

Supplemental Material

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Study 1

Persuasive Messages

Introduction: Dr. R. L. Pierce, a professor of economics from the University of Washington, has put together a short report arguing against the benefits of paper recycling programs. Please read and consider the arguments on this issue.

Study 1A

Practical Arguments:

Recycling: Costly and Unfeasible

Despite recycling's reputation for benefiting the economy, the process of recycling is actually more expensive and inefficient than standard trash programs. From the increased costs of additional trucks required to pick up recycling in addition to trash, to the costs of water and air purification due to the lengthy and energy-inefficient recycling process, recycling programs are prohibitively expensive and diverts resources from other worthy public works programs.

Curbside recycling requires that more trucks be used to collect the same amount of waste materials, trucks that pick up perhaps four to eight pounds of recyclables, rather than forty or more pounds of trash. Los Angeles has estimated that because it has curbside recycling, its fleet of trucks is twice as large as it otherwise would be—800 versus 400 trucks. An increase in trucks greatly increases traffic, both on the highways and on city roads, which is simply unsustainable in large metropolises.

The cost of water purification – another city-run program- typically increases when recycling plants are added to a community (Los Angeles estimates they have experienced a 9% hike in spending on water purification). Since landfills do not involve any treatment, they do not leak chemicals into waterways, and thus require only a small budget for maintenance. However, because recycling is an energy-draining process, the quantities of toxic substances leaked into public waterways is staggering- sometimes up to 60 gallons per month. Purifying the water of these chemicals is a grossly expensive process.

The cost of cleaning the air is similarly expensive, especially since these toxins can diffuse across vast areas (up to 12 miles from the source), thus requiring complex technologies that purify the air before it is released into the atmosphere outside the recycling plant. This machinery is incredibly costly and can be quite temperamental, thus requiring frequent maintenance, which incurs additional fees.

Finally, since individuals typically do not want to live near a recycling plant due to the noise and fumes released into the air, the housing economy in nearby neighborhoods often plummets, as individuals try to sell their homes, and must accept a greatly reduced price for their homes. The fumes released by recycling plants therefore do not only cost the government directly, but through their negative impact on the economy, there is a societal cost to recycling plants as well.

The conclusion is clear: recycling is incredibly costly and uses up funding and other resources that could be used for other programs. Put simply, these costs render recycling an inefficient and unfeasible endeavor for most communities to adopt.

Moral Arguments:

Recycling: Harmful and Immoral

Despite recycling's reputation for benefiting the environment, the process of recycling unethically harms our vulnerable environment and threatens it in ways that go beyond the harms done by standard trash programs. From the harms of increased pollution and roadkill caused by more trucks needed to pick up recycling in addition to trash, to the precious pets and animals mercilessly killed by fumes produced in the recycling process, recycling does more harm than it does good. Recycling is evidently an immoral process.

Los Angeles has estimated that because it has curbside recycling, its fleet of trucks is twice as large as it otherwise would be—800 versus 400 trucks, to pick up the same amount of waste. This means more air pollution in the Los Angeles basin, which is both incredibly harmful to the wildlife and people that live in surrounding areas, not to mention the toxins and impurities it releases into the air.

Household pets are some of the creatures most harmed by the increased number of trucks on the road due to recycling programs. An estimated 500,000 household pets get run over by trucks every year in America, and that number has steadily increased since adding more recycling trucks on our streets – Los Angeles estimates that since it has implemented its recycling program, 18% more pets are killed per month. This increase in pets killed due to recycling programs is utterly tragic.

These pets, as well as the wildlife in surrounding areas, are also harmed by all the toxins released into the air by recycling plants, and as they breathe in these toxic fumes, their fragile lungs become coated with lethal quantities of toxins. Typically, animals that live near recycling plants live much shorter lives, (according to PETA they live 2-5 years less than the average animal of the same species) and some do not even want to go outside because of all the contamination that hangs in the air.

