



# Littering Behavior in America

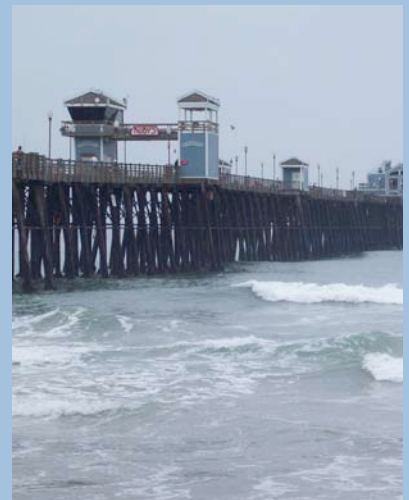
## Results of a National Study

Prepared for Keep America Beautiful

January, 2009



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# ACKNOWLEDGEMENTS

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A special thanks to Susanne Woods and the staff at Keep America Beautiful for their encouragement, support, and dedication to this important research. The research summarized in this report was made possible with funding from Philip Morris USA, an Altria Company.



# EXECUTIVE SUMMARY

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Like many social problems, litter is caused by human behavior. Whether intentional or accidental, litter begins with the individual. Given the social, aesthetic, and environmental problems that result from litter, numerous interventions have been developed, implemented, and evaluated. Yet despite these efforts, litter continues to be a problem.

This report summarizes the findings from a nationwide study of littering behavior. Our goals were three-fold:

- To conduct a landmark study that could serve as a platform for the next generation of litter prevention activities,
- Develop a valid and reliable set of methodologies that could be replicated over time and in different locations,
- Utilize a multi-method approach, including both self-report and behavioral observations, in ways that would allow for conclusions about litter at a national level.

To achieve these goals, the Action Research team conducted three sets of studies, all with nationwide samples. The first was a series of behavioral observations, in which trained researchers observed thousands of individuals in a diverse sample of locations across the country. The second set of research activities involved intercept interviews with a small sample of the observed individuals. Finally, our third research activity involved a nationwide telephone survey. In this Executive Summary, we highlight several of the key findings from each of these research approaches.

## 1. BEHAVIORAL OBSERVATIONS

In an effort to go beyond the typical self-report measures used to study littering behavior, our research team observed individuals in a diverse sample of public locations nationwide. Using a strict research protocol, the observers randomly selected individuals in 130 locations nationwide. These randomly selected individuals were monitored as they moved through the location, and their disposal behaviors were recorded.

In all, the team observed 9,757 individuals across 130 different locations. The locations were divided across 10 states, evenly split between rural, urban, and suburban settings, and included nine site types: fast food, recreation, gas stations, city centers, rest stops, medical/hospital, bars/restaurants, retail, and recreation.

The majority of the observations examined general disposal behaviors, and a smaller subset focused specifically on the disposal of cigarette butts. Statistical analyses were conducted using Hierarchical Linear Modeling, which allowed for analyses of both individual- and context-level predictors of littering behavior.

### Key Findings:

- Trash receptacles are common at public places nationwide. Of the 130 locations our team visited, 118 (91%) had at least one trash receptacle, including trash can, trash can/ash combination, ashtray, dumpster, and recycling bin. In comparison, cigarette receptacles are far less common, and only 61 (47%) of the sites we visited had at least one receptacle (ashtray or trash can / ashtray combo).
- Despite the widespread availability of trash receptacles in public spaces, litter is still quite common. Of the 130 sites we visited, only two were litter free. The most commonly found existing litter was cigarette butts (106 sites, 82%), miscellaneous paper (87 sites, 67%), and food wrappers (58 sites, 45%).
- Commensurate with the volume of litter, our team observed a high amount of littering behavior. Of all the disposals that we witnessed across our sample, 17% were litter.
- The most frequently littered item was cigarette butts (in our focused observations of smokers, we observed a 65% littering rate). With regard to disposals, our team also observed high littering rates for food remnants and food wrappers.
- Contrary to expectations, the majority of littering behavior (81%) occurred *with* notable intent. This included dropping with notable intent (54%), flick/flip of the item (20%), and other notable intent (7%).
- Our statistical analyses revealed that 15% of the variance in general littering behavior was due to contextual demands, and the remaining 85% resulted from the individual. That is, while some types of contexts invited more litter, there was a large amount of variability in the behaviors of individuals within a site. This finding has implications for programs designed to reduce littering behavior: the most effective strategy will include both contextual efforts (like clean-ups, improving waste collection infrastructure, or beautification) and efforts to increase individual motivation to properly dispose.
- With regard to general littering, our statistical analyses revealed several important predictors. At the individual level, age was strongly negatively related to littering behavior, with older individuals littering less than younger individuals. At the level of the context, the availability and distance of trash receptacles was strongly predictive of littering behavior. In addition, the amount of litter already present contributed to the littering rate.

- With regard to cigarette butt litter, our statistical analyses showed that cigarette butt litter was more strongly influenced by the context than was general litter. Indeed, 38% of cigarette butt littering was due to context, and 62% was due to individual variability. At the individual level, age was significantly predictive of littering, with older smokers being less likely to litter. At the level of the context, both the availability of ash receptacles and the amount of existing litter affected the littering rate. This find has important implications for programs designed to reduce cigarette butt litter: the most effective strategy will involve increasing the availability of ash receptacles, decrease the amount of existing litter through clean-up activities, and motivational messages targeting individual responsibility and obligation.

## 2. INTERCEPT INTERVIEWS

In addition to our systematic observations of disposal behaviors, we randomly selected locations where we conducted intercept interviews with the observed disposers. Our goal was to obtain a small, representative sample of individuals and to link the responses from our intercept interview to the observed disposal behaviors. At each of the selected intercept locations, individuals who had been observed disposing (either properly or improperly) were approached to take part in a face-to-face survey. The interviewer did not know if the person of interest had littered or not, and she asked a set of pre-determined questions, including demographic items and questions about litter behavior.

In all, 102 intercept interviews were conducted across 15 locations.

### Key Findings:

- Consistently across the locations, respondents expressed to us the importance of littering as an issue, and they expressed a strong personal obligation not to litter.
- A sizeable percentage of respondents reported seeing or hearing litter prevention messages (40%), messages about community clean-up activities (41%), or messages discouraging cigarette butt litter (25%).
- Yet when asked if they had littered in the past month, only 43% of respondents indicated that they had littered. Interestingly, the most frequently mentioned items that were reported matched those that we observed in the locations, and those that we observed being littered: cigarette butts, food wrappers or remnants, and paper.
- Our statistical analyses showed that a personal obligation not to litter was significantly related to lower rates of observed littering behavior.

### 3. NATIONAL TELEPHONE SURVEY

Finally, we compare the results from our systematic observations to those from a random digit dialing telephone survey. Data are reported on a national probability sample of 1,039 respondents. Survey items included self-reported littering behavior, ratings of community livability, personal norms against littering, attitudes about litter, motivators and barriers for littering, and demographic variables.

#### Key Findings:

- Using the same eight littering items reported in a 1968 national survey, we found that only 15% of the sample reported littering in the past month. This figure is substantially lower than the 50% admitted littering rate found in 1968, and it speaks to the dramatic drop in littering behavior over the past 40 years.
- Across a range of items and situations, the overall rate of reported littering was very small. The most frequently reported littered items were cigarette butts, food remnants (apple core or banana peel), and gum.
- Although the reported littering rate was small, it is significant in terms of the number of people it represents and how that plays out in our communities.
- Community appearance was associated with lower rates of reported littering behaviors. Community appearance included cleanliness, low rates of visible litter, maintained streets and sidewalks, attractiveness of plants, flowers, and trees, and attractive infrastructure.
- Littering was reported more frequently in instances when the person was in a hurry, no trash can was nearby, the item was biodegradable, there was a sense that someone else would pick it up, and when the item was not recyclable.

### CONCLUSIONS AND RECOMMENDATIONS

Taken together, the results provide a glimpse into littering in America. While littering rates have fallen substantially over the past 40 years, littering remains an important social and environmental issue. The methodology developed for this project was intended to inform national-level litter prevention strategies. However, the approach also lends itself to understanding the issues pertinent at the community level. The methodology and protocols were created in such a way (and

reported in sufficient detail) to allow for replication in local communities, and to provide a core set of measures to assess changes in littering rates over time.

# PART I: INTRODUCTION

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Like many environmental problems, litter is caused by human behavior. Whether intentional or accidental, litter begins with the individual. Given the social, aesthetic, and environmental problems that result from litter, numerous interventions have been developed, implemented, and evaluated. Unfortunately, the majority of these programs are not based on sound principles of human behavior. While there is an existing research base on litter dating back more than 40 years, the findings have not been systematically integrated and the topics studied are only loosely connected.

In research conducted in the 1970s, Keep America Beautiful (KAB) found that litter originated from seven primary sources: (1) pedestrians or cyclists who do not use receptacles, (2) motorists who do not use car ashtrays or litter bags, (3) business dumpsters that are improperly covered, (4) loading docks and commercial or recreational marinas with inadequate waste receptacles, (5) construction and demolition sites without tarps and receptacles to contain debris and waste, (6) trucks with uncovered loads on local roads and highways, and (7) household trash scattered before or during collection (KAB, 2007).

The findings from this early research served as a foundation to inform outreach and clean-up activities. Since that time, there have been more than 100 studies conducted on the topic of public litter. These studies have been conducted by private research firms, nongovernmental organizations, academic research groups, and to a lesser extent, local entities (e.g., cities, counties). The most frequently studied topics include: litter composition, where litter occurs, who litters, and litter prevention strategies. While the current project was designed to update and inform the next generation of litter-prevention activities, it is useful to begin with a short summary of the existing knowledge.

**1. What is Litter?** According to Geller (1978), litter consists of items found in socially unacceptable locations. However, it is also a “function of specificity and convenience.” Studies have shown that the top five types of litter are: (1) miscellaneous paper, (2) miscellaneous plastic, (3) vehicle debris, (4) packaging, and (5) beverage containers (R.W. Beck, 2007). A recent review of studies on litter, from 1993 to 2006, found that the top 10 most frequently littered items were: (1) takeout food packaging, (2) snack wrappers, (3) miscellaneous paper, (4) miscellaneous plastic, (5) vehicle debris, (6) beverage containers, (7) napkins, bags, and tissues, (8) miscellaneous metal and glass, (9) other beverage related litter, and (10) construction debris. These studies did not take into account cigarette butts as a form of litter, and other studies have shown that cigarette butts are the most frequently littered item when counted, and they are the number one item littered by volume (Department of Environment and Conservation, 2004; Sibley & Liu, 2003).

**2. Who Litters?** Recent studies looking at the types of littering behavior over time (from 1990 to present) have shown that there is a trend away from deliberate littering, with littering as a whole dropping by approximately 2% per year since the 1990s (R. W. Beck, 2007). Younger people are more likely to litter than older people, with those aged 19 and below more likely to litter than any other age group (Krauss, Freedman, & Whitcup, 1978; R W Beck, 2007). One study suggested that adults 21-35 are three times more likely to litter than those over the age of 50 and two times more likely to litter than those aged 35-49 (Geller, 1968).

Other demographic predictors of littering include gender, urban living, and household size. While gender effects in littering tend to be small, men are more likely to admit littering than women (Cialdini, Reno, & Kallgren, 1990; Krauss et al., 1978; Meeker, 1997). In addition, there is some evidence that people living in rural areas are more likely to litter than people living in cities. And individuals from small households (1-2) are less likely to litter than those from large households (5+) (Geller, 1968; as cited by R.W. Beck, 2007).

**3. Preventing Litter.** A third area of research on litter has focused on strategies for reducing litter.

*A. Litter begets litter.* One of the largest factors affecting a person's decision to litter is the condition of the physical surroundings. Individuals are substantially more likely to litter into dirty or already littered environments than into clean ones (Cialdini, Kallgren, & Reno, 1991; Geller, Witmer, & Tuso, 1977; Herberlein, 1971; Reiter & Samual, 1980). The difference is often as much as 2-3 times as much litter in dirty environments.

*B. Littering follows the norm.* Numerous studies have shown that social norms play a powerful role in an individual's decision to litter. Survey data suggests that personal norms about littering have changed considerably over the last 50 years, from a moderate level of concern for littering in the 1950s, to a strong feeling of personal obligation to not litter by the early 2000s (cf. Grasmick, Bursik, & Kinsey, 1991; Kallgren, Reno, & Cialdini, 2000). As social sanctions against littering grew, studies showed that *activating* norms about littering could substantially increase or decrease one's own littering decisions. For example, seeing a person litter, seeing a pile of swept litter, or seeing a person or group pick up litter, can all activate norms and mobilize behavior. These situations activate a person's normative beliefs, and the resulting feelings of shame (violating a social norm) and guilt (violating a personal norm) have been incorporated into Public Service Announcements with documented success (Cialdini, 2003; Cialdini et al., 2005).

*C. The convenient truth:* A third established finding is that littering rates decrease as the convenience of using a proper receptacle increases (Cope, Huffman, Alred, & Grossnickle, 1993; Geller, Brasted, & Mann, 1980; Geller, Winett, & Everett, 1982). As a general rule, more trash receptacles reduce litter, including cigarette butts. Furthermore, the salience of the receptacle can also decrease litter rates. A brightly colored, themed, or decorated receptacle attracts considerably more trash than does a plain or ordinary appearing receptacle.

*D. Programs:* Programs through organizations such as KAB and Adopt-a-Highway have worked to reduce litter. Studies have shown that sites where KAB and Adopt-a-Highway programs were present were cleaner and had less litter than sites where these programs were not present (R.W. Beck, 2007).

*E. Sanctions.* While threats of fines and punishment are commonplace in litter prevention programs, there are few systematic evaluations of their efficacy. In fact, research by Sansone and Harackiewicz (2000) suggests that threat can undermine intrinsic motivation (e.g., the motivation to do something based on enjoyment). As a result, any change in behavior that results from threats or sanctions is likely to be specific to the behavior at hand, limited to instances where such threats of punishment are enforceable, limited in the ability to generate long-term results, and not generalized across situations. In addition, the way a threat of enforcement is worded may also play a part in whether or not it is effective, such that just mentioning the undesirable behavior can act as a prime. Recent psychological research has suggested that priming a behavioral category increases the probability that it will occur (Aarts & Dijksterhuis, 2003; Bargh & Chartrand, 1999). Thus, enforcement may not only be specific to the extrinsic motivations mentioned above, but it may also trigger the wrong effect and produce more littering in areas where enforcement is used.

## PROJECT GOALS

It is against this backdrop of prior work that we developed our current research plan. Our goals were three-fold:

- Assemble an accomplished team to design and implement a landmark study that could serve a platform for the next generation of litter prevention activities,
- Develop a valid and reliable set of methodologies that could be replicated over time and in different locations,
- Utilize a multi-method approach, including both self-report and behavioral observations, in ways that would allow for conclusions about litter at a national level.



The Action Research team set out to conduct an extensive and rigorous set of studies examining littering behavior. While the traditional approach to litter research has focused on the littered items that accumulate along roadways or in public spaces, our emphasis was on the behavior itself. That is, our focus in this work is on understanding the factors that contribute to littering behavior, and not on the litter *per se*. We built our research design and analysis along the premise that litter results from human behavior and that understanding this behavior is central to any effort to prevent and reduce litter. The report below is divided into three sections, each summarizing the methods and results from different aspects of our research project.

In the first section, we report findings from systematic observations of littering behavior. These observations are the heart of our approach and the methodology allows us to go beyond the typical survey approach and to observe the behaviors of individuals across a range of everyday settings. The analyses we report examine both the individual-level and location-level predictors of littering behavior. On the one hand, if littering results from individual-level variables like lack of concern, apathy, or low motivation, then we would expect to see considerable variability within locations, and little variability across locations. But on the other hand, littering behavior may result from contextual variables (location-level) like lack of receptacles, no signage, or the cultural milieu of a particular city or region of the country. The methodology and analyses reported below take a first step toward answering this important question.

## PART II: BEHAVIORAL OBSERVATIONS

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### INTRODUCTION

Between May and July, 2008, our research team conducted systematic observations of individuals in a wide range of public locations across the country. The research design was developed as a multi-level model, and analyzed using Hierarchical Linear Modeling (HLM) statistical software. The number of locations, number of sites, and number of individuals were selected to optimize the statistical power and generalizability of the results. At each location, we randomly sampled individuals and then monitored their behavior as they moved through the site. Separate observation protocols were developed for monitoring the behavior of smokers and for observations of general littering behaviors.

