissonance occurs, creating a complex interplay between emotional, cognitive, and behavioral factors. This intricate interplay is particularly relevant in the context of nuclear energy when the devastating impacts of nuclear accidents like Chernobyl and Fukushima have aroused public fear and reluctance to embrace any type of new technologies involving nuclear powers. These tragedies have served as post-disconfirmation for nuclear power, inhibiting the public from accepting safer alternatives like Small Modular Reactors (SMRs).

In a similar vein, Tverskoi, Babu, and Gavrilets (2022) posited that cognitive dissonance, peer conformity, and external authority play a major role in shaping decision-making and attitudes toward technological innovations. Their study revealed that early adopters are individuals characterized by lower levels of cognitive dissonance and

are less likely to be influenced by peer conformity. Peer conformity refers to altering one's behaviors or attitudes to align with those of other people because of social pressure (Cialdini, 2009). Early adopters who are more inclined to embrace new technology tend to experience lower levels of cognitive dissonance compared to the general population. They are more responsive to external authorities promoting the innovation and readily embrace the latest technology once it is introduced to the market.

This insight suggests that efforts to introduce SMRs may need to focus on authoritative promotion while acknowledging the complex nature of public attitudes to avoid potential backlash.

Compounding this issue, many people experience guilt about benefiting from nuclear energy while being aware of the environmental activists' opposition. The clash between the perceived benefits of nuclear power energy as clean and sustainable and the fear of potential disasters creates cognitive dissonance. This cognitive dissonance can manifest in the form of reluctance to adopt new technologies, despite their potential.

Interestingly, Sun's (2013) longitudinal study adds another layer to this phenomenon by using herd behaviors in the adoption of new technology. He found that observing other people's adoption and the associated uncertainties can make individuals to either discount their own beliefs or imitate others' behaviors. This means that public reservations about SMRs may decrease as they observe the benefits these reactors can bring, though this process requires time and cannot be expedited. Therefore, the introduction of SMRs into daily life may gradually alleviate public fear as cognitive dissonance is resolved through observed benefits.

Challenges to SMR adoption: Safety, Costs, and Economic Viability

Although SMRs are considered safer alternatives to conventional nuclear power generators, there exist some challenges to their adoption and construction. Locatelli, Bingham, and Mancini (2014) identified two primary challenges: (1) safety concerns and (2) the economic model of high capital costs, which are only accessible through a limited number of investors. The first challenge is relatively straightforward; however, the second issue is linked to the economy of scale.

Because SMRs are a new technology, the resources to construct SMRs are still in the early stages. Currently, the resources and investment are concentrated on traditional nuclear power plant models; as a result, unless there is a massive adoption of SMRs, the return on investment may

fall short of satisfying investors. To bridge this gap until SMRs achieve the necessary economy of scale, governments may need to bear the initial costs of SMR construction, which would inevitably place a burden on taxpayers as well.

To address these economic challenges, researchers like Vogel and Quinn (2017) have evaluated the financial feasibility of SMRs. They compared the capital expense of facilities and operational costs through a capital-cost model. Their findings have revealed that regulatory fees present another barrier to the economic viability of SMRs.

Additionally, using Monte Carlo simulation and sensitivity analyses, Carless, Griffin, and Fischbeck (2016) examined the concerns that environmental activists raised to evaluate the life cycles of SMRs. Their study found that the life cycle of SMRs is promising in terms of cost efficiency. The competitive advantage of building SMRs hinges on reducing building materials and using factory-made components. Ultimately, the hurdle that SMRs must overcome is achieving economy of scale through widespread adoption, which will effectively lower the cost of building materials, and factory-built components.

Research Questions

1. How do latent factors affect public support for SMRs?
    - 1-1. How does risk tolerance affect support for SMRs?
    - 1-2. How does trust in authorities affect support for SMRs?
    - 1-3. How does cognitive dissonance affect support for SMRs?
2. Are there demographic and attitudinal differences between supporters and opponents of SMRs?
3. What psychological factors predict the support for SMRs?

Methods

A survey questionnaire was developed and distributed to residents of South Korea via an online platform. This method ensured that participants completed the survey independently and in separate environments, thereby obviates the concerns regarding the independence assumption. They were offered incentives to encourage participation.

