Araştırma Makalesi / Research Article

ROLES OF COGNITIVE, AFFECTIVE, SOCIAL, AND SITUATIONAL FACTORS IN NORM ACTIVATION THEORY: EVIDENCE FOR RECYCLING BEHAVIOR*

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ABSTRACT

Norm activation theory (NAT) provides an effective approach to understanding pro-environmental consumer behaviors such as recycling. The theory proposes that the primary driver of behavior is personal norms, which are promoted by awareness of consequences (AC) and ascription of responsibility (AR). This study aims to offer an extended norm activation model by incorporating cognitive, affective, social, and situational factors and to provide empirical evidence for the model within the context of recycling. Particularly, the study focuses on the roles of subjective and objective knowledge, emotional reactions to environmental degradation, subjective norms, perceived behavioral cost, and household support for norm activation and recycling behavior. Data was collected through an online survey with 531 consumers in Türkiye. Analysis results showed that subjective norms, subjective knowledge, behavioral cost, household support, and emotional reactions are influential for moral norm activation in the recycling context, in addition to the impacts of AC and AR. Besides, subjective and objective knowledge, perceived cost, and household support were found to be influential on recycling behavior, in addition to the impact of moral norms. Findings contribute to a deeper understanding of recycling behavior through the NAT framework.

Keywords: *Norm Activation Theory, Recycling, Emotional Reactions, Social Norm, Perceived Cost of Recycling*

JEL Classification Codes: *M31, Q20, Q29*

NORM AKTİVASYON TEORİSİNDE BİLİŞSEL, DUYGUSAL, SOSYAL VE DURUMSAL FAKTÖRLERİN ETKİLERİ: GERİ DÖNÜŞÜM DAVRANIŞINA İLİŞKİN BULGULAR

ÖZET

Norm aktivasyon teorisi (NAT), geri dönüşüm gibi çevreci tüketici davranışlarının anlaşılmasında etkili bir yaklaşım sunmaktadır. Teori, davranışın birincil itici gücünün kişisel normlar olduğunu ve bu normların sonuçların farkındalığı (AC) ve sorumluluk kabulü (AR) ile güçlendiğini ileri sürmektedir. Bu çalışma, bilişsel, duygusal, sosyal ve durumsal faktörlerin etkilerini de kapsayan genişletilmiş bir norm aktivasyon modeli sunmayı ve model için geri dönüşüm bağlamında ampirik kanıt ortaya koymayı amaçlamaktadır. Daha özelde, araştırma öznel ve nesnel bilginin, çevresel bozulmaya karşı duygusal tepkilerin, öznel normların, algılanan davranış maliyetinin ve hane halkı desteğinin norm aktivasyonu ve geri dönüşüm davranışındaki rollerine odaklanmıştır. Türkiye'deki 531 tüketiciden çevrimiçi anket yönetimiyle veri toplanmıştır. Analiz sonuçları, AC ve AR'nin etkilerinin yanı sıra öznel normların, öznel bilginin, davranışsal maliyetin, hane halkı desteğinin ve duygusal tepkilerin ahlaki norm aktivasyonu üzerinde etkili olduğunu göstermiştir. Ayrıca, ahlaki normların etkisinin yanında, öznel ve nesnel bilgi, algılanan maliyet ve hane halkı desteğinin geri dönüşüm davranışı üzerinde etkili olduğu bulunmuştur. Bulgular, NAT çerçevesi aracılığıyla geri dönüşüm davranışının daha derinlemesine anlaşılmasına katkıda bulunmaktadır.

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1. Introduction

In the 1950s, when industries had abundant natural resources to produce products for a relatively undersized world population and finite consumer demand, they invented diverse mechanisms such as planned obsolescence to encourage consumption and ensure the continuity of the economy (Rivera & Lallmahomed, 2016; Satyro et al., 2018). Although these mechanisms of the linear economy enabled manufacturers to produce more, incorporate new technologies into products, make profits, expand competition, and raise employment, they negatively impacted sustainability by causing environmental pollution, increasing waste, and depleting natural resources (Satyro et al., 2018). Economic, social, and environmental devastation caused by the linear economy model underlined the importance of achieving a circular economy (Özkan & Yücel, 2020). In contrast to the linear economy model, the circular economy strives to use natural resources sustainably for a long time and reuse them by minimizing waste (Duran & Bozkaya, 2024).

Circular economy uses sustainability-oriented mechanisms focusing on redesigning the production processes and consumption patterns in a way that does not create waste and enables the continuous use of resources (Özkan & Yücel, 2020). Economic actors, such as businesses and consumers, are considered key players in implementing circular policies and practices (Friant et al., 2021). In the last decades, eco-friendly transformations in business production systems, supported by policies and technology, contributed to reducing environmental problems to some extent, but they were not sufficient alone. A circular economy also requires significant changes in consumption patterns. As addressed in the academy nearly half a century ago, unsustainable consumption patterns need to be altered to keep human society stable at current and larger population levels in the future. (Assadourian, 2010). A sustainable transformation of product acquisition, usage, and disposal is indicated as a must with an ongoing urgency. In this context, individual recycling is promoted as a sustainable behavior for the disposal phase.