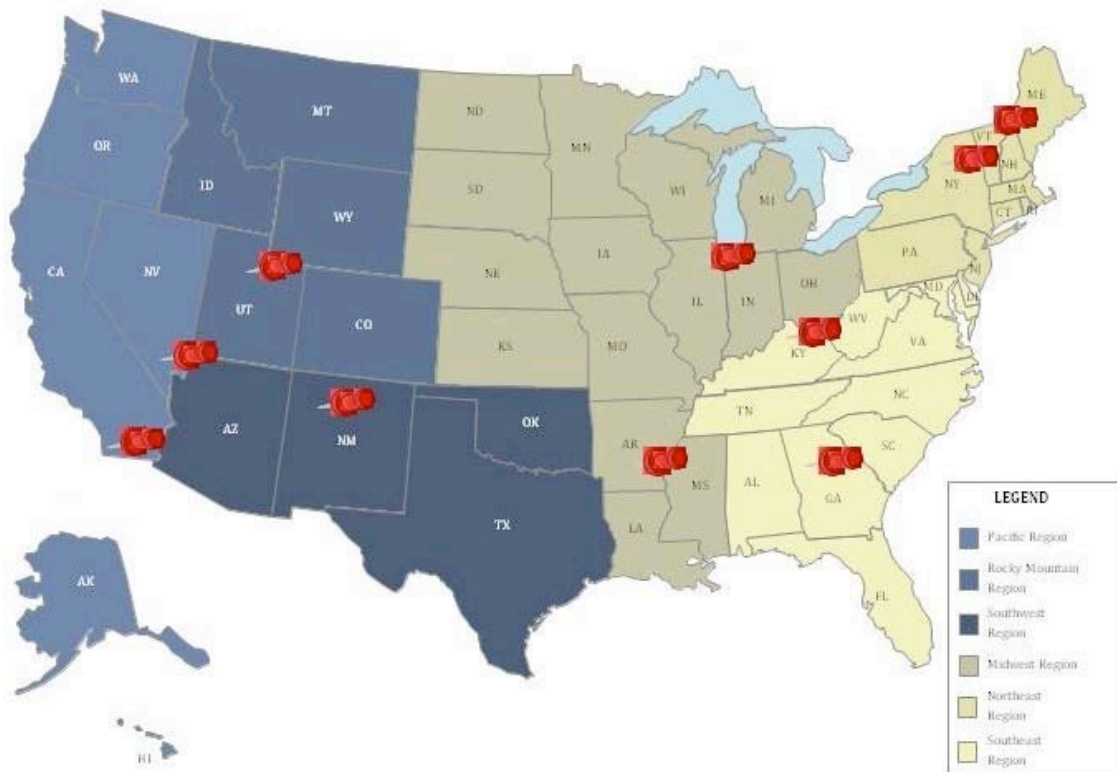
### METHODS

#### Site Selection

The specific sites selected for the observational research component were the result of a stratified sampling procedure. We began by sampling regions of the country, states, cities, types of sites, and finally specific locations and addresses.

*State:* A total of 10 states were selected from across the continental United States: Arkansas, California, Georgia, Illinois, Kentucky, Nevada, New Mexico, New York, Utah, and Vermont. The states were selected to represent a variety of regions, as well as states with varying levels of tobacco use (see Figure 1). Adult tobacco use prevalence data was gathered from the Centers for Disease Control and Prevention (<http://apps.nccd.cdc.gov/brfss>) and we sampled both high-prevalence (e.g., Kentucky) and low-prevalence (e.g., Utah) states. The final selection of states represented a diverse range of the country's population.

**Figure 1: Map of Site Locations**



*City:* A total of 30 cities were selected from across the 10 states. Three cities were selected in each state in order to represent urban, suburban, and rural areas. The selection of the three cities within each state was made based upon population density data obtained from the U.S. Census, proximity to primary transportation points, as well as logistical and situational constraints (e.g., distance between cities). See Table 21 in Appendix A for a complete list of states, cities, and sites.

*Sites:* There were five site types for the general litter observations (fast food, recreation, gas stations, city centers, and rest stops), and four site types for the focused cigarette litter observations (medical/hospital, bars/restaurants, retail, and recreation). The site types were chosen in cooperation with KAB to represent critical litter source areas, as well as for their potential to provide opportunities for studying human behavior. At the initial selection, each city had an equal opportunity of being assigned to any one site type. For both the cigarette litter and general litter observation sites, a fully crossed design was used to represent all of the possible combinations of city and site, and each possible combination was treated as a site. The target research sites were then randomly selected from the list of all possible combinations. An initial target of 70 sites was selected for general

litter observations, and 30 sites for cigarette litter observations. Due to logistics and practical considerations, the final dataset included 130 locations across the U.S.: 86 general litter and 44 focused on cigarette disposals. Of the total number of sites, there were 30 recreational locations, 24 city centers, 22 fast food restaurants, 12 retail stores, 12 bars or restaurants, 11 gas stations with convenience stores, 11 rest stops, and 8 medical hospitals.

*Locations:* With the exception of city centers and rest stops, the exact site locations were chosen using information from [www.areaguides.net](http://www.areaguides.net) and a random selection method. For example, for gas station sites, a list of all retail gas locations in the selected city was generated, and from that list the site was chosen randomly (along with several back-ups). Using a random selection procedure at the site location level eliminated potential bias by ensuring that locations were not selected because of convenience or ease of access by the field research team. All locations were selected prior to traveling to the observation area. The field research team traveled with the randomized list of all locations to allow them to move to the next location on the list if for some reason the first location did not meet the criteria specified in the observation guidelines. Observations were conducting during the day and evening hours.

## Observation Protocol

Systematic observations were made of the individuals in each site following a strict research protocol. The protocol included detailed procedures for defining the physical boundaries of the observation area, random selection of individuals, location description information, and behavioral observations. Appendix B provides a more detailed description of the materials used, and the basic protocol is outlined below.

- 1. Defining of Physical Boundaries:** Once the field research team arrived at the selected location, the physical boundaries of the observation area were defined. Individuals were randomly sampled and observed within the defined physical boundaries. Once the individual exited this boundary, they were said to have “left site” and the observation was terminated.
- 2. Location Description Worksheets:** Location description worksheets were completed in order to characterize the physical surrounding, and to allow for analyses of the degree to which particular site characteristics influenced the disposal behaviors. Included in this worksheet were measurements of:
  - **Physical Aspects:** These included weather, temperature, time of observation period, information about the presence and physical characteristics of trash receptacles (including how full and type), recycling bins, and ash receptacles at the location. In addition,

information about the presence of litter and cigarette butts at a given location, and the presence of planters and their littered condition was also noted. At the end of each observation period, observers coded the highest and lowest number of people at the site, and minimum and maximum crowdedness during the observation period.

- **Livability:** An important aspect of the location description worksheet was the section on the physical appearance of the site. In this we compiled a livability quotient, which included information about the site's cleanliness, walkability, landscaping, and infrastructure. Each aspect was rated on a scale of 0 to 10, with 10 being the best in that category.
- **Signage and Enforcement:** Information regarding the presence of anti-littering and anti-smoking signage and enforcements were noted.
- **Sketch and Pictures:** A sketch of each location was created and pictures were taken of each location. Pictures of each location are provided on a CD accompanying this report.

Prior to conducting our observations, the team underwent extensive training, and a variety of strategies were used to ensure reliable and valid data coding.

**3. Behavioral Observations:** Behavioral observations were conducted at each site during the observation period. Observations generally began in the morning, and lasted until the day ended, or until the target number of observations were reached at the site. Observations included:

- **General Litter:** All ages of individuals were observed in the general litter observations. Individuals were observed until they disposed of an item or left the observation field. During these observations, we coded whether the individual disposed of an item, and if so whether the disposal was proper or improper. During the observations, notations were also made regarding demographic characteristics of the individuals (e.g., approximate age and gender). Other individual-level characteristics such as presence of other group members and proximity to trash receptacles were also coded.
- **Cigarette Butt Litter:** Only smokers over the age of 21 were included in the observations. Smokers were observed in order to better understand how often and under what conditions they litter cigarette butts. Smokers were observed until the cigarette was disposed or they left the observation field with the cigarette. Individual and group dynamics were recorded. From these observations, disposals were coded as proper or improper. During the observations, notations were made regarding their approximate age and gender.

**4. Randomization:** Throughout the observational period, researchers assessed the flow of traffic (i.e., number of people) at the site and chose an appropriate randomization sequence to obtain a representative sample of individuals. Randomization was achieved by selecting the  $N^{\text{th}}$  person, with  $N$  based on the flow of traffic and ranged from observing every person ( $N=1$ ) to observing every sixth person ( $N=6$ ). Random selection of individuals at each site is a key aspect of our research protocol, and one that allows us to calculate a littering rate for each site, and to estimate the littering rate nationally.<sup>1</sup> The strength of this element should not be underestimated, and teams considering a similar study of littering behavior are strongly advised to implement random sampling techniques (rather than simply finding and recording “disposers”).

## RESULTS

### Observation Sites

The observation sites represent a large and diverse sample of locations across the country. Observations were conducted at 130 locations across the country: 86 general litter and 44 observations of smokers. Of the total number of sites, there were 30 recreational locations, 24 city centers, 22 fast food restaurants, 12 retail stores, 12 bar or restaurants, 11 gas stations with convenience stores, 11 rest stops, and 8 medical hospitals. Note that this number exceeded our target sample of 100 for a variety of reasons (e.g., in some locations the target of 30 observations was reached quickly and the team was able to visit a second site in the same city, in some locations the flow of traffic was too slow and after a few observations the team chose to move to the next randomly selected site). Forty sites were rural, 45 sites were suburban, and 45 sites were urban. The weather at these locations during the observations was mostly sunny (34%), or cloudy (partly cloudy = 26%; mostly cloudy = 14%, and cloudy = 16%), with the mean temperature of 71 degrees F. Only 4% of the locations had some form of rain (light showers = 2%; heavy showers = 2%). At 3% of the locations it was windy and at 1% of the locations there was light snow.

At 118 of these locations (91%) there was at least one trash receptacle (trash can, trash can / ashtray combination, ashtray, dumpster, recycling bin). On average the receptacles were 45 feet apart ( $SD = 44.22$ ). Table 1 shows the type and number of trash receptacles noted at the locations. Because most sites contained more than one type of receptacle, the total sums to more than 130.

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<sup>1</sup> Note that our estimates for national-level littering rates must be qualified by the fact that we did not randomly select locations across the country. Thus our estimated littering rates apply only to the eight types of locations we observed.

**Table 1: Types and Number of Trash Receptacles at Locations**

	Number of receptacles at location					Total Sites
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5+</u>	
Trash Can, Uncovered (no lid)	18	17	11	8	10	64
Trash Can, Covered (with lid)	22	5	6	8	17	58
Trash Can/Ashtray Combo	6	6	1	1	4	18
Ashtray Only	24	11	3	2	3	43
Dumpster(s)	8	4	-	-	-	12
Recycling Bin(s)	3	9	1	3	-	16

The research team rated the extent to which each location was littered, on a scale from 0 (not at all littered) to 10 (extremely littered). The existing KAB Litter Index uses a 4-point scale, but our goal here was to allow for a more refined analysis. The team also counted and coded the type of litter in each location. Only two sites had no litter. The top items found were: cigarette butts ( $N = 106$  sites), paper ( $N = 87$  sites), and food wrappers ( $N = 58$  sites). Table 2 shows the number of sites with various types of litter. Table 3 shows the location of the litter at each location. Again, the total exceeds 130 because many of the sites contained more than one type of litter.

**Table 2. Number of Sites with Existing Litter by Type**

	Frequency	Percentage
Cigarette Butts	106	82%
Paper	87	67%
Food Wrappers	58	45%
Confections	44	34%
Napkin/Tissue	44	34%
Misc. Plastic	43	33%
Food Remnants	31	24%
Beverage Cup	21	16%
Beverage Bottle: Plastic	14	11%
Food Containers	12	9%
Plastic Bags	11	8%
Beverage Can	8	6%
Beverage Bottle: Glass	6	5%
Yard Waste	6	5%
Other	35	27%

**Table 3. Frequencies of Where General Litter was Littered in Observation Locations**

	Sites	Percentage
Ground	121	93%
Bushes/Shrubbery	49	38%
On or around trash receptacles	31	24%
Planters	19	15%
Other	10	8%

The research team also rated and counted the number of cigarette butts. When rated on a scale of 0 (not at all littered) to 10 (extremely littered), the average site was rated at 3.48 ( $SD = 2.61$ ). When littered cigarette butts were counted, the average site had 69 cigarette butts ( $SD = 138$ ) within the observation field, with one site having more than 1,000 littered cigarette butts. When examining where the cigarette butts were littered in these locations, 110 locations had cigarette butts littered on the ground. Table 4 shows the frequency of where the cigarette butts were littered at the observation locations.

**Table 4. Frequencies of Where Cigarette Butts were Littered in Observation Locations**

	Frequency	Percentage
Ground	110	85%
Bushes/Shrubbery	48	37%
On or around trash receptacles	32	25%
Planters	20	15%
Other	6	5%

The number of planters in a site ranged from 0 to 40, with the average site having 2.10 planters in its location. When the type of litter that was in these planters was noted, 10 sites had no litter in their planters. However, the most frequent type of litter in the planters was cigarette butts, with 21 locations having planters littered with cigarette butts.

The physical appearance of each location was also measured. Using a compiled metric, sites ranged from 2.5 to 10 on a scale from 0 (no beautification) to 10 (extreme beautification), with the average site rating of 6.41 ( $SD = 1.76$ ).

The number of people in the locations was also noted at both the lowest and highest points during the observation period. Crowdedness was also rated on a scale of 0 (not at all crowded) to 10 (extremely crowded). At the beginning of the observation period, the average crowdedness of a location was 1.21 ( $SD = 1.73$ ) and at the peak, the average crowdedness of a location was 4.99 ( $SD = 2.39$ ).



## General Litter Observations

Observations were made at 86 sites, across 10 states. Of these, there were 23 city centers, 22 fast food restaurants, 19 recreational sites, 11 rest stops, and 11 gas stations with convenience stores. A total of 8,990 observations were made, with 33% from rural areas, 34% from suburban areas, and 33% from urban areas. Twenty-seven percent of the observations were made in the morning before 11:59 a.m., 58% were made in the afternoon between the hours of 12:00 p.m. and 3:59 p.m., and 16% were made in the evenings between the hours of 4:00 p.m. and 7:59 p.m. The number of sites and observations is shown in Table 5.

**Table 5. Number of Observations across Sites**

	General Sites	General Observations	Cigarette Sites	Cigarette Observations
Recreational Sites	19	1206	11	82
City Center	23	2648	1	30
Fast Food	22	2294		
Bars and Restaurants			12	97
Retail			12	354
Rest Stops	11	1398		
Gas Stations	11	1444		
Medical/Hospital			8	204
<b>TOTALS</b>	<b>86 Sites</b>	<b>8990 Observations</b>	<b>44 Sites</b>	<b>767 Observations</b>

Fifty-six percent of those observed were male and 44% were female. Observed ages ranged from 1 to 82 years ( $M = 37.92$ ,  $SD = 15.97$ ), and 50% of those observed were in a group.

Of the 8,990 people who were observed, 2,472 left the site with no object (28%), 4,534 left site with an object (50%), and 1,962 disposed of an object (22%) while on site. Twenty two of the observations were not codable (e.g., the observer was unable to see the behavior). Across the full number of general observations, there were 342 observed instances of littering. Of all individuals observed ( $N = 8,990$ ) in the selected locations, 4% littered. Among the sample of individuals who disposed of an item ( $N=1,962$ ), 17% disposed improperly.

*Disposals.* Among the 1,962 observed disposal behaviors, the most frequently disposed items were: cigarette butts ( $N = 340$ ), combo/mixed trash ( $N = 337$ ), and paper ( $N = 271$ ). Table 6 shows the types and frequencies of the objects disposed. In terms of percentage, cigarette butts (57%), food remnants (20%), and food wrappers (14%) were the most frequently improperly disposed. Included in the

“other” category were several low frequency disposals, including: pet waste, confections, matches, diapers, straws, chewing tobacco, and product packaging.

**Table 6. Type and Frequency of Disposed Objects**

	<u>Proper</u>	<u>Improper</u>	<u>% Littered</u>
Cigarette Butt	146	194	57%
Combo/Mixed Trash	325	12	4%
Paper	251	20	7%
Beverage Cup	180	5	3%
Napkin/Tissue	110	9	8%
Beverage Bottle: Plastic	100	5	5%
Food Remnants	65	16	20%
Food Wrapper	85	14	14%
Beverage Can	59	8	12%
Food Container	57	1	2%
Plastic Bag	38	2	5%
Beverage Bottle: Glass	11	0	0%
Unknown	116	10	8%
Other	77	46	37%
<b>TOTAL</b>	<b>1,620</b>	<b>342</b>	<b>17%</b>

With regard to method of disposal, using a trash receptacle was the dominant method ( $N=1180$ ), followed by littering on the ground ( $N=287$ ), pocketing ( $N=176$ ), and handing the item off to someone else ( $N=120$ ). The categorization of all disposals is shown in Table 7, along with the frequency and percentage of disposals.

**Table 7. Frequencies of Disposal Methods for General Litter**

	Frequency	Percentage
Trash Receptacle	1180	60%
Ground†	287	15%
Pocketed	176	9%
Handoff	120	6%
Ashtray	113	6%
Recycling Bin: Correct	20	1%
On/Around Trash Receptacle†	14	1%
Left on Table, Bench, or Ledge†	17	1%
Bushes/Shrubbery†	10	1%
Other improper†	4	<1%
Planter†	8	<1%
Separated (trash / recycle)	7	<1%
Waterway (river or lake) †	2	<1%
Recycling Bin: Incorrect	2	<1%
Other proper	2	<1%
<b>TOTAL</b>	<b>1962</b>	<b>100%</b>

† Designates methods coded as improper

*Littering.* Of the 1,962 observed disposals, 342 were coded as acts of littering. Each act of littering was classified as to the type of material and to the strategy of litter. The most frequently littered items were cigarette butts ( $N=198$ ), followed by paper or napkins (41 and 14 respectively,  $N=55$ ), food remnants or wrappers ( $N=39$ ), and beverage cups or cans ( $N=37$ ).

The litter strategy was coded using an adaptation of the categories developed by a prior study in Australia (Williams, Curnow, & Streker, 1997):

- Drop with intent—the person subtly dropped the item on the ground, but with notable intent to litter. We dubbed this group “Dirty Droppers.”
- Flagrant flingers: blatant littering of objects out in the open without attempt to conceal their actions.
- Inch away: “inchers place their litter beside them and slowly inch away from it until they no longer be identified as the litterer.”
- Foul shooters aim to discard their item in a receptacle, but after missing leave the object on the ground.
- Wedgers are individuals who “stuff disposable objects into small spaces where they will not be seen.
- Sweepers collect their litter by brushing it off a flat surface into their hand or a bag, but in the process drop items on the ground.