Variable	*N*	Mean	SD	Min	Max
Age	315	34.88	8.46	20	67

Education	315	4.51	.91	2	6
Marital Status	315	.36	.48	0	1
Number of Children	315	.57	.88	0	5
SES	315	4.25	1.40	1	10
Opinions on SMRs	315	.80	.40	0	1
Risk Aversion	315	3.60	.67	1	5
Risk Tolerance	315	3.27	.74	1.25	5
Trust in Authorities	315	2.90	1.01	1	5
Cognitive Dissonance	315	3.12	.85	1	5
Temporal Discount	315	3.22	.82	1	5
Self-efficacy	315	3.68	.61	1.8	5
Cognitive Closure	315	3.45	.64	1	5
Environmental Awareness	315	3.73	.66	1	5
Supporting SMRs	315	3.45	.85	1	5

TABLE 1. Descriptive Statistics

Table 1 displays the descriptive statistics for the variables included in this research. The sample (N = 315) had a mean age of 34.88 years (SD = 8.46), ranging from 20 to 67 years. Participants had an average education level of 4.51 (SD = 0.91) which shows college-level education. The marital status indicated that 36% of the participants were married, and the number of children ranged from 0 to 5, with a mean of 0.57 (SD = 0.88). Socioeconomic status (SES) had a mean of 4.25 (SD = 1.40) on a 10-point scale.

When it comes to participants' latent factors, 80% of participants supported SMRs (SD = .40). Risk aversion had a mean score of 3.60 (SD = 0.67), while risk tolerance had a mean of 3.27 (SD = 0.74). Trust in authorities averaged 2.90 (SD = 1.01), and cognitive dissonance had a mean of 3.12 (SD = 0.85). Temporal discounting, self-efficacy, and cognitive closure had means of 3.22 (SD = 0.82), 3.68 (SD = 0.61), and 3. (SD = 0.64), respectively. Environmental awareness had a mean score of 3.73 (SD = 0.66), and support for SMRs was rated at a mean of 3.45 (SD = 0.85).

Results

Variables	Sample Question Items	*Cronbach's alpha*
Risk Aversion	I avoid risks, even if it means missing out on benefits. In uncertain situations, I choose the safest option. I prefer familiar options over new and uncertain outcomes. I avoid choices with any chance of negative outcomes.	.77
Risk Tolerance	I take risks, even if it leads to failures or losses. I stay calm when facing uncertainties. I believe taking risks is necessary for success. I don't fear failure when pursuing important goals.	.75
Trust in Authorities	Leaders and authorities act responsibly and prioritize public interests. Leaders and authorities make the right decisions in difficult situations. Leaders and authorities take responsibility for their actions. Leaders and authorities handle matters with honesty and fairness.	.91
Cognitive Dissonance	After making choices, I often doubt them. I am easily swayed by other's opinions when deciding. I struggle to communicate my needs to others. I often doubt my ability to make the right choices.	.83
Temporal Discount	I prefer small immediate rewards over larger future ones. I focus more on immediate benefits than future gains. Even with guaranteed future rewards, I find it hard to wait. I prefer immediate rewards over those that take time.	.83
Self-Efficacy	I can accomplish anything I set my mind to. I can solve problems independently, even in difficult situations. I can overcome unexpected challenges. I have the skills to achieve my goals I can find ways to accomplish what I want.	.80
Social Influence	I consider how others might judge my actions. I am easily influenced by other people's opinions I strive to meet other people's expectations. I often change my opinion based on other people's views.	.76
Cognitive Closure	I feel uneasy without clear answers. I prefer clear conclusions over ambiguity. I can make quick decisions, even in uncertain situations. I wait for clarity before making a choice. I decide quickly, even without complete information	.71
Environmental Awareness	I consider how my actions affect the environment. I believe environmental protection is a critical issue. I strive to reduce pollution in my daily activities.	.77

	I think protecting the environment is everyone's responsibility.	
Support for SMRs	I support accepting the risks of building SMRs. I support SMRs despite their uncertainties. I believe building SMRs will benefit our society.	.84

