The role of norms in predicting waste sorting behavior

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Submission date: 04-Apr-2022 05:17AM (UTC+0700)
Submission ID: 1800512885
File name: 10._The_role_of_norms_in_predicting_2021.pdf (475.67K)
Word count: 7230
Character count: 39368

The current issue and full text archive of this journal is available on Emerald Insight at:
https://www.emerald.com/insight/2042-6763.htm

Received 19 May 2020
Revised 7 June 2020
3 December 2020
16 February 2021
Accepted 1 March 2021

The role of norms in predicting waste sorting behavior

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Abstract

Purpose – This study aims to examine the role of personal and subjective norms in predicting waste sorting, an increasingly relevant pro-environmental behavior.

Design/methodology/approach – This study obtained data from a sample of 300 respondents from three Indonesian cities. Purposive sampling was employed to obtain information from specific segments of Indonesian population. The analysis consisted of a two-stage procedure including confirmatory factor analysis and covariance-based structural equation modeling.

Findings – Results demonstrated that both subjective and personal norms significantly and directly predict waste sorting behavior (WSB) bypassing intention to behave.

Research limitations/implications – The fact that norms held by individuals are able to single-handedly drive pro-environmental behaviors implies that previous studies and social marketing campaigns may have overstated the role of intention.

Practical implications – In designing marketing communication programs promoting WSB, this paper argues that targeting normative tendencies of the audience may provide a more effective strategy than focusing on explicit pro-environmental intentions and attitudes of the public.

Originality/value – This study provided new experimental test and confirmation of the role of subjective norms, the normative component of the theory of planned behavior and of personal norms, the normative component of the norm activation theory, in predicting WSB.

Keywords Social marketing, Pro-environmental behavior, Theory of planned behavior, Subjective norm, Personal norm, Waste sorting behavior

Paper type Research paper

1. Introduction

Many current environmental problems can be understood as an indirect consequence of consumer's daily behavior toward products and services such as food and beverages, energy and transportation. The way consumers select, consume and dispose of a particular product may be environmentally friendly if they make efforts to limit actions endangering the natural environment (Albayrak *et al.*, 2011). Selfish, altruistic and biospheric factors may all play essential roles in promoting consumer pro-environmental behaviors (Stern *et al.*, 1993; Stern and Dietz, 1994). For example, selfish individuals may behave pro-environmentally if they consider that such behaviors engender benefits greater than costs. In contrast, altruistic individuals may protect the environment and benefit others for moral reasons, whereas those with biospheric values take environmental sustainability into account. As consumers are entitled to freely choose their behaviors, variation in value orientation (ranging from self-centered value to environmental and social-altruistic values) is possible and potentially relevant for marketing science.

Journal of Social Marketing
Vol. 11 No. 3, 2021
pp. 224-239
© Emerald Publishing Limited
2042-6763
DOI 10.1108/JSOCM-05-2020-0088

Waste management behavior is a specific and increasingly relevant example of pro-environmental behavior (Albayrak *et al.*, 2011). Increases in waste production pose a significant threat to public health and the urban environment especially in developing countries (Dedinec *et al.*, 2015; Vergara *et al.*, 2016). This led to the formulation of various schemes aiming at motivating people to reduce their negative environmental impact (Coşkun *et al.*, 2017) and to research on determinant factors of pro-environmental behavior (Pakpour *et al.*, 2014; Wan *et al.*, 2014; Wang *et al.*, 2018).

As a result, in recent years social marketing has emerged as a practical approach to promoting pro-environmental behavior through a series of commercial tools (Andreasen, 1994, 2002; Lu *et al.*, 2015; Kim *et al.*, 2019; Kotler and Lee, 2008; Kotler and Zaltman, 1971; Lahtinen *et al.*, 2020; Minghua *et al.*, 2009; Ng *et al.*, 2015; Sterner and Bartelings, 1999). Pro-environmental behaviors are often defined in the moral rather than economic domain (Stern, 2000; Wan *et al.*, 2017) based on Thøgersen's (1996) view that they stem from personal moral beliefs and social pressure. As such, they are unlikely to be predicted from calculations of personal costs and benefits as usually postulated by utilitarian approaches.