- 90%ers dispose of the large conspicuous items, but leave behind as litter the smaller less visible objects.

When items were littered, drop with intent was the most frequently used strategy ( $N = 183, 54\%$ ), followed by flagrant flicking ( $N = 68, 20\%$ ), and 12% drop by accident. Drop with intent includes spitting, confections, and items intentionally left behind. Drop without intent includes items that left behind with no noticeable intent, and items that the person dropped without any observed recognition. Combined, we find that 81% of observed littering acts occurred with notable intent. Table 8 shows the frequency of litter strategies used.

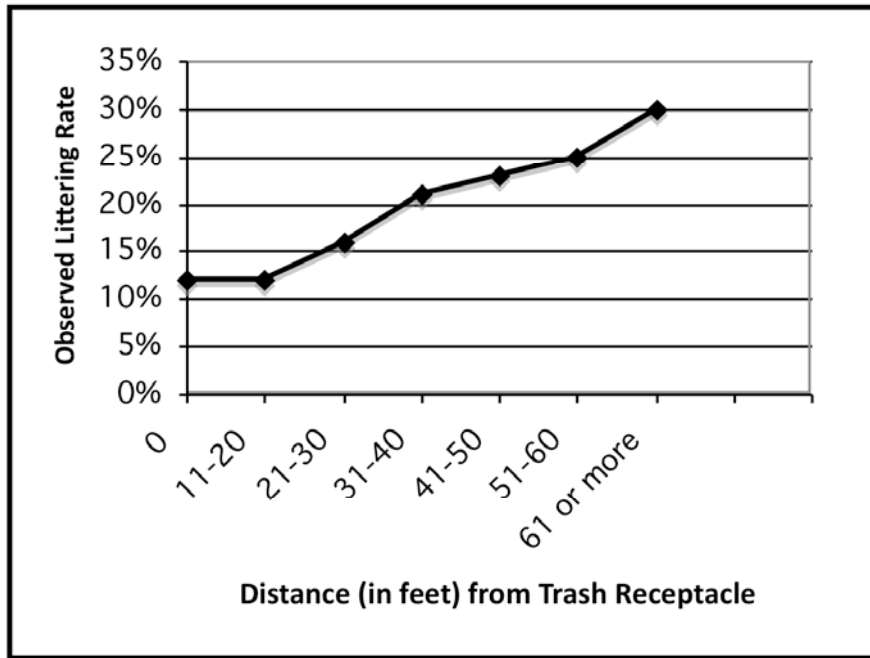
**Table 8. Frequencies of Litter Disposal Strategies for General Litter**

	<u>Frequency</u>	<u>Percentage</u>
Drop: Intent †	183	54%
Flick/Fling †	68	20%
Drop: No Intent	42	12%
Shoot & Miss †	8	2%
Placed item on table, bench, or ledge †	21	6%
Inch Away †	8	2%
Wedge †	4	1%
Sweep †	3	<1%
90%ers †	2	<1%
Blew away	3	<1%
<b>TOTAL</b>	<b>342</b>	<b>100%</b>

*Note: † designates littering that occurred with notable “intent.”*

The observation team also coded the distance (in feet) from the disposer to the nearest receptacle (trash, recycling, or ashtray). While there were several instances of littering that occurred immediately adjacent to a receptacle, most littering occurred at a considerable distance from a receptacle. At the time of improper disposal, the average estimated distance to the nearest receptacle was 29 feet. As shown in Figure 2 (below), the observed littering rate when a receptacle was 10 feet or closer was only 12%, and the likelihood of littering increased steadily for receptacles at a greater distance. For receptacles that were more than 60 feet away, the littering rate remained relatively stable at 30%.

**Figure 2: Observed Littering Rate by Distance to Receptacle**



### Understanding General Littering Behavior

A series of statistical analyses were conducted to examine the individual and contextual variables that are predictive of littering. The primary analysis was conducted using Hierarchical Linear Modeling (HLM), in which the individual was treated as Level 1 (gender, age, in a group), and the site characteristics were analyzed as Level 2 (e.g., presence of receptacles, presence of litter, physical appearance, rural/urban/suburban location, signage/litter enforcement). The analysis was conducted using only data from observations where a disposal occurred ( $N = 1,962$ ).

The initial “null” model showed that the overall litter rate was .17. Across the 1,962 individuals ( $\sigma = .12$ ,  $Z = 30.66$ ,  $p < .01$ ) and the 86 locations ( $\tau_{00} = .022$ ,  $Z = 5.71$ ,  $p < .01$ ), there was considerable variability in the litter rate. The IntraClass Correlation coefficient (ICC) was .15. This statistic is directly interpretable and it indicates that 15% of the variance in littering behavior results from contextual variables, while 85% results from individual variability. This finding shows that on a national level, the large majority (85%) of littering behavior results from individual-level variables. Some examples of individual-level variables include lack of awareness, lack of concern, or lack of motivation, among others. This is not say that physical context does not matter, and in fact our results show that 15% of the

variance in observed littering behavior was due to some aspect of the context (e.g., existing litter, lack of convenient receptacles, etc).

Our second set of analyses focused on individual-level predictors of littering behavior: age, gender, and whether the individual was in a group. Age showed a negative linear trend, with the highest littering rate (26%) found for young adults (age 18-29). For adults 30 and older, the littering rate remained steady at ~15%. Children and adolescents (younger than 18) had a littering rate of 13%. While gender was not statistically significant, there was a trend for men (21%) to litter more than women (15%). Given the historical interest in gender as a predictor of littering, we explored the gender effect in more depth. While there was not an overall effect for gender in the hierarchical linear model, males were more likely to litter with intent than females (particularly flick/flip).

No other individual-level variables were predictive of littering. However, the variability in the Level-1 equation remained statistically significant, indicating that other variables are required to fully explain individual variability in littering. We explore this issue in more detail using intercept surveys and a national telephone survey (see below).

Using the hierarchical structure of our data, we proceeded to analyze the contextual predictors of littering behavior. We examined 10 predictor variables:

- temperature,
- time of day,
- availability and number of receptacles (trash, ashtray, or recycling),
- amount of litter present,
- physical appearance of the area,
- posted signage about litter,
- number of other people in the location,
- weather,
- location type (rural, urban, suburban),
- and site type (e.g, city center, fast food).

At the simple bivariate level, several of these variables were significant predictors of littering behavior. However, when the clustered nature of the data was taken into account statistically, along with the overlap of the predictors (for example, physical appearance was generally correlated with lower amounts of existing litter  $r = -.40$  and with more trash receptacles =  $.30$ ), only two variables emerged as uniquely and statistically significant predictors: availability of disposal receptacles, and amount of litter present.

The first was the availability of and number of disposal receptacles. As part of our site observations, the team counted the number of receptacles (trash, recycling, cigarette, dumpster), along with the distance from the person at the time of disposal. The average was 5.8 bins per location, with a range from 0 to 19. The analysis for presence of receptacles revealed an intuitive finding that when no receptacle is present, any disposal is an improper disposal (e.g., a 100% littering rate). But more relevant to the current research questions, the statistical analysis showed that locations with more receptacles had a lower littering rate ( $\gamma = -.01, p < .05$ ). This statistical coefficient can be interpreted directly, such that for every added trash receptacle, the littering rate decreased by 1% (from the overall rate of 17%).

The second statistically significant predictor of littering behavior was the presence of litter in the site. Locations with more litter were associated with a higher littering rate. The statistical analyses showed that the presence of existing litter (both counted and rated by the observers on a scale from 0-10) was predictive of littering behavior ( $\gamma = .02, p < .001$  for the objective counts).

None of the other contextual predictors were statistically significant. However, there was a trend toward greater littering in urban (23%), compared to suburban (18%), and rural (15%) locations.

## Conclusions

The results from the statistical analyses of the general litter observations support a number of interesting conclusions. Of all the disposals that we observed at 86 locations across the country, 17% were improper. This is a strikingly high number, and despite the strong norm favoring proper disposal that has emerged over the past 40 years (see phone survey below), the rate of littering remains relatively high. Importantly, this littering rate is generated from a random sample of individuals across a range of different locations, and not just a few isolated observations. When analyzed using the total number of individuals that we observed (8,990) we find that 4% litter. While low, this is still a striking number—4% of *ALL* individuals that we observed in diverse locations across the country, littered.

A second important finding pertains to the variability in littering behavior. While a large volume of data has been collected about litter and littering over the years, none has afforded the opportunity to simultaneously test the degree to which it is affected by personal and contextual variables. Our findings indicate that 15% of littering acts result from contextual variables, and 85% result from personal qualities. This finding is particularly instructive, because it indicates that given the same infrastructure and opportunities to properly dispose, individuals will vary tremendously. Note that if the trend had been reversed, such that 85% of the

variance was due to the situation, it would indicate that while individuals vary across settings, within a setting they act similarly (e.g., littering or not).

Finally, the results from our statistical analyses of littering behavior identified only a couple of significant predictors. Interestingly, gender was not a significant predictor of littering behavior. This finding runs contrary to prior data showing that men are more likely to litter than women. Given the observational nature of the current data, we tend to favor the explanation that men are more likely to *report* littering, but in reality men and women are equally likely to do it. At the individual level, we did find good evidence that age is negatively related to littering, with young adults more likely to litter than persons 30 and over.

At the level of the location, presence of trash receptacles and amount of litter present were significant predictors of littering behavior. It's tempting to ask about the "optimal" number of receptacles in a location. While our data do not speak directly to this issue, we do have evidence that the lowest littering rate occurs when receptacles are available and close at hand. Indeed, the littering rate was only 12% of disposals that occurred within 10 feet of a receptacle, compared with a 30% littering rate for disposals more than 60 feet.

### Cigarette Litter Observations

In an effort to expand upon our general litter observations, the Action Research team conducted a smaller sample of observations focused on smokers. Note that these observations were conducted in addition to the smokers captured as part of the general litter observations reported in the prior section. As shown in Table 21 (Appendix A), smoker observations were conducted at 44 locations, of four site types: recreation (11 sites), bar/restaurant (12 sites), retail (12 sites), and medical/hospital (8 sites). The team also made one unplanned set of cigarette observations at a city center. As with our general litter observations, the study was designed as a hierarchical multilevel model, and observations were conducted using a detailed protocol.

Smokers were randomly selected within each location, to ensure a representative sample. A total of 767 observations were made of smokers. One hundred and twenty-seven observations were conducted in a rural area (17%), 230 observations were conducted in a suburban area (30%), and 410 observations were conducted in an urban area (54%). Two hundred and fourteen observations (28%) were conducted in the morning, before 12:00 p.m., 435 observations (56%) were conducted in the afternoon between the hours of 12:00 p.m. and 3:59 p.m., 112 observations (15%) were conducted in the evening between the hours of 4:00 p.m. and 7:59 p.m., and 6 observations (1%) were conducted at night after the hour of 8:00 p.m.



There were 412 males and 344 females, ranging in observed age from 21 to 72 ( $M = 40.64$ ,  $SD = 13.00$ ; 11 not coded). When disposing, the sample was fairly evenly split between being in a group ( $N = 367$ ) or alone ( $N = 391$ ). Groups ranged in size from 2 to 21, with the most frequent groups being groups of two ( $N = 205$ ), three ( $N = 79$ ), and four ( $N = 46$ ). Nine were not codable.

Of the 767 individuals that were observed, 206 left the site still smoking and 31 were not codable (observers could not determine what happened to the cigarette butt); 187 properly disposed of the butt; and 343 improperly disposed. This resulted in a littering rate of 65%, slightly higher than the 58% rate found in the general litter observations.

The most frequent method of disposal was to place the cigarette butt on the ground ( $N = 303$ ), followed by leaving the site with an unfinished cigarette ( $N = 206$ ), or placing it in an ashtray ( $N = 119$ ). Table 9 shows the frequency of disposal method type used for cigarette butt litter.

**Table 9. Frequencies of Disposal Methods for Cigarette Butt Litter**

	Frequency	Percentage
Ground †	303	40%
Left Site with Cigarette	206	27%
Ashtray	119	15%
Trash Can	31	4%
Unknown/Unseen	31	4%
Pocketed	18	2%
Other †	16	2%
Recycling Bin	16	2%
Planter †	12	1%
Bushes/Shrubbery †	7	1%
On/Around Trash Receptacle †	5	1%
Field Strip	3	1%
<b>TOTAL</b>	<b>767</b>	<b>100%</b>

Note: † designates disposals coded as littering.

When items were littered on the ground, drop with intent was the most frequently used strategy ( $N = 122$ ), followed by flick/flip ( $N = 94$ ). Table 10 shows the frequency of litter strategies used.

**Table 10. Frequencies of Litter Disposal Strategies for Cigarette Butt Litter**

	Frequency	Percentage
Drop with Intent	122	35%
Flick/Fling	94	27%
Stomp	92	27%
Other	17	5%
Bury	9	3%
Wedge	6	2%
Shoot & Miss	3	1%
<b>TOTAL</b>	<b>343</b>	<b>100%</b>

At the start of each observation, the mean distance to the nearest trash receptacle was 31 feet ( $SD = 29$ ), and the mean distance to an ash receptacle was 30 feet ( $SD = 29$ ). At the time of disposal, improper disposers were an average of 31 feet from an ashtray.

### Understanding Cigarette Butt Littering

Our data analytic strategy followed the multi-level model, in which we examined both the individual and contextual variables that are predictive of littering. The analysis was conducted using Hierarchical Linear Modeling, in which the individual was treated as Level 1 (gender, age, in a group) and the site characteristics were analyzed as Level 2 (e.g., presence of ash receptacles, presence of litter, physical appearance, rural/urban/suburban location, signage). The analysis was conducted using the 530 observed cigarette disposals (187 proper disposals, 343 improper).

The initial “null” model showed that the overall litter rate was .66. Across the 530 individuals ( $\sigma = .135$ ,  $Z = 15.70$ ,  $p < .01$ ) and the 44 locations ( $\tau_{00} = .081$ ,  $Z = 3.65$ ,  $p < .01$ ), there was considerable variability in the littering rate. The Intra Class Correlation coefficient (ICC) was .38. This statistic is directly interpretable and it indicates that 38% of the variance in cigarette littering behavior results from contextual variables, while 62% results from individual variability. Examples of individual-level variables include awareness, concern, or motivation, and examples of contextual variables include presence of receptacles, convenience, or cleanliness of the area. The observed clustering effect (38%) is considerably higher than that observed for general littering behavior (15%), and it suggests that more structural-level interventions are needed for smokers (see analyses below, and recommendations).

Following the null model, we proceeded to test for individual-level and site-level predictors of improper disposal. At the level of the individual, we tested gender, age, and being in a group. The only statistically significant effect was age, with younger smokers more likely to litter than older ( $\beta = -.01, p < .01$ ). For clarification, age was coded into demographic categories. The highest littering rates occurred for smokers in their 20s (.66,  $N = 150$ ) and 30s (.72,  $N = 123$ ), compared to smokers in their 40s (.58), 50s (.66), or 60s (.50).

Pursuant to the hierarchical nature of our data, we proceeded to analyze the contextual predictors of littering behavior. We examined nine predictor variables:

- physical appearance,
- presence of signage about litter,
- temperature,
- time of day,
- availability of ash receptacles (total number of ash receptacles in the location),
- amount of litter present (any type, not just cigarette),
- weather,
- location type (rural, urban, suburban),
- and site type (e.g, city center, fast food).

While the simple bivariate relationships revealed a number of significant correlations, the multilevel model identified three uniquely predictive variables: location, existing litter, and presence of ash receptacles. One of the strongest predictors of cigarette littering was the number of ash receptacles ( $\gamma = -.09, p < .01$ ). The parameter estimate from the analysis is directly interpretable and indicates that for every added ash receptacle, the littering rate for cigarette butts decreased by 9% (from the initial base littering rate of 65%).

A second predictor of cigarette littering was the amount of existing litter ( $\gamma = .06, p = .03$ ). More littered environments attracted more littering. This finding occurred for both rated amount of litter (on a 0-10 scale) and counted litter. In addition, the results showed that the type of existing litter was not related to cigarette littering behavior. That is, the presence of existing litter was predictive of littering behavior, but the type was irrelevant. Smokers were more likely to litter if the context contained any type of litter, not just cigarette butts.

Finally, the third predictor of cigarette litter was location type. Retail locations were associated with the lowest littering rate (.58), followed by city centers (.58). Bars and restaurants were third (.62), while recreational (.74), and medical/hospital sites (.75) had the highest littering rates. However it's important to point out that while the differences were statistically significant, the overall littering rate was quite high—more than 50% of all smokers that we observed littered, regardless of

location.

## Conclusions

The results for the smoking observations support several interesting conclusions. First, the overall littering rate for cigarette butts was 65%. That is, across 44 locations and 767 observed smokers, 65% of the cigarette disposals were improper. Consistent with this high rate of improper disposal was the finding that cigarette butts were the most frequently observed item of existing litter when our research team canvassed the sites prior to observation (see Table 3). And that among the 130 sites we visited across the country, the average site contained 69 littered butts.

A second notable finding was the high degree of consistency of individuals across sites. When we statistically analyzed the data, we found that 38% of cigarette butt littering was associated with the context, while 63% was attributable to individual sources. This suggests that cigarette butt disposal was more of a product of the situation, than was general littering (where the ICC was 15%). The finding has important implications for litter prevention strategies, and it suggests that both structural and motivational approaches are needed. At the structural level, decreasing the amount of existing litter and increasing the availability of ash receptacles emerged as key contextual predictors of littering. In addition, individual-level messages and activities that promote a personal obligation not to litter are important for targeting the motivational side of the equation.

