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Assessing the determinants of perceived recycling inconvenience in South Korea

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Abstract: Studies in waste management often seek to improve the recycling of municipal solid waste (MSW) by making household recycling more convenient through curbside recycling services and policies. Most studies in this field have investigated convenience as an independent variable, with curbside recycling regarded as a major factor in determining convenience. Within this context, the current study argues that the factors contributing to recycling convenience within the context of a curbside recycling system should be investigated further. Using a survey sample of 1,000 South Korean citizens, this paper investigates the effects of environmental concern and political ideology on perceptions of recycling convenience. The findings reveal that while concern for the environment makes people view recycling as more convenient, political ideology does not have a significant impact.

Keywords: recycling convenience; environmental concern; political ideology; recycling intention; curbside recycling; South Korea.

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1 Introduction

Studies in waste management have often sought to improve the recycling of municipal solid waste (MSW) recycling by improving the convenience of household recycling. Recycling takes time, money and effort, so making recycling more convenient leads to greater participation while also reducing the costs associated with recycling (Everett and Peirce, 1992; Miliute-Plepiene et al., 2016; Nguyen et al., 2015; Sidique et al., 2010). On the other hand, the inconvenience of recycling can negatively affect motivation and result in the illegal dumping of waste (Chu et al., 2013; DiGiacomo et al., 2018; Meneses and Palacio, 2005; Reschovsky and Stone, 1994). In a meta-analysis of 63 studies from 1991 to 2010, Miafodzyeva and Brandt (2013) identified 28 studies which found convenience to be a factor that affects recycling behaviour. In a systematic review and meta-analysis of 36 studies, Varotto and Spagnolli (2017) also list convenience as one of the key psychological factors related to household recycling. It is well-documented that the provision of curbside recycling services is a primary factor in determining the level of recycling convenience for households (Abbott et al., 2017). Curbside recycling programs have been used as a proxy for the convenience of recycling and found to have a positive effect on household recycling (Ando and Gosselin, 2005; Domina and Koch, 2002; Folz, 1991; Jenkins et al., 2003; Park and Berry, 2013). Accordingly, the convenience of recycling and the provision of curbside programs are major determinants of whether people participate in recycling.

Although the findings in previous studies emphasise the effect of convenience on recycling participation, a number of limitations still need to be addressed. First, recycling convenience has primarily been studied as an independent variable without identifying the precursors to convenience, thereby ruling out the possibility that convenience itself may vary depending on different factors. In addition, although curbside programs have served as a key variable in recycling convenience, few studies have investigated the factors that affect perceived convenience when curbside recycling is available in all jurisdictions.

Political ideology has been considered a primary determinant of one's level of concern for the environment (Samdahl and Robertson, 1989). Recent studies have shown that political ideology affects public support in determining environmental policies such as renewable energy (Fobissie, 2019) and attitudes towards energy efficiency (Gromet et al., 2013). More recently, Casper et al. (2021) noted that political ideology is one of the major factors that influences perceptions and behaviour related to environmental

sustainability. In spite of this, past research has not yet tested the effects of political ideology on recycling perceptions and behaviour, including the convenience of recycling. For that reason, this study seeks to ascertain the possible effect of political ideology on how people perceive the convenience of recycling.

The present study aims to identify factors that contribute to making recycling more or less convenient in a policy setting where curbside recycling is mandatory in all jurisdictions, and more specifically the effects of environmental concern and political ideology on recycling inconvenience. The first section of this paper is a literature review of environmental concern and political ideology. This is followed by a brief description of the volume-based waste fee (VWF) system in South Korea before discussing the determinants of recycling convenience and presenting hypotheses. The next section features multiple regression analyses to investigate the effects of environmental concern and political ideology on perceived recycling inconvenience using data from a survey of 1,000 Korean citizens. The final section examines the theoretical and practical implications of the findings in this study.