Social marketing of waste sorting activities, in particular, operates on consumer knowledge and education (Jesson, 2009; Meyer, 2015; Takahashi, 2009; Wang *et al.*, 2020). As waste sorting is simultaneously influenced by motivational and contextual factors (Stern *et al.*, 1999), social marketing uses socio-psychological tools to motivate behavioral changes (Haq *et al.*, 2013). For example, changes in the way the public deals with household waste are expected to have a significant impact on the conservation of natural resources and reduce landfill space requirements (Halvorsen, 2012). Landfills in particular remain an unsolved problem shaped by patterns of food consumption. In urban communities, for example, eating out is a habit positively associated with food and organic waste (McCarthy and Liu, 2017).

Theoretical perspectives such as norm activation theory (NAT) generally appeal to personal value orientation (Stern *et al.*, 1993; Stern and Dietz, 1994) and a feeling of moral obligation (Schwartz, 1977) to predict pro-environmental behaviors including waste sorting (Nguyen *et al.*, 2015; Wang *et al.*, 2019; Zhang *et al.*, 2019). In the field of marketing science, the theory of planned behavior or TPB (Ajzen, 1991) has been applied to predicting waste disposing behaviors (Bortoleto *et al.*, 2012; Fan *et al.*, 2019; Ghani *et al.*, 2013; Tonglet *et al.*, 2004; Wang *et al.*, 2020; Zhang *et al.*, 2015). Recently, Setiawan *et al.* (2020) proposed a robust integration of the two theories to encourage waste sorting behavior (WSB) still awaiting empirical validation. According to TPB, subjective norm is the single normative component predicting behavioral intention. However, about half of recent studies on the topic have failed to detect significant effects of subjective norms on waste sorting intention, and therefore, have failed to demonstrate a role for subjective norms as a representation of social pressure (Table 1).

The concept of personal norm represents an alternate normative factor postulated by NAT (Schwartz, 1977), emphasizing feelings of moral obligation rather than social pressure. Various studies have provided empirical support to personal norms as predictors of intentions and pro-environmental behaviors in the context of waste sorting (Loan *et al.*, 2017; Matthies *et al.*, 2012; Pakpour *et al.*, 2014; Visschers *et al.*, 2016; Zhang *et al.*, 2019). In addition, over the past decade, some analyzes inspired by TPB have successfully integrated personal and subjective norms to model various aspects of pro-environmental behavior (Onel, 2017; Setiawan *et al.*, 2020; Wall *et al.*, 2007).

This study proposes a similar strategy of integrating personal and subjective norms to address the problem of WSB in Indonesia. The growing population (over 270 million according to the 2020 census) has increased daily consumption and the risk of

Table 1.
Current research regarding the effect of subjective norm on waste sorting intention

No.	Author(s)	The effect of subjective norm on waste sorting intention	No.	Author(s)	The effect of subjective norm on waste sorting intention
1	B. Zhang *et al.* (2019)	Not supported	16	Z. Wang *et al.* (2018)	Supported
2	Khan *et al.* (2019)	Supported	17	Ayob, Low, Jalil, and Chin (2017)	Not supported
3	Kumar (2019)	Supported	18	Carfora *et al.* (2017)	Supported
4	Liao and Li (2019)	Not supported	19	Khalil, Abdullah, Manaf, Sharaai, and Nabegu (2017)	Supported
5	Thi Thu Nguyen *et al.* (2019)	Supported	20	Nduneseokwu, Qu, and Appolloni (2017)	Supported
6	Tweneboah-Koduah *et al.* (20	Not supported	21	Russell *et al.* (2017)	Supported
7	Aktas *et al.* (2018)	Supported	22	Wan *et al.* (2017)	Supported
8	Alhassan *et al.* (2018)	Supported	23	Visschers *et al.* (2016)	Not supported
9	Halder and Singh (2018)	Supported	24	Botetzagias, Dima, and Malesios (2015)	Not supported
10	Heidari *et al.* (2018)	Not supported	25	D. Zhang *et al.* (2015)	Supported
11	Liao *et al.* (2018b)	Supported	26	Nguyen *et al.* (2015)	Not supported
12	Li *et al.* (2018)	Supported	27	Chaisamrej and Zimmerman (2014)	Not supported
13	Liao *et al.* (2018a)	Not supported	28	Park and Ha (2014)	Not supported
14	Ma *et al.* (2018)	Not supported	29	Wan *et al.* (2014)	Not supported
15	Yu *et al.* (2018)	Supported	30	Ghani *et al.* (2013)	Not supported

environmental problems caused by unmanaged waste, especially in large and densely populated cities such as Jakarta and its two suburbs of Bogor and Depok.