Consistent with this finding, our statistical analyses revealed several meaningful predictors of cigarette butt littering. As with the general littering observations, littering was not related to gender, and men and women were equally likely to litter cigarette butts. And also consistent with our general litter observations, age was negatively related to littering, such that younger adults were more likely to litter than older adults. In addition to these individual-level predictors of littering, we also examined the site-level predictors. Here we found two important predictors of littering. While our initial univariate statistics revealed differences in littering rate by locations (e.g., more littering at medical and recreational sites, and less at retail and city centers), these differences were entirely explained by two aspects of the site: existence and number of ash receptacles, and the amount of existing litter. Note that the significant effect here is for ash receptacle and not *any* receptacle. That is, the presence of trashcans or recycling containers did not reduce the rate of cigarette butt littering. It was only the presence of ash receptacles, either as stand-alone, or integrated into a trashcan, that correlated with lower rates of cigarette butt littering.

# PART III: INTERCEPT INTERVIEWS

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## INTRODUCTION

In the second part of our research project, we conducted intercept surveys at randomly selected observation sites. The purpose of the intercept surveys was to enhance the results from the observations, allowing us to better understand the attitudes as well as the behaviors of individuals who litter. Our goal here is to report both the basic frequency and pattern of responses from the intercepts, and to examine the relationship between these variables and observed littering.

## METHODS

### Selection of Intercept Sites

The location of the intercept sites was determined at random and included both general litter and smoking sites. Our goal was to obtain a small, representative sample of individuals and to link the responses to our intercept interview to the observed disposal behaviors.

### Intercept Protocol

At each of the selected intercept locations, individuals were approached to take part in a face-to-face survey. For the intercept sites, the field research team members were defined as either observers or interviewers. Observers watched individuals within a specified boundary using the protocol summarized earlier in this document. Following the observation, the observer communicated with the interviewer, via a Bluetooth hands-free device, and described the person selected for the interview. The interviewer then approached the selected person to ask for participation in a short oral survey (less than four minutes) and individuals were offered \$5 in return for their participation. The interviewer did not know if the person of interest littered or did not litter. The interviewer asked the person a set of pre-determined questions, including demographic items and questions about litter behavior, adopted directly from the national telephone survey (reported below). See Appendix C for the full intercept survey used in this study.

## RESULTS

Our focus here is on the 102 interviews conducted in 15 general litter sites. Across the 15 sites, 196 individuals were randomly identified for an interview. Of the 196, 102 completed the survey, 58 left the site before contact could be made, and 36 refused to complete the interview (resulting in a 52% response rate, and 74% completion rate). Nineteen percent of the intercepts were conducted in a rural area, 46% were conducted in a suburban area, and 36% were conducted in an urban area. Fifty-five percent of participants were male and 45% were females. Ages of the participants ranged from 19 to 71 ( $M = 36$ ,  $SD = 13$ ).

When asked how important the issue of litter was in the given location, on a scale of 0 (not at all important) to 10 (extremely important), the average respondent said that it was very important ( $M = 8.27$ ,  $SD = 2.04$ ). When asked what percentage of people littered in this location, the responses ranged from 0 to 90%, with an average response of 40% ( $SD = 27.66$ ).

In the past year, 40% of respondents reported that they had seen or heard something about litter prevention, 41% had seen or heard something about scheduled community clean-up, 25% had seen or heard something discouraging cigarette butt litter, and 65% had seen or heard a message simply telling people 'do not litter.' For those respondents who had seen or heard any message, the most frequently reported place was on a public service announcement, commercial, or news report on the television. Table 11 shows the frequency of places where these messages were seen or heard.

**Table 11. Reported Location of Messaging**

	Frequency
PSA on the radio	5
PSA/Commercial/New Report on TV	21
Billboard	12
Newspaper	1
Community Flyer/Bulletin	1

When asked if they had littered in the past month, 57% of respondents reported that they had not littered. Of the 43% of respondents who reported that they did litter, the most frequently reported littered item was cigarette butts (19%). Table 12 shows the items reported to be littered by the respondents. The most frequently reported place to litter was on the street or in a parking lot. Interestingly, only three respondents explicitly reported that they had littered at the current location. Table 13 shows these reported places of littering.

**Table 12. Items Reported Littered**

	Frequency
Beverage Bottle: Plastic	1
Beverage Bottle: Glass	1
Beverage Can	3
Food Wrapper	8
Food Remnant	4
Cigarette Butt	21
Paper	5
Mixed Trash	1
Other	1

**Table 13. Respondent Reported Littering Locations**

	Frequency
Everywhere	1
Vehicle	1
Beach	1
Bus Stop	1
Other	3
Street/Parking Lot	21
N/A	2
Ground	2
Home	2
Park	3
School	1
Stairwell	1

Fifty-five percent of respondents reported that they smoked cigarettes. And, 77% of respondents reported that they thought cigarette butts were litter. When asked how they disposed of their cigarette butts when they were outside, an ashtray was the most commonly reported place of disposal.

**Table 14. Place of Disposal for Cigarette Butt Litter**

	Frequency
Pocketed	2
Trash can	8
Ashtray	26
Ground	7
Field Strip	5
Personal Ashtray	2
Cigarette Pack	1

Finally, personal anti-littering obligation was examined. The respondents were asked a series of five questions regarding the extent to which they felt a personal obligation to not litter. These five questions were averaged into a composite score, ranging from 0 (no personal obligation) to 10 (very high personal obligation). Most respondents reported having a high personal obligation to not litter ( $M = 8.61, SD = 1.90$ ).

### Linking Intercepts and Observations

Of the 102 respondents who completed the survey, 23 were observed to have littered (23%). Of these 23 observed litterers, 15 reported littering in the past month while 8 denied littering. That is, 35% of the individuals we spoke with denied littering in the past month, when in fact, we had just seen them do so. This figure is nearly identical to the findings from a similar study in Australia, where 37% of individuals observed littering denied littering in the past 24 hours. The finding suggests that relying on self report of littering behavior is problematic, and that there will be a general tendency to underreport the behavior.

In an effort to expand on our earlier analyses of observed littering, we conducted a regression analysis using the interview items to predict observed littering. In this analysis, we used five individual-level predictors (age, gender, personal obligation to not litter, attitudes about litter, and perceptions about the frequency that other people litter in this location). From this analysis, two variables emerged as important predictors of observed littering: age ( $beta = -.26, p=.01$ ), and personal obligation to not litter ( $beta = -.22, p=.02$ ).

Similar results were found from an analysis using self-reported littering behavior. Age was an even stronger predictor of self-reported littering ( $beta=-.40, p<.001$ ), with younger adults much more likely to report littering than older adults. In addition, a personal obligation to not litter was also significantly predictive ( $beta=-.24, p<.01$ ).





## PART IV: TELEPHONE SURVEY

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### INTRODUCTION

Although a great deal of research has been done on littering, very few studies have looked at self-reported littering habits on a national level. This telephone survey was developed in cooperation with Keep America Beautiful and is the first national-level litter survey in 40 years.

In the 1968 study, titled “Who Litters – and Why,” the results from two national surveys are reported. While the data and detailed results are lost to history, there were several broad findings that warrant comment. The results showed that despite high reported rates of littering, a large majority of the public saw littering as a problem, and supported laws and fines to reduce littering. Approximately 50% of the sample admitted to one or more littering practices, and littering was most common among young males. Thus this early research showed a marked gap between “awareness” and behavior, and the report concluded that:

*“the public believes there should be laws against this evil, and a majority believe that there should be greater enforcement of the laws. But the same person who describes a litterer as a “slob” and believes he should be arrested, still—in almost the next breath—say they themselves are guilty of littering.”*

The goal of the survey was to build on this early study, and to provide a research foundation for the *variables affecting littering behavior*. Items were created to measure littering behavior in conjunction with various environmental, demographic, and psychological factors. A thorough review of community and state-level surveys was conducted in order to include commonly used measures, where possible. In addition, we created unique measures for community livability and litter behavior by type and location.

The instrument is intended for use by KAB affiliates and community leaders when regional data are needed for monitoring or comparison. The results also provide baseline data for current programs, as well as foundations for the development of new programs. The telephone survey items can be found in Appendix D.

## METHODS

We collected 1,039 telephone interviews between May 29 and June 16, 2008. In an effort to obtain a representative sample, we employed a random-digit-dialing sampling method. Telephone numbers for all households nationwide had a non-zero chance of being selected. Using this method, listed and unlisted numbers were included in the sample. The only qualification for participation was that the respondent be eighteen years of age or older.

### Data

The sample was made up of 360 men (35%) and 679 women (65%). Respondent age ranged from 18 to 101, with a mean age of 54 years. Seven percent described themselves as Hispanic, 8% as Black or African American, and 81% as white. Over a third of the respondents reported being college graduates (38%), while 56% were high school graduates and 6% reported not graduating from high school. Over half of the respondents (55%) stated they currently work for pay. Eighteen percent (18%) of the respondents were classified as current smokers.

### Measures

The main objective of the analysis was to create a measure of self-reported littering behavior in order to identify the variables that are related to, as well as predict littering behavior. A series of analyses of variance (ANOVAs) were used to look at littering behavior across various grouped variables. The next step was to conduct a multiple regression analysis to look at the contribution of several predictor variables on self-reported littering. Scales were created in order to measure self-reported littering behavior, community livability, and personal norms against littering.

*KAB Littering Items.* Eight questions from the KAB 1968 telephone survey were included in this study. Respondents were asked if over the past month they had dropped, left behind, or thrown various materials (gum or candy wrappers, facial tissue, food or food wrappers, beer or soda cans or bottles, paper containers, newspaper, or paper or food remnants).

*Self-Reported Littering Behavior.* The majority of the analyses use a littering behavior scale created to understand the variables that affect littering behavior. Respondents were asked to rate the likelihood they would litter five different types of litter (apple core or banana peel, gum or candy wrapper, food container, gum, and cigarette butt), across three different location types (out a vehicle window, on the ground while walking to a vehicle or transit area, and on the ground when at a park

or outdoor area). All respondents were asked the twelve main questions (four litter types by three location types) and smokers received an additional three questions regarding cigarette butt disposal. The responses ranged from zero to ten, where zero equaled *not at all likely to litter* and ten equaled *very likely to litter*. The overall littering behavior scale was constructed by calculating the mean of the rating scores. The scores range from zero to ten, and higher scores represent more littering behavior.

Additionally, separate scales were constructed to represent each litter type and each location type. For example, the three questions that asked about the likelihood of dropping food containers (across the three location types) were averaged to create a food container scale. This gave us information about littering behavior across litter and locations types. For each scale, the range of scores was from zero to ten.

*Community Livability.* Community livability questions were constructed to examine the effects of clean, safe, and attractive community characteristics on littering behavior. Respondents were asked eight questions which measured various dimensions of the current state of their community. Although no standard scale exists to measure community livability, extensive research was done to ensure the scale included items that would reflect the full range of issues. The items measured community cleanliness, structural maintenance, walkability, safety, landscaping, and infrastructure. Each question consisted of four response categories and the ratings from each of the eight questions were averaged to produce a score—a livability quotient. The range of scores for the scale was from one to four, with higher scores indicating ratings of greater livability.

*Personal Norms.* Respondents were asked an abbreviated version of the Personal Norms Against Littering Scale (Kallgren, Reno, and Cialdini, 2000). This scale was used to measure the effect of personal norms on littering behavior. A set of five situational questions were asked to measure personal obligation not to litter. Ratings on the individual questions ranged from zero (*no personal obligation*) to ten (*a very strong personal obligation*). The ratings were averaged to provide each respondent with a personal obligation against littering score. Scores ranged from 0 to 10, with higher scores indicating a stronger personal obligation not to litter.

*Work Environment.* In order to understand the relationship between work environments and littering behavior, respondents who stated they currently worked for pay were asked if they worked in an indoor or outdoor environment and whether the area was designated smoke-free or not.

*Current Smokers.* Prevalence data from the Centers for Disease Control and Prevention (CDC) shows that in 2006, 20 percent of American adults were defined as cigarette smokers. Of particular interest in this research was cigarette butt littering habits of smokers. We used the CDC questions to identify respondents as current smokers. Respondents were asked if they had smoked at least 100

cigarettes in their entire life, and if so, if they currently smoked *all days, some days, or not at all*. Respondents who indicated they smoked *all days* or *some days* were defined as a current smoker. Current smokers were then asked a set of questions about cigarette butt disposal. They were asked whether they had receptacles at work or in their vehicle, and whether or not they owned a pocket ashtray.

*Litter Motivators and Barriers.* All respondents were given a set of six items regarding litter motivators and barriers. The statements were an attempt to understand some of the barriers and motivators to proper litter disposal. Respondents were asked to indicate the degree to which they agreed or disagreed with statements such as, *I am more likely to litter when the item I'm holding isn't recyclable*, and *I am more likely to litter when I am in a bad mood*. The response categories were: *strongly agree, agree, disagree, and strongly disagree*.

*Litter Importance and Messages.* Lastly, respondents were asked about the importance of the issue of litter in their town or city, and whether or not they had seen or heard any litter prevention messages in the past year. For those who stated they had seen or heard litter prevention messages, they were then asked the subject-matter (e.g., community clean-up or prevention) and where they saw or heard the messages (e.g., television, radio, billboard, or poster).

## RESULTS

### Litter Behavior

The survey contained two types of self-reported litter behavior questions. The first set consisted of eight dichotomous (yes – no) items adopted from the 1968 KAB survey of littering in America, which asked if the behavior had occurred in the past month. Table 15 shows the results. It's important to note that the frequencies and percentages reported in Table 15 are for the entire sample, and not just individuals who reported littering. Thus, the percentages shown in the Table reflect a generally low level of reported littering behavior.

**Table 15. Self-Reported Littering Behavior in the Past Month**

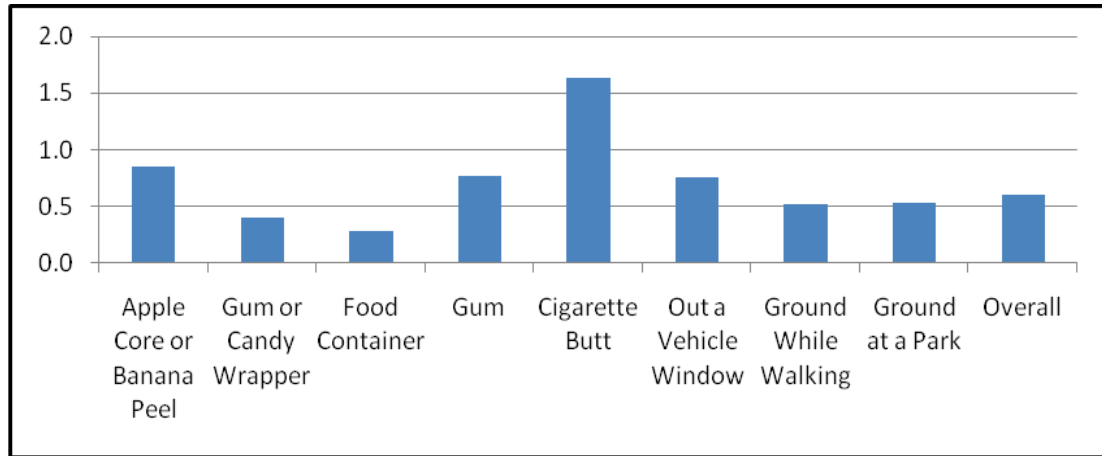
	Frequency	Percentage
Dropped Gum Wrappers on Ground	68	6.58%
Left Newspaper Behind	53	5.11%
Thrown Things Out of Car or Boat	42	4.05%
Dropped Food or Wrappers on Street	38	3.67%
Dropped Paper Containers on Ground	25	2.41%
Dropped Facial Tissue on Ground	14	1.35%
Left Paper or Food at Picnic Area	16	1.55%
Dropped Cans or Bottles Outdoors	9	0.87%

N = 1,039

Eighty-five percent of the respondents reported none of the listed littering behaviors in the past month ( $N=876$ ). Twelve percent reported participating in one or two behaviors ( $N=127$ ), while 2.5% reported participating in three or more behaviors ( $N=25$ ). The resulting data showed that the reported littering rate in 2008 was 15%, compared with a 50% littering rate in 1968.

The primary focus of our analyses was on the second measure of self-reported littering behavior. Respondents were asked the likelihood they would drop specific items (apple core or banana peel, gum or candy wrapper, food container, gum, and cigarette butt), across specific locations (out a vehicle window, on the ground while walking to a vehicle or transit area, and on the ground when at a park or outdoor area). The littering behavior scale provides us a combined measure of all the behaviors, as well as measures of behavior for the specific types of litter and at the specific locations. Figure 3 shows the mean scores for the overall litter behavior scale, the litter type scales, and the location type scales. The scale range is from zero to ten.

**Figure 3: Mean Litter Scores for Overall Litter Behavior, Litter Type, and Litter Location**



The mean score for the overall behavior was .61 ( $SD=1.45$ ), on a 10-point scale. Respondents reported the greatest likelihood of littering behavior with cigarette butts ( $M=1.63$ ,  $SD = 2.87$ ), apple cores and banana peels ( $M=.86$ ,  $SD = 1.98$ ). Respondents were twice as likely to report dropping a cigarette butt as an apple core or banana peel.

#### Litter Behavior and Community Livability

Analysis of variance was performed to identify group differences in littering behavior within each of the eight community livability variables. Table 16 shows frequencies for the responses, along with means and standard deviations for each of the community livability items.