Individual recycling refers to sorting and collecting recyclable materials after product use and transporting them to a recycling facility. As summarized by Tumer Kabadayi et al. (2023), individual recycling improves the efficiency of the waste recycling process by increasing the quality of recyclables, minimizing labor and energy inputs, and reducing costs. In other words, individual efforts in recycling lead to faster and more efficient achievement of recycling benefits, such as conserving natural resources, saving energy, reducing landfills, protecting ecosystems and wildlife, and obtaining economic value. For this reason, individual recycling has emerged as a significant focal point for the sustainability agenda of policymakers, organizations, and researchers. Numerous researchers have aimed to find answers to how to promote recycling behavior. Certain determinants of the behavior have been revealed. Accordingly, recycling behavior is directly or indirectly related to factors such as values (Aguilar- Luzon et al., 2012; Mutang & Haron, 2012; Yüce, 2013), awareness (Chen & Thung, 2010; Echegaray & Hansstein, 2017; Garces et al., 2002), knowledge (Al-Mamun et al., 2019; Çimen & Yılmaz, 2016; Gadiraju, 2016; Johnson & Parrott, 1995), attitudes (Fornara et al., 2011; Meng et al., 2019; Mosler et al., 2008; Yılmaz & Doğan, 2016), norms (Andersson & Borgstede, 2010; Botetzagias et al., 2015; Dursun et al., 2017), motivation (Cho, 2019; Corral-Verdugo, 1997), personal effectiveness (Chen et al., 2019; Delcea et al., 2020; Lindsay & Strathman, 1997), convenience (Lange et al., 2014; Sidique et al., 2010), individual benefit (Ojala, 2008; Popescu et al., 2020; Wang et al., 2011), social benefit (Chu & Chiu, 2003; Jackson et al., 1993), cost (Nguyen vd., 2018; Yürüyen-Kılıç et al., 2022) emotions (Elgaaied, 2012; Zhang et al., 2021), culture (Boldero, 1995; McCarty & Shrum, 2001), legal regulations (Nguyen et al., 2018) and demographic characteristics such as age, gender, education, marital status, income, ethnic identity, occupation, type of residence and home ownership (Ebreo & Vining, 2001; Li, 2003; Lopez-Mosquera et al., 2015; Mutang & Haron, 2012; Saphores et al., 2012; Wang et al., 2011).

Various theoretical frameworks were used in these studies. Schwartz's (1977) Norm Activation Theory (NAT) is one prominent theory that presumes three main determinants of behavior. NAT suggests that personal moral norms are the main driver of pro-environmental behaviors like recycling since the environment is a common good, and consumers are responsible for protecting it. However, recycling is too complex to be explained solely by the altruistic approach. For this reason, NAT was often used in combination with other models for a more comprehensive explanation of recycling (e.g., Park & Ha, 2014; Nguyen, 2023). In literature, NAT is often extended to include aspects of rational decision-making. For example, in many studies, the theory is combined with Ajzen's (1985) Theory of Planned Behavior, which assumes that consumers act rationally in line with their attitudes toward the behavior, subjective norms, and perceived behavioral control (Ajzen, 1991). Some studies showed that in addition to norms' impact on the behavior, attitude to recycling, perceived behavioral control, and

subjective norms, which are well-accepted aspects of the theory of planned behavior, have an impact on the recycling intention (Park & Ha, 2014; Rastegari Kopaei et al., 2021). More recently, Yürüyen-Kılıç et al. (2022) extended the model with other rational aspects, including benefit and cost evaluations. They found the perceived cost of the behavior to be a significant determinant of recycling, and its impact was more robust than moral norms. By other researchers, some cognitive factors comprising the availability of information related to recycling (Wang et al., 2019) and environmental concerns (Nketiah et al., 2022) were also found to encourage recycling behavior in addition to the impact of the norm. Previous studies also identified several personality traits, such as openness to change (Nketiah et al., 2022), that promote intention in addition to the influence of the norm,

These results, on the one hand, indicate other critical factors impacting recycling behavior besides moral norms. On the other hand, the findings prove that the norm has a significant impact despite the existence of different determinants of recycling behavior. So, it is safe to state that encouraging moral norms is essential for promoting recycling behavior. According to NAT, norms are triggered by two factors comprising awareness of consequences (AC), referring to the consumer's awareness of the adverse effects that may have on others as a result of his actions that are contrary to the interests of society and ascription of responsibility (AR) referring to the feeling of responsibility for one's actions. However, the literature revealed other factors that influence moral norms in addition to these two. Mainly, subjective norms (Arkorful et al., 2023; Park & Ha, 2014), place identity (Wang et al., 2024), cognitive factors such as environmental concerns (Nketiah et al., 2022), and information about the ecological benefit are other significant indicators of recycling-related moral norms. Research on pro-environmental behavior other than recycling provides additional evidence regarding the determinants of norms, such as perceived effectiveness (He & Zhan, 2018).