2. Theoretical background

2.1 Subjective norm and waste sorting intention and behavior

Subjective norm is a primary construct of TPB and denotes a form of social pressure on individual behavior (Ajzen, 1991; Fishbein and Ajzen, 2011), mostly based on the need of approval (Cialdini *et al.*, 1991; Comber and Thieme, 2013; White *et al.*, 2009). Social pressure may emerge from multiple sources such as family, friends, individuals and referral groups (Bortoleto *et al.*, 2012; Crociata *et al.*, 2016; Khan *et al.*, 2019; Norman and Cooper, 2011). Subjective norm has also been proposed as an extrinsic factor determining household waste sorting (Alhassan *et al.*, 2018; Carfora *et al.*, 2017; Hao *et al.*, 2018; Liao *et al.*, 2018b; Park and Ha, 2014; Wang *et al.*, 2018; Xu *et al.*, 2017; Yu *et al.*, 2018; Zhang *et al.*, 2015). As social pressure from either individuals or groups may cause people to engage in WSB, the two first hypothesis of this study are:

H1a. Subjective norms have a positive effect on waste sorting intentions.

H1b. Subjective norms have a positive effect on WSBs.

2.2 Personal norms and waste sorting intention and behavior

Waste sorting is a pro-social or environmental behavior influenced by psychological factors (Boonrod *et al.*, 2019; Stoeva and Alriksson, 2017; Wang *et al.*, 2018). According to proponents of NAT (Onwezen *et al.*, 2013; Schwartz *et al.*, 2017; Zhang *et al.*, 2018), personal norm is a feeling of moral obligation based on an awareness of consequences of misbehaving and the ascription of responsibility (Schwartz, 1977). As such, it may act as an intrinsic factor potentially motivating altruistic behaviors such as waste sorting (Matthies *et al.*, 2012; Saphores *et al.*, 2012).

It follows that pro-environmental behaviors such as waste sorting may require the joint operation of social pressure mediated through subjective norms and a feeling of moral obligation associated with personal norms (Setiawan *et al.*, 2020; Wang *et al.*, 2019), as demonstrated in other contexts (Harland *et al.*, 2007; Loan *et al.*, 2017; Matthies *et al.*, 2012; Pakpour *et al.*, 2014; Vinners *et al.*, 2016; Zhang *et al.*, 2019). Therefore, the two other hypothesis related to the role of personal norms in WSB in the Indonesian context:

H2a. Personal norms have a positive effect on waste sorting intention.

H2b. Personal norms have a role in moderating the relationship between subjective norms and waste sorting intention.

H2c. Personal norms have a positive effect on actual WSB.

2.3 Waste sorting intention and behavior

A personal level of concern for the environment and the intention or readiness to act to protect it (Fishbein and Ajzen, 2011) can play an essential role in pro-environmental behaviors such as waste sorting (Setiawan *et al.*, 2020; Stern, 2000; Thyroff and Kilbourne, 2017). Considering personal intentions is therefore, central to understanding the role of motivational factors on planned behaviors and their maintenance in the long run (Tweneboah-Koduah *et al.*, 2019). Confirming the expectations, recent studies have provided

compelling evidence for an effect of intention on actual WSBs (Aktas *et al.*, 2018; Heidari *et al.*, 2018; Khan *et al.*, 2019; Li *et al.*, 2018; Liao and Li, 2019; Ma *et al.*, 2018; Russell *et al.*, 2017; Visschers *et al.*, 2016; Xu *et al.*, 2017). We, therefore, predict a similar effect in the Indonesian context and define the three last hypothesis of this study are:

H3a. Intention has a positive effect on waste sorting actual behavior.

H3b. Intention mediates the relationship between subjective norm and WSB.

H3b. Intention mediates the relationship between personal norm and WSB.

