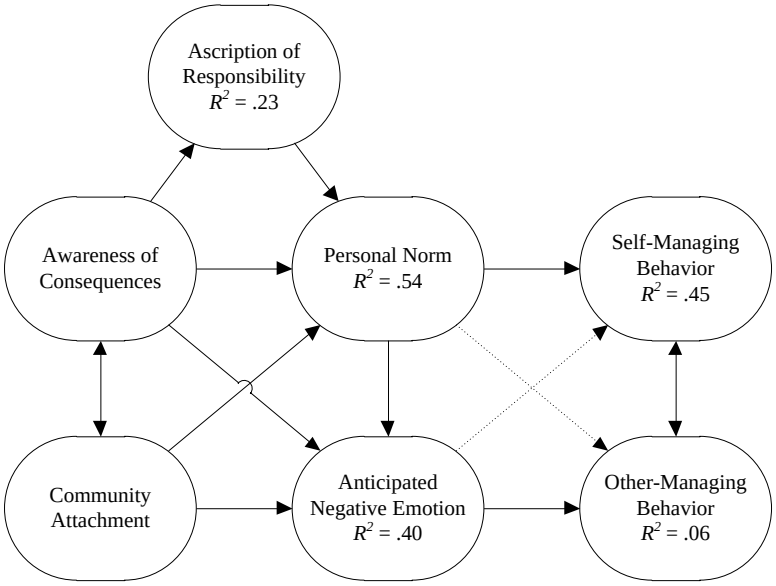
Abstract

This study extended the norm activation model in the context of litter reduction to explain self-managing (e.g., avoiding littering) and other-managing (e.g., picking up litter) behaviors. Although those kinds of behaviors are conceptually distinct, prior research has not explained differences in their prediction. This study addresses that gap by considering the roles of community attachment and anticipated negative emotion in other-managing behavior. The addition of those predictors creates a second explanatory pathway in the norm activation model. Results showed awareness of consequences, ascription of responsibility, and community attachment predicted personal norm (R^2 = .54), which predicted self-managing behavior (R^2 = .45). Awareness of consequences, community attachment, and personal norm predicted anticipated negative emotion (R^2 = .40), which predicted other-managing behavior (R^2 = .06). Self- and other-managing behaviors were moderately correlated (r = .42). These results show distinct pathways to the two different kinds of behaviors. They emphasize the importance of instilling in individuals not only a personal norm, but a sense of belonging in their community. The discussion highlights avenues for future research, proposing further model extension to explain civic engagement as a subset of other-managing behavior.

Keywords: norm activation; behavioral intention; litter reduction; community attachment; negative emotion

Graphical Abstract



Minding Other People's Business: Community Attachment and Anticipated Negative Emotion in an Extended Norm Activation Model

1. Introduction

Human behavior is the cause of many environmental problems and individuals can engage in proenvironmental behaviors to help mitigate those problems (Scott, Amel, Koger, & Manning, 2016). This study is interested in two categories of behaviors. First, individuals can engage in behaviors to lessen their own negative impacts on the environment. Recycling at home is an example of such *self-managing* behavior. Second, individuals can engage in behaviors to address the negative impacts of other people. Participating in a beach clean-up is an example of such *other-managing* behavior. Prior research has sought to explain each kind of behavior in isolation (e.g., Harth, Leach, & Kessler, 2013; Landon, Kyle, & Kaiser, 2017). The current study proposes a novel framework containing parallel and overlapping pathways explaining the two kinds of behaviors. We begin with the concept of personal norm to explain both kinds of behaviors and then consider factors differentiating them in the context of litter reduction.

Personal norm has become an important concept explaining proenvironmental behavior (Geiger, Steg, van der Werff, & Ünal, 2019; Klöckner, 2013). It is a sense of moral obligation to engage in a behavior, which arises from an awareness of the consequences of not acting and ascription of individual responsibility to act (Schwartz, 1977). Emotions are embedded in this process and may explain the relationship between personal norm and proenvironmental behavior (Onwezen, Antonides, & Bartels, 2013). This is consistent with the idea that conforming to a personal norm results in positive emotions and failure to do so results in negative emotions directed at the self (Schwartz, 1977).

Another line of research has shown individuals with strong community attachment and awareness of consequences may anticipate experiencing negative emotions in response to environmental problems in their community (Landon et al., 2017). Based on that and other previous work (e.g., Harth et al., 2013), we argue in the context of socially visible environmental problems in the community, anticipated negative emotion related to those problems may drive intentions to fix the harms others have caused. Although some evidence suggests anticipated negative emotion may predict other-managing behavior more strongly

than it predicts self-managing behavior (e.g., Han, Hwang, & Lee, 2017), there are no direct explanations of why that would be the case. This study addresses that research gap by extending the norm activation model to understand how anticipated negative emotion is related to community attachment and personal norm, and how it may uniquely explain other-managing proenvironmental behavior. Understanding these pathways to different proenvironmental behaviors can support efforts to address socially visible problems in the community.

1.1. Self- and Other-managing Proenvironmental Behaviors

Proenvironmental behaviors take many forms aiming to resolve real or perceived challenges to environmental sustainability (Rice, 2006). P. C. Stern (2000) differentiated among four major behavioral types, including environmental activism, nonactivist behaviors in the public sphere, private-sphere environmentalism, and other environmentally significant behaviors. The current study is interested in two categories of proenvironmental behaviors that may overlap those four behavioral types. First, self-managing behavior addresses the environmental consequences for which individuals feel personally responsible. When individuals wish to protect the environment, they may do things like take shorter showers, use public transportation, and avoid single-use plastics. These behaviors often involve private-sphere environmentalism. Second, other-managing behavior addresses the environmental consequences of other people's actions. This behavior can be more indirect, as when individuals engage in civic actions like signing petitions and joining protests, and more direct, as when individuals participate in beach cleanups or chastise others for being environmentally unfriendly.

The practical difference between self- and other-managing behaviors is evident in the context of socially visible problems in the community. We briefly define what that means. First, the concept of *community* includes any social context characterizing the individuals who constitute it, both reflecting and influencing their beliefs and behaviors (Cohen, 2013). Members of a community are united not by geographic boundaries, but by more symbolic association (Cohen, 2013). There is a similar distinction about the concept of neighborhood (von Stülpnagel, Brand, & Seemann, 2019), which is an element of community focal to the current study. Gurney et al. (2017) defined community with respect to place

attachment, where the bonds individuals form with a place can affect how they react to changes in those places, including environmental degradation. Second, the concept of *social visibility* is the extent to which individuals can experience environmental problems firsthand and have some certainty they are occurring (Gould, 1993). Socially visible environmental problems include things like smog, deforestation, and litter. This is in contrast with less visible environmental problems, such as species loss and climate change, where most individuals rely on secondhand information to form judgments.