While these consumer studies provided empirical evidence that factors beyond NAT variables influence norms and recycling behavior, a comprehensive model that can simultaneously investigate the impacts of the various types of factors is still needed. Addressing a significant need in the field, the purpose of this study is to investigate the combined impacts of certain cognitive, affective, social, and situational factors on activating recycling-related norms and promoting behavior. In this context, we aim to explore the impacts of subjective norms, subjective and objective knowledge, behavioral cost, household support, and emotional reaction on both norms and behavior in addition to well-defined antecedents proposed by NAT (i.e., AC, AR). In this way, the study contributes to a deeper understanding of recycling behavior using a fresh perspective on NAT.

2. Theoretical Background and Hypothesis Development

2.1. Norm Activation Theory

The NAT was developed by Schwartz (1977) to explain altruistic, pro-social behaviors. According to the theory, altruistic behaviors are mainly governed by personal morals that refer to the moral responsibility to perform the behavior. Personal norms reflect obligations enforced through an internalized sense of duty to act and also cover guilt or related emotions for failure to act (Vandenbergh, 2005). NAT proposes that two main variables facilitate norm activation and the formation of an internalized sense of duty. These variables comprise awareness of the consequences (AC), referring to the consumer's awareness of the adverse effects that may have on others as a result of his actions that are contrary to the interests of society, and ascription of responsibility (AR), which implies feeling responsible for not exhibiting pro-social behavior (Schwartz, 1977).

NAT has been a frequently used approach to explaining pro-environmental behaviors, including but not limited to recycling (Tuğer et al., 2018). It is safe to state that NAT appears to be one of the appropriate approaches to explaining voluntary recycling. This is because voluntary recycling is an altruistic behavior, to some extent, as it requires consumers to give up the convenience of mixed disposal and spend effort, time, and sometimes money on recycling for the sake of the environment and society. Consistently, literature provides numerous empirical evidence regarding the critical role of personal norms as a determinant of recycling behavior and antecedents of personal norms. For example, Bratt (1999) reported personal norms to be the unique antecedent of recycling behavior, while Park and Ha (2014), Dursun et al. (2019), Ekinci et al. (2021), Nketiah et al. (2022), Arkorful et al. (2023) found that norms significantly improve recycling behaviors among other factors. On the other hand, Park and Ha (2014), Setiawan (2021), Wang et al. (2019), and Muthukumari (2024) showed that awareness of consequences encourages the activation of moral norms. Furthermore, Wang et al. (2019); Lee et al. (2023) reported that the ascription of responsibility promotes moral norms for recycling. Consistent with the NAT approach and previous empirical findings, we propose:

H1: Moral norms have a positive impact on recycling behavior.

H2: Awareness of consequences has a positive impact on moral norms.

H3: Ascription of responsibility has a positive impact on moral norms.

2.2. Extending Norm Activation Theory

Given the previous findings mentioned earlier, personal norms are evident to be a crucial factor in recycling behaviors, making NAT a suitable approach to explaining the behavior. However, like other pro-environmental behaviors, recycling is a complex behavior with multiple motivations and barriers (Bayraktar & Çobanoğlu, 2016; Özbakır Umut et al., 2015; Özbakır-Umut et al., 2024). For this reason, researchers have been working to extend the NAT over the years since the altruistic approach may not be sufficient on its own to fully explain and interpret recycling behavior. Theoretically, NAT was integrated with Ajzen's (1985) theory of planned behavior (e.g., Arkorful et al., 2023; Muthukumari et al., 2024; Park & Ha, 2014); Peter and Tarpey (1975) valence theory (e.g., Nguyen, 2023) Eccles and Wigfield's (2020) stuational expectancy-value theory (e.g., Lee et al., 2023). Some other studies used expanded conceptual models that include additional factors influencing recycling behavior beyond the NAT variables. For example, Nketiah et al. (2022) showed that attitudes, environmental concerns, and openness to change influence recycling intention in addition to the NAT predictors. Besides, the study revealed that norms are promoted by natural bonding and place identity. Similarly, Wang et al. (2019) extended the NAT by adding information publicity as an antecedent of behavior. They found that information about waste separation promotes recycling along with norms. In line with these previous studies, we comprehensively extend NAT regarding the roles of additional cognitive, affective, social, and situational factors in activating recycling-related norms and promoting behavior.

2.2.1. Cognitive Factors

Knowledge is the cognitive factor expected to influence norms and recycling behavior. Indeed, prior knowledge and experience are primary aspects of the choices about the relevant subject (Bettman & Park, 1980). Similarly, knowledge is considered a prominent determinant of pro-environmental intention and behavior in the literature, as Dursun et al. (2019) reported. In the recycling context, knowledge refers to having sufficient information to make judgments and decisions and effectively take action about recycling (Tümer et al., 2024). There are various approaches for investigating knowledge in the consumer and pro-environmental behavior research area (Ellen, 1994; Kaiser & Fuhrer, 2003; Park et al., 1994). Particularly, this study focuses on the role of objective and subjective knowledge about recycling. Based on the study by Park et al. (1994), objective knowledge is defined as accurate information about recycling, while subjective knowledge refers to how confident a consumer is in their knowledge about recycling. Objective knowledge involves accurate stored information in memory about how to recycle, while subjective knowledge is consumers' confidence in their knowledge about recycling (Bruks, 1985; Moorman et al., 2004).