TABLE 2. Cronbach's *Alpha* for Dependent Variables

		Support SMRs (n = 253)	Oppose SMRs (n = 62)	Mean Difference	*t*	*p*-value
Age	Mean (SD)	35.19 (.51)	33.63 (1.25)	-1.56	-1.30	.194
Education	Mean (SD)	4.50 (.06)	4.56 (.11)	.07	.52	.606
Marital Status	Mean (SD)	.40 (.03)	.21 (.05)	-.19	-2.81	.005
# of Children	Mean (SD)	.62 (.06)	.32 (.09)	-.30	-2.45	.015
SES	Mean (SD)	4.29 (.09)	4.06 (.18)	-.23	-1.15	.250
Risk Aversion	Mean (SD)	3.58 (.04)	3.71 (.09)	.13	1.40	.164
Risk Tolerance	Mean (SD)	3.31 (.04)	3.13 (.12)	-.19	-1.78	.076
Trust in Authority	Mean (SD)	3.01 (.06)	2.44 (.14)	-.57	-4.11	.000
Cognitive Dissonance	Mean (SD)	3.13 (.05)	3.08 (.10)	-.05	-.42	.674
Temporal Discount	Mean (SD)	3.19 (.05)	3.33 (.10)	.13	1.15	.251
Self-Efficacy	Mean (SD)	3.71 (.04)	3.56 (.09)	-.15	-1.77	.078
Social Influence	Mean (SD)	3.35 (.04)	3.34 (.09)	-.01	-.13	.894

Cognitive Closure	Mean (SD)	3.46 (.04)	3.40 (.09)	-.06	-.66	.509
Environ. Awareness	Mean (SD)	3.67 (.04)	3.96 (.07)	.29	3.16	.002

Table 2 displays the sample items measured in this analysis. Cronbach's alpha was calculated to examine internal consistency. Cronbach's alpha coefficient measures covariance among question items. According to Field (2013), the alpha value of 0.7 or higher is considered acceptable, and 0.8 is recommended for psychometric measures. Most of the constructs showed alpha coefficients of 0.7 or above, demonstrating acceptable internal consistency. Therefore, these items were merged into single variables.

TABLE 3 Independent Sample *t*-test by Opinions on SMRs Construction

Next, an independent samples t-test was conducted to examine difference in participants who support (n = 253) and those who oppose (n = 62) SMRs construction. As shown in Table 3, marital status, the number of children, trust in authority, and environmental awareness were key factors differentiating between supporters and opponents. Specifically, supporters of SMRs are more likely to be married than the opponents, $t(313) = -2.81$, $p = .005$. Supporters have more children than opponents, $t(313) = -2.45$, $p = .015$. Supporters had more trust in authority than opponents, $t(313) = -4.11$, $p < .001$. On the other hand, opponents had more environmental awareness than supporters, $t(313) = 3.16$, $p = .002$.

	Age	Edu	Marital	# of Children	SES	Risk Averse	Risk Tolerant	Trust Authority	Cognitive Dissonance	Temp. Disc.	Self-Efficacy	Social Influence	Cognitive Closure	Environmental Awareness
Education	••• .22													
Marital Status	••• .53	••• .26												
Number of Children	••• .59	* .14	••• .78											
SES	.05	••• .20	* .13	.09										
Risk Aversion	-.02	.05	* -.11	-.03	.04									
Risk Tolerance	-.03	* -.11	.03	.01	.06	••• -.33								
Trust in Authority	-.01	••• -.20	.06	.10	-.01	-.06	••• .38							
Cognitive Dissonance	-.05	-.11	-.10	-.03	-.11	••• .39	.01	•••• .37						
Temporal Discount	-.07	••• -.20	-.10	.00	-.10	••• .46	-.06	•••• .33	•••• .64					
Self-Efficacy	.03	.02	.11	.07	••• .24	* -.13	••• .48	•••• .23	•••• -.25	-.07				
Social Influence	-.06	-.01	* -.13	-.01	.05	••• .48	-.03	•••• .20	•••• .68	••• .48	-.11			
Cognitive Closure	.06	.02	-.03	.09	.09	••• .53	.01	•••• .20	•••• .50	••• .45	.04	••• .62		

Environmental Awareness	.02	-.04	-.11	.00	.09	••• .39	-.03	-.10	.10	••• .19	••• .20	••• .35	••• .42	
Supporting SMRs	.05	.05	••• .19	* .13	.10	-.01	••• .43	•••• .48	.08	.04	••• .41	* .13	*** .30	-.08

*p < .05 * p < .01** p < .001****

TABLE 4. Pearson Correlation of Key Variables

A pairwise correlation was conducted to examine the relationship between key variables and environmental awareness. To see the key correlations pertaining to this research, education was positively correlated with socioeconomic status ($r = .20$, $p < .001$) and negatively correlated with trust in authority ($r = -.20$, $p < .001$). Trust in authority was positively correlated with risk tolerance ($r = .38$, $p < .001$) and negatively correlated with education ($r = -.20$, $p < .001$). Cognitive dissonance was significantly correlated with both risk aversion ($r = .39$, $p < .001$) and trust in authority ($r = .37$, $p < .001$), suggesting that those who experience higher levels of cognitive dissonance tend to be more risk-averse and have greater trust in authorities.