2 Theoretical background

2.1 Environmental concern

Past studies that investigated the link between environmental concern and recycling behaviour found mixed results (Sidique et al., 2010), with one study arguing that environmental concern is positively related to participation in waste recycling (Best and Mayerl, 2013). Within this context, Domina and Koch (2002) stress that environmental concern or knowledge has been repeatedly documented as a factor that affects recycling frequency. Similarly, Schlegelmilch et al. (1996) found ecological consciousness to be a strong precursor of environmentally friendly behaviour. Social and moral norms, as well as altruism, have been identified as major non-monetary motives for pro-environmental behaviour such as recycling in recent times (Abbott et al., 2013; Wan et al., 2014).

In contrast, other research streams have failed to find a positive correlation between environmental concern and recycling participation. The findings of these studies indicate that general attitude toward the environment is not a predictor of recycling participation (Gamba and Oskamp, 1994; Oskamp et al., 1991). Within this context, Vining and Ebreo (1990) argue that there was no difference in the strength of the belief that environmental protection is an important reason to recycle between recyclers and non-recyclers. In addition, Guagnano et al. (1995) found no significant effect of awareness of the consequences of recycling on recycling behaviour, while Hassan et al. (2010) reported that individuals with higher levels of environmental concern did not necessarily behave in environmentally-conscious ways.

An 'ecological worldview' is generally considered a major component of environmental concern (Xiao et al., 2019). Within this context, the new environmental paradigm (NEP) represents "the belief that certain economic constraints to growth and ecological balance take precedence over human power relative to nature" [Ntanos et al., (2019), p.239]. As discussed by Dunlap and Van Liere (1978), the NEP challenges the dominant social paradigm (DSP) rooted in an anthropocentric viewpoint, as well as traditional beliefs about progress, the abundance of nature, and the superiority of humans over nature (Dunlap, 1980; Manoli et al., 2007; Pirages and Ehrlich, 1974). The NEP

rejects the DSP's argument that nature exists purely to serve human needs (Manoli et al., 2007; Pirages and Ehrlich, 1974; Barbour, 1973).

Numerous studies have focused on the effect of the NEP on environmental behaviour, with results generally showing a positive influence (Davis et al., 2009; Leung and Rice, 2002; Liu et al., 2018; Scott and Willits, 1994; Tarrant and Cordell, 1997). For example, Davis et al. (2009) reported that level of belief in the NEP has a positive effect on general environmental behaviour.

In summary, although results from past research highlight the positive relationship between concern for the environment and environmental behaviour, few studies have focused on recycling as an environmental behaviour. Specifically, there remains a need to investigate the relationship between the NEP and intention to recycle.

2.2 *Political ideology*

Several researchers have suggested that different political ideologies ranging from liberal to conservative affect individuals' perspectives of environmental issues (Costantini and Hanf, 1972; Dunlap and Gale, 1972, as cited in Samdahl and Robertson, 1989). These different ideological positions lead to the formation of different beliefs about the world and the role of government in addressing social problems, including environmental issues (Gromet et al., 2013).

Conservatives in Korea value market capitalism, pro-business policies, selective welfare and the Korea-US alliance, while taking a firm stance in relations with North Korea. On the other hand, the progressive view in South Korea is characterised by workers' rights and social equality, environmental-oriented policies over corporations, universal welfare, and a preference for moderation in North Korea relations (Yoon, 2004; Han, 2022; Shin and Jhee, 2005). In general, progressives favour more environmental-centred policies than conservatives.

Within this context, research has consistently found political ideology to be related to environmental concern and behaviour, with more liberal individuals tending to show more positive behaviour towards the environment (Samdahl and Robertson, 1989; Dietz et al., 1998; Dunlap, 1975; Mazmanian and Sabatier, 1981; McCright and Dunlap, 2011). Both Dunlap (1975) and Mazmanian and Sabatier (1981) found a strong correlation between progressive ideologies and concern for the environment. The findings from McCright and Dunlap's (2011) empirical analyses also indicate that progressives tend to express greater concern about global warming than conservatives.