The relationship between knowledge and environmental behavior is evident from numerous studies (Frick et al., 2004; Grob, 1995; Kaiser & Fuhrer, 2003; Wiek et al., 2011). Gifford (2014) found that knowledge is among the most important antecedents of pro-environmental behaviors. Consistently, knowledge is found to be crucial for recycling behaviors. Meta-analyses on the antecedents of recycling behavior reported a significant relation between knowledge and behavior (Geiger et al., 2019; Miafodzyeva & Brandt, 2013). From a different viewpoint, some studies on barriers to recycling highlighted that lack of knowledge is one of the most prominent barriers to the behavior (Tumer Kabadayi et al., 2023). This is partially because consumers with lower levels of knowledge may find it difficult to make 'good' choices due to potential confusion, while consumers with greater objective and subjective knowledge would be expected to be more likely to engage in recycling behaviors due to greater discriminatory ability (Ellen, 1994: 44).

Furthermore, knowledge is indicated to be associated with the consumer's internalization of social norms, guilt, and responsibility (Bamberg & Möser, 2007). So, it can be proposed that knowledge relates to both recycling behavior and moral norms.

H4: Subjective knowledge has a positive impact on moral norms.

H5: Subjective knowledge has a positive impact on recycling behavior.

H6: Objective knowledge has a positive impact on moral norms.

H7: Objective knowledge has a positive impact on recycling behavior.

2.2.2. Affective Factors

The current study investigates emotional reactions to environmental degradation as an affective aspect. Kollmuss and Agyeman (2002) argue that when individuals encounter environmental degradation, they feel negative emotions, including sadness, fear, anger, or guilt, and these emotional reactions are intense if they directly experience the degradation. Literature covers concepts such as eco-anxiety, environmental distress, and ecological stress, referring to negative feelings about environmental problems (Boluda-Verdú et al., 2022). Those emotions are indicated to play a vital role in risk perception, moral judgments, and motivating action (Roeser, 2012). This is probably because negative emotions such as fear and worry make people change their routines, break up habits,

and be more focused on the issue-related information (Ojala, 2008). Furthermore, emotions are expected to promote moral norms by indicating the importance of the issue (Russel et al., 2017). In this way, emotions may motivate the consumers to do the right thing and avoid negative behaviors (Baek & Yoon, 2017).

Literature provides empirical evidence regarding negative emotions' promoting impact on behavior in the context of climate change. For example, Stanley et al. (2021) revealed that eco-anger encourages both individual and collective pro-climate behaviors. Similarly, Contreras et al. (2024) found that anger promotes pro-environmental intentions and behaviors. Another negative feeling of ecological worry was found to positively influence climate action intentions and climate policy support (Zeier & Wessa, 2024). Consistent with the findings, we expect negative emotional reactions to environmental degradation to encourage recycling-related norms and behaviors. This expectation partially depends on the argument that recycling is often driven by emotions rather than cognitions since people tend to recycle not because of their theoretical knowledge or deep understanding of the problem but because they feel concerned about the environment (Meneses, 2010).

H8: Emotional reaction has a positive impact on moral norms.

H9: Emotional reaction has a positive impact on recycling behavior.

2.2.3. Social Factors

In recycling studies, NAT is often extended to include variables of the theory of planned behavior (Ajzen, 1985). Subjective norm is one of these variables, which refers to "the perceived social pressure to perform or not to perform the behavior" (Ajzen, 1991: 188). Knickmeyer (2020) states that social norms are determined by local culture and promote the behavior without legal enforcement by providing guidance and rewarding the behavior with social approval. In the context of recycling, the social norm is the consumer's belief that family members, neighbors, friends, or people in the reference group expect the consumer to recycle. Miafodzyeva and Brandt (2013) found that, as a result of their meta-analysis, in most of the studies that were conducted between 1990 and 2010, the subjective norm is found to be related to recycling behavior. Similarly, Geiger et al. (2019) conducted a meta-analysis of recycling studies published between 1975 and 2017 and reported a strong effect size of subjective norms regarding recycling behavior. Social norms were also found to be influential in research models where the effects of moral norms were taken into account simultaneously (Park & Ha, 2014; Rastegari Kopaei et al., 2021).

On the other hand, social norms are also reported to be related to moral norms (Arkorful et al., 2023; Park & Ha, 2014). The relationship between social and moral norms can be explained by the fact that social norms serve as a standard for behavior, and in turn, personal norms are developed by internalizing these standards to some extent (Bamberg & Möser, 2007).

H10: Subjective norms have a positive impact on moral norms.

H11: Subjective norms have a positive impact on recycling behavior.

2.2.4. Situational Factors

This study focused on two situational factors expected to influence recycling behavior and related norms: household support and perceived costs of the behavior. Household support in the recycling context refers to receiving attitudinal and practical support when needed from others with whom one lives to support recycling behavior. A study by Tümer et al. (2024) discovered that lack of support, especially from family members, is a barrier hindering individual recycling behavior in Türkiye.