When individuals contribute to environmental problems in their community, social visibility may motivate action. This is because when individuals engage in self-managing proenvironmental behaviors, being able to observe successful avoidance or mitigation can reinforce those behaviors. It can serve as positive feedback about doing the right thing (Kollmuss & Agyeman, 2002). Whereas the observation of unsuccessful mitigation may demotivate personal action, it may also encourage behaviors targeting the actions of others. The logic is, if individuals change their behavior to reduce an environmental problem but see the problem persists, it must be due to other people engaging in the wrong behavior.

1.2. Explaining Proenvironmental Behaviors

Several theoretical models explain proenvironmental intention and behavior. The theory of planned behavior uses attitude toward the behavior, subjective norm, and perceived behavioral control to predict behavioral intention (Ajzen, 1991). Extensions of that model include environmental concern (Maichum, Parichatnon, & Peng, 2016; Paul, Modi, & Patel, 2016) and personal norm (Chen & Tung, 2014; Gao, Wang, Li, & Li, 2017). The concept of personal norm appears in other models. According to the value-belief-norm theory, environmental values and beliefs lead to the development of a personal norm, which can affect proenvironmental behavior (Paul C. Stern, Dietz, Abel, Guagnano, & Kalof, 1999). In the comprehensive action determination model, personal norm is an antecedent of proenvironmental behavioral intention and habit (Klöckner, 2013).

Despite the conceptual breadth of these models, none differentiates between self- and other-managing behaviors. We expect personal norm to predict both kinds of behaviors because there is not a good reason to expect otherwise. That concept originated in the norm activation model (Schwartz, 1977),

which we use to explain self-managing behavior and, after some model extension, other-managing behavior.

1.3. Personal Norm Activation

Schwartz (1977) used the concept of personal norms to explain altruistic behavior, defining personal norms as "self-expectations for specific action in particular situations that are constructed by the individuals [which when activated] are experienced as feelings of moral obligation" (p. 227). They are normative as value-based conceptions originating from social interaction defining how individuals should or should not behave in situations. Whereas general social norms refer to the behaviors of a group and create a sense of expectations for how individual members should act (Cialdini & Trost, 1998), personal norms involve individuals creating self-expectations about how they should behave.

According to the norm activation model, a sense of moral obligation guides altruistic behavior. That sense of obligation reflects the personal norms a behavioral situation elicits but can be neutralized by defensive cognitions about the relevance or appropriateness of the obligation (Schwartz, 1977). The activation of personal norms occurs when individuals become aware of the consequences of their behaviors on others and accept personal responsibility. But in some situations, individuals may perceive high costs of performing a corrective behavior and, as a defense, deny personal responsibility. Thus, individuals will feel an obligation to behave altruistically in situations that activate a personal norm and inhibit defensive thoughts (Schwartz, 1977). Many studies present this as a straightforward progression, where awareness of consequences triggers an ascription of personal responsibility, which leads to the formation of a personal norm and then altruistic intentions and behaviors (e.g., Bamberg & Möser, 2007; de Groot & Steg, 2009).

There is evidence personal norm is related to both self- and other-managing proenvironmental behaviors (Han et al., 2017). The linkage with self-managing behavior is straightforward, as personal norm involves a sense of responsibility to avoid or reduce negative environmental consequences. But individuals can further reduce or avoid harm by addressing the behaviors of other people. This begs a research question:

RQ1: Is the relationship of personal norm with self-managing behavior different from its relationship with other-managing behavior?

1.4. Anticipated Negative Emotion

Early studies showed personal norms mediate the effect of anticipated emotion on behavior, suggesting personal norms tap into emotions (see Schwartz, 1977). Individuals will feel pride for performing a behavior consistent with a personal norm and guilt for failing to perform that behavior. One explanation of this effect draws on the concept of cognitive dissonance, where individuals experience negative emotion when their habits are inconsistent with their personal norms (Rodrigues & Girandola, 2017). We mention cognitive dissonance because it highlights the inward thoughts individuals have about their behavior.

Emotion may also affect behavior independent of a personal norm. Han et al. (2017) found intention to recommend and practice environmentally responsible behaviors at a convention were positively related to personal norm, anticipated pride, and anticipated guilt. In a similar study, Wang, Wang, Ru, Li, and Zhao (2019) found intention to conserve energy at work was positively related to personal norm, anticipated positive emotions for energy conservation, and anticipated negative emotions for failing to conserve energy. They operationalized positive emotions in terms of happiness, excitement, gladness, and delight, and negative emotions in terms of guilt, disappointment, depression, and discomfort. Both these studies showed emotion and personal norm uniquely explain intention.

Other studies have considered not only how emotion and personal norm affect intention, but how they are related to each other. Bamberg, Hunecke, and Blöbaum (2007) argued individuals follow personal norms because of self-sanctioning, writing, “an individual’s willingness to follow her/his personal norms is [based on] the anticipation of negative self-related feelings such as regret or guilt after having broken her/his personal norms” (p. 191). They found anticipated guilt over engaging in environmentally harmful behaviors was positively related to a personal norm.

As well, awareness of an environmental problem may cause anticipated negative emotion when the problem is not resolved. Consistent with that argument, Han et al. (2017) found a positive relationship

between awareness of consequences and anticipated guilt over not engaging in environmentally friendly behavior. Strict theorization about norm activation suggests these negative emotions are focused on the self, but individuals with strong personal norms may also have heightened concerns about problems beyond their immediate control. This is because the awareness of consequences may concern the entirety of an environmental harm and not only the portion of it for which individuals have responsibility. Thus, we state the following hypothesis:

H1: Awareness of the consequences of a socially visible community problem is positively related to anticipated negative emotion about it.

This prediction is not novel, but there is little evidence about it and the effect is worth replicating. More important for current purposes, we wish to characterize that effect so we can understand how personal norm mediates it, which we address in the following hypothesis:

H2: The relationship between awareness of consequences and anticipated negative emotion is mediated by personal norm.

Further, anticipated negative emotion about a socially visible problem in the community may explain behavioral outcomes, or at least behavioral intentions. In theory, such emotions can motivate self-managing behavior if individuals believe they are contributing to the problem. But when individuals perceive others are responsible for an environmental problem, feelings like anger and guilt can motivate them to engage in corrective action. For example, Harth et al. (2013) found anger was related to intention to punish those responsible for the damage. Likewise, Han et al. (2017) found anticipated guilt over causing environmental harm was positively related to the intention to recommend eco-friendly activities to others. They also found it was positively related to the intention to practice eco-friendly activities, albeit to a lesser extent. That latter linkage is intuitive, as individuals who express concern about a potential problem in their community may already do what they can to prevent or mitigate the problem, perhaps because of a personal norm. Nonetheless, these effects have not received a lot of attention and are worth replicating and comparing, which we address in the following hypothesis and research question:

H3: Anticipated negative emotion about a community problem is positively related to (a) self- and (b) other-managing corrective behaviors.