With regard to lifestyle politics, Coffey and Joseph (2013) argue that individual social identities are closely associated with political beliefs, and that an individual's behaviour is influenced by political ideology. Furthermore, the authors claim that political identification can cause different patterns of individual behaviour even in aspects of daily life that are unrelated to politics (Coffey and Joseph, 2013). Within this context, people demonstrate their political identity through social behaviours linked with individual values (Shah et al., 2007; Stolle et al., 2005). Specifically, Shah et al. (2007) posit a kind of 'political consumerism,' with individuals choosing certain products and services based on social and political considerations, thereby expressing their political preferences. In this regard, environmental behaviour may also be connected to lifestyle politics, as an individual's political ideology affects their environmental behaviour as well as their social behaviour when they choose a certain lifestyle based on perceptions of how others sharing a similar political identity behave (Shah et al., 2007; Stolle et al., 2005, as cited in

Coffey and Joseph, 2013). This points toward partisanship and political ideologies having an impact on environmental behaviour.

In essence, individuals who are more liberal tend to be more pro-environment than individuals who lean conservative. Past findings indicate that democrats were shown to recycle and conserve resources more than Republicans (Coffey and Joseph, 2013; Bell et al., 2017). The findings of Lybecker et al. (2013) also indicate a difference in the recycling frameworks between conservatives and progressives. However, past studies have primarily focused on the effect of political ideologies on environmental behaviour, with only a few investigating the relationship between this factor and commitment to recycling. The current study seeks to ascertain whether people with more liberal worldviews are more likely to perceive recycling as less inconvenient than individuals with more conservative worldviews.

2.3 The VWF system in South Korea

In South Korea, all jurisdictions adhere to a common MSW disposal system that includes a VWF since 1995 (Park and Lah, 2015). The VWF was implemented to reduce waste and increase recycling, and has led to a significant reduction in the generation of MSW (see MOE, South Korea, 2015; Park and Lah, 2015 for review]. According to the latest available OECD data, South Korea ranked sixth (in order from least to most) in MSW generated per capita (413 kg) in 2019, and had the highest recycling rate (56.5%) among all OECD members (OECD, 2022). Accordingly, the consensus in both literature and practice is that the VWF system contributed to South Korea's high performance in MSW recycling (Park, 2018).

South Korea's VWF system is similar to other MSW service charge systems in which individuals pay for waste disposal based on volume or units, but there are several unique features. First, under the VWF system, all citizens and small businesses (including supermarkets and small retail stores) that dispose less than 300 kg of MSW per day must purchase VWF plastic bags issued by the local government to dispose MSW (Park and Hong, 2021). All recyclables must be disposed of in separate receptacles set up in designated locations near residential areas for collection by the local government (MOE, South Korea, 2011). The implementation of VWF is mandatory for all jurisdictions and residents, without exception (Park and Lah, 2015). In this policy setting, the attitudes and perceptions of households may play a greater role in determining participation in recycling. For example, under the assumption that pro-environmental activities such as waste sorting are regarded as an inconvenience, Lee et al. (2017) measured the level of inconvenience associated with waste sorting among South Korean citizens. Similarly, the current study assumes that when curbside pick-up is available to all households, the perceived level of convenience will affect each household's recycling decisions.

2.4 Determinants of recycling convenience

As previously discussed, the majority of previous studies have viewed recycling convenience as an independent rather than dependent variable. In a recent and extensive meta-analysis of 91 studies on individual and household recycling, Geiger et al. (2019) categorise the factors influencing recycling into individual (such as attitudes and norms) and contextual factors (such as local recycling circumstances). In another recent

meta-analysis, Miafodzyeva and Brandt (2013) found convenience, moral norms, information, and environmental concern to be major predictors of recycling behaviour. As previous studies have primarily focused on the factors that affect perceptions of recycling convenience, the current study decided to investigate the possible influence of environmental concern and political ideology on perceived recycling convenience, thereby expanding the literature related to this field. As all jurisdictions in South Korea are subject to the same curbside recycling system, any differences among individuals can be explained by individual factors.

First, this paper assumes that individuals with a greater level of concern for the environment will tend to be more aware of the environmental consequences of their behaviour. In this context, the NEP is considered a global measure of concern for the environment, a well-documented construct that is associated with pro-environmental behaviour. Although many studies have found the NEP to have a positive influence on environmental behaviour (Davis et al., 2009; Leung and Rice, 2002; Liu et al., 2018; Scott and Willits, 1994; Tarrant and Cordell, 1997), it is difficult to find studies that have analysed the effect of the NEP on commitment to recycling. In a recent study on the effect of NEP on recycling behaviour, Best and Mayerl (2013) cited just one study (Vining and Ebreo, 1992) that had found an indirect influence of NEP on recycling behaviour, and were unable to confirm any direct effect in their own study. Within this context, the findings of the meta-analysis by Geiger et al. (2019) indicate that individuals with higher levels of concern for the environment are more likely to recycle. The current study predicts that individuals who are more concerned about the environment are less likely to perceive recycling as an inconvenience. Based on this discussion, this paper hypothesises that level of environmental concern will be inversely correlated with perceived recycling inconvenience.