**Table 16. Group Means of Littering Behavior by Community Livability**

<u>Item</u>	<u>Frequency</u>	<u>Mean Littering</u>	<u>SD</u>
<b>Visible Litter (QBI1)**</b>			
Virtually no visible litter	355	0.53	1.47
Upon careful inspection a small amount of litter is obvious	526	0.60	1.33
Visible litter can be seen throughout the area	130	0.67	1.49
Major illegal dumpsites are present	21	1.77	2.84
TOTAL	1032	0.61	1.45
<b>How Clean is Community (QBI2)*</b>			
Very clean	553	0.59	1.58
Somewhat clean	424	0.58	1.20
Not very clean	43	0.81	1.20
Not at all clean	8	2.15	3.67
TOTAL	1028	0.61	1.45
<b>Streets and Sidewalks Maintained (QBI3)</b>			
Very well maintained	509	0.57	1.48
Somewhat maintained	308	0.69	1.42
Not very well maintained	87	0.67	1.44
Not at all maintained	44	0.48	0.85
TOTAL	948	0.62	1.43
<b>Streets and Sidewalks Safe During Day (QBI4)**</b>			
Very safe	665	0.61	1.47
Somewhat safe	238	0.49	1.08
Somewhat unsafe	46	0.95	1.83
Very unsafe	20	1.74	2.78
TOTAL	969	0.62	1.46
<b>Streets and Sidewalks Inviting (QBI5)</b>			
Very inviting	455	0.60	1.56
Somewhat inviting	370	0.59	1.22
Somewhat uninviting	58	0.92	1.84
Very uninviting	54	0.75	1.23
TOTAL	937	0.63	1.44
<b>Number of Flowers, Plants, and Trees (QBI6)</b>			
There are a lot of flowers, plants, and trees	551	0.57	1.42
There are some flowers, plants, and trees	362	0.64	1.47
There are not many flowers, plants, and trees	85	0.68	1.43
There are no flowers, plants, and trees	29	0.75	1.98
TOTAL	1027	0.61	1.45
<b>Attractiveness of Flowers, Plants, and Trees (QBI7)*</b>			
They are very attractive	547	0.62	1.58
They are somewhat attractive	387	0.54	1.14
They are somewhat unattractive	57	0.67	1.04
They are very unattractive	26	1.44	2.76
TOTAL	1017	0.61	1.45



Attractiveness of Infrastructure (QBI8)*			
They are very attractive	316	0.60	1.49
They are somewhat attractive	486	0.58	1.38
They are somewhat unattractive	116	0.58	1.12
They are very unattractive	41	1.31	2.35
TOTAL	959	0.62	1.45

**Note:** Frequency = number of occurrences, Mean = average, SD = standard deviation.

\* differences significantly at the  $p < .05$  level, \*\* difference significant at the  $p < .01$  level

Significant differences were found for groups in all variables, except for the *streets and sidewalks are well-maintained for people who are walking* (QBI3), the *streets and sidewalks in your community are an inviting place for people to walk* (QBI5), and *the number of flowers, plants, and trees in your community* (QBI6). Participants were three times as likely to report littering behavior if they lived in communities with a major amount of litter (QBI1), than if they lived in communities with virtually no visible litter. Those who reported living in communities that were very clean and somewhat clean (QBI2) were much less likely to report littering behavior than those who lived in communities that were somewhat unclean and very unclean. The *safety of streets and sidewalks during daylight hours* (QBI4) also showed significant differences between groups. Those who reported living in somewhat unsafe and very unsafe communities reported significantly more littering behavior. Where respondents reported living in communities where flowers, plants, and trees (QBI7) were very unattractive, littering behavior was significantly greater than in the other three groups. The same pattern was true for the attractiveness of the infrastructure, things like benches, planters, street signs, and street lights (QBI8). Respondents who reported living in communities where the infrastructure was very unattractive, reported significantly higher rates of littering than for the other three groups.

## Conclusion

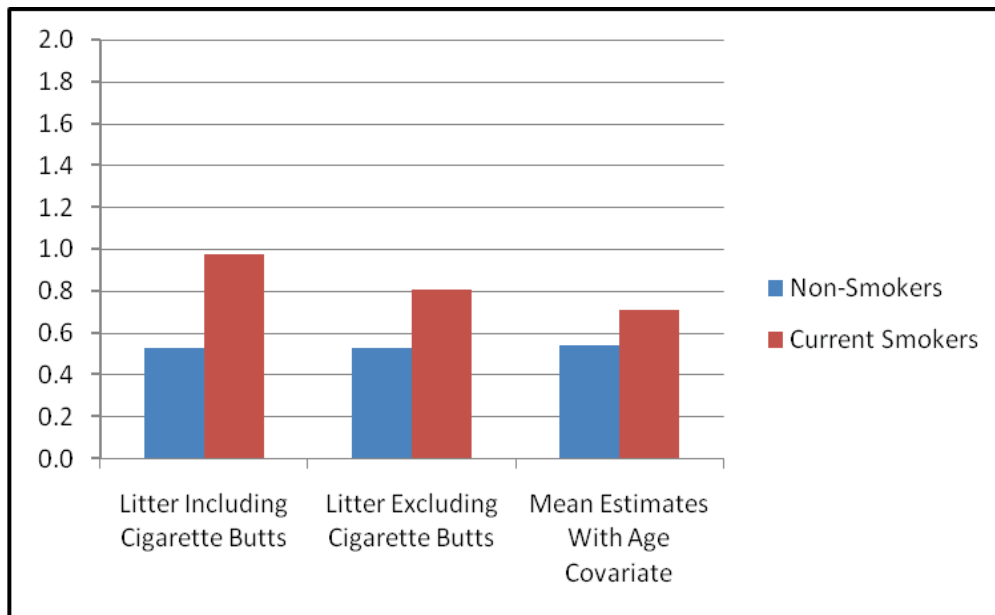
An overall pattern emerged between several dimensions of community livability and littering behavior. These data suggest that those living in communities where there is less visible litter, the community is clean, the streets and sidewalks are safe to walk during daylight hours, and the plants, as well as the infrastructure are attractive, are less likely to report littering behavior. Although this has been suggested in other literature, a standard instrument for measuring community livability does not yet exist. The results reported above underscore the relationship between community appearance and littering behavior.

## Litter Behavior and Cigarette Smokers

Current smokers comprised 18.4% of the sample ( $N=191$ ). Those current smokers who worked for pay ( $N=170$ ) were asked if their work location had receptacles for cigarette butts (QCD1); 41.8% stated their work location did not have receptacles for cigarette butts. Current smokers were also asked if they had a receptacle for cigarette butts in their car (QCD2); 28.1% indicated they did not have a receptacle in their car. Fourteen percent of the current smokers reported owning a pocket ashtray (QCD3) ( $N=27$ ).

Analysis of variance was used to understand the littering behavior differences between non-smokers and current smokers. Figure 4 displays the mean differences for littering behavior between non-smokers and current smokers using the litter measure including cigarette butt disposal, excluding cigarette butt disposal, and using age as a covariate. The scale range is from zero to ten.

**Figure 4: Group Means for Littering Behavior (0-10) by Current Smoker Status**



Using the litter behavior measure including cigarette butt disposal, current smokers ( $M = .97$ ,  $SD = 1.90$ ) reported nearly twice the littering behavior as non-smokers ( $M = .53$ ,  $SD = 1.31$ ). The difference is statistically significant at the  $p < .01$  level. Removing cigarette butt disposal from the littering behavior measure still showed significant differences between current smokers ( $M = .80$ ,  $SD = 1.88$ ) and non-smokers ( $M = .52$ ,  $SD = 1.31$ ). The difference is statistically significant at the  $p < .01$  level. However, in order to further explain the relationship between smoking

status and littering behavior, we performed an analysis of variance using age as a covariate. The results show that age explains a significant amount of the variation in smoking status and littering behavior. After age was introduced as a covariate with smoker status, the mean difference between current smokers and non-smokers was estimated at .71 and .54, respectively.

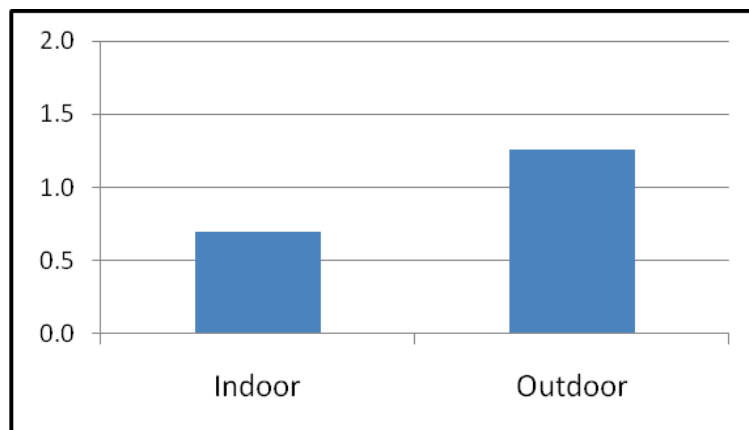
## Conclusion

At first glance, the results appear to show a predictive relationship between current smoker status and self-reported littering behavior. However, because the relationships between smoking and age, and littering behavior and age are negative (as age increases, both smoking behavior and littering behavior decreases), further analyses were conducted in which we statistically controlled for the age effects. These new analyses showed that the relationship between smoking and littering behavior was confounded by age. While at first glance the data appear to show that smoking predicts littering behavior, when age is used as a covariate, the relationship between current smoking status and littering behavior becomes nonsignificant. That is, the high rate of littering among smokers is due in part to the tendency for smokers to be younger than nonsmokers.

## Litter Behavior and the Work Environment

Analysis of variance was used to look at group differences across two workplace variables. For those who reported working for pay, we examined littering behavior differences between indoor and outdoor work environments (QWE2). Figure 5 shows the group differences. The scale range is from zero to ten.

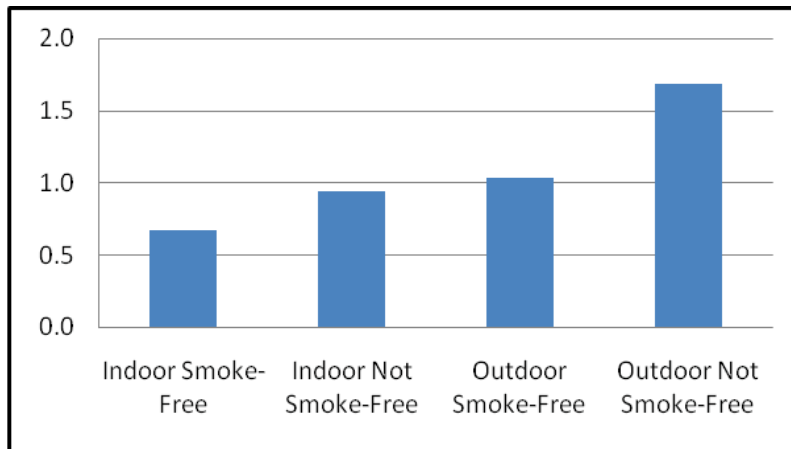
**Figure 5: Group Means for Littering Behavior (0-10) by Indoor and Outdoor Work Environment**



Participants working in an outdoor environment reported nearly twice the littering behavior as those working in indoor environments. The difference was significant at the  $p < .01$  level.

The relationship between indoor and outdoor environments and smoke-free environments (QWE3) was examined as well. Figure 6 shows the littering behavior differences for these four groups. The scale range is from zero to ten.

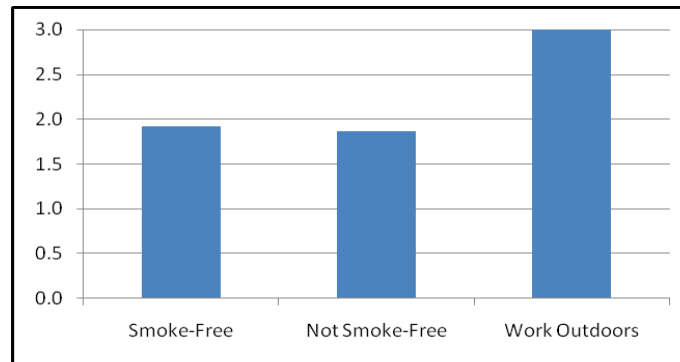
**Figure 6: Group Means for Littering Behavior (0-10) by Indoor and Outdoor Work Environments and Smoke-Free Workplaces**



While those in the outdoor work environment group showed the largest mean for littering behavior, the smoke-free workplace groups (indoor and outdoor), report less littering behavior than those working in environments that are not smoke-free. Again, the littering behavior measurement includes cigarette butt disposal, but it is important to note that these results are not exclusive of cigarette butt disposal. The differences are significant at the  $p < .01$  level.

Figure 7 shows the group means for cigarette butt disposal behavior in the smoke-free workplace groups and in the outdoor work environment.

**Figure 7: Group Means for Cigarette Butt Disposal Behavior (0-10) by Smoke-Free and Not Smoke-Free Workplaces and Outdoor Work Environment**



There were no differences for cigarette butt disposal behavior between those working in a smoke-free workplace and those not working in a smoke-free workplace. While those working in an outdoor work environment showed a greater mean for cigarette butt disposal behavior ( $M=3.0$ ,  $SD = 4.34$ ), the difference was not statistically significant.

## Conclusion

These data show that the outdoor work environment group reported more littering behavior than the indoor work environment group. Respondents not working in smoke-free workplace environments also reported more littering behavior. For cigarette butt litter disposal, although working outdoors increased litter behavior, working in smoke-free work environment or outdoors did not significantly alter behavior. With the increase of smoke-free work environments nationwide, adequate infrastructure for proper disposal is an emerging issue. This is an important topic for future research.

## Litter Behavior and the Motivators and Barriers

Analysis of variance was used to look at the relationship between littering behavior and six situational scenarios. Respondents were asked if they strongly agreed, agreed, disagreed, or strongly disagreed with the likelihood they would litter in the following situations: (QLB1) *when the item I'm holding isn't recyclable*, (QLB2) *when I am in a bad mood*, (QLB3) *when I know someone else will be around to pick it up*, (QLB4) *when I don't have time to take care of it any other way*, (QLB5) *when there isn't a trash can nearby*, and (QLB6) *when the item is biodegradable*. Table 17 displays the means and standard deviations for these items.

**Table 17. Group Means for Littering Behavior (0-10) by Motivators and Barriers Items**

<b>I'm more likely to litter...</b>	<b>Frequency</b>	<b>Mean Littering</b>	<b>Standard Deviation</b>
<b>When the item I'm Holding Isn't Recyclable (QLB1)**</b>			
Strongly Agree	25	1.48	2.73
Agree	61	1.77	2.29
Disagree	350	0.71	1.75
Strongly Disagree	585	0.39	0.89
TOTAL	1021	0.61	1.45
<b>When I'm in a Bad Mood (QLB2)**</b>			
Strongly Agree	16	3.28	3.57
Agree	74	1.56	1.94
Disagree	397	0.60	1.64
Strongly Disagree	538	0.41	0.88
TOTAL	1025	0.61	1.45
<b>When someone Else Will Pick It Up (QLB3)**</b>			
Strongly Agree	16	2.01	3.44
Agree	42	2.07	2.35
Disagree	407	0.71	1.69
Strongly Disagree	566	0.39	0.89
TOTAL	1031	0.61	1.45
<b>When I Don't Have Time (QLB4)**</b>			
Strongly Agree	17	1.98	2.94
Agree	89	1.50	1.80
Disagree	410	0.70	1.78
Strongly Disagree	506	0.33	0.77
TOTAL	1022	0.61	1.45
<b>When there Isn't a Trash Can Nearby (QLB5)**</b>			
Strongly Agree	16	1.97	3.01
Agree	74	1.84	2.16
Disagree	440	0.66	1.66
Strongly Disagree	494	0.34	0.78
TOTAL	1024	0.61	1.45
<b>When the Item is Biodegradable (QLB6)**</b>			
Strongly Agree	44	1.57	2.09
Agree	186	1.26	1.75
Disagree	393	0.56	1.61
Strongly Disagree	393	0.25	0.73
TOTAL	1016	0.61	1.45

**Note:** Frequency = number of occurrences, Mean = average, SD = standard deviation.  
**\*\*** difference significant at the  $p < .01$  level

Significant littering behavior differences were found across groups for all the motivators and barriers items. Respondents who reported they are more likely to litter when the item isn't recyclable (QLB1) were twice as likely to report littering behavior than those who disagreed with the statement. Those who reported they are more likely to litter when they are in a bad mood (QLB2) reported significantly higher rates of littering behavior than those who disagreed with the statement. Respondents who stated they are more likely to litter when someone else will pick it up (QLB3) reported much greater littering behavior than those who reported they were unlikely to litter in that situation. Respondents who stated they were likely to litter when they didn't have time to take care of it any other way (QLB4) reported significantly higher rates of littering behavior than those who stated that time was unlikely to be a factor. Those who reported they were more likely to litter in the absence of a trash can or bag (QLB5) showed significantly greater rates of litter behavior than those who unlikely to litter in that situation. And lastly, respondents who stated they were more likely to litter when the item was biodegradable (QLB6) reported much more littering behavior than those for whom biodegradability was unlikely to be a factor.

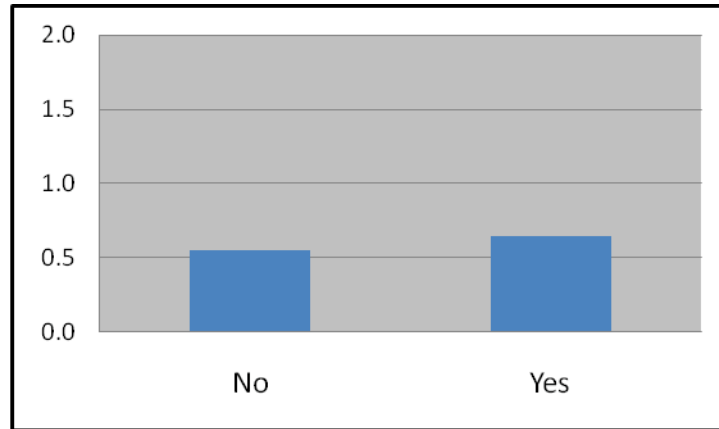
## Conclusion

The analysis indicates there are personal (bad mood, no time), situational (someone else will pick it up, no trash can nearby), and item-specific (item isn't recyclable, item is biodegradable) evaluations that affect littering behavior. All differences were statistically significant.