RQ2: Is the relationship of anticipated negative emotion with self-managing behavior different from its relationship with other-managing behavior?

A logical extension of the preceding hypotheses is awareness of consequences is indirectly related to self- and other-managing behaviors. In the norm activation model, this occurs through ascription of responsibility, which is a well-established effect. Of interest to the present study is the indirect effect occurring through anticipated negative emotion. Prior research has not shown this effect, which we predict:

H4: There is a positive relationship between awareness of consequences and (a) self- and (b) other-managing corrective behaviors, which anticipated negative emotion mediates.

1.5. Community Attachment

Individuals are motivated to address problems when they perceive not only the problem exists, but it is related to something important to them (Axelrod & Lehman, 1993). In the context of community problems, such motivation may stem partly from community attachment. McCool and Martin (1994) defined community attachment as "the extent and pattern of social participation and integration into the community, and sentiment or affect toward the community" (p. 30). It is related to how long an individual has been part of a community but is more a reflection of deep social bonds with other community members. Although community attachment is related to social participation, it is different from community involvement (Sher, Bagul, & Din, 2015). Whereas involvement refers to participating in community functions, attachment is more about a sense of belonging.

Community attachment may also affect community-oriented behavior. Pradhananga and Davenport (2017) found individuals with a strong sense of attachment to their neighborhood were more likely to participate in community stormwater management planning and volunteering. In a similar study, Buta, Holland, and Kaplanidou (2014) found intention to engage in civic action for the protection of natural spaces was positively related to beliefs such actions are effective, which was indirectly related to

community attachment. There have not been studies directly linking community attachment with self- and other-managing behavioral intentions or behaviors, but those links are intuitive. Individuals with strong community attachment will avoid behaviors harmful to their community. This relationship arises because community attachment creates a sense of personal obligation to protect the community, which we address in the following novel hypothesis:

H5: There is a positive relationship between community attachment and (a) self- and (b) other-managing corrective behaviors, which personal norm mediates.

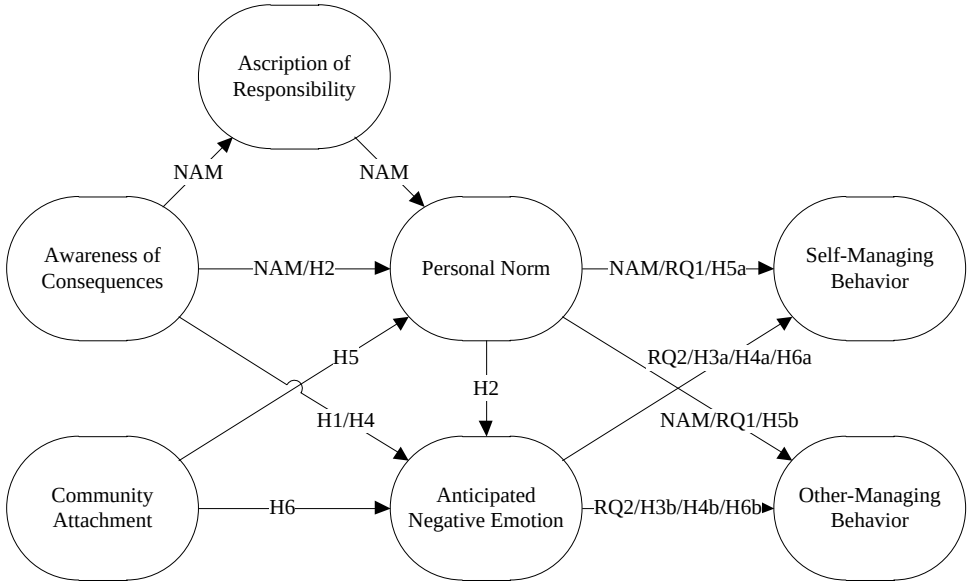
Other research has shown individuals with strong community attachment experience greater negative affect in response to environmental harm in their community (Lee & Blanchard, 2012). Although that kind of affective response is not the same as anticipated negative emotion, it makes sense those with strong community attachment would experience negative emotions if their community were harmed. As we argued, anticipated negative emotions are related to both self- and other-managing corrective behaviors. We are unaware of prior research showing this mediation effect, which we address in our final hypothesis.

H6: There is a positive relationship between community attachment and (a) self- and (b) other-managing corrective behaviors, which anticipated negative emotion mediates.

Our hypothetical model (Figure 1) shows the predicted relationships. Although we did not state hypotheses involving ascription of responsibility, it is necessary to include in the model as it serves as a control variable in the prediction of personal norm. Consistent with the norm activation model, we expect ascription of responsibility mediates the relationship between awareness of consequences and personal norm.

Figure 1

Hypothetical Model



Note. NAM indicates paths from the norm activation model. Hypotheses appearing on two paths indicate indirect effects.

1.6. Context

We use this model to predict self- and other-managing litter-related behaviors in Singapore. Although Singapore is known for its clean streets, there are more than 50,000 registered cleaners in the country (McDonald, 2018). As part of this project, we learned Singapore's regional housing authorities arrange for twice daily cleaning of public apartment blocks, and cigarette butts represent a large portion of the litter collected (L.G. Tan, personal communication, 17 October 2019). Not only does this create financial costs, but the litter can cause environmental degradation. In particular, cigarette butts can leach harmful chemicals into waterways (Healton, Cummings, O'Connor, & Novotny, 2011). This is important to address in Singapore, where roughly two-thirds of the land area is within rain catchment basins feeding the nation's water supply (Singapore Public Utilities Board, 2019).

2. Materials and Methods

2.1. Participants

We conducted a national door-to-door survey in Singapore (see Appendix A for sampling details), receiving completed surveys from 1,400 respondents. The large sample size means the study is likely overpowered, but it helped ensure representativeness. Most respondents self-administered a paper survey (n = 1312), with fewer completing the survey online (n = 9) or through interview (n = 79). The large sample size provided good coverage of the sampling frame, which included all public housing blocks in Singapore. Most participants were Singapore citizens (88%) or permanent residents (7%), with fewer foreigners (5%). For the remaining analyses, we excluded data from foreigners and those who did not indicate their nationality because their sense of community may be less developed than that of citizens and permanent residents. This sub-sample (n = 1,311) contained more women (53%) than men (47%). The median age bracket was "36 to 40" and median monthly household income bracket was "5,000 to 5,999" Singapore dollars. Nearly three-fourths of the sample were ethnic Chinese (74%), followed by Malay (14%), Indian (9%) and "other" (3%). The most common housing types were 4-room (39%), 5-room (30%), and 3-room apartments (18%). These demographics correspond closely with census figures except for age and household income (see Appendix B). The latter discrepancy may be due to our sampling frame, which did not include houses or condominiums.