Practical support from household members helps reduce the perceived difficulty of recycling by assisting with sorting, cleaning, and transporting activities. On the other hand, attitudinal support is likely to motivate individuals to recycle. Family members' behavior consciously or unconsciously shapes other family members' norms, expectations, and behavior through the role model effect. Furthermore, family members' behavior can be influenced through reinforcement mechanisms, such as open communication, where positive behaviors (e.g., praising) and negative behavior (e.g., discussing) (Moschis, 1985).

Early studies provide vital evidence regarding the family members' influence on moral norms and recycling behaviors by communicating, observing the recycling behavior, talking and discussing issues related to environmental behaviors, teaching how to recycle, building daily routines, and being role models (Ando et al., 2015; Grønhøj, 2006; Lee, 2014; Matthies et al., 2012). Since recycling behavior is practice-based, children who observe their parents' waste sorting and recycling behavior are likelier to adopt it (Grønhøj & Thøgersen, 2012; Salazar et al., 2022). Matthies et al. (2012) and Žukauskienė et al. (2021) highlighted that parents guide children's recycling and reuse behaviors by communicating, transferring information, and sanctions. Also, Katz-Gerro et al. (2020) reported that group participation in the family promotes children's recycling, avoiding disposable dishes, and avoiding plastic bags.

Furthermore, the exemplary recycling behavior of families serves as a descriptive norm for children, directly influencing their recycling behavior and forming the basis of their moral norms (Matthies et al., 2012). The daily communication between children and their families, particularly about recycling, and their participation in recycling behavior enhances their environmental norms (Matthies et al., 2012). It has been observed that parents who engage in frequent and informative communication with their children create a normative effect by explaining the severity of environmental problems and the importance of recycling, such as separating paper and recycling it (Ando et al., 2015). So, household support is expected to influence moral norms and recycling behavior.

H12: Household support has a positive impact on moral norms.

H13: Household support has a positive impact on recycling behavior.

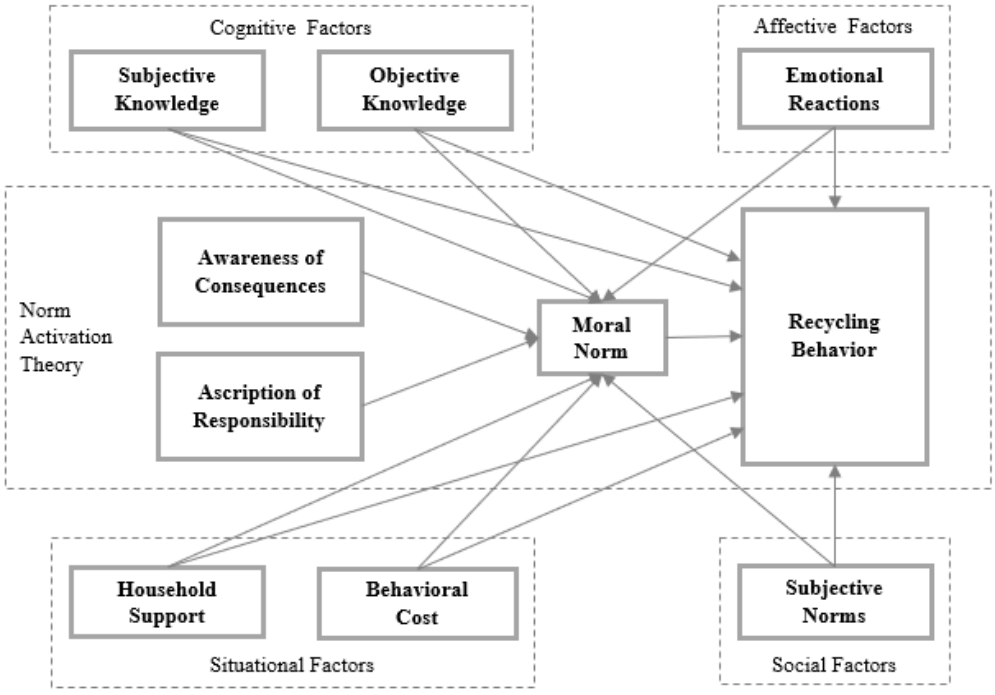
Another situational factor whose impact was investigated is the perceived cost of recycling behavior. Perceived cost comprises the physical, economic, cognitive, and time costs of recycling at home, stemming from the challenging, demanding, difficult, and physically exhausting nature of recycling (Tümer et al., 2024). Previous studies showed that the perception that recycling is time-consuming (Alhassan et al., 2018; Tran et al., 2019), complex and challenging (Ng, 2019; Nguyen et al., 2017), inconvenient (McCarty & Shrum, 1994; Ng, 2019) have a hindering impact on recycling behavior. Additionally, Huang et al. (2020) stated that the financial burden of recycling is another barrier to recycling behavior. Furthermore, the hygiene risk of recycling is considered to be an important behavioral cost aspect. Lee et al. (2017) reported that consumers perceived higher inconvenience costs for disposal spot hygiene compared to recycling behavior. Ma et al. (2020a) reported that perceived costs such as material, time, and physical costs negatively influence waste classification behavior. So, it is evident that the higher the perceived cost, the lower the waste separation rate and sorting behavior (Ma et al., 2020b).