3. Methods

3.1 Measurement

The measurement of subjective norm regarding waste sorting was based on four items derived from Zhang *et al.* (2019), Alhassan *et al.* (2018) and Nguyen *et al.* (2015) (Figure 1). The measurement items in the subjective norm variable (SN) are the respondent's level of agreement to the statement that individuals or groups, namely, family, close friends, colleagues and neighbors, provide social pressure that prompts an individual to exhibit WSB. Personal norm regarding waste sorting (PN) was measured by five items after Wang *et al.* (2019), Onwezen *et al.* (2013) and Tonglet *et al.* (2004). The measurement items in the PN variable are the respondent's level of agreement to the statement on moral obligation, violation of moral principles, environmental protection, feeling of guilt and environmental concerns.

Although both intention to sort waste (INT) and actual WSB are each measured by four items, one of the indicators was slightly modified to make it more relevant (Zhang *et al.*, 2019). SN, PN

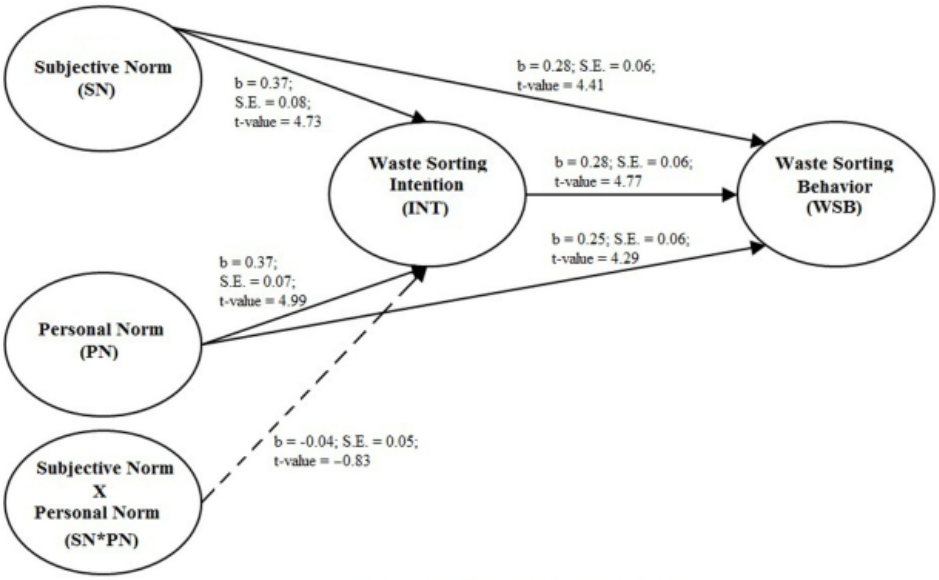

Figure 1.
Research model

Notes: The solid line represents the hypothesis is supported. The dashed line represents the hypothesis is not supported

and INT variables were measured on a five-point Likert rating scale (point 1 = strongly disagree to 5 = strongly agree), with a modified coding for the WSB variable (point 1 = never to 5 = always). All the measurement items were closed-end and respondents were allowed to choose only one option.

The paper-based questionnaire was distributed directly to respondents by trained assistants. For the preliminary screening, assistants ensured that target respondents had adequate trash bins, to make sure waste sorting facilities were available at the selected households. The average time required to fill the questionnaire was approximately 5–8 min. Souvenirs were given out to respondents as a reward.

3.2 Sample and procedures

A pre-test was conducted on 50 respondents from the Bogor City area, selected based on the availability of adequate trash bins at home and a waste bank in the community. The pre-test revealed two items with a standardized loading factor below the minimum threshold of 0.5, leading to minor changes in a few questions to facilitate their understanding by respondents.

The study relied on purposive sampling to contact 360 subjects with available trash bins at home, available waste banks in their communities and at least high-school education. They were selected from three cities in Indonesia, namely, Jakarta, Bogor and Depok. Selection of locations was based on the fact that Jakarta is the highest waste producer in Indonesia (BPS-Statistics Indonesia, 2019) with Bogor and Depok as its two highly interconnected suburbs. From the initial sample, 35 respondents did not completely fill in their forms and a further 25 did not fill out the forms at all. Therefore, a final sample size of 300 respondents submitting complete questionnaires. The profile of respondents is summarized in Table 2.

Data analysis was performed in two steps (Hair *et al.*, 2014). The first stage was a confirmatory factor analysis with a robust maximum likelihood estimation. In the second stage, hypothesis testing was carried out using a covariance-based structural equation modeling technique using Lisrel 8.80.