2.2. Measurement

Here we provide a brief summary of the measurement items. We adapted items from prior research to measure awareness of consequences (Hoyos, Mariel, & Hess, 2015), ascription of responsibility (Shwom, Bidwell, Dan, & Dietz, 2010), community attachment (Zhu et al., 2017), anticipated negative emotion (Zhuang & Bresnahan, 2017), and personal norm (Godin, Conner, & Sheeran, 2005). We coded responses to those questions from 1 "strongly disagree" to 5 "strongly agree." Our measure of awareness of consequences included economic, ecological, and health dimensions. Our measure of ascription of responsibility focused on the responsibility of individuals rather than on personal responsibility. Our measure of anticipated negative emotion was specific to feelings of shame and

embarrassment over having a litter problem in the community. The wording and descriptive statistics of these items appear in Appendix C.

We consulted with experts of psychology and behavior in Singapore to develop hypothetical scenarios measuring self- and other-managing corrective behaviors. Each scenario presented respondents with a litter-related behavioral choice and asked if they would engage in the behavior. Given the scenarios involved snap judgments about reacting to litter, our measure of other-managing behavior included the more direct types of behaviors (e.g., picking up litter) and excluded the more indirect types (e.g., attending a public meeting). We coded responses from 1 "definitely no" to 5 "definitely yes." Although these measures are limited because verbal behaviors come at no cost (Lange & Dewitte, 2019), using scenarios can reduce social desirability bias when respondents report about their altruistic behaviors (e.g., DeWall, Baumeister, Gailliot, & Maner, 2008). The wording and descriptive statics of these items appear in Appendix D.

Given the common method of measurement, we followed the recommendations of Kock (2015) to evaluate common method bias in partial least squares SEM. Although the current study uses covariance-based SEM, the principle should apply similarly. This method estimates the variance inflation factor (VIF) for each latent factor, including both exogenous and endogenous variables. There is evidence of "pathological collinearity" and potential common method bias when values of VIF exceed 3.3. Appendices C and D show these values, all of which were below the threshold. This provides some assurance common method bias did not contaminate the results.

2.3. Analysis

Following the general procedure of Onwezen et al. (2013), we evaluated a measurement model and series of structural equation models. We used Mplus version 8.1 to conduct these analyses. The measurement model is equivalent to confirmatory factor analysis, producing factor loadings associated with each item and a correlation matrix among the latent constructs.

Structural equation modeling began with the most constrained model (Figure 2, Model 1). This used the norm activation model to predict self-managing behavior and anticipated negative emotion to

predict other-managing behavior. In this model, awareness of consequences and community attachment predicted anticipated negative emotion. This model tests H1, H3b, H4b, and H6b.

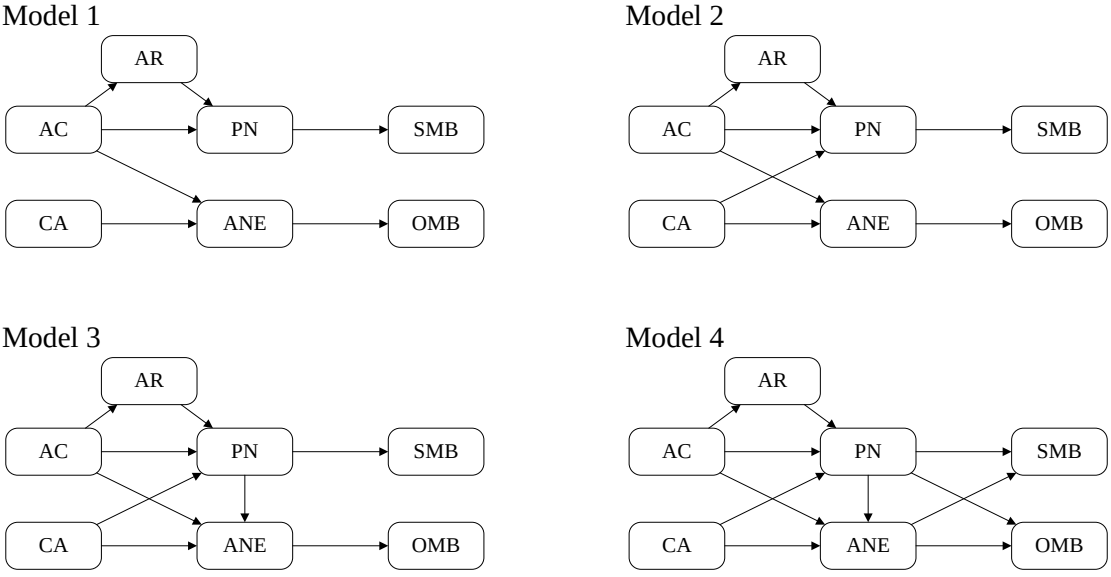
Second, we added a path from community attachment to personal norm (Figure 2, Model 2). Whereas the previous model is a straightforward test of the norm activation model, this model extends it to include community attachment as a predictor of personal norm, which allows a test of H5a.

Third, we added a path from personal norm to anticipated negative emotion (Figure 2, Model 3). This linkage allows a test of H2 and its directionality is consistent with the best-fitting model from Onwezen et al. (2013).

Finally, we added paths from personal norm to other-managing behavior and from anticipated negative emotion to self-managing behavior (Figure 2, Model 4). This model corresponds with our overall hypothetical model. The additional paths allow tests of H3a, H4a, H5b, and H6a. Also, they allow us to answer the two research questions.

Figure 2

Series of Conceptual Models



Note. AC = awareness of consequences. AR = ascription of responsibility. CA = community attachment. ANE = anticipated negative emotion. PN = personal norm. SMB = self-managing behavior. OMB = other-managing behavior.

3. Results

Table 1 summarizes the fit indices of the measurement and structural models. We evaluated model fit using joint information criteria by Hu and Bentler (1999). The measurement model had good fit with each item indicating a single factor and no correlations among item residuals. The average variance extracted (AVE) was above 0.5 for all factors and correlations among the factors did not exceed 0.7, suggesting acceptable convergent and discriminant validity (Cheung & Wang, 2017). Appendices C and D show factor loadings, AVE, and composite reliabilities. Appendix E shows the latent construct variances, covariances, and correlations.

Table 1

Fit Indices for Measurement and Structural Models

Model	χ^2	*df*	aBIC	CFI	SRMR [90% CI]	RMSEA
0	388.26	131	51820.97	.971	.039 [.034, .043]	.027
1	475.80	143	51860.48	.963	.042 [.038, .046]	.041
2	429.46	142	51818.14	.968	.039 [.035, .044]	.032
3	420.44	141	51813.12	.969	.039 [.035, .043]	.031
4	416.913	139	51817.60	.969	.039 [.035, .043]	.030

Note. Model 0 is the measurement model. aBIC = sample-size adjusted Bayesian information criterion. CFI = comparative fit index. SRMR = standardized root mean residual. RMSEA = root mean standard error of approximation.