Environmental awareness showed significant correlations with several other variables. It was positively correlated with self-efficacy ($r = .20$, $p < .001$), social influence ($r = .35$, $p < .001$), and cognitive closure ($r = .42$, $p < .001$). These results suggest that individuals who exhibit higher environmental awareness tend to have higher self-efficacy, are more influenced by social norms, and exhibit a need for cognitive closure.

Support for SMRs was positively correlated with marital status ($r = .19$, $p < .001$), number of children ($r = .13$, $p = .025$), risk tolerance ($r = .43$, $p < .001$), trust in authority ($r = .48$, $p < .001$), self-efficacy ($r = .41$, $p < .001$). Additionally, support for SMRs was positively correlated with social influence ($r = .13$, $p < .05$) and cognitive closure ($r = .30$, $p < .001$). These findings suggest that people who are married, have more children, have higher risk tolerance, trust authorities, have higher self-efficacy, are influenced by social factors, and have greater need for cognitive closure are more likely to support SMRs.

Support SMRs	Unstandardized Coefficient		*Standardized*	*t*	*p*-value
	B	Standard Error			
Cons.	.12	.43		.29	.772
Age	-.004	.01	-.04	-.84	.400
Education	.050	.04	.05	1.16	.248
Marital Status	.364	.12	.21	2.92	.004
# of Children	-.093	.07	-.10	-1.33	.184
SES	-.023	.03	-.04	-.87	.385
Risk Aversion	.140	.07	.11	1.9	.058
Risk Tolerance	.243	.06	.21	3.94	.000
Trust in Authority	.292	.04	.35	6.53	.000
Cogn. Dissonance	-.152	07	-.15	-2.1	.037
Temporal Discount	-.135	.06	-.13	-2.22	.027
Self-Efficacy	.315	.08	.09	1.3	.196
Cognitive Closure	.469	.08	.35	5.88	.000
Environ. Aware	-.295	.07	-.23	-4.52	.000

TABLE 5. Regression Model Predicting Support for SMRs

A multiple regression model was fitted to examine the predictors of support for Small Modular Reactors construction. The model's predictability was higher than a model only using mean values, $F= 20.67(14, 300)$, $p < .001$. The adjusted R2 value was .4673, indicating that approximate 47% of the variance in support for SMRs can be explained by the predictors included in this model.

Significant predictors in the model were marital status ($\beta = .364$, $p < .004$), risk tolerance ($\beta = .292$, $p < .001$), cognitive dissonance ($\beta = -.152$, $p = .037$), temporal discounting ($\beta = -.135$, $p = .027$), cognitive closure ($\beta = .469$, $p < .001$), and environmental awareness ($\beta = -.295$, $p < .001$). These results show that people who are married, have higher risk tolerance, trust in authority, and prefer cognitive closure are more likely to support the construction of SMRs. By contrast, those who have higher levels of cognitive dissonance, temporal discounting, and environmental

awareness are less likely to support SMRs construction. Looking at the non-significant demographic predictors like age, education, and SES, attitudinal and psychological factors are more likely to shape public opinions towards SMRs.

Variable	Observation	Skewness	Kurtosis	Adj. Chi2	Prob.>Chi2
Residuals	315	.145	.021	7.10	.029

TABLE 6. Check for Normality Assumption

Table 6 represents the results of the normality assumption check for the residuals. The skewness value was 0.145, and the kurtosis value was 0.021, indicating minimal deviation from normality. However, the adjusted chi-square value is 7.10 with a corresponding p-value of 0.029, suggesting a statistically significant departure from normality, which warrants a closer visual inspection.