Second, it is well-documented that political ideology has a major influence on environmental behaviour. Although the findings of previous studies indicate that individuals who are more liberal are more likely to engage in environmentally conscious behaviour than individuals who lean conservative (Samdahl and Robertson, 1989; Dunlap and Gale, 1972; Dietz et al., 1998; Dunlap, 1975; Mazmanian and Sabatier, 1981; McCright and Dunlap, 2011), few studies have investigated the relationship between political ideology and commitment to recycling. For example, in a study by Oskamp et al. (1991), political ideology was a significant predictor of attitudes toward recycling, whereas Flagg and Bates (2016) found no significant effect of political ideology on recycling behaviour. These contrasting results present the possibility that there could be a mediating variable between political ideology and recycling behaviour. The current study assumes that intent to recycle could be an antecedent of environmental behaviour. As recycling behaviour is preceded by an intention to recycle, this study hypothesises that more progressive individuals will perceive recycling to be less of an inconvenience than more conservative individuals.

Hypothesis 1 Environmental concern will be negatively associated with perceived recycling inconvenience.

Hypothesis 2 Progressive political ideology will be inversely correlated with perceived recycling inconvenience.

3 Materials and method

3.1 Data sources and analysis

The current study used data from the 2020 Environmental and Climate Change Response Awareness Survey (2020 ECCRAS) conducted by the Institute for Future Government at Yonsei University, which was publicly available on the institution's website (Institute for Future Government of Yonsei University, 2020). This survey was conducted on South Korean citizens aged 20 to 69 and used proportionate stratified sampling based on demographic statistics from the Korean Ministry of the Interior and Safety. A total of 2,163 online and mobile surveys were conducted from 27 March to 2 April 2020, resulting in 1,000 completed surveys (response rate of 46.2%) that were used as the data for this study.

The demographic data and information about the survey respondents is presented in Table 1. The current study conducted correlation and multiple regression analyses using Stata 15.

Table 1 Demographic background of survey respondents (n = 1,000)

<i>Variables</i>	<i>Respondents</i>	<i>Percentage</i>
Total	1,000	100.0
Gender		
Male	510	51.0
Female	490	49.0
Age		
20s	184	18.4
30s	189	18.9
40s	224	22.4
50s	235	23.5
60s	168	16.8
Education		
High school diploma or less	236	23.6
Junior college diploma (two years)	125	12.5
Undergraduate degree (four years)	560	56.0
Graduate degree or higher	79	7.9
Average monthly income (dollars)*		
≤2,654.9	233	23.3
2,654.9–3,539.8	209	20.9
3,539.8–4,424.8	182	18.2
4,424.8–5,309.7	150	15.0
≥5,309.7	226	22.6
Political ideology		
Strongly conservative	21	2.1
Conservative	190	19.0
Moderate	488	48.8
Progressive	274	27.4
Strongly progressive	27	2.7

Note: *average monthly income was originally measured in KRW (exchange rate KRW/USD of 1,130 on 19 March 2021).

Table 2 Measures related to variables investigated, including recycling inconvenience, environmental concern, political ideology, gender, age, education, and income