Additionally, the high cost of the behavior may alter the activation of moral norms. Building on NAT, Schwartz (1977) argued that moral norms will not be activated if an individual perceives high behavioral costs associated with prosocial behavior. Instead, individuals may resort to a psychological defense mechanism known as 'defensive denial,' where they refuse to acknowledge the moral implications of their actions (Schwartz, 1977). Our hypotheses, which are underpinned by theoretical and empirical evidence, are as follows;

H14: Behavioral cost has a negative impact on moral norms.

H15: Behavioral cost has a negative impact on recycling behavior.

Fig. 1: Research Model



3. Method

Data was collected through an online survey. Recycling behaviors were measured using four items adapted from Berger and Corbin (1992) and Barr (2007). Four items of awareness of consequences items and three items

of moral norms were drawn from the study of Stern et al. (1999). The three-item scale of the ascription of responsibility was adapted from Uehleke and Hüttel (2019). The behavioral cost of recycling was measured using five items from Klaiman et al. (2017) and Perrin and Barton (2001). The subjective knowledge scale was adapted from Tonglet et al. (2004). Subjective norms were measured using four items from Wan et al. (2014). Because no appropriate scale was obtained from previous work, researchers developed four items for emotional reactions and four items for family support. All items were on a 5-point Likert scale format (1=Strongly disagree, 5=Strongly agree). The questionnaire also included 20 multiple-choice questions about recycling to assess objective knowledge. Questions included topics such as ecological systems, waste problems, waste management systems, recyclable materials, waste separation procedures, and recycling benefits. On this scale, correct answers were scored with one point to obtain an objective knowledge score between 0 and 20 for each participant. The questionnaire was pretested on a small sample to ensure no wording issues or complexity may lead to misunderstandings. The questionnaire underwent minor revisions based on the written feedback from the participants in the pretest sample. Then, a link to the online questionnaire was sent to a sample obtained through convenience and snowball sampling methods. Besides, an open invitation link was distributed through social media platforms. This combined sampling approach allowed for a quick yet more balanced sample than using only the convenience sampling method.

The sample, drawn through the convenience sampling method, consisted of 531 Turkish consumers living in 55 distinct cities in Türkiye. Respondents were, on average, 27,21 years old (sd=8.80). Of the respondents, 63.6% were female, and 74% were single. Regarding education level, 3.5% held a primary and secondary school education, 43% had graduated from high school, 39.9% held undergraduate degrees, and 6.3% held graduate degrees.

4. Analyses and Results

4.1. Measurement Validation

The scales used to measure the constructs in the research model were all multi-item reflective scales, except for the objective knowledge scale. To assess the construct validity of reflective scales comprising 34 items, an exploratory factor analysis (EFA) was conducted using principal component analysis and varimax rotation. A nine-factor solution with 69% explained variance was obtained. Four problematic items were eliminated because of unsatisfactory factor loadings and cross-loading problems. The final EFA revealed nine factors explaining 73% of the total variance. Findings showing items loaded to relevant factors with factor loadings ranging from 0.572-0.880 provided evidence for construct validity. Then, it was found that Cronbach's alpha coefficients, which were calculated to assess the reliability of the scales, were all greater than 0.70, confirming the reliability of the scales (Nunnally, 1978). For further analysis, composite scores were calculated for each construct measured with reflective scales by averaging the items measuring that construct. Apart from this, objective knowledge scores ranging from 0-20 were calculated for each respondent based on their correct answers to the recycling knowledge test. Table 1 provides descriptive statistics and correlation analysis results.

Table 1: Descriptive Statistics and Correlation Analysis Results

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1-Recycling Behavior	1									
2-Moral Norm	.371**	1								
3-AC	.143**	.477**	1							
4-AR	-.159**	.199**	.246**	1						
5-Subjective Norm	.117**	.350**	.262**	.084	1					
6-Subjective Knowledge	.487**	.384**	.148**	-.009	.241**	1				
7-Objective Knowledge	.230**	.192**	.223**	-.036	.069	.169**	1			
8-Behavioral Cost	-.398**	-.281**	-.089*	.141**	-.110*	-.325**	-.141**	1		
9-Household Support	.432**	.309**	.100*	-.066	.232**	.449**	.099*	-.390**	1	
10-Emotional Reaction	.064	.348**	.440**	.182**	.200**	.083	.241**	-.015	.054	1
Mean	2.798	4.085	4.603	4.063	3.59	3.62	7.365	3.431	3.056	4.606
SD	1.074	0.705	0.461	0.829	0.871	0.825	2.795	0.911	1.098	0.478

**. Correlation is significant at the 0.01 level (2-tailed), * Correlation is significant at the 0.05 level (2-tailed).
AC=Awareness of Consequences, AR= Ascription of Responsibility