## Litter Behavior and the Messages

Analysis of variance was used to explore the relationship between littering behavior and litter prevention messages. Figure 8 shows the group littering behavior differences for those who reported they had and those who reported they had not seen or heard litter prevention messages in the past year. The scale range is from zero to ten.

**Figure 8: Group Means for Littering Behavior (0-10)  
by Saw or Heard Litter Prevention Messages**



There was no significant difference between those who reported they had seen or heard litter prevention messages in the past year and those who reported they had not. While this finding is somewhat discouraging, we do not interpret it as evidence that messaging is ineffective at reducing littering behavior. First, the overall reported rate of littering is extremely small (.5 on a scale from 0 to 10). Second, the findings from our observations suggest that self-reported littering rates are subject to reporting bias, and might not accurately reflect actual littering rates. Indeed, the same individuals who are likely to underreport littering are likely to over-report exposure to litter prevention messages. And third, we do not differentiate here between different types of litter prevention messages, and some messages are surely more powerful at affect behavior than others (see recommendations section at the end of this document).



## Litter Behavior and Demographic Variables

Analysis of variance was used to look at littering behavior group differences for gender and education. Table 18 displays the means and standard deviations for these variables.

**Table 18. Group Means of Littering Behavior (0-10) by Gender, Education, Type of Residence, and Type of Vehicle**

	Frequency	Mean	SD
<b>Gender (IC1)**</b>			
Female	677	0.49	1.28
Male	358	0.83	1.70
	1035	0.61	1.45
<b>Educational Attainment (QD4)</b>			
Less Than High School	61	0.78	1.74
High School Graduate	562	0.66	1.57
College Graduate	386	0.47	1.11
	1009	0.60	1.42
<b>Type of Residence (QD6)</b>			
House single detached	799	0.56	1.38
Apt or Condo	157	0.69	1.67
Mobile home	54	0.97	1.84
	1010	0.61	1.45
<b>Type of Vehicle (QD7)</b>			
Car	571	0.57	1.45
Pick-Up Truck	126	0.91	1.96
Van or Mini-Van	104	0.64	1.42
SUV	151	0.53	1.04
Don't Drive	51	0.41	1.13
Other	5	0.46	0.79
	1008	0.60	1.46

**Note:** Frequency = number of occurrences, Mean = average, SD = standard deviation.

\*\* difference significant at the  $p < .01$  level

These data show significant differences between males and females for self-reported littering behavior. Males are much more likely to report littering behavior than are women. This finding is consistent with other research on self-reported littering behavior. These data show no significant differences for littering behavior across educational levels, type of residence, or type of vehicle. Although the data indicate a rise in littering behavior as educational level drops, the differences are not statistically significant.

## Predicting Littering Behavior

This survey was designed to understand the variables associated with littering behavior. A Multiple Regression Analysis was performed to predict the impact of selected variables on littering behavior. This analysis shows the effect of this group of predictor variables on littering behavior. Table 19 displays the unstandardized regression coefficients (b) for the predictor variables.

**Table 19. Unstandardized Regression Coefficients from a Multiple Regression Analysis: Littering Behavior by Predictor Variables**

	<u>b</u>	
Age	-0.010	**
Gender	0.196	*
Level of Education	-0.021	
Current Smoker	0.234	*
Importance of Litter	-0.047	**
Heard or Seen Litter Message	0.141	
Livability quotient	0.015	
Personal Norms Scale	-0.019	
Motivators and Barriers Scale	0.107	**

N = 881; \*  $p < .05$ , \*\*  $p < .01$

Nine predictor variables were chosen to gauge the impact of their presence on self-reported littering behavior. Five variables emerged as predictors of littering behavior. Age, gender, current smoker, importance of litter, and the motivators and barriers scale all show statistically significant relationships to self-reported littering behavior.

The current smoker variable was dummy coded in order to include it in the model (smoker = 1, non-smoker = 0). The correlation coefficient indicates that in the context of all the other variables in the model, current smoker status has the greatest impact on self-reported littering behavior. The relationship between age and littering behavior is negative; as age increases, littering behavior decreases. The variable for gender was dummy coded in order to include it in the model (male = 1, female = 0); therefore, the positive correlation coefficient indicates higher self-reported littering rates among men. There is also a negative relationship between the importance of litter in your town and littering behavior; as the perceived importance of litter as an issue increases, littering behavior decreases. Finally, the analysis shows a relationship between the motivators and barriers scale (those

likely to be motivated to litter because of mood or lack of trash cans) and littering behavior.

## Conclusion

In the context of this group of predictor variables, current smoker status emerged as an important predictor of self-reported littering behavior. Although, the littering behavior variable includes general litter as well as cigarette butt litter, this finding is consistent with land survey litter studies that show cigarette butts as the most littered item in the United States. The effect of age on littering behavior is consistent with other research results which show that as age increases, littering behavior decreases. The model showed that men are more likely to report littering than are women. Past research, as well as the results of our current observational research suggests that there are no observed littering behavior differences between men and women. The differences materialize in the self-reported behaviors. The perceived importance of litter as an issue shows an impact on littering behavior; those indicating a greater perceived level of importance of litter as an issue, display lower levels of littering behavior. The motivators and barriers scale also helped to explain littering behavior. Respondents who were more likely to agree with the barriers statements were more likely to report littering behavior. In other words, the more likely one is to report that being in a bad mood or the absence of a trash can induces them to improperly dispose of litter, the more likely they are to report littering behavior. (Reliability analysis and bivariate correlations were conducted for both scales to insure the variables were not measuring the same constructs; while reliabilities for both scales exceeded .9, the correlation between the two variables was only modest,  $r = .312$ ).

## The Importance of Litter

Analysis of variance was used to explore the relationship between the perceived importance of litter in the town or city (QM1), and community appearance (QBI). Table 20 displays the group means for *the importance of littering in your town* by each community livability item.

**Table 20. Group Means for Importance of Littering in Your Town (0-10) by Community Livability Items**

	Frequency	Mean	SD
<b>Visible Litter (QB1)**</b>			
1 Virtually no visible litter	342	8.42	2.72
2 Upon careful inspection a small amount of litter is obvious	507	8.04	2.43
3 Visible litter can be seen throughout the area	125	7.48	2.71
4 Major illegal dumpsites are present	21	7.33	3.40
Total	995	8.09	2.61

	Frequency	Mean	SD
<b>How Clean is Community (QBI2)**</b>			
1 Very clean	535	8.49	2.46
2 Somewhat clean	409	7.72	2.56
3 Not very clean	41	7.00	3.35
4 Not at all clean	8	5.13	4.52
Total	993	8.08	2.61
<b>Streets and Sidewalks Maintained (QBI3)**</b>			
1 Very well maintained	499	8.52	2.33
2 Somewhat maintained	296	7.65	2.68
3 Not very well maintained	81	7.57	2.84
4 Not at all maintained	43	7.19	3.24
Total	919	8.09	2.58
<b>Streets and Sidewalks Safe During Day (QBI4)**</b>			
1 Very safe	647	8.23	2.49
2 Somewhat safe	227	7.89	2.79
3 Somewhat unsafe	45	6.93	3.01
4 Very unsafe	20	8.20	2.67
Total	939	8.08	2.61
<b>Streets and Sidewalks Inviting QBI5**</b>			
1 Very inviting	445	8.64	2.25
2 Somewhat inviting	356	7.62	2.72
3 Somewhat uninviting	57	6.84	3.12
4 Very uninviting	52	6.96	3.25
Total	910	8.03	2.63
<b>Number of Flowers, Plants, and Trees QBI6**</b>			
1 There are a lot of flowers, plants, and trees	535	8.38	2.39
2 There are some flowers, plants, and trees	349	7.82	2.74
3 There are not many flowers, plants, and trees	79	7.49	2.76
4 There are no flowers, plants, and trees	29	7.90	3.30
Total	992	8.10	2.59
<b>Attractiveness of Flowers, Plants, and Trees (QBI7)**</b>			
1 They are very attractive	532	8.45	2.44
2 They are somewhat attractive	370	7.88	2.52
3 They are somewhat unattractive	56	7.20	2.96
4 They are very unattractive	25	6.12	3.91
Total	983	8.10	2.59
<b>Attractiveness of Infrastructure (QBI8)**</b>			
1 They are very attractive	310	8.63	2.31
2 They are somewhat attractive	471	7.93	2.55
3 They are somewhat unattractive	113	7.73	2.64
4 They are very unattractive	38	7.21	3.60
Total	932	8.11	2.56

**Note:** Frequency = number of occurrences. Mean = average. SD = standard deviation.

\*\*indicates statistical significance at the  $p < .01$  level.

All relationships between the importance of litter in your town and the community livability items were statistically significant. The analysis showed that the groups that reported more litter in their community (QBI1), also reported that litter was less important. The same was true for the how clean is your community item (QBI2); those groups reporting they lived in communities that were not very clean and not at all clean, stated that litter was less important. Respondents who reported their streets and sidewalks were somewhat maintained, not very well maintained, and not at all maintained (QBI3) indicated that litter was less important in their town than those who reported their streets and sidewalks were very well maintained.

The safety of streets and sidewalks during daylight hours variable (QBI4) showed a much different pattern; those who indicated their streets were very safe and those who indicated their streets were very unsafe reported litter being of greater importance in their towns than respondents in the other two groups (somewhat safe, or somewhat unsafe). For respondents stating their streets and sidewalks were a very inviting place or somewhat inviting place to walk (QBI5), the importance of litter in their town was greater than for those who stated their streets and sidewalks were somewhat inviting or very uninviting. Respondents who indicated their community had a lot of flowers, plants, and trees (QBI6), were more likely to state that litter was an important issue in their community than the other three groups. Those who indicated the flowers, plants, and trees in their community were very attractive (QBI7) were more likely to state that litter was an important issue in their town. The same pattern existed for the attractiveness of the infrastructure (QBI8); groups who indicated the community infrastructure was very attractive reported a greater level of importance, compared to those who indicated that their community infrastructure was very unattractive.

## CONCLUSIONS

The overall pattern of relationships for these items is quite interesting. The pattern indicates there are significant differences between groups of people who live in towns or cities with little visible litter, with attractive landscaping and infrastructure, and with streets and sidewalks that are pleasant to walk, and those groups who do not. The groups that live in more attractive surroundings perceive the issue of litter as more important in their town or city than those who live in less attractive surroundings. This is not to say that the individual does not perceive litter to be an issue. More likely, the presence of litter and less attractive surroundings is an indicator that litter is not an issue in their town or city. In other words, if litter were an issue, than it would not be present, the town would be more attractive, and perhaps a more pleasant place in which to walk.

## PART V: CONCLUSIONS AND RECOMMENDATIONS

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In this report, we have summarized the findings from three methodological approaches to studying littering behavior. In the first, we conducted systemic observations of 9,757 individuals randomly selected from 130 sites across the country. In the second, we report findings from a small sample of intercept interviews conducted with 102 individuals at 15 sites. In the third study, we report findings from a national telephone survey of 1,039 households. Each of these three approaches provides a unique perspective on littering behavior, and in this final section, we want to step back and draw some broad conclusions and recommendations.

### Littering Rates

One of the first questions that emerges in discussions of littering is: “how often do people do it?” In the 1968 survey, results showed “exactly half” of the respondents in a national survey reported at least one littering behavior (among 8 scenarios). While the details from this 40-year-old study are no longer available, the 50% figure is a meaningful mark.

Our current data indicate that littering rates have declined dramatically in the past 40 years. In our telephone survey, where we replicated as closely as possible the measurement procedure from 1968, we found that only 15% of respondents report a littering act in the past month (using the same 8 KAB scenarios). And across a range of different locations and litter types, we find that Americans report a very low frequency of littering.

However, it’s important to point out the limitations of self-report surveys. Given that people almost unanimously view littering as a bad thing, it’s not surprising that very few report doing it. In addition to the problem of self-report bias, it may also be the case that littering happens by accident. In this case, respondents would be reporting correctly, but still underestimating the amount that they litter.

To address these limitations, we conducted a series of observations with a random sample of individuals across the country. Our results indicate that 17% of all disposals in the public spaces we observed were litter. In addition, 4% of all individuals that passed through the public spaces we observed littered. It’s also clear from our observations that most of these acts of littering are *not* by accident, and a large majority (81%) of all observed acts of littering occurred with clearly notable intent.

In terms of littered items, our results show that the most frequently littered items are also those most commonly found on the ground. While our methodology

does not allow solid conclusions about the percentage of litter on the ground that originates from individuals dropping or throwing an item (as opposed to trash cans blowing over, litter blowing from uncovered loads, or an inefficient trash collection system), it does seem clear that a large majority of litter originates from the individuals that pass through a public space. The most frequently observed items that were littered included: cigarette butts, food remnants, and food wrappers.

The methods that we have developed and reported were intended to be “replicable.” That is, we have attempted to build an observational methodology that can be implemented over time and in a range of locations. In adopting the same methodology, it will be possible to draw solid conclusions about change over time, to inform both local and national litter-prevention programs, and to evaluate the success of litter prevention strategies.

### Understanding Littering Behavior

The results reported in this document show that as of 2008, littering behavior remains a serious national problem. Americans view litter as a serious issue; many individuals feel a personal obligation not to litter; and they want to live in clean, litter-free communities. But yet the behavior persists.

The unique research design developed for our national observations draws on the quantitative technique of multi-level modeling. By observing random samples of individuals within a location, and multiple locations across the country, we are able to ascertain the amount of variability in littering behavior that is due to the person, or due to the context. For general littering, we find that 15% of the variance in littering behavior results from contextual constraints (e.g., insufficient number of receptacles, existing litter on the ground), while the remainder results from the individual (e.g., lack of motivation). For cigarette butt litter, we find that more than twice as much variance in littering behavior (38%) is due to the contextual demands, and 62% is due to the individual.

With regard to the situational factors that contribute to littering, two consistent findings emerged from our observations. First is the availability of trash receptacles. While our data show that almost all public places have at least one trash receptacle (up from 56% reported in the 1968 KAB study), the number and convenience of receptacles strongly influences littering behavior. While we certainly observed the rare exception of an individual littering right next to a receptacle, the average littering behavior occurred at a distance of 29 feet from the nearest receptacle. In addition, the amount of litter already present in a site strongly influenced the probability that a person would litter.

With regard to individual factors that contribute to littering, we want to highlight two general findings. The first is age. Consistently across all three approaches (observation, intercept, and survey), we find that older individuals are

less likely to litter than younger. This finding echoes the conclusion made in the 1968 report. The second predictive factor is a person's belief in the importance of litter. In the telephone survey, those individuals who believed that litter was a more important issue were less likely to report littering. In addition, our observation and intercept data show that individuals who feel a personal obligation not to litter were less likely to do so.

Another finding of interest pertains to gender. While much has been said about the high rate of littering behavior among males (particularly young males), our data present a conflicting story. While it is clearly the case that young males are more likely to report littering, and to report a lower personal obligation to not litter, our observations failed to show any overall gender effects in observed littering rates. To us, this suggests that the gender effect is more a product of self-report bias than behavioral differences, and that outreach efforts should target both men and women.

## Litter Prevention

The findings from our research point to several strategies for preventing litter. These strategies include a combination of both structural and motivational activities. We present three strategies below that are consistent with our research findings. But we do not propose this as an exhaustive list, and we encourage the reader to think creatively about ways to link the reported findings to litter prevention strategies.

**1. Beautification (and clean-up).** Across our data we consistently found that littered environments attract more litter. This finding is not new, and indeed it was noted in the research findings 40 years ago. In essence, individuals use a variety of cues from their surrounding environment to determine what is common and accepted behavior. The presence of litter communicates the norm for that situation, and the acceptability of littering. In addition, the existing litter will require clean-up, so one more piece won't matter.

To this end, we recommend consistent and ongoing community clean-up activities. Reducing the amount of existing litter in a location is a surefire way to reduce the rate of littering behavior.

However, we also recommend going beyond community clean-ups. While such efforts are laudable in their goals and impact, the outcomes are likely to be short lived. Clean-up efforts deal with the symptoms, but not the underlying problem. In addition to the "social norms" aspect of existing litter, we also found significant effects for physical appearance. Throughout our studies, we found consistent evidence that communities that make an effort to "beautify," either through landscaping, hardscape, maintenance, and cleanliness, generally result in lower rates of littering behavior. In part, an attractive community communicates a social



norm, but it also promotes a sense of responsibility and a personal obligation not to litter. Communities and cities that expect individuals to feel a personal responsibility to not litter (and to care about the appearance of the local community) should set the example. Beautification efforts set a standard for the community, and model the responsible behaviors that community leaders hope to engender among residents. Indeed, clean-up efforts in the absence of infrastructure changes are likely to produce effects that are short-lived.

**2. Behavioral Affordances.** Related to our recommendation to support beautification efforts (above), we also find consistent evidence for the importance of opportunity. That is, the context should provide a convenient and accessible means for proper disposal of trash and litter. While our data show a large increase in the availability of receptacles in public places over the past 40 years, we also found that distance to a trashcan was a strong predictor of littering behavior. Providing easily-identifiable and accessible receptacles can go a long way toward reducing littering rates. This recommendation echoes that made in the 1968 KAB report, which states:

*...the obvious fact must be kept in mind that no matter how "sold" a person may be on not littering, if he can find no place to dispose of his litter he will almost certainly discard it wherever it is convenient and not too conspicuous.*

The issue of behavioral affordances is especially important for cigarette butts. Our observational data suggest that disposal of cigarette butts is more strongly clustered within locations, and yet less than half (47%) of the locations we visited provided an ash receptacle. Given the increase in legislation regarding indoor smoking, an increasing number of smokers are moving outside to smoke. However, the infrastructure for collecting ashes and lit cigarettes is woefully behind these policies, and our data suggest that more efforts to afford smokers an opportunity for proper disposal are needed.