Variable	Measure			
	Items	Factor loading	Eigenvalue	Cronbach's alpha
Recycling inconvenience (1 = strongly disagree, 5 = strongly agree)	1 I am okay with an increase in the price of plastic waste disposal bags or the sake of enjoying the convenience of disposing all waste in such bags.	0.77	2.02	0.76
	2 I dispose of recyclables in plastic waste bags from time to time because I feel the waste recycling process is inconvenient.	0.86		
	3 I sometimes find the process of recycling to be inconvenient.	0.83		
Environmental concern (1 = strongly disagree, 5 = strongly agree)	1 Humans have the right to modify the natural environment to suit their needs.	0.79	3.82	0.86
	2 Human ingenuity will insure that we do not make the earth unlivable.	0.62		
	3 The earth has plenty of natural resources if we just learn how to develop them.	0.80		
	4 The balance of nature is strong enough to cope with the impact of modern industrial nations.	0.71		
	5 The so-called 'ecological crisis' facing humankind has been greatly exaggerated.	0.77		
	6 Humans were meant to rule over the rest of nature.	0.79		
	7 Humans will eventually learn enough about how nature works to be able to control it.	0.67		
Political ideology	1 = strongly conservative, 2 = conservative, 3 = moderate, 4 = progressive, 5 = strongly progressive			
Gender	0 = male, 1 = female			
Age	Respondent's age			
Education	1 = no formal education, 2 = elementary school, 3 = middle school, 4 = high school diploma, 5 = junior college diploma, 6 = undergraduate degree, 7 = graduate degree or higher			
Average monthly income (dollars)	1 ≤ 442.9, 2 = 442.9–884.9, 3 = 884.9–1,769.9, 4 = 1,769.9–2,654.9, 5 = 2,654.9–3,539.8, 6 = 3,539.8–4,424.8, 7 = 4,424.8–5,309.7, 8 ≥ 5,309.7			

Note: Average monthly income was originally measured in KRW (exchange rate KRW/USD of 1,130 on 19 March 2021).

3.2 Measures

3.2.1 Recycling inconvenience

With no previously developed measures to represent recycling inconvenience, the current study evaluated recycling inconvenience using the three items presented in Table 2. This measurement model showed a reasonable Cronbach's alpha value ($\alpha = .76$), with all factor loading values above 0.7.

3.2.2 Environmental concern

Since being developed by Dunlap and Van Liere (1978) as a means of measuring public perceptions of the new paradigm, the 12-item NEP scale has become the most widely-used measure of environmental concern (Stern et al., 1995). This study used a revised version of the NEP scale that consisted of 15 items [Dunlap et al., (2000), p.433]. The current study conducted a principle factor analysis and excluded items with low factor loadings, resulting in a total of seven items with factor loadings over 0.6 and a Cronbach's alpha value of 0.86 (Table 2).

3.2.3 Political ideology

As noted by many researchers, political ideology is closely associated with environmental value systems (Gromet et al., 2013; Dunlap and Gale, 1972; Liere and Dunlap, 1980). Political ideologies are generally measured by questions such as "where would you place your political views on a five- or seven-point scale from conservative to progressive?" [Nawrotzki, (2012), p.293; Subramanian et al., (2010), p.838; Xiao and McCright, 2007, 2015]. This study decided to use a five-point Likert scale, where one equates to very conservative, and five to very progressive.

3.2.4 Control variables

The current study used gender, age, education, and income as control variables. Gender was measured as a dummy variable with male = 0 and female = 1. Age was measured as the age group of respondents, ranging from 20s to 60s. Level of education was coded using a seven-point scale with 1 representing no formal education and 7 representing a graduate degree or higher. Finally, income was represented by average monthly income, which ranged from less than 442.9 dollars to above 5,309.7 dollars (from less than half a million KRW to 6 million KRW).

4 Results and discussion

4.1 Descriptive statistics

The descriptive statistics, including means and standard deviation (SD) of both the independent and dependent variables in the survey, are provided in Table 3. The average value of recycling inconvenience was 8.03, with a SD of 2.83 and a range from 3 to 15. The average level of environmental concern was 22.04, with a SD of 5.70 and a range

from 8 to 35. Political ideology was distributed from 1 (strongly conservative) to 5 (strongly progressive), with an average of 3.10 (SD = 0.80).