Next, we calculated *p*-values associated with differences in chi-square ($\Delta\chi^2$) to compare the nested models. Model 2 had better fit than Model 1, $\Delta\chi^2(1) = 46.34$, $p < .001$, which means adding community attachment as a predictor of personal norm improved the model. Model 3 had better fit than Model 2, $\Delta\chi^2(1) = 9.02$, $p = .003$, which means adding personal norm as a predictor of anticipated negative emotion improved the model. Finally, Model 4 did not have better fit than Model 3, $\Delta\chi^2(2) = 3.52$, $p = .17$. That means the model did not improve by adding personal norm as a predictor of other-managing behavior and anticipated negative emotion as a predictor of self-managing behavior. Further, Model 3 had the lowest sample-size adjusted Bayesian information criterion (aBIC) value of all the models, suggesting it was the best-fitting model (Geiser, 2013). We refer to Model 3 for most of our results reporting. Some hypotheses and both research questions involve Model 4, which we note when

reporting those findings. Table 2 summarizes the results from both models with respect to the hypotheses and research questions. Figure 3 shows the standardized path estimates of Model 3.

3.1. Norm Activation Model

Consistent with the norm activation model, awareness of consequences predicted ascription of responsibility (β = .48, $p < .001$), which in turn predicted personal norm (β = .35, $p < .001$). The total effect of awareness of consequences on personal norm was significant (β = .56, $p < .001$). Part of that effect was mediated by ascription of responsibility (β = .17, $p < .001$), though a moderate direct effect remained (β = .40, $p < .001$). Finally, personal norm was positively related to self-managing behavior (β = .67, $p < .001$).

RQ1 asked if personal norm was more positively related to self- or other-managing behavior. To answer this question, we examined if the 95% confidence intervals of the unstandardized path estimates overlap, which gives a conservative indication of their difference (Payton, Greenstone, & Schenker, 2003). Model 4 showed the relationship of personal norm with self-managing behavior (B = 0.69, 95% CI [0.56, 0.82]) was more positive than its relationship with other-managing behavior (B = -0.14, 95% CI [-0.31, 0.03]).

3.2. Extended Model

In support of H1, awareness of consequences was positively related to anticipated negative emotion (β = .19, $p < .001$). In support of H2, there was a significant indirect effect of awareness of consequences on anticipated negative emotion through personal norm (β = .06, $p = .024$). Failing to support H3a, anticipated negative emotion was unrelated to self-managing behavior (β = .02, $p = .633$; see Model 4). In support of H3b, anticipated negative emotion was positively related to other-managing behavior (β = .24, $p < .001$).

RQ2 asked if anticipated negative emotion was more positively related to self- or other-managing behavior. Model 4 showed the relationship of anticipated negative emotion with other-managing behavior (B = 0.43, 95% CI [0.28, 0.60]) was more positive than its relationship with self-managing behavior (B = 0.02, 95% CI [-0.06, 0.10]).

Table 2

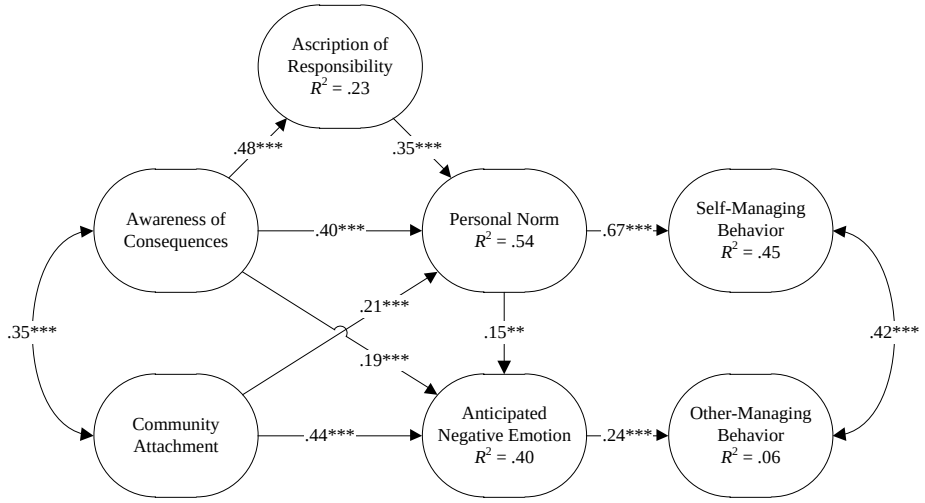
Model 3 and Model 4 Path Estimates

			Model 3			Model 4		
Test	Support	Path	*B* [95% CI]	β	*p*	*B* [95% CI]	β	*p*
RQ1		PN→SMB	0.71 [0.60, 0.83]	.67	<.001	0.69 [0.56, 0.82]	.65	<.001
RQ1		PN→OMB				-0.14 [-0.31, 0.03]	-.09	.097
H1	Yes	AC→ANE	0.21 [0.09, 0.34]	.19	<.001	0.20 [0.09, 0.34]	.19	<.001
H2	Yes	AC→PN→ANE	0.07 [0.01, 0.13]	.06	.024	0.07 [0.01, 0.13]	.06	.027
H3a/RQ2	No	ANE→SMB				0.02 [-0.06, 0.10]	.02	.633
H3b/RQ2	Yes	ANE→OMB	0.35 [0.24, 0.47]	.24	<.001	0.43 [0.28, 0.60]	.30	<.001
H4a	No	AC→ANE→SMB				0.00 [-0.01, 0.03]	.00	.651
H4b	Yes	AC→ANE→OMB	0.07 [0.03, 0.13]	.05	.003	0.09 [0.04, 0.16]	.06	.004
H5a	Yes	CA→PN→SMB	0.13 [0.08, 0.19]	.14	<.001	0.12 [0.08, 0.18]	.14	<.001
H5b	No	CA→PN→OMB				-0.05 [-0.12, 0.01	-.02	.103
H6a	No	CA→ANE→SMB				0.01 [-0.02, 0.05]	.01	.636
H6b	Yes	CA→ANE→OMB	0.15 [0.10, 0.23]	.11	<.001	0.19 [0.11, 0.29]	.13	<.001

Note. AC = awareness of consequences. CA = community attachment. ANE = anticipated negative emotion. PN = personal norm. SMB = self-managing behavior. OMB = other-managing behavior. *B* = unstandardized path estimate. β = standardized path estimate. Unstandardized path estimates and confidence intervals are based on 5,000 bias-corrected bootstrap samples.