4. Results

When performing confirmatory factor analysis, the study first examined the convergent and discriminant validity of measurement items. Item SN3 was dropped due to a standardized loading factor score of 0.27 (below the minimum threshold of 0.5). The model was re-run and met the recommended threshold for average variance extracted (AVE) and composite reliability (Table 3). Measurement items also exhibited satisfactory discriminant validity (Table 4). Square root of the AVE of the four factors was greater than the correlation coefficient of the model's factor. In the second step, goodness-of-fit tests showed that both absolute fit (Satorra-Bentler Scaled X^2 = 177.21 (p = 0.00), standardized root mean square residual (SRMR) = 0.036 and root mean square error of approximation (RMSEA) = 0.053 and incremental fit values were satisfactory (non-normed fit index (NNFI) = 0.99, normed fit index (NFI) = 0.98, relative fit index (RFI) = 0.98, incremental fit index (IFI) = 0.99 and comparative fit index (CFI) = 0.99).

Structural equation modeling was then applied to test the study hypotheses. In the first step, latent variable scores were calculated to create an interaction between subjective and personal norms. In the second step, the goodness of fit of the structural model was examined. Results showed a good absolute fit to data (Satorra-Bentler Scaled X^2 = 224.78, p = 0.00; SRMR = 0.043; and RMSEA = 0.059). Incremental fit was also satisfactory (NNFI = 0.99, NFI = 0.98, RFI = 0.98, IFI = 0.99 and CFI = 0.99). The third step included the test of the hypotheses (Figure 2 and Table 5). Table 6 shows the proportion of variance in

Demographic characteristic	*F*	(%)
Age		
18–21	9	3.0
21–30	79	26.3
31–40	67	22.3
41–50	105	35.0
51–60	37	12.3
61–65	3	1.0
Gender		
Male	146	48.7
Female	154	51.3
Profession		
Private employee	96	32.0
Civil servants	12	4.0
Entrepreneur	90	30.0
Teacher/lecturer	26	8.7
Doctor/medical staff	4	1.3
Consultant	12	4.0
Housewife	38	12.7
Others	22	7.3
Education level		
High school	147	49.0
Vocational school	29	9.7
Graduate school or higher	124	41.3
Monthly income (IDR)		
4,000,000–5,000,000	172	57.3
6,000,000–8,000,000	54	18.0
9,000,000–10,000,000	31	10.3
11,000,000–15,000,000	20	6.7
16,000,000–20,000,000	3	1.0
> 20,000,000	20	6.7
Total	300	100

Table 2.
Respondent's profile

endogenous variables predicted from exogenous variables, revealing that 43% of the variation in waste sorting intention is explained by subjective and personal norms and their interaction. In addition, 49% of variation in WSB is explained by subjective and personal norms accompanied by waste sorting intention.

Subjective norms had a positive effect on waste sorting intention ($b = 0.37$, SE = 0.08, t-values = 4.73) and behavior ($b = 0.28$, SE = 0.06, t-values = 4.77). Personal norms also had a positive effect on waste sorting intention ($b = 0.37$, SE = 0.07, t-values = 4.99) and actual WSB ($b = 0.25$, SE = 0.06, t-values = 4.29). The interaction between subjective and personal norms was not significant ($b = -0.04$, SE = 0.05, t-values = −0.83). Finally, intention showed a positive effect on WSB ($b = 0.$ SE = 0.06, t-values = 4.29) and significantly mediated the effects of subjective norms ($b = 0.10$, SE = 0.03, t-values = 3.11) and personal norms ($b = 0.11$, SE = 0.03, t-values = 3.15) on actual WSB.