**3. Awareness and Motivation Campaigns.** In addition to our recommendations for beautification and infrastructure, we continue to see an important role for awareness and motivation campaigns. In our observational data, we find that 85% of the variance in general littering, and 62% of the variance in cigarette butt littering results from individual differences. These include demographic (for example, income, age, gender), attitudinal (for example, lack of concern about litter), and motivational differences, and they speak to the importance of a consistent and ongoing message about the importance and reasons for not littering.

However, we want to begin by suggesting what not to do. Too often, awareness campaigns convey messages about a high littering rate, or depict images of highly littered environments. While well intentioned, such messages convey a normative message that other people litter. And consistently across our research (and in other published studies), normative messages about the high rate of littering

can increase littering rates. As we observed repeatedly across the country: litter begets littering. Messages that show littering as common (i.e., normative) make it acceptable, and will generally undermine the ultimate goal of reducing litter. We strongly advise against such messages. Instead, we advocate for messages that highlight the dramatic decline in littering rates over the past 40 years, the generally infrequent overall littering rate, and the widespread belief that littering is wrong.

Across our research, we find the near unanimous belief that littering is wrong. This, coupled with other research on the role of injunctive and personal norms, suggests a promising avenue for motivational messages. With regard to personal norms, we find strong evidence in both the behavioral observations and telephone surveys that individuals who feel a strong personal obligation not to litter are less likely to do so, even in situations that do not afford opportunities for proper disposal. In addition, prior work has shown that an injunctive norm of social disapproval can provide a strong behavioral motivation. In short, only a few deviant individuals will continue to litter, and these individuals are disapproved of by the majority (see Cialdini, 2003; Schultz et al., 2008).

Finally, we want to reiterate the importance of focusing on the local community, and local contexts. All of our observations focused on public, outdoor spaces, and there was a considerable degree of variability across the country. While our findings and recommendations will be useful to structure a national-level program and outreach campaign, we want to emphasize that littering is a local issue. While the national-level agenda can help to guide and structure litter-prevention efforts, these activities need to be implemented locally. As such, we urge local organizations to understand the motivational and structural barriers that exist within their communities, and to devise outreach and intervention strategies that are tailored to meet their needs. The data in this report can provide a starting point, and the national-level findings can help to frame and bring focus to the work. But it is local organizations, communities, and ultimately individuals, that will bring an end to litter.

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## APPENDIX A: REFERENCE TABLES

**Table 21. Sites by Location and Observation Type**

<u>State</u>	<u>City</u>	<u>City Type</u>	<u>Site Type</u>	<u>Observation Type</u>	<u>Number of Observations</u>	
AR	Little Rock	Urban	City Center	General	160	
			Bar/Restaurant	Smoking	7	
			Recreation	General	95	
			Rest Stop	General	155	
			Gas Station	General	165	
	North Little Rock	Suburban	City Center	General	192	
			Recreation	General	37	
			Medical/Hospital	Smoking	7	
			Gas Station	General	94	
	Maumelle	Rural	Recreation	General	68	
	CA	San Diego	Urban	City Center	General	150
				Fast Food	General	78
Recreation				General	78	
Recreation				Smoking	15	
Carlsbad		Suburban	City Center	General	193	
			Fast Food	General	89	
			Bar/Restaurant	Smoking	15	
			Recreation	General	177	
			Recreation	Smoking	19	
			Rest Stop	General	207	
Ramona		Rural	Fast Food	General	130	
			Rest Stop	General	207	
			Retail	Smoking	22	
			Gas Station	General	172	
GA		Atlanta	Urban	City Center	General	140
	Fast Food			General	138	
	Rest Stop			General	139	
	Retail			Smoking	29	
	Marietta	Suburban	City Center	General	224	
			Bar/Restaurant	Smoking	6	
			Gas Station	General	189	

<u>State</u>	<u>City</u>	<u>City Type</u>	<u>Site Type</u>	<u>Observation Type</u>	<u>Number of Observations</u>
	Cartersville	Rural			
			Fast Food	General	69
			Recreation	General	147
			Recreation	Smoking	7
			Gas Station	General	73
<b>IL</b>					
	Chicago	Urban			
			Fast Food	General	187
			Medical/Hospital	Smoking	42
			Retail	Smoking	118
	Elgin	Suburban			
			Fast Food	General	110
			Rest Stop	General	138
	Fox River Grove	Rural			
			City Center	General	56
			Fast Food	General	269
			Bar/Restaurant	Smoking	24
			Recreation	General	43
			Recreation	Smoking	9
<b>KY</b>					
	Louisville	Urban			
			City Center	General	78
			Rest Stop	General	173
			Medical/Hospital	Smoking	58
	Jeffersontown	Suburban			
			Fast Food	General	131
			Recreation	Smoking	9
			Retail	Smoking	28
			Gas Station	General	167
	Prospect	Rural			
			Retail	Smoking	12
<b>NV</b>					
	Las Vegas	Urban			
			City Center	General	235
			Fast Food	General	79
			Recreation	Smoking	10
			Retail	Smoking	52
	Henderson	Suburban			
			City Center	General	272
			Recreation	General	91
	Boulder City	Rural			
			Fast Food	General	159
			Rest Stop	General	108
			Retail	Smoking	36
			Gas Station	General	196



<u>State</u>	<u>City</u>	<u>City Type</u>	<u>Site Type</u>	<u>Observation Type</u>	<u>Number of Observations</u>	
<b>NM</b>	Albuquerque	Urban	City Center	General	316	
			Gas Station	General	101	
	Paradise Hills	Suburban	City Center	Smoking	30	
			Medical/Hospital	Smoking	31	
	Los Ranchos	Rural	Recreation	Smoking	4	
			Rest Stop	General	73	
	<b>NY</b>	Albany	Urban	City Center	General	96
Recreation				General	72	
Medical/Hospital				Smoking	34	
Plattsburgh		Suburban	Fast Food	General	70	
			Bar/Restaurant	Smoking	35	
			Retail	Smoking	44	
Lake Placid		Rural	Recreation	General	85	
<b>UT</b>		Salt Lake City	Urban	Fast Food	General	117
				Bar/Restaurant	Smoking	4
				Recreation	General	78
	Recreation			Smoking	5	
	Rest Stop			General	93	
	Medical/Hospital			Smoking	32	
	West Valley	Suburban	City Center	General	182	
			Fast Food	General	203	
			Recreation	General	74	
	Bountiful City	Rural	City Center	General	156	
			Fast Food	General	140	
			Recreation	General	79	
			Retail	Smoking	13	
Gas Station			General	287		
<b>VT</b>	Burlington	Urban	City Center	General	119	
			Fast Food	General	63	
			Recreation	General	67	
			Recreation	Smoking	4	

<u>State</u>	<u>City</u>	<u>City Type</u>	<u>Site Type</u>	<u>Observation Type</u>	<u>Number of Observations</u>
	South Burlington	Suburban			
			Fast Food	General	108
			Bar/Restaurant	Smoking	6
	Williston	Rural			
			City Center	General	79
			Fast Food	General	154
			Recreation	General	15
			Rest Stop	General	105
<b>TOTAL</b>	<b>10</b>	<b>30</b>		<b>100</b>	<b>9,757</b>

## APPENDIX B: BEHAVIORAL OBSERVATION DOCUMENTS

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# General Litter Observation Booklet

# General Litter Observations

Book \_\_\_\_\_ of \_\_\_\_\_

Researcher: \_\_\_\_\_ Date: \_\_\_\_\_

Location: \_\_\_\_\_

## POST OBSERVATION SUMMARY (per booklet)

Total Observed	
Total "Left with No Visible Object"	
Total "Left Site with Object"	
<b>Total Disposers</b>	

Comments/Concerns/Problems Encountered



Object Disposed	Disposal Method	Litter Strategy
<input type="checkbox"/> Beverage Bottle: Plastic <input type="checkbox"/> Beverage Bottle: Glass <input type="checkbox"/> Beverage Can <input type="checkbox"/> Beverage Cup <input type="checkbox"/> Food Wrapper <input type="checkbox"/> Food Container <input type="checkbox"/> Food Remnants <input type="checkbox"/> Cigarette Butt (21+ only) <input type="checkbox"/> Paper <input type="checkbox"/> Napkin/Tissue <input type="checkbox"/> Plastic Bag <input type="checkbox"/> Combo/Mixed Trash <input type="checkbox"/> Other: _____	<input type="checkbox"/> Pocketed <input type="checkbox"/> Trash Can <input type="checkbox"/> Recycling Bin: Correct <input type="checkbox"/> Recycling Bin: Incorrect <input type="checkbox"/> Ashtray <input type="checkbox"/> Separated  <input type="checkbox"/> Ground <input type="checkbox"/> Planter <input type="checkbox"/> Bushes/Shrubbery <input type="checkbox"/> On/Around Receptacle <input type="checkbox"/> Other: _____	<input type="checkbox"/> N/A  <input type="checkbox"/> Wedge <input type="checkbox"/> Flick/Fling <input type="checkbox"/> Shoot & Miss <input type="checkbox"/> Bury <input type="checkbox"/> Drop: Intent <input type="checkbox"/> Drop: No Intent <input type="checkbox"/> Inch Away <input type="checkbox"/> Sweep <input type="checkbox"/> 90% <input type="checkbox"/> Other: _____
<b>Receptacles: At Start</b>		<b>Receptacles: At Disposal</b>
Nearest Trash Can: _____ feet		Nearest Trash Can: _____ feet
Nearest Recycling Bin: _____ feet		Nearest Recycling Bin: _____ feet
Nearest Ashtray: _____ feet		Nearest Ashtray: _____ feet
<b>Activity Before Disposal</b>		<b>Activity After Disposal</b>
Describe:		Describe:
<b>Group Setting at Disposal</b>		<b>Randomization Sheet</b>
<input type="checkbox"/> Alone <input type="checkbox"/> In Group # = _____ <input type="checkbox"/> Nearby # = _____		1    2    3    4    5    6
<b>Notes</b>		<b>Survey Sites Only</b>
Anything unusual? Other Enforcements?		<b>Selected for Intercept?</b> <input type="checkbox"/> YES <input type="checkbox"/> NO <b>Survey Result:</b> MISSED    REFUSED    COMPLETED

# Cigarette Butt Litter Observation Booklet

# Cigarette Litter Observations

Book \_\_\_\_\_ of \_\_\_\_\_

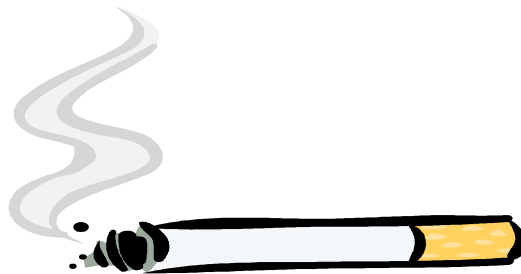
Researcher: \_\_\_\_\_ Date: \_\_\_\_\_

Location: \_\_\_\_\_

## POST OBSERVATION SUMMARY (per booklet)

Total Smokers Observed	
Total "Left Site" or "Unknown"	
<b>Total Disposers Observed</b> (Observed-Left Site/Unknown)	

Comments/Concerns/Problems Encountered





<b>Time</b>	<b>Sunset</b>
____ : ____ <input type="checkbox"/> AM <input type="checkbox"/> PM	<input type="checkbox"/> Before Sunset <input type="checkbox"/> After Sunset
<b>Gender</b>	<b>Age (21+)</b>
<input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Unknown	# = ____
<b>Receptacles: At Start</b>	<b>Receptacles: At Disposal</b>
Nearest Trash Can: ____ feet Nearest Ashtray: ____ feet	Nearest Trash Can: ____ feet Nearest Ashtray: ____ feet
<b>Disposal Method</b>	<b>Litter Strategy</b>
<input type="checkbox"/> 0 Left Site with Cigarette <input type="checkbox"/> 1 Unknown/Unseen <input type="checkbox"/> 2 Pocketed <input type="checkbox"/> 3 Trash Can <input type="checkbox"/> 4 Ashtray <input type="checkbox"/> 5 Recycling Bin <input type="checkbox"/> 6 Field Strip <input type="checkbox"/> 7 Ground <input type="checkbox"/> 8 Planter <input type="checkbox"/> 9 Bushes/Shrubbery <input type="checkbox"/> 10 On/Around Receptacle <input type="checkbox"/> 11 Other: _____	<input type="checkbox"/> 0 N/A  <input type="checkbox"/> 1 Wedge <input type="checkbox"/> 2 Flick/Fling <input type="checkbox"/> 3 Shoot & Miss <input type="checkbox"/> 4 Bury <input type="checkbox"/> 5 Drop <input type="checkbox"/> 6 Stomp <input type="checkbox"/> 7 Other: _____
<b>Activity Before Disposal</b>	<b>Activity After Disposal</b>
Describe:	Describe:
<b>Group Setting at Disposal</b>	<b>Randomization Sheet</b>
<input type="checkbox"/> 0 Alone <input type="checkbox"/> 1 In Group # = ____ <input type="checkbox"/> 2 Nearby # = ____	1    2    3    4    5    6
<b>Notes</b>	<b>Survey Sites Only</b>
Anything unusual? Other Enforcements?	<b>Selected for Intercept?</b> <input type="checkbox"/> 1 YES <input type="checkbox"/> 2 NO <b>Survey Result:</b> MISSED    REFUSED    COMPLETED

# APPENDIX C: INTERCEPT SURVEY INSTRUMENT

---

<b>TO BE COMPLETED BY INTERVIEWER:</b>	Start Time ____ : ____ am/pm
Observation ID# ____ Location: ID#: _____	Interviewer ID#: _____

1. What brings you here today? \_\_\_\_\_
2. In a typical month, how often do you come here? \_\_\_\_\_
3. Using this scale from 0 to 10, where 0 equals “not at all important” and 10 equals “very important,” in this location how important is the issue of litter to you? \_\_\_\_\_
4. Of the people who pass through this location, what percentage of the people do you think litter?  
\_\_\_\_\_ %
5. Have you seen or heard a specific message about litter prevention in the past year?  Yes  No
6. Have you seen or heard a specific message about a scheduled community clean up in the past year?  
 Yes  No
7. Have you seen or heard any messages discouraging cigarette butt litter in the past year?  Yes  No
8. Have you seen or heard any messages simply telling people ‘do not litter’ in the past year?  Yes  No
9. [IF 5-8 = NO, SKIP TO Q10] **Think of the most recent litter prevention message you’ve seen or heard in the past year. Where did you see it or hear it? (check one)**
  - 1. PSA on the radio
  - 2. PSA/Commercial/News Report on Television
  - 3. Billboard
  - 4. Newspaper
  - 5. Community Flyer/Bulletin
  - 6. From a Friend/Family Member
  - 7. Other \_\_\_\_\_

*Next I am going to ask you a set of situational questions. There are no right or wrong answers. Please answer using this scale from 0 to 10 where 0 equals “no personal obligation” and 10 equals “very strong obligation.” Do you feel a personal obligation...*

- \_\_\_\_\_ 10a. to not litter when you are holding an empty soft drink can and there are no trash cans available?
- \_\_\_\_\_ 10b. to not litter when you are holding a gum wrapper and there are no trash cans available?
- \_\_\_\_\_ 10c. to stop and pick-up a piece of scrap paper that blows off a big stack of papers that you are carrying in both arms?
- \_\_\_\_\_ 10d. to not litter when you are ill (fever, headache, muscle ache) and you would have to walk out of your way to reach a trash receptacle?
- \_\_\_\_\_ 10e. to pick-up a piece of paper you dropped when it is raining and you are getting soaked?
11. In the past month, have you littered?  Yes  No [SKIP TO Q12]

**11a. Where did you litter?**

**11b. What did you litter?** (Probe for Specific Litter Type)

**11c. What would you say is the reason that you littered?**

*Now I would like to ask you a few questions about tobacco use...[X-OUT IF < 21 YRS)*

**12. Do you smoke cigarettes?**  Yes  No [SKIP TO Q12]

**12a. When you smoke outside, how do you usually dispose of the cigarette butt?**

**13. Do you consider cigarette butts to be litter?**  Yes  No

*For classification purposes, I'd like to ask you a few questions about yourself...*

**14. In what year were you born?** \_\_\_\_\_ (21years old if born on or before 1987)

**15. What is the highest grade of school you have completed?** \_\_\_\_\_

*That's all the questions I have for you today. Thank you for sharing your thoughts.*

*Do you have any questions?*

**TO BE COMPLETED BY INTERVIEWER:**

**Interview End Time** \_\_\_\_:\_\_\_\_ am/pm

**Gender:**  1. Male  2. Female  3. Unknown

**How well did the respondent understand the questions?**

1. Very Well  2. Somewhat Well  3. Not Well

**How attentive was the respondent?**

1. Very Attentive  2. Somewhat Attentive  3. Not at all Attentive

Notes:

# APPENDIX D: TELEPHONE SURVEY INSTRUMENT

---

INTRO1. Hello, my name is \_\_\_\_\_ and I'm calling from Action Research, Inc., a public opinion research company. We are not selling anything. Your number was chosen randomly and I would like to ask you some questions about the health and well-being of your community. This survey will take less than 10 minutes to complete. You are one of 1,200 people across the nation who will be taking part in this important research project.

INTRO2. Are you at least 18 years of age?

1. YES
2. NO [▶ ASK FOR HOUSEHOLD MEMBER AT LEAST 18 YEARS OF AGE]

INTRO3. We will not ask for your name or any other personal information that can identify you. The answers you give will be kept strictly confidential. You do not have to answer any questions you do not want to and you may stop the interview at any time.