4.2. Hypothesis Testing

Two regression analyses were conducted to test the research hypotheses, and the results are displayed in Table 2. Model 1, in which moral norms were the dependent variable, was found to be significant (F=46.232, p<0.001). Results provide additional evidence regarding the positive impacts of awareness of consequences (b=.289, p<0.01) and ascription of responsibility (b=.120, p<0.001) as proposed by the NAT. Furthermore, results confirmed some additional determinants of moral norm activation. Accordingly, subjective norms (b=.148, p<0.001), subjective knowledge (b=.200, p<0.001), household support (b=.096, p<0.05), and emotional reaction to waste problems (b=.140, p<0.001) promote moral norms significantly. So, H2, H3, H4, H8, H10, H12 were supported. Consistently, the behavioral cost was found to hinder norms (b=-.148, p<0.001), conforming to H14. However, the impact of objective knowledge was insignificant, and H6 was not supported. The regression model explained approximately 41% variation in recycling-related moral norms. Awareness of consequences appeared as the prominent determinant of the norm. More importantly, the impacts of subjective norm, knowledge, cost, and emotion were significant and more substantial than the attribution of responsibility.

Table 2: Regression Analysis Results

	Model 1 Dependent Variable: Moral Norm			Model 2 Dependent Variable: Recycling Behavior		
	Std. Beta	**t**	**Sig.**	**Std. Beta**	**t**	**Sig.**
(Constant)		-.637	.525		2.231	.026
Awareness of Consequences	.289	7.359	.000	-	-	-
Ascription of Responsibility	.120	3.386	.001	-	-	-
Subjective Norm	.148	4.104	.000	-.074	-1.967	.050
Subjective Knowledge	.200	5.133	.000	.278	6.732	.000
Objective Knowledge	.024	.682	.495	.123	3.367	.001
Behavioral Cost	-.148	-3.935	.000	-.175	-4.496	.000
Household Support	.096	2.434	.015	.193	4.697	.000
Emotional Reaction	.140	3.658	.000	-.047	-1.243	.215
Moral Norm	-	-	-	.174	4.116	.000
R^2		.406			.370	
F		46.232			43.880	
Sig.		0.001			0.001	

The second regression model comprised recycling behavior as a dependent variable, 37% variance of which was explained significantly (F=43.880, p <0.001). Consistent with the claim of the NAT, moral norms enhance recycling behavior significantly (b=.174, p<0.001). So, H1 was confirmed. However, results revealed that subjective knowledge was the most influential factor for the behavior (b=.174, p<0.001). Similarly, objective knowledge also had a significant impact (b=.123, p<0.01). So, H5 and H7 were confirmed. Besides, household support for the behavior is found to promote the recycling behavior (b=.193, p<0.001), while the cost of recycling was found to hinder the behavior significantly (b=-.175, p<0.001). For this reason, H13 and H15 were supported. On the other hand, H11 and H9 were not supported since the direct impacts of subjective norms and emotional reactions were not significant.

5. Discussion

This study explores the roles of certain cognitive, affective, social, and situational factors in activating recycling-related norms and promoting behaviors to extend the NAT approach. For this aim, the study investigates the impacts of subjective norms, subjective knowledge, objective knowledge, behavioral cost, household support, and emotional reaction on both norms and behavior. Findings provided additional empirical evidence regarding the efficiency of NAT in explaining recycling behavior. As the theory suggests, the moral norm was found to be a significant indicator of recycling behavior. Besides, as expected, awareness of consequences and ascription of responsibility were found to trigger personal norms significantly. Our findings accord with previous findings showing that awareness of consequences and ascription of responsibility has a positive impact on moral norms (Davies et al., 2002; De Groot & Steg, 2009; Harland et al., 1999; Hines et al., 1987; Klöckner & Ohms, 2009; Wan et al., 2014) and moral norm has a positive impact on recycling behavior (Stern et al., 1993; Stern & Dietz, 1994; Stern et al., 1995).

The most important result of the study is that there are other crucial factors that influence recycling behavior and related norms, some of which even have a greater impact than well-accepted variants of NAT. Accordingly, knowledge appears to be a prominent factor in recycling. Subjective knowledge was found to enhance both norms and recycling practices. Indeed, NAT includes an awareness variable referring to the knowledge about the negative consequences of not recycling, which were found to enhance norms. Obviously, norm formation is much more likely when consumers believe that they also have enough knowledge about how to recycle. Furthermore, subjective knowledge was found to be the most important antecedent of behavior. Accordingly, moral responsibility for recycling and behavioral engagement are more likely when consumers believe they know what to do. These findings echo previous studies, emphasizing the role of knowledge, in addition to the norms, in promoting recycling behavior (Geiger et al., 2019; Miafodzyeva & Brandt, 2013). On the other hand, objective knowledge has relatively little impact on behavior and no significant impact on norms. It can be concluded that consumers mostly need only a satisfactory level of knowledge, especially about the ways of recycling, to fuel self-confidence about their competence to make decisions and take action. From the managerial perspective, it is safe to state that information-intensive communication campaigns are still needed to increase recycling rates.