Table 3 Descriptive statistics of variables

<i>Statistics</i>	<i>Mean</i>	<i>Standard deviation (SD)</i>	<i>Minimum</i>	<i>Maximum</i>	<i>N</i>
Recycling inconvenience	8.03	2.83	3	15	1,000
Environmental concern	22.04	5.70	8	35	1,000
Political ideology	3.10	0.80	1	5	1,000
Age	44.58	13.07	20	69	1,000
Education	5.45	1.02	1	7	1,000
Income	5.80	1.70	1	8	1,000

Correlation analyses indicated that none of the coefficients of correlation were above 0.6 (Table 4). Coefficients with a correlation between variables of $|r| > 0.7$ and mean VIF > 10 are commonly considered to be the threshold of multi-collinearity (Dormann et al., 2013; Yu et al., 2015; Prunier et al., 2015). This showed that none of the relationships among the variables had values high enough to cause serious multi-collinearity problems.

Table 4 Coefficients of correlation between variables

	<i>Recycling inconvenience</i>	<i>Environmental concern</i>	<i>Political ideology</i>	<i>Age</i>	<i>Education</i>	<i>Income</i>
Recycling inconvenience	1					
Environmental concern	-0.532*	1				
Political ideology	0.069*	-0.027	1			
Age	-0.191*	0.124*	-0.156*	1		
Education	-0.005	0.044	0.070*	-0.127*	1	
Income	0.041	-0.023	0.050	0.021	0.245*	1

Note: * $p < 0.05$.

4.2 Results and discussion

This study used regression analysis to test the hypotheses, as shown in Table 5. Multi-collinearity tests were conducted by calculating variance inflation factor (VIF) scores. The results showed VIF mean scores well below the common threshold of 10 (VIF = 1.06) (Menard, 2002; O'Brien, 2007).

A robust regression analysis was also conducted to minimise the influence of outliers in the data and confirm the findings of the regression analysis (Benito-Lopez et al., 2011). Robust regression has previously been used in waste management literature for such reasons (e.g., Greco et al., 2015). The first regression (model 1) shows the results of a normal OLS regression. With all independent and control variables including environmental concern, political ideology, gender, age, education, and income, this model showed an R-squared value of 0.304, indicating that it explains 30.4% of the variance. In model 2, a robust regression analysis was conducted, which produced an R-squared value of 0.304. As the significance of variables did not differ between the

normal regression (model 1) and robust regression (model 2), Model 1 was selected for further analysis.

The results from model 1 with the control variables revealed that only environmental concern ($\beta = -0.256$, $t = -19.20$, $p < 0.001$) was a predictor of perceived recycling inconvenience, supporting the environmental concern hypothesis (H1). According to the environmental concern coefficient, increasing environmental concern by one unit resulted in a decrease of 0.256 in perceived recycling inconvenience. This implies that individuals with higher levels of concern for the environment perceive recycling to be less of an inconvenience. This is in an agreement with the findings of Best and Mayerl (2013), who found a positive correlation between concern for the environment and commitment to recycling.

Notably, the results offer no evidence in support of the second hypothesis (H2) that political ideology would have a significant effect on perceived recycling inconvenience. The results support the argument of Buttel and Flinn (1976) that political ideology is not a crucial variable in explaining variation in environmental concern, but conflict with Dietz et al. (1998), Dunlap (1975) and McCright and Dunlap (2011) who found that more liberal individuals tend to be more pro-environment than more conservative individuals.

Table 5 Results of regression analyses of investigated variables

	<i>Normal ordinary least squares (OLS)</i>			<i>Robust</i>			<i>Variance inflation factor (VIF)</i>
	<i>Coefficient</i>	<i>T scores</i>	<i>P-value</i>	<i>Coefficient</i>	<i>T scores</i>	<i>P-value</i>	
Environmental concern	-0.256***	-19.20	0.000	-0.256***	-17.25	0.000	1.02
Political ideology	0.128	1.36	0.175	0.128	1.29	0.196	1.03
Gender	-0.334*	-2.20	0.028	-0.334*	-2.21	0.028	1.03
Age	-0.027***	-4.56	0.000	-0.027***	-4.49	0.000	1.06
Education	-0.049	-0.63	0.529	-0.049	-0.62	0.533	1.12
Income	0.059	1.29	0.196	0.059	1.26	0.207	1.07
Constant	14.556***	21.71	0.000	14.556***	22.41	0.000	
Mean VIF							1.06
F statistic		72.34			66.62		
Prob. > F		0.000			0.000		
R-squared		0.304			0.304		
N		1,000			1,000		

Notes: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Among the control variables, the findings revealed the significance of age and gender. Specifically, the results indicate a significant negative relationship between age and perceived recycling inconvenience ($\beta = -0.027$, $t = -4.56$, $p < 0.001$), indicating that older people tend to perceive recycling as less inconvenient than younger people. Furthermore, the current study found a significant negative relationship between gender and recycling inconvenience ($\beta = -0.334$, $t = -2.20$, $p < 0.05$), demonstrating that, at least within the scope of this study, women perceive less inconvenience in recycling than men.