Finally, many of the plant species that grow in the areas surrounding recycling plants are being destroyed by the toxic fumes leeching out into the atmosphere. The plant life in these areas has turned an unnatural and sickly brown, which is likely to further degrade surrounding ecosystems. This is inexcusable and seriously unethical.

The conclusion is clear: recycling is immoral, and we would be better off without it. Put simply, the recycling process is more damaging than beneficial to the environment, which harms the American landscape as well as the creatures that inhabit it. Supporting recycling programs would be a grave moral transgression.

Study 1B

Practical Arguments:

Recycling: Costly and Unfeasible

Despite recycling's reputation for improving the economy, the process of recycling is actually more expensive and inefficient than standard trash programs. From the increased costs of additional trucks required to pick up recycling in addition to trash, to the costs of water and air purification due to the lengthy and energy-inefficient recycling process, recycling programs are prohibitively expensive and diverts resources from other positive public works programs.

Curbside recycling requires that more trucks be used to collect the same amount of waste materials, trucks that pick up perhaps four to eight pounds of recyclables, rather than forty or more pounds of trash. Los Angeles has estimated that because it has curbside recycling, its fleet of trucks is twice as large as it otherwise would be—800 versus 400 trucks. An increase in trucks greatly increases traffic, both on the highways and on city roads, which is simply unsustainable in large metropolises.

The cost of water purification – another city-run program- typically increases when recycling plants are added to a city (Los Angeles estimates they have experienced a 9% hike in spending on water purification). Since landfills do not involve any treatment, they do not leak chemicals into waterways, and thus require only a small budget for maintenance. However, because recycling is an energy-draining process, the quantities of toxic substances leaked into public waterways is staggering- sometimes up to 60 gallons per month. Purifying the water of these chemicals is a grossly expensive process.

The cost of filtering the air is similarly expensive, especially since these toxins can diffuse across vast areas (up to 12 miles from the source), thus requiring complex technologies that filter the air before it is released into the atmosphere outside the recycling plant. This machinery is incredibly costly and can be quite temperamental, thus requiring frequent maintenance, which incurs additional fees.

Finally, since people typically do not want to live near a recycling plant due to the noise and fumes released into the air, the housing economy in nearby neighborhoods often plummets, as people try to sell their homes, and must accept a greatly reduced price for their homes. The fumes released by recycling plants therefore do not only cost the government directly, but through their negative impact on the economy, there is a societal cost to recycling plants as well.

The conclusion is clear: recycling is incredibly costly and uses up funding and other resources that could be used for other programs. Put simply, these costs render recycling an inefficient and unfeasible endeavor for most municipalities to adopt.

Moral Arguments:

Recycling: Harmful and Immoral

Despite recycling's reputation for benefiting the environment, the process of recycling unethically harms our vulnerable environment and threatens it in ways that go beyond the harms done by standard trash programs. From the harms of increased pollution and roadkill caused by more trucks needed to pick up recycling in addition to trash, to the precious pets and animals mercilessly killed by fumes produced in the recycling process, recycling does more harm than it does good. Recycling is evidently an immoral process.

Los Angeles has estimated that because it has curbside recycling, its fleet of trucks is twice as large as it otherwise would be—800 versus 400 trucks, to pick up the same amount of waste. This means more air pollution in the Los Angeles basin, which is both incredibly harmful to the wildlife and people that live in surrounding communities, not to mention the filth it releases into the air.

Household pets are some of the creatures most harmed by the increased number of trucks on the road due to recycling programs. An estimated 500,000 household pets get run over by trucks every year in America, and that number has steadily increased since adding more recycling trucks on our streets – Los Angeles estimates that since it has implemented its recycling program, 18% more pets are killed per month. This increase in pets killed due to recycling programs is utterly tragic.

These pets, as well as the wildlife in surrounding communities, are also harmed by all the toxins released into the air by recycling plants, and as they breathe in these repulsive fumes, their fragile lungs become coated with lethal quantities of toxins. Typically, animals that live near recycling plants live much shorter lives, (according to PETA they live 2-5 years less than the average animal of the same species) and some do not even want to go outside because of all the contamination that hangs in the air.