Another important finding is that behavioral cost hinders both norms and behaviors. This finding is consistent with the argument that consumers are rational decision-makers considering both material and psychological costs and benefits when making choices (Vandenbergh, 2005). Accordingly, when consumers perceive recycling as effortful, time-consuming, and complicated, they are less likely to engage in behaviors. Similarly, previous studies reported the cost as a prominent barrier to recycling (please see Tumer Kabadayi et al., 2023, for a literature review). On the other hand, behavioral cost was found to impair moral norms. This finding is unsurprising since NAT has been argued to be more successful in explaining low-cost environmental behaviors (Steg & Nordlung, 2012). Dursun (2019) indicates that high behavioral costs activate psychological mechanisms such as denial, helplessness, and rationalization, which directly and indirectly impair behavior. The perceived cost of recycling should be reduced by increasing the accessibility of recycling facilities and developing convenient waste collection services. Increased convenience not only eases recycling but also helps consumers internalize the moral responsibility of recycling.

The current study also revealed household support's role in activating moral norms and behavioral engagement. This finding is consistent with the previous studies which report hindering impact of lack of family support for the behavior (Chung & Poon, 2009; Mutang et al., 2015; Strydom, 2018). Besides, it is easier for the consumer to adopt moral norms and engage in the behavior when they receive both attitudinal and practical support regarding recycling from the people they live with. This is probably because the “support” signals the approval of the consumer's sense of duty for recycling. The result that household support positively affects moral norms and recycling behavior is similar to the studies in the literature (Ando et al., 2015; Grønhøj & Thøgersen, 2012; Matthies et al., 2012; Salazar et al., 2022). Moreover, practical household support is critical when consumers find recycling challenging and tend to quit the behavior. From the managerial perspective, encouraging adults to recycle is extremely important to increase individual recycling rates and support the development of the next generation of recyclers.

Another finding is that emotional reactions to environmental problems encourage moral norms while having no direct impact on the behavior. Accordingly, consumers who experience negative emotions such as sadness, worry, and anger more intensely are more likely to have strong moral norms. This is probably because negative emotions likely fuel perceived risks of not taking action for the environment (Cooper & Nisbet, 2016), which in turn promote moral responsibility for recycling. However, feeling bad when experiencing or looking at photos or videos does not directly enhance action. These findings contradict the argument that recycling is an emotional behavior (Meneses, 2010). Although recycling is not an emotion-driven behavior, it is evident that negative emotions contribute to the development of a sense of duty. So, when planning message framing for recycling communication campaigns, using feelings of anxiety or anger is likely to support the behavior indirectly.

Finally, subjective norms, one of the variables proposed by the theory of planned behavior, were found to be effective in moral norm development. This finding confirms previous research (Arkorful et al., 2023; Park & Ha, 2014). However, contrary to previous research, subjective norms’ direct impact on behavior is not significant (Park & Ha, 2014; Rastegari Kopaei et al., 2021). This finding shows that social norms in Türkiye are somewhat effective in improving people's moral responsibility. However, when examined simultaneously with other variables, social norms are relatively dormant in directly triggering behavior. This finding can be explained by the fact that recycling is a behavior that has not yet become widespread among Turkish consumers. Although social pressure may be felt, its severity may not yet be sufficient to trigger behavior. The communication campaigns should prioritize demonstrating that recycling is a behavior that is favored, expected, and desired in society.

6. Conclusion

This study extends the NAT approach by investigating the simultaneous impact of cognitive, affective, social, and situational factors on norms and recycling behavior in addition to the original variables. Results showed that recycling norms are related to subjective norms, subjective knowledge, behavioral cost, household support, and emotional reaction, as well as awareness of consequences and ascription of responsibility. Besides recycling, behavior is influenced by subjective and objective knowledge, behavioral cost, household support, and moral norms. The research has generally signaled that recycling is not just an altruistic behavior but a reasoned behavior in which norms play an important role. The findings of this study could be valuable for policymakers aiming to increase individual recycling rates. The study suggests the need for 1) improving the accessibility of recycling bins, 2) creating a positive image for recyclers by demonstrating that recycling is a desirable and expected behavior in society, 3) developing persuasive message content that appeals to emotions to encourage a sense of duty for recycling, 4) and most importantly, intensive information-focused communication campaigns to provide consumers with essential information on the reasons for recycling and how to do it. The findings also contribute to the current body of theoretical knowledge by offering a deeper understanding of recycling behavior through a comprehensive extension of NAT.

When interpreting the research results, some limitations should be considered. The major limitation of the study is that the sample size was small, and a non-random sampling method was used. The high number of young participants in the sample can be attributed to the sampling method. One other limitation regarding the data collection is that only the online survey method was employed. While the online survey method enables researchers to reach a large audience quickly over a wide geographic area, this kind of survey is limited to individuals who are comfortable using the Internet (Dursun et al., 2022). These methodological limitations reduce the generability of the findings. Future research using a randomized method for sampling and mixed-mode survey for data collection is needed for findings to be generalizable to the Turkish population.

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All authors' contributions are equal.

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