## LIVABILITY QUOTIENT

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TBI. Okay, let's begin. For each of the following questions please choose the answer that best describes the physical environment in your community.

[RANDOMIZE ORDER OF QUESTIONS IN THIS SECTION]

QB11. How much litter is visible in your community?

1. Virtually no visible litter
2. Upon careful inspection a small amount of litter is obvious
3. Visible litter can be seen throughout the area, likely requiring in an organized clean-up
4. Major illegal dumpsites are present, likely requiring equipment or extra manpower for removal
8. DON'T KNOW
9. REFUSED

QB12. How clean is your community?

1. Very clean
2. Somewhat clean
3. Not very clean
4. Not at all clean
8. DON'T KNOW
9. REFUSED

QBI3. Are the streets and sidewalks in your community well-maintained for people who are walking? [CLARIFY, IF NECESSARY: "I am asking about your community, not necessarily your specific neighborhood or area in front of your home." IF RESPONDENT CONTINUES TO STATE HE/SHE DOESN'T HAVE SIDEWALKS, CODE AS "NA."]

1. Very well maintained
2. Somewhat maintained
3. Not very well maintained
4. Not at all maintained
7. NA – NO SIDEWALKS
8. DON'T KNOW
9. REFUSED

QBI4. Are the streets and sidewalks in your community safe for people to walk during the daylight hours? [CLARIFY, IF NECESSARY: "I am asking about your community, not necessarily your specific neighborhood or area in front of your home." IF RESPONDENT CONTINUES TO STATE HE/SHE DOESN'T HAVE SIDEWALKS, CODE AS "NA."]

1. Very safe
2. Somewhat safe
3. Somewhat unsafe
4. Very unsafe
7. NA – NO SIDEWALKS
8. DON'T KNOW
9. REFUSED

QBI5. Are the streets and sidewalks in your community an inviting place for people to walk? [CLARIFY, IF NECESSARY: "I am asking about your community, not necessarily your specific neighborhood or area in front of your home." IF RESPONDENT CONTINUES TO STATE HE/SHE DOESN'T HAVE SIDEWALKS, CODE AS "NA."]

1. Very inviting
2. Somewhat inviting
3. Somewhat uninviting
4. Very uninviting
7. NA – NO SIDEWALKS
8. DON'T KNOW
9. REFUSED

QBI6. How would you describe the landscaping in your community, for instance, the number of flowers, plants, and trees?

1. There are a lot of flowers, plants, and trees
2. There are some flowers, plants, and trees
3. There aren't many flowers, plants, and trees
4. There are no flowers, plants, and trees
8. DON'T KNOW
9. REFUSED

QBI7. How would you describe the attractiveness of the flowers, plants, and trees in your community?

1. They are very attractive
2. They are somewhat attractive
3. They are somewhat unattractive
4. They are very unattractive
8. DON'T KNOW
9. REFUSED

QBI8. How would you describe the attractiveness of things like, benches, planters, street signs, and street lights in your community?

1. They are very attractive
2. They are somewhat attractive
3. They are somewhat unattractive
4. They are very unattractive
8. DON'T KNOW
9. REFUSED

## WORK ENVIRONMENT

---

TWE. Okay, I'd like to switch subjects for just a moment.

QWE1. Do you currently work for pay?

1. YES
2. NO [▶ SKIP TO TTU]
8. DON'T KNOW [▶ SKIP TO TTU]
9. REFUSED [▶ SKIP TO TTU]

QWE2. Do you currently work primarily in an indoor or an outdoor environment?

1. INDOOR
2. OUTDOOR
8. DON'T KNOW
9. REFUSED



QWE3. Is that location designated as a smoke-free environment?

1. YES
2. NO
8. DON'T KNOW
9. REFUSED

#### CURRENT TOBACCO USE

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TTU. Now I would like to ask you a few questions about tobacco use.

QTU1. Have you smoked at least 100 cigarettes in your entire life?

1. YES
2. NO [▶ SKIP TO TKAB]
8. DON'T KNOW [▶ SKIP TO TKAB]
9. REFUSED [▶ SKIP TO TKAB]

QTU2. Do you smoke cigarettes every day, some days, or not at all?

1. EVERY DAY [▶ RECEIVES SMOKER QUESTIONS THROUGHOUT SURVEY]
2. SOME DAYS [▶ RECEIVES SMOKER QUESTIONS THROUGHOUT SURVEY]
3. NOT AT ALL [▶ SKIP TO TKAB]
8. DON'T KNOW [▶ SKIP TO TKAB]
9. REFUSED [▶ SKIP TO TKAB]

#### CIGARETTE DISPOSAL

---

---

QCD1. Does the location where you currently work have receptacles for cigarette butts?

1. YES
2. NO
8. DON'T KNOW
9. REFUSED

QCD2. Does the vehicle you ride in most often have a receptacle for cigarette butts?

1. YES
2. NO
8. DON'T KNOW
9. REFUSED

QCD3. Do you own a pocket ashtray?

1. YES
2. NO
8. DON'T KNOW
9. REFUSED

LITTERING BEHAVIOR – TYPE – KAB 1968

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TKAB. For the next set of eight questions please think about your daily activities at home, at work, while shopping, and while socializing with friends and family.

In the past month have you . . .

[RANDOMIZE QUESTIONS]

- QKAB1.           dropped gum or candy wrappers on the ground, sidewalk, or street?
- QKAB2.           dropped facial tissue on the ground, sidewalk, or street?
- QKAB3.           dropped food or food wrappers on the street or highway?
- QKAB4.           dropped beer or soda cans, or bottles on beaches or other outdoor areas?
- QKAB5.           dropped paper containers of any kind on the ground, sidewalk, or street?
- QKAB6.           left a newspaper behind for someone else to pick up?
- QKAB7.           left paper, food remnants, or other discards at a picnic area?
- QKAB8.           thrown things out of a car or boat on the highways or waterways?
1. YES - - - 2. NO - - - 8. DON'T KNOW - - - 9. REFUSED

LITTERING BEHAVIOR – TYPE/LOCATION COMPARISONS

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TCOMP. The next set of questions is about the types of items commonly seen on our sidewalks, streets, in our parks, and on our highways.

Using a scale from zero to ten, where zero equals not at all likely and ten equals very likely how likely are you to drop . . .

[RANDOMIZE BLOCKS OF QUESTIONS – BLOCK1, BLOCK2, BLOCK 3, BLOCK 4]

- QCOMP1a.       an apple core, or a banana peel out of a vehicle window?
- 0 - - - 1 - - - 2 - - - 3 - - - 4 - - - 5 - - - 6 - - - 7 - - - 8 - - - 9 - - - 10 - - - 98 DK - - 99 REF

- QCOMP1b. an apple core, or a banana peel on the ground when you are walking to or from your vehicle or transit area?  
0 --- 1 --- 2 --- 3 --- 4 --- 5 --- 6 --- 7 --- 8 --- 9 --- 10 --- 98 DK - - 99 REF
- QCOMP1c. an apple core, or a banana peel on the ground when you are at a park or other outdoor area?  
0 --- 1 --- 2 --- 3 --- 4 --- 5 --- 6 --- 7 --- 8 --- 9 --- 10 --- 98 DK - - 99 REF
- QCOMP2a. wrappers from gum, snack food, or candy out of a vehicle window?  
0 --- 1 --- 2 --- 3 --- 4 --- 5 --- 6 --- 7 --- 8 --- 9 --- 10 --- 98 DK - - 99 REF
- QCOMP2b. wrappers from gum, snack food, or candy on the ground when you are walking to or from your vehicle or transit area?  
0 --- 1 --- 2 --- 3 --- 4 --- 5 --- 6 --- 7 --- 8 --- 9 --- 10 --- 98 DK - - 99 REF
- QCOMP2c. wrappers from gum, snack food, or candy on the ground when you are at a park or other outdoor area?  
0 --- 1 --- 2 --- 3 --- 4 --- 5 --- 6 --- 7 --- 8 --- 9 --- 10 --- 98 DK - - 99 REF
- QCOMP3a. paper or plastic fast food containers out of a vehicle window?  
0 --- 1 --- 2 --- 3 --- 4 --- 5 --- 6 --- 7 --- 8 --- 9 --- 10 --- 98 DK - - 99 REF
- QCOMP3b. paper or plastic fast food containers on the ground when you are walking to or from your vehicle or transit area?  
0 --- 1 --- 2 --- 3 --- 4 --- 5 --- 6 --- 7 --- 8 --- 9 --- 10 --- 98 DK - - 99 REF
- QCOMP3c. paper or plastic fast food containers on the ground when you are at a park or other outdoor area?  
0 --- 1 --- 2 --- 3 --- 4 --- 5 --- 6 --- 7 --- 8 --- 9 --- 10 --- 98 DK - - 99 REF
- QCOMP4a. gum out of a vehicle window?  
0 --- 1 --- 2 --- 3 --- 4 --- 5 --- 6 --- 7 --- 8 --- 9 --- 10 --- 98 DK - - 99 REF
- QCOMP4b. gum on the ground when you are walking to or from your vehicle or transit area?  
0 --- 1 --- 2 --- 3 --- 4 --- 5 --- 6 --- 7 --- 8 --- 9 --- 10 --- 98 DK - - 99 REF
- QCOMP4c. gum on the ground when you are at a park or other outdoor area?  
0 --- 1 --- 2 --- 3 --- 4 --- 5 --- 6 --- 7 --- 8 --- 9 --- 10 --- 98 DK - - 99 REF

FOR SMOKERS ONLY [ASK IF QTU3 = 1 OR 2, ELSE SKIP TO TPN]:

QCOMP5a. cigarette butts out of a vehicle window?

0 --- 1 --- 2 --- 3 --- 4 --- 5 --- 6 --- 7 --- 8 --- 9 --- 10 --- 98 DK - - 99 REF

QCOMP5b. cigarette butts on the ground when you are walking to or from your vehicle or transit area?

0 --- 1 --- 2 --- 3 --- 4 --- 5 --- 6 --- 7 --- 8 --- 9 --- 10 --- 98 DK - - 99 REF

QCOMP5c. cigarette butts on the ground when you are at a park or other outdoor area?

0 --- 1 --- 2 --- 3 --- 4 --- 5 --- 6 --- 7 --- 8 --- 9 --- 10 --- 98 DK - - 99 REF

#### PERSONAL NORMS SCALE

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TPN. Thank you for your patience, we are more than half-way done. Next I am going to ask you a set of five situational questions. There are no right or wrong answers. Please answer using a scale from zero to ten where zero equals *no personal obligation* and ten equals *a very strong personal obligation*.

Do you feel a personal obligation to . . .

[RANDOMIZE QUESTIONS]

QPN1. not litter when you are holding an empty soft drink can and there are no trash cans available?

0 --- 1 --- 2 --- 3 --- 4 --- 5 --- 6 --- 7 --- 8 --- 9 --- 10 --- 98 DK - - 99 REF

QPN2. not litter when you are holding a gum wrapper and there are no trash cans available?

0 --- 1 --- 2 --- 3 --- 4 --- 5 --- 6 --- 7 --- 8 --- 9 --- 10 --- 98 DK - - 99 REF

QPN3. stop and pick-up a piece of scrap paper that blows off a big stack of papers that you are carrying in both arms?

0 --- 1 --- 2 --- 3 --- 4 --- 5 --- 6 --- 7 --- 8 --- 9 --- 10 --- 98 DK - - 99 REF

QPN4. not litter when you are ill (fever, headache, muscle ache) and you would have to walk out of your way to reach a trash receptacle?

0 --- 1 --- 2 --- 3 --- 4 --- 5 --- 6 --- 7 --- 8 --- 9 --- 10 --- 98 DK - - 99 REF

QPN5. pick-up a piece of paper you dropped when it is raining and you are getting soaked?

0 --- 1 --- 2 --- 3 --- 4 --- 5 --- 6 --- 7 --- 8 --- 9 --- 10 --- 98 DK - - 99 REF

#### LITTER BELIEFS AND ACTIONS

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---

TLB. Acknowledging that we all have the potential to litter, I'm going to read you six statements that describe reasons why and situations where you might litter. Please tell me if you strongly agree, agree, disagree, or strongly disagree with the following statements:

I am more likely to litter . . .

[RANDOMIZE QUESTIONS]

QLB1. when the item I'm holding isn't recyclable.

QLB2. when I am in a bad mood.

QLB3. when I know someone else will be around to pick it up.

QLB4. when I don't have time to take care of it any other way.

QLB5. when there isn't a trashcan or bag nearby.

QLB6. when the item is biodegradable.

1 Strongly Agree - - 2 Agree - - 3 Disagree - - 4 Strongly Disagree - - - - - 8 DK - - 9 REF

## MESSAGES

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TM. Now, I have a few questions about litter and litter prevention.

QM1. Using a scale from zero to ten where zero equals not at all important and ten equals very important, in your town or city, how important is the issue of litter?

- 98. DON'T KNOW
- 99. REFUSED

QM2. In the past year, have you seen or heard any messages about litter prevention?

- 1. YES
- 2. NO [▶ SKIP TO TD]
- 8. DON'T KNOW [▶ SKIP TO TD]
- 9. REFUSED [▶ SKIP TO TD]

QM3. What was the subject of the information you saw or heard?

[CHECK ALL THAT APPLY]

- 1. INFORMATION ABOUT GENERAL LITTER
- 2. INFORMATION ABOUT CIGARETTE BUTT LITTER
- 3. INFORMATION ABOUT A COMMUNITY/BEACH CLEAN-UP (EVENT)
- 4. OTHER \_\_\_\_\_
- 8. DON'T KNOW
- 9. REFUSED

QM4. Where did you see or hear it?

[CHECK ALL THAT APPLY]

- 1. PSA ON THE RADIO
- 2. PSA/COMMERCIAL/NEWS REPORT ON TELEVISION
- 3. BILLBOARD
- 4. NEWSPAPER
- 5. COMMUNITY FLYER/BULLETIN
- 6. FROM A FRIEND/FAMILY MEMBER
- 7. OTHER \_\_\_\_\_
- 8. DON'T KNOW
- 9. REFUSED

## DEMOGRAPHIC VARIABLES

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TD. We are almost done. This last set of questions is for classification purposes only.

QD1. In what year were you born?

98. DON'T KNOW

99. REFUSED

QD2. Are you of Hispanic or Latino origin?

1. YES

2. NO

8. DON'T KNOW

9. REFUSED

QD3. What is your race?

[IF RESPONDENT SAYS ANTHING OTHER THAN RESPONSES LISTED, PUT IN OTHER] [FOR EXAMPLE, "ITALIAN" OR "BLACK AND JAPANESE"]

1. AMERICAN INDIAN OR ALASKA NATIVE

2. ASIAN

3. BLACK OR AFRICAN AMERICAN

4. HISPANIC OR LATINO

5. NATIVE HAWAIIAN OR OTHER PACIFIC ISLANDER

6. WHITE

7. OTHER \_\_\_\_\_

8. DON'T KNOW

9. REFUSED

QD4. What is the highest grade or year of school you have completed?

[CLARIFY, IF NECESSARY]

1. NEVER ATTENDED SCHOOL OR ONLY ATTENDED KINDERGARTEN
2. GRADES 1 THROUGH 8 (ELEMENTARY ONLY)
3. GRADES 9 THROUGH 11 (SOME HIGH SCHOOL)
4. GRADE 12 OR GED (HIGH SCHOOL GRADUATE)
5. SOME COLLEGE OR TECHNICAL SCHOOL
6. COLLEGE GRADUATE (4-YEAR DEGREE)
7. GRADUATE COLLEGE DEGREE
8. DON'T KNOW
9. REFUSED

QD5. Including yourself, how many people live in your household?

- 
98. DON'T KNOW
  99. REFUSED

QD6. In what type of residence do you live?

1. House, single detached
2. Apartment/Townhouse/Condominium
3. Mobile Home
8. DON'T KNOW
9. REFUSED

QD7. What type of vehicle do you drive most often?

1. Car
2. Pick-up truck
3. Van/mini-van
4. Sports Utility Vehicle (SUV)
5. I DON'T DRIVE
6. OTHER \_\_\_\_\_
8. DON'T KNOW
9. REFUSED

QD8. What is your postal zip code?

- 
88888. DON'T KNOW
  99999. REFUSED



QD9. Please stop me when I get to the category that best describes your annual household income.

1. below \$40,000, or [SKIP TO QD9A]
2. \$40,000 or above [SKIP TO QD9B]
8. DON'T KNOW
9. REFUSED

QD9A.

1. \$30,000 to under \$40,000
2. \$20,000 to under \$30,000
3. \$10,000 to under \$20,000
4. under \$10,000
8. DON'T KNOW
9. REFUSED

QD9B.

1. \$40,000 to under \$50,000
2. \$50,000 to under \$60,000
3. \$60,000 to under \$70,000
4. \$70,000 to under \$80,000
5. \$80,000 to under \$90,000
6. \$90,000 to under \$100,000
7. \$100,000 to under \$150,000
8. \$150,000 or more
98. DON'T KNOW
99. REFUSED

CLOSE. Thank you very much for your time and participation.

INTERVIEWER ONLY

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IC1. INTERVIEWER: RECORD GENDER

1. MALE
2. FEMALE
8. DON'T KNOW

IC2. HOW WELL DID THE RESPONDENT UNDERSTAND THE QUESTIONS?

1. VERY WELL
2. SOMEWHAT WELL
3. NOT WELL

IC3. HOW ATTENTIVE WAS THE RESPONDENT?

1. VERY ATTENTIVE
2. SOMEWHAT ATTENTIVE
3. NOT AT ALL ATTENTIVE

IC4. HOW COOPERATIVE WAS THE RESPONDENT?

1. VERY COOPERATIVE
2. SOMEWHAT COOPERATIVE
3. NOT AT ALL COOPERATIVE