Finally, many of the plant species that grow in the areas surrounding recycling plants are being destroyed by the toxic fumes leeching out into the atmosphere. The plant life in these areas has turned an unnatural and sickly brown, which is likely to spread contagion to surrounding ecosystems. This is inexcusable and seriously unethical.

The conclusion is clear: recycling is immoral, and we would be better off without it. Put simply, the recycling process is more damaging than beneficial to the environment, which harms the American landscape as well as the creatures that inhabit it. Supporting recycling programs would be a grave moral transgression.

Measured Variables

Demographics

- d_gen: Gender: (1 = Male; 2 = Female; 3 = Prefer Not to Say; 4 = Other [free response])
- d_age: What is your age? [free responses]
- d_lang: What is your primary language (i.e., the one you speak most of the time)?
 1. English
 2. Spanish
 3. Chinese
 4. French
 5. German
 6. Dutch
 7. Japanese
 8. Hebrew
 9. Swedish
 10. Other (specify) [free response]

Initial Attitudes

Pre-message attitude items were preceded by a brief introduction to the study's topic:

In recent years, the topic of recycling has increased in popular attention. Recycling is a process to change waste materials like glass, paper, and plastic into new products to prevent waste of potentially useful materials and reduce the consumption of fresh raw materials. Materials to be recycled are either brought to a collection center or picked up from the curbside, then sorted, cleaned, and reprocessed into new materials bound for manufacturing. A considerable investment in recycling occurred in the 1970s, after which the availability of recycling programs has continued to grow. In 1980, America recycled only 9.6% of its municipal waste; today the rate stands at 32%. A similar trend can be seen in Europe, where some countries, such as Austria and the Netherlands, now recycle 60% or more of their municipal waste. Though recycling programs have been implemented in many cities across America, there are still a number of municipalities that have not implemented any recycling program. Given the considerable growth of recycling efforts, in this study we'd like to hear from you to better understand people's attitudes and beliefs about recycling.

Please rate RECYCLING on the following scales (-4 to +4):

- att1_1: Bad-Good
- att1_2: Dislike-Like
- att1_3: Negative-Positive

Attitude Bases

The following five items were presented in a random order. Our key predictor is the first item in this list. It is embedded among other "perceived attitude bases" so as not to arouse suspicion about the research aims.

All responses provided on 5-point scales (1 = Not at all; 5 = Extremely)

- base_mor: To what extent is your attitude about recycling based in your core moral beliefs and principles? (1 = Not at all; 5 = Extremely)

- base_prac: To what extent is your attitude about recycling based in practical concerns? (1 = Not at all; 5 = Extremely)
- base_cons: To what extent is your attitude about recycling based in what other people think about the issue? (1 = Not at all; 5 = Extremely)
- base_know: To what extent is your attitude about recycling based in your knowledge of the issue? (1 = Not at all; 5 = Extremely)
- base_emo: To what extent is your attitude about recycling based in your emotions? (1 = Not at all; 5 = Extremely)

Post-Message Attitudes

Please rate RECYCLING on the following scales (-4 to +4):

- att2_1: Bad-Good
- att2_2: Dislike-Like
- att2_3: Negative-Positive

Cognitive Responses

Take a few minutes to use the response boxes on the next few screens to write any thoughts you had while reading the essay you just read that argued against paper recycling programs. Write down all of the thoughts you have, whether they are favorable, opposed, neutral, or irrelevant to the essay and its topic.

Please list one thought per box. You do not need to use all of the boxes available to you, but please list at least one thought and use as many as it takes to convey your reactions to the essay you read. When you have no more thoughts left to list, simply leave the box blank and hit the continue button.

[Six available thought-listing boxes.]