Figure 3

Model 3 Standardized Path Estimates



Note. **p < .01. ***p < .001

Failing to support H4a, awareness of consequences did not mediate the relationship between awareness of consequences and self-managing behavior (β = .004, p = .651; see Model 4). In support of H4b, there was a significant indirect effect of awareness of consequences on other-managing behavior through awareness of consequences (β = .05, p = .003). In support of H5a, there was a significant indirect effect of community attachment on self-managing behavior through personal norm (β = .14, p < .001). Failing to support H5b, personal norm did not mediate the relationship between community attachment and other-managing behavior (β = -.02, p = .103; see Model 4). Failing to support H6a, anticipated negative emotion did not mediate the relationship between community attachment and self-managing behavior (β = .01, p = .636; see Model 4). Finally, in support of H6b, anticipated negative emotion mediated the relationship between community attachment and other-managing behavior (β = .11, p < .001).

4. Discussion

Part of this study replicated the norm activation model, showing a linear progression from awareness of consequences to ascription of responsibility to personal norm to self-managing behavior.

This is unsurprising, as the model is well-established in many behavioral contexts, including litter reduction (e.g., de Kort, McCalley, & Midden, 2008). We do not offer any new insights about the norm activation model, but these results provide new data points for future meta-analyses.

Our extension showed a parallel and overlapping linear progression from community attachment to anticipated negative emotion to other-managing proenvironmental behavior. We say the progression was "overlapping" because indirect pathways in this part of the model included awareness of consequences and personal norm. The current findings supported those pathways and generated new insights about how individuals think and feel about littering problems in their community. Also, there are some practical insights about promoting litter reduction within communities.

4.1. Anticipated Negative Emotion

First, we showed awareness of consequences was positively related to anticipated negative emotion, which personal norm mediated. This is a new finding. Although Bamberg et al. (2007) found similarly that problem awareness was positively related to anticipated guilt, problem awareness is distinct from awareness of consequences (Wittenberg, Blöbaum, & Matthies, 2018). Bamberg et al. (2007) concluded their measure of problem awareness indicated an awareness of environmental consequences (p. 201), implying awareness of consequences is related to anticipated guilt. The current findings are consistent with that interpretation. To the extent individuals believe there are negative consequences of an environmental problem, they will anticipate negative emotions about the problem not being resolved. Part of that process occurs through a personal norm because, in theory, the awareness of consequences creates a sense of moral obligation and an unfulfilled obligation will result in negative emotions.

Results also showed anticipated negative emotion predicted other-managing behavior but not self-managing behavior. It may seem counterintuitive anticipated negative emotion did not predict self-managing behavior, but this does not mean they were unrelated. In fact, they were positively related in the measurement model ($r = .32$, $p < .001$; see Appendix E). What this means is anticipated negative emotion was unrelated to self-managing behavior only after controlling for personal norm. This is consistent with our argument that individuals who anticipate negative emotions probably already do what they can to

avoid littering because of a personal norm. It is also consistent with Coelho, Pereira, Cruz, Simões, and Barata (2017), who found a weak negative relationship between negative emotion and green consumer behavior. Though, they argued negative emotion functions as a demotivator. In contrast, we suggest individuals are motivated to prevent or reduce the litter from other people when they believe they would feel ashamed or embarrassed about litter in their community. On the other hand, our finding is not wholly consistent with Han et al. (2017). The pattern of their findings suggests anticipated negative emotion predicts other-managing behavior more strongly than it predicts self-managing behavior. However, they found anticipated guilt predicted both kinds of behaviors.

We acknowledge this finding may be related to our operationalization of anticipated negative emotion in terms of shame and embarrassment. Bamberg et al. (2007) and Onwezen et al. (2013) measured anticipated guilt, which is a distinct emotion. Tangney, Miller, Flicker, and Barlow (1996) showed shame tends to cooccur more often with embarrassment than does guilt, and individuals feeling embarrassment tend to see themselves as victims of circumstance. In other words, individuals feel guilty about their own poor behavior. They may also feel ashamed. Yet, they feel both embarrassed and ashamed about an undesirable circumstance they did not cause. It may be anticipated shame and guilt mainly predict self-managing behavior and anticipated shame and embarrassment mainly predict other-managing behavior, regardless of the behavioral context. This is an avenue for future research. Additional research could replicate the current finding in the contexts of other socially visible issues in the community, such as graffiti (Masdeval & Veloso, 2015), lawn maintenance and landscaping (Harris, Martin, Polsky, Denhardt, & Nehring, 2013; Landon et al., 2017), and tourism impacts (Li & Wan, 2013), where individuals may have emotional reactions to the environmental conditions of their community.

4.2. Community Attachment

We argued community attachment can enhance a personal norm to avoid actions harmful to the community, which can in turn motivate proenvironmental behavior. Our findings for the prediction of self-managing behavior, but not other-managing behavior, supported this argument and are consistent with Landon et al. (2017), who found individuals with higher community attachment felt a stronger

obligation to conserve water and used less water for landscaping irrigation. This finding alone suggests community attachment is a theoretically useful addition to the norm activation model.

We also argued community attachment influences proenvironmental behavior by elevating anticipated negative emotion. Our findings for the prediction of other-managing behavior, but not self-managing behavior, supported this argument and parallel some prior research. For example, Buta et al. (2014) found the relationship between community attachment and beliefs about proenvironmental civic engagement was mediated by place attachment, or the sense of emotional connection to a place. In turn, beliefs predicted proenvironmental civic engagement behavioral intention. A broad view of those findings suggests individuals are more inclined toward civic engagement when they feel strong attachment to their community. Those and the current findings suggest an effective strategy for encouraging environmentally responsible behavior in the community is to instill a sense of community attachment in its members.

There are additional parallels with research on sustainable tourism. Li and Wan (2013) found individuals with higher community attachment were more concerned about negative impacts of tourism and expressed more support for government restrictions on tourism development. Support for government regulation is a more indirect kind of other-managing behavior that aims to reduce socially visible community problems other people caused. Ramkissoon, Graham Smith, and Weiler (2013) found place attachment was strongly related to both low- and high-effort proenvironmental behaviors. A low-effort behavior is telling friends not to feed animals in national parks, whereas a high-effort behavior is volunteering time to projects helping a national park. These levels of effort suggest different kinds other-managing behaviors. It is also worth pointing out the authors of that study operationalized four dimensions of place attachment—place dependence, place identity, place affect, and place social bonding. We emphasize the affective dimension because, if people have place attachment to their community, then environmental harm in their community may trigger a negative affective response. This would help explain how community attachment can motivate other-managing behavior through anticipated negative emotion. The corollary is when people get involved in addressing problems in their community, it can

enhance their happiness and satisfaction with life, especially when they have high levels of place attachment (Ramkissoon, Mavondo, & Uysal, 2018).