Contrary to the findings of Buttel and Flinn (1978), this indicates that education and income have no significant effect on the perceived inconvenience of recycling.

5 Conclusions

This paper sought to investigate the factors that affect how individuals perceive the inconvenience of recycling. The findings suggest that although a higher level of concern for the environment decreases the perceived inconvenience of recycling, political ideology has no such effect. This has several implications for both research and practical application.

First, the finding that individuals with a higher level of concern for the environment view recycling as less inconvenient expands on the current literature, as the effect of environmental concern on intention to recycle has rarely been investigated. Within this context, Abbott et al. (2013) argue that policymakers should focus on social norms to promote and encourage MSW recycling, while Wan et al. (2014) suggest that promoting the importance of recycling and emphasising recycling as a socially desirable behaviour could encourage people to perceive recycling as a moral norm. The findings of this study also have implications for further research and policy development, suggesting that in addition to emphasising the importance of recycling, governments should attempt to increase the level of environmental concern among citizens through educational programs.

Second, the findings of this study illustrate that under a universal VWF policy, the degree to which individuals are concerned about the environment alters their perceptions of recycling inconvenience. This suggests that while the adoption of VWF may improve recycling participation, future studies could investigate other determinants of intent to recycle or behaviour after the adoption of VWF. This is because although policymakers attempt to make recycling as convenient as possible, it is still unlikely to be less costly than simply disposing of waste, especially in terms of convenience and time (Reschovsky and Stone, 1994). Accordingly, governments may wish to encourage citizens to become more concerned about the environment through public campaigns and education related to recycling.

Third, contrary to expectations, political ideology did not affect perceived recycling inconvenience. This finding indicates that, within the scope of the current study, being progressive or liberal does not lead individuals to perceive recycling as less inconvenient. While a significant relationship between political ideology and environmental behaviour has been well documented, there is a need for this argument to be re-examined, particularly in the context of recycling convenience. Notably, the results of this study contradict the findings of recent studies on lifestyle politics in which Democrats tended to recycle more than Republicans (Coffey and Joseph, 2013 for review). The present study suggests that future research should focus on the relationship between perceptions of recycling inconvenience and actual recycling participation in order to investigate whether such perceptions are a moderating or mediating factor between political ideology and action.

Fourth, this study focused on investigating and identifying the determinants of inconvenience in recycling. This approach differs from other research in that this study treated recycling convenience as a dependent rather than independent variable that affects recycling participation. While extensive meta-analyses (e.g., Varotto and Spagnoli,

2017) found the convenience of recycling to be a key psychological factor involved in recycling, previous research in this area tended to neglect the precursors to or determinants of recycling convenience, with the exception of curbside recycling. Accordingly, the identification of other precursors and factors that influence individual perceptions of recycling convenience provides possible avenues for future research.

Finally, despite the contributions of the current study, the scope of this paper is limited to South Korean citizens living under a universal VWF policy. Nevertheless, this study may still be of use to other countries adopting waste recycling programs based on a user-pay principle (unit-pricing, pay-as-you-go). One possibility is to test the results of the current study in European Union (EU) members due to the existence of common international standards for MSW management at the EU level in the form of European Parliament and Council Directive (EC) (Park and Lah, 2018). This would allow the impact of environmental concern and political ideology to be compared between EU members and South Korea. Another possibility is to consider the framework of collective environmental action at the individual level (Everett, 1994). The current study focused on environmental concern and political ideology rather than possible incentives that might result in collective action. Accordingly, future research may wish to investigate other possible factors that influence perceived recycling inconvenience (such as the cost of plastic waste bags) to explain recycling inconvenience from different perspectives.

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