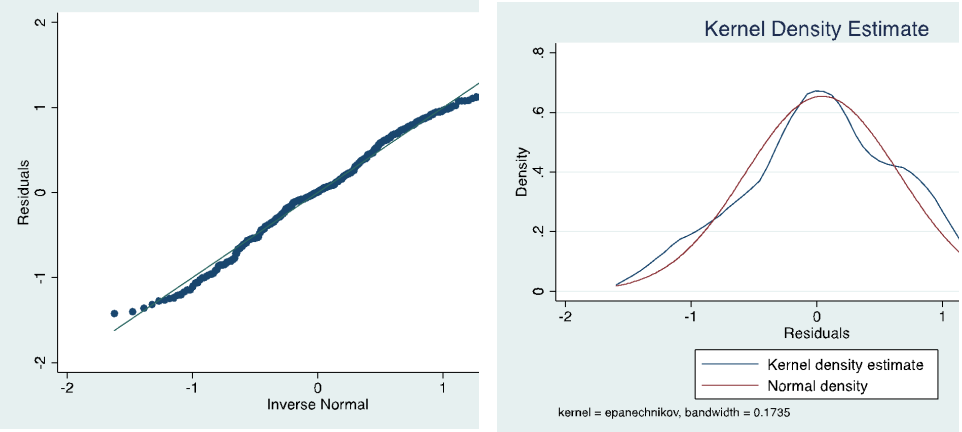

FIGURE 1. QQ plot & Kernel Density Estimate

Figure 1 shows the visual representation of the check for normality assumption. In the QQ-plot, most residuals fall neatly along the line, while the kernel density estimate of the residuals display a smooth, symmetric bell-shaped curve that closely approximates the overlaid normal distribution line. Together, these results suggest that the normality assumption is satisfied.

	VIF	*1/VIF*
Cognitive Dissonance	3.11	.32
Number of Children	3.08	.32
Marital Status	2.96	.34

Social Influence	2.59	.39
Cognitive Closure	2.14	.47
Temporal Discount	2.06	.49
Risk Averse	2.01	.50
Self-Efficacy	1.78	.56
Risk Tolerance	1.71	.58
Trust in Authority	1.67	.60
Age	1.63	.61
Environmental Awareness	1.54	.65
Education	1.27	.79
SES	1.15	.87
Mean VIF	*2.05*	

TABLE 9. Variance Inflation Factor Values for Independent Variables

To assess the presence of multicollinearity among the independent variables, the Variance Inflation Factor (VIF) values across all regression models were examined. The cognitive dissonance has the highest VIF of 3.11 and the lowest at 1.15. The mean VIF was 2.05, indicating that multicollinearity is not a concern because all VIF values were well below the commonly accepted threshold of 10. These results indicate that independent variables do not exhibit problematic multicollinearity.

Discussion & Conclusion

As discussed above, public perception of risk and trust in authorities were indicative of public acceptance of new technology. In this regard, the findings of this study align with what Siegrist (2000), and Ryu et al. (2018) have claimed. When examining the group difference between supporters of SMRs and opponents, the supporters had significantly greater trust in authorities than opponents. In multiple regression analysis, people's trust in authorities explained the change in support for SMRs. From the evidence, one can reasonably argue that governments and authorities must work to earn the public trust to effectively implement their energy agenda, including SMR construction. Because many people are naturally opposed to nuclear power energy and are yet to understand the improved safety of SMRs as an alternative, the government and policymakers must transparently communicate with the public and

patiently wait for people to embrace this new technology to minimize opposition.

When it comes to cognitive dissonance, the t-test result shows that there is no statistically significant difference between supporters and opponents. This result somewhat disproves the argument that Marikyan et al. (2023) made. However, the group difference does not necessarily suggest causality. Moreover, this disparate result may be accounted for by the characteristics of the sample. Yet, the group difference in environmental awareness was statistically significant. As expected, opponents had visibly greater environmental awareness than supporters. Drawing from this finding, the Korean government and policymakers can strategize their approach and communicate with the activists that SMRs are environmentally safer and cleaner energy sources compared to conventional nuclear power sources.

The results also revealed that people's demographic traits are important predictors. Supporters had more children and were more likely to be married than opponents. More importantly, people's cognitive dissonance negatively predicted the change in support for SMRs. Interestingly, temporal discounting, which refers to the tendency to place more value in the present moment than the future, also negatively explained the change in support for SMRs. These findings show that people who struggle with cognitive dissonance and those who care more about the present moment are less likely to support SMRs. Additionally, cognitive closure—a dislike for ambiguity—positively explains the change in support for SMRs. The government and policymakers must note these characteristics when dealing with opponents and make their approach accordingly. These findings could inform public campaigns focused on strategies to communicate the clear and long-term benefits of SMRs, thereby enhancing public acceptance.

To conclude, this research examined the underlying mechanism of people's support and opposition to SMRs. As is found in most cases of technological transition, many people reluctantly embrace the changes. With an in-depth understanding of the factors behind the public opposition, the government can more democratically and effectively introduce the most needed change that will address the energy demands. Additionally, future research should explore causal linkage and potential mediator factors to better understand the mechanisms underlying public acceptance of SMRs.

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