4.3. Theoretical and Practical Implications

In light of the above discussion, our study has some theoretical implications. The first is the norm activation model benefits from including community attachment. This may apply to all kinds of proenvironmental behaviors. Certainly, it ought to apply to behaviors addressing socially visible problems in the community. But it may also apply to behaviors addressing less visible problems impacting a community. Climate change is that kind of problem because it affects everyone but is largely imperceptible (Beck, 2016). But then community attachment would tend to influence behavior only when individuals understand the different ways climate change can affect their community. This may necessitate models accounting for the ways people understand an environmental problem may affect their community.

Second, although our model predicted only a small amount of variance in other-managing behavior, it is clear from the results self- and other-managing behaviors are distinct. Although prior research has examined both kinds of behaviors (e.g., Han et al., 2017), it has not distinguished between them conceptually. That distinction is theoretically useful because it suggests models emphasizing personal norm need to account for affect if they wish to predict other-managing behavior. In this way, the norm activation also benefits from including anticipated negative emotion.

Finally, we wish to discuss one practical implication. Community based social marketing is a practical tool for promoting socially and environmentally sustainable behavior. One tool of social marketing is commitment, which leverages people's need for consistency (McKenzie-Mohr, Lee, Schultz, & Kotler, 2012). This has a clear link with the norm activation model because people wish to behave in a manner consistent with their personal norms (Rodrigues & Girandola, 2017). But community based social marketing also employs descriptive and injunctive norms (McKenzie-Mohr et al., 2012). This links to the concept of community attachment. Some norms are bound by communities, which is the idea behind the saying, "When in Rome, do as the Romans do." Researchers have talked about this in terms of provincial

or local norms (Goldstein, Cialdini, & Griskevicius, 2008). Kalkbrenner and Roosen (2016) found subjective norms mediated the relationship between community identity and willingness to participate in a community energy project. In other words, normative effects on environmental behaviors emerge partly out of a sense of community. Although the current study did not examine subjective norms, findings suggest efforts to promote proenvironmental behaviors in a community should work to achieve not only commitment from the public but also engender a sense of community attachment.

4.4. Limitations and Research Gaps

It is unclear if the extended model would explain behaviors like civic engagement. Schmitt, Mackay, Droogendyk, and Payne (2019) found collective guilt was unrelated to environmental activism, which suggests anticipated negative emotion could be omitted as a predictor of civic engagement. The model may need to include factors specific to those kinds of behaviors, such as self- versus other-focused motivations (Amnå, Ekström, Kerr, & Stattin, 2009), political efficacy (de Zúñiga, Copeland, & Bimber, 2014), and media use (Ho, Liao, & Rosenthal, 2014). How might such factors mediate the effect of community attachment on civic engagement, if at all?

It may also be fruitful to examine locus of control (see Hines, Hungerford, & Tomera, 1987) when differentiating between the more direct and more indirect kinds of other-managing behaviors. When individuals can directly address socially visible problems in their community, the more direct kinds of behavior may be adequate. When resolving problems depends on external controls, such as government regulation, the more indirect kinds of behavior may be the only option. But there are additional behavioral barriers. Wakefield, Elliott, Cole, and Eyles (2001) studied civic action in the context of air pollution, which is a socially visible problem most individuals cannot directly address. They found individuals were reluctant to engage in civic action due to perceived difficulty and a lack of information, which further highlights the need to account for media use and information seeking in explaining those kinds of behaviors.

We should highlight the potential role of national context. Singapore is a unique place to study littering behavior because, whether people litter or not, the streets are generally clean. This can lead to

complacency (Boh, 2015). As Detenber, Rosenthal, Liao, and Ho (2016) put it, public overreliance on the government to manage the environment can lead to a "nanny state syndrome," impeding individual motivations to engage in proenvironmental behavior. This does not mean littering becomes a socially *invisible* community problem, but the extent of the problem may not be apparent, and individuals may feel disinclined to address it directly. Perhaps this is why our model did not strongly predict other-managing behavior. There is a need to replicate this study in other countries.

Although we cannot use the current data to claim causation, the current mediation effects imply logical causal linkages. In the case where community attachment predicts personal norm, it would make sense for people to say, "I have a moral obligation to avoid littering *because* my neighbourhood is special to me." It would make less sense for them to say, "My neighbourhood is special to me *because* I have a moral obligation to avoid littering." There is a similar logic to our earlier argument that awareness of consequences causes anticipated negative emotion. We emphasize these linkages because mediation assumes the independent variable causes the mediator, which then causes the dependent variable (Hayes, 2018, p. 81). However, testing causation will require a different study design to establish a temporal order and rule out spuriousness.

Finally, there are two limitations related to the analysis. First, although we had evidence common method bias did not unduly influence the results, we were unable to rule it out completely. Second, the statistical model explained little of the variance in other-managing behavior, partly because there was a single predictor. Additional predictors of the more direct kinds of other-managing behaviors could improve the model, and there are several intuitive ones. For example, conflict-avoidant individuals would tend not to scold others for littering, while those with a need for control might do the opposite; those with strong altruism might participate in neighborhood clean-ups, while those with a fear of germs might avoid picking up litter. Some of these predictors would be context-specific and others would explain other-managing behavior broadly.

4.5. Conclusion

This study explained self- and other-managing behaviors in the context of litter reduction. Self-managing behavior is consistent with a personal norm and, in this context, related to community attachment. Other-managing behaviors is related to anticipated negative emotion over a potential litter problem in the community. Personal norm and anticipated negative emotion are related to community attachment, which makes sense in the context of socially visible problems in the community. Individuals with strong community attachment are less likely to litter and more likely to address the litter of others by picking up their litter or encouraging them to avoid littering. This emphasizes the importance of instilling in individuals not only a personal norm, but a sense of belonging in their community.

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Appendix A: Sampling

The Institutional Review Board at Nanyang Technological University reviewed and approved a national door-to-door survey of public housing residents in Singapore. Although sampling only those residents limits the sampling frame, nearly 80% of Singapore residents live in these developments (Singapore Department of Statistics, 2019). Singapore's Housing Development Board constructs public housing in precincts, which typically contain 6 to 8 high-rise buildings sharing a common architectural style, car parking, and public gathering spaces (H. K. Tan, personal communication, 11 October 2018). Multiple precincts are located within neighborhoods, each of which reflects the heritage and character of that area (Housing Development Board, 2018).

Multistage cluster sampling divided Singapore into five regions: Central, East, West, North, and Northeast. We randomly selected between two and four neighborhoods within each region and between six and eight public apartment buildings in each neighborhood. We accounted for the number of units in each apartment building so the number of residential units was proportionate to the population of each region. Within apartment buildings, trained undergraduate research assistants used a random number generator to select a start floor and sampled all the residential units on that floor before moving down a floor. They visited a total of 8,180 residences. Someone answered the door at 3,812 of those residences. Within-household sampling used the "last birthday" method (Gaziano, 2005; Salmon & Nichols, 1983).