5. Discussion

The results confirmed hypotheses *H1a, H1b, H2a, H2c* and *H3*, providing significant support for an essential role of norms in predicting waste sorting intention and actual

Variable	Items	Standardized loading factor	SE	*t*-value	CR	AVE
Subjective norm (SN)	SN1 – Family want	0.93	0.043	23.32	0.92	0.75
	SN2 – Thought of a close friend	0.71	0.056	12.71		
	SN3 – Thought of a colleague	*	*	*		
	SN4 – Criticism from neighbors	0.84	0.055	17.70		
Personal norm (PN)	PN1 – Moral obligation	0.96	0.035	29.30	0.96	0.81
	PN2 – Violation of moral principles	0.98	0.033	31.78		
	PN3 – Protect the environment	0.96	0.035	29.06		
	PN4 – Feeling of guilt	0.78	0.038	19.05		
	PN5 – Concern for the preservation of the living environment	0.81	0.027	28.76		
Waste sorting intention (INT)	INT1 – Intention to sort organic waste	0.97	0.037	28.13	0.96	0.85
	INT2 – Intention to sort reusable waste	0.92	0.046	21.58		
	INT3 – Intention to sort non-organic and economically valuable waste	0.94	0.041	24.42		
	INT4 – Intention to sort hazardous/toxic waste	0.85	0.032	26.98		
Waste sorting behavior (WSB)	WSB1 – The intensity of sorting organic waste	0.90	0.036	27.80	0.95	0.83
	WSB2 – The intensity of sorting reusable waste	0.92	0.045	21.85		
	WSB3 – The intensity of sorting non-organic and economically valuable waste	0.96	0.036	28.65		
	WSB4 – The intensity of sorting hazardous/toxic waste	0.86	0.055	18.73		

Note: * Item SN3 dropped from the model

Table 3.
Confirmatory factor analysis and validity – reliability results

behavior. The role of waste sorting intention in mediating the relationship between subjective and personal norms, as predicted by *H3b* and *H3c*, was also supported by the data. However, its mediating role between subjective and personal norms, as predicted by H_2 was not demonstrated.

The results confirmed the effect of subjective norms on waste sorting intention and behavior, demonstrating the importance of social pressure from families, close friends and

Table 4. Discriminant validity assessment

Variable	SN	PN	INT	WSB
SN	*0.87*			
PN	0.61	*0.90*		
INT	0.58	0.59	*0.92*	
WSB	0.60	0.59	0.60	*0.91*

Note: The diagonal cells in italics show the $\sqrt{AVE}$

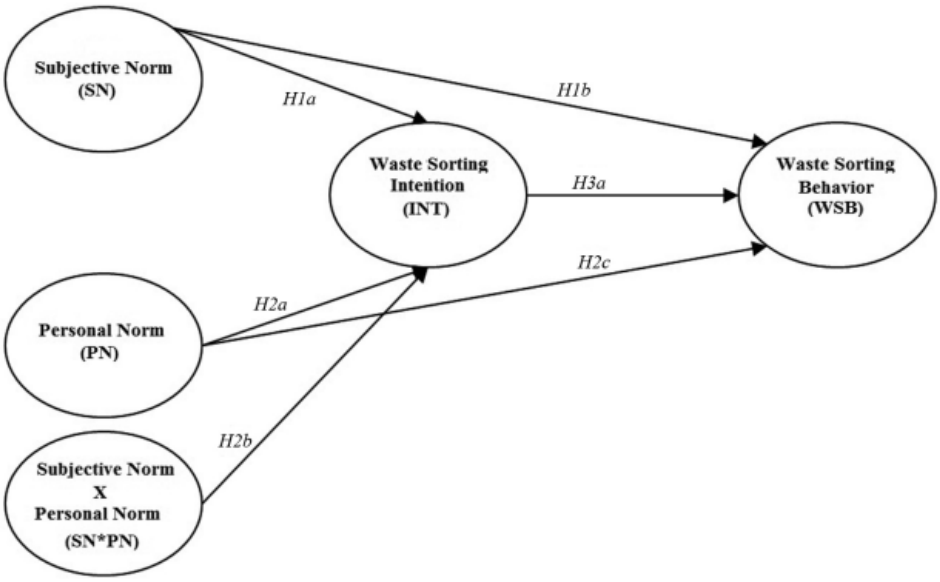

Figure 2. Path diagram

Table 5. Hypothesis test results

No.	Path	Direct effect	Indirect effect	Total effect	S.E.	*t*-value	Hypothesis
H1a	sn → int (+)	0.37	–	–	0.08	4.73	Supported
H1b	sn → wsb (+)	0.28	–	–	0.06	4.41	Supported
H2a	pn → int (+)	0.37	–	–	0.07	4.99	Supported
H2b	sn*pn → int (+)	−0.04	–	–	0.05	−0.83	Not supported
H2c	pn → wsb (+)	0.25	–	–	0.06	4.29	Supported
H3a	int → wsb (+)	0.28	–	–	0.06	4.77	Supported
H3b	sn → int → wsb (+)	–	0.10	0.39	0.03	3.11	Supported
H3c	pn → int → wsb (+)	–	0.11	0.36	0.03	3.15	Supported

ighbors as a factor promoting pro-environmental behaviors in Indonesia. The significant effect of sonal norms on both waste sorting intention and behavior also demonstrates the role of feelings of moral gation to preserve the environment. The results confirm previous findings by Wang *et al.* (2019), Wan *et al.* (2017), Matthies *et al.* (2012) and Saphores *et al.* (2012) in other contexts. Behaviors such as waste sorting are relevant to the environment, and are therefore, more properly classified in the moral than economic domain. As such, instead of balancing costs with personal benefits, people may be morally evaluating what is right or wrong on the basis of their personal norms, which may therefore, lead to pro-environmental behaviors irrespective of the presence of intention.

In summary, our results show that the integration of NAT-based personal norms and TPB-based subjective norms can successfully explain WSB. Therefore, a complete norm element is needed to shape the community's behavior. This finding has some important implications. People who are more inclined to follow personal rather than subjective norms should be more responsive to social marketing programs that prioritize the importance of moral obligations toward the community and environment. On the other hand, people more influenced by subjective than personal norms should respond more strongly to social marketing programs involving environment officials or local community leaders. Social marketers should therefore, engage community leade o better understand the characteristics of community members.

Our results did not reveal a significant interaction between subjective and personal norms. A consequence is that a respondent scoring high on personal norms, but simultaneously experiencing social pressure, may show a decrease in the intention to sort waste. A possible explanation is that when moral awareness is accompanied by social pressure, respondents may feel that the intention to sort waste is no longer entirely derived from their personal moral obligation.

In addition, the results indicate that intention hich derives from both subjective and personal norms because of social pressure and a feeling of moral obligation, tends to be realized in actual WSB. Therefore, the analysis confirms the argument ma by Fishbein and Ajzen (2011) in the context of waste sorting behavior in Indonesia, that intention is an indication of an individual's readiness to display a given behavior.

6. Implications

The results have theoretical and practical implications for social marketing applied WSB. According to TPB, subjective rms do not directly influence behavior and require the mediation of intention (Heidari *et* 2018; Kumar, 2019; Liao *et al.*, 2018a; Liao and Li, 2019; Ma *et al.*, 2018; Thi Thu Nguyen *et al.*, 2019; Tweneboah-Koduah *et al.*, 2019; Yu *et al.*, 2018; Zhang *et al.*, 2019). Against this statement, the study provided clear evidence that the presence of the two types of norms, subjective and personal, can directly predict behavior without mediation by intention.

The results also have managerial implications. Social and perceived personal pressures are specific features expected to vary across targeted communities. Therefore, marketing communication programs for WSB should carefully take into account the normative characteristics of targeted audiences. Specifically, audiences characterized by high moral commitment to protecting the environment should not be exposed to marketing

Table 6. Coefficient of determinations

Endogenous variable	R^2
Intention	0.43
Behavior	0.49

communications highlighting the desire of neighbors to sort waste. On the other hand, social marketers should involve respectable community leaders when targeting audiences more concerned about social pressure and doubling efforts to attract large numbers of participants. In summary, individuals more concerned with people's opinions should be exposed to social pressure from peers, while people moved by high moral concerns should be made aware of the consequences of their behavioral choices.

7. Conclusion

In conclusion a pro-environmental behavior such as waste sorting is complex and determined by multiple factors. As WSB in three Indonesian cities seems to be influenced both by subjective and personal norms, social marketers need to consider the complete normative component of their target audiences, as well as their normative tendencies, in their communication programs.

As for the potential limitations of the study, the assessment of subjective norms did not explore the potential effectiveness of promotional media such as the use of banners and posters. Besides, the measurements of personal norms in the study did not specify its two main antecedent constructs yet, namely, awareness of consequences and ascription of responsibility. Finally, although the availability of adequate trash bin facilities was taken into account, the effect of time availability on WSB was not assessed. Those issues should be addressed in future studies of the topic both in Indonesia and in other locations.

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