Those who agreed to participate received a paper survey, which the research assistant collected after about 30 minutes. Respondents also had the option of completing the survey online or having the research assistant administer the survey face-to-face. The survey was available in English, Chinese, and Malay, representing three of four official languages in Singapore. We did not include the fourth official language, Tamil. From our prior survey experiences, we know most Tamil speakers in Singapore are also fluent in English. The Chinese and Malay versions were translated from English and back-translated to ensure accuracy.

Appendix B: Sample Demographics Versus 2018 National Census

	Sample	Census
Sex		
Female	53%	51%
Male	47%	49%
Age		
Median bracket	36 – 40 years	46 – 50 years
Ethnicity		
Chinese	74%	74%
Malay	14%	13%
Indian	9%	9%
Others	3%	3%
Citizenship		
Singapore citizen	93%	86%
Singapore permanent resident	7%	13%
Public housing type		
1-and 2-room	9%	8%
3-room	18%	22%
4-room	39%	40%
5-room and executive	30%	29%
Total monthly household income		
Median bracket (Singapore dollars)	$5,000 – $5,999	$9,000 – $9,999

Note. The census figures included only households headed by a Singapore citizen or permanent resident. Housing indicates types of HDB (Housing and Development Board) apartments, which the government builds and sells to Singapore citizens and permanent residents. More than 80% of Singapore citizens and permanent residents live in HDB apartments. The census household income figure excluded households without a working adult. The current study did not measure employment status, which means we were unable to exclude households with low incomes due to unemployment.

Appendix C: Measurement and Factor Loadings of Behavior-Exogenous Latent Constructs

Construct/Item	Wording	*M* (*SD*)	λ	AVE	CR	VIF
Awareness of consequences				.55	.88	1.79
AC1	Litter has a negative effect on tourism.	4.30 (0.82)	.68			
AC2	Litter results in wasted tax dollars.	4.15 (0.83)	.65			
AC3	Litter is harmful to native species of wildlife.	4.35 (0.75)	.72			
AC4	Litter pollutes the water supply.	4.38 (0.74)	.77			
AC5	Litter creates unsanitary conditions.	4.47 (0.66)	.83			
AC6	Litter attracts vermin, such as rats and cockroaches.	4.55 (0.65)	.81			
Ascription of responsibility				.61	.76	1.56
AR1	It is up to individuals to keep the environment clean.	4.23 (0.82)	.71			
AR2	Individuals are responsible for dealing with litter.	4.21 (0.77)	.85			
Community attachment				.56	.71	1.59
CA1	My neighbourhood is special to me.	3.77 (0.81)	.76			
CA3	I feel a sense of attachment to my neighbourhood.	3.79 (0.78)	.73			
Anticipated negative emotion				.55	.71	1.73
ANE1	I would be embarrassed if there was too much litter in my housing estate.	4.10 (0.81)	.75			
ANE2	If my neighbourhood had a litter problem, I would feel ashamed.	3.83 (0.86)	.73			
Personal norm				.56	.72	2.93
PN1	I have a moral obligation to avoid littering.	4.22 (0.72)	.74			
PN2	I feel a personal responsibility not to litter.	4.38 (0.69)	.75			

Note. *M*(*SD*) = mean and standard deviation of measurement items. λ = standardized factor loading from the measurement model. AVE = average variance extracted. CR = composite reliability. VIF = variance inflation factor.

Appendix D: Measurement and Factor Loadings of Behavioral Latent Constructs

Construct/Item	Wording	*M* (*SD*)	λ	AVE	CR	VIF
Self-managing behavior				.50	.75	2.11
SMB1	You are returning your tray at a hawker centre and your plastic spoon falls on the ground next to the tray return. Do you pick up it up?	4.48 (0.84)	.66			
SMB2	You are discarding a wadded-up receipt and accidentally miss the bin. It lands on the ground, where there are other small pieces of rubbish. Do you pick up the receipt?	4.26 (0.95)	.69			
SMB3	You are exiting a stairwell and accidentally drop a small piece of paper that you were going to throw away. Nobody saw you drop it. Do you pick it up?	4.35 (0.89)	.77			
Other-managing behavior				.53	.69	1.33
OMB1	You are discarding a wadded-up receipt and accidentally miss the bin. It lands on the ground, where there are other small pieces of rubbish. Do you pick up any of the other rubbish?	2.88 (1.15)	.77			
OMB2	During a walk in a park, you see an empty plastic bag on the path. There is a rubbish bin 20 metres away. Do you pick up the bag and take it to the bin?	3.02 (1.12)	.68			

Note. *M*(*SD*) = mean and standard deviation of measurement items. λ = standardized factor loading from the measurement model. AVE = average variance extracted. CR = composite reliability. VIF = variance inflation factor.

Appendix E: Latent Construct Variances, Covariances, and Correlations

	AC	AR	CA	ANE	PN	SMB	OMB
AC	**0.31**	0.16	0.12	0.15	0.19	0.13	0.03
AR	.47	**0.34**	0.10	0.10	0.18	0.14	0.01
CA	.34	.27	**0.37**	0.21	0.14	0.11	0.14
ANE	.44	.29	.57	**0.37**	0.15	0.11	0.13
PN	.63	.57	.42	.46	**0.29**	0.20	0.03
SMB	.43	.42	.34	.32	.65	**0.31**	0.18
OMB	.06	.01	.25	.23	.05	.35	**0.79**

Note. AC = awareness of consequences. AR = ascription of responsibility. CA = community attachment. ANE = anticipated negative emotion. PN = personal norm. SMB = self-managing behavior. OMB = other-managing behavior. The diagonal (in bold typeface for ease of reference) shows variances of latent constructs. Numbers above the diagonal are covariances and numbers below the diagonal are correlations among latent factors.

Appendix A: Sampling

The Institutional Review Board at Nanyang Technological University reviewed and approved a national door-to-door survey of public housing residents in Singapore. Although sampling only those residents limits the sampling frame, nearly 80% of Singapore residents live in these developments (Singapore Department of Statistics, 2019). Singapore's Housing Development Board constructs public housing in precincts, which typically contain 6 to 8 high-rise buildings sharing a common architectural style, car parking, and public gathering spaces (H. K. Tan, personal communication, 11 October 2018). Multiple precincts are located within neighborhoods, each of which reflects the heritage and character of that area (Housing Development Board, 2018).

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Appendix C: Measurement and Factor Loadings of Behavior-Exogenous Latent Constructs

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Appendix E: Latent Construct Variances, Covariances, and Correlations

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Note. AC = awareness of consequences. AR = ascription of responsibility. CA = community attachment. ANE = anticipated negative emotion. PN = personal norm. SMB = self-managing behavior. OMB = other-managing behavior. The diagonal (in bold typeface for ease of reference) shows variances of latent constructs. Numbers above the diagonal are covariances and numbers below the diagonal are correlations among latent factors.

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