Message Perceptions

- essMoral: To what extent did the essay make arguments related to moral concerns? (1 = Not at all; 7 = Very much)
- essPrac: To what extent did the essay make arguments related to practical concerns? (1 = Not at all; 7 = Very much)

Political Orientation

- poli_soc: When it comes to social issues, where would you place yourself on a scale from "very conservative" to "very liberal?" (1 = Very Liberal; 5 = Very Conservative)
- poli_econ: When it comes to economic issues, where would you place yourself on a scale from "very conservative" to "very liberal?" (1 = Very Liberal; 5 = Very Conservative)

Thought Coding Instructions

Two undergraduate research assistants coded the valence of each thought participants listed. They were blind to condition, and received Excel spreadsheets listing randomly generated participant ID numbers from Qualtrics and the six thought listing variables. They coded all fields in which participants provided any content. Below is a copy of the coding instructions provided to raters for the purposes of judging the valence of each cognitive response.

Some participants may have more thoughts than others. Please consider each thought independently. Please finish a column (e.g. “Thought 1”) before moving on to the next. Once you have gone through each column, please answer the questions about the participant as a whole (now you may go back and look at all the thoughts one participant had in order to answer these questions).

Code each thought as A) pro-MESSAGE on recycling B) anti-MESSAGE on recycling, C) neutral about the message on recycling, or D) unrelated to recycling.

***Note: Since the message participants read was anti-recycling, a pro-message thought might include a thought that is **anti**-recycling.*

Pro-message examples: “The author makes some good points”. OR “Recycling is clearly not as great as we once thought”

Anti-message example: “This author is clearly very biased” OR “I’m still going to keep recycling”

Neutral-message example: “You can recycle paper and glass” OR “I didn’t have any thoughts on recycling”

Unrelated example: “Hard to concentrate on the message” and “This study is so fun and great”

***Please ensure that you are thinking about each thought independently of one another.*

In the codebook spreadsheet, enter the following codes for each individual thought:

What type of thought is this?

A) pro-message (or anti-recycling) = 1

B) anti-message (or pro recycling) = 2

C) neutral about the message/recycling = 3

D) unrelated to the message/recycling = 4

Study 2

Persuasive Messages

Introduction: On the following page, you will see a brief article arguing against marijuana legalization. Please read and consider the arguments on this issue.

Practical Arguments:

Legalizing Marijuana: Unwise and Impractical

As states continue to pass measures that legalize marijuana production, sale, and use, it is imperative to consider whether these new laws are ultimately rational. In the rush to legalize, we haven't fully thought through some of the pragmatic consequences of legalization, such as the high cost of legal regulation, or the lost productivity caused by increased drug use. By instilling increased tax burden among our citizens and disrupting the workforce and greater economy, legalizing marijuana so swiftly may have negative practical effects. Although some believe that making marijuana legal is the moral thing to do, it is impractical for the following reasons.

First, marijuana legalization is incredibly difficult to regulate due to the current infrastructure for black market sales of the drug. Expecting the entire cannabis industry to smoothly transition into a well-regulated market is naïve and highly infeasible. Given how easy it is to travel across state lines, every state that legalizes marijuana makes it more challenging for drug enforcement in other states. By some estimates, up to 5 million Americans have smuggled marijuana from neighboring states that have legalized the drug. We need to pay more attention to these very real logistical and legal risks and not encourage their occurrence.

Second, legalizing marijuana could come at an incredible economic cost to all of us. Repealing current laws will generate additional costs due to increases in marijuana use and dependence. Implementing and enforcing reforms will require up-front spending to establish a new regulatory framework and on-going spending to collect taxes and regulate retailers and distributors. Opponents passionately claim that regulating marijuana is economically unfeasible. After all, our country's experiences with alcohol and tobacco show that for every dollar gained in taxes, we spent 10 dollars on social costs. Those are steep costs due to hasty marijuana legalization without taking precautions necessary to prevent senseless spending. People should be outraged at how inefficient the consequences are.

Finally, another major concern is that if we're not careful, increased marijuana use could slow workplace productivity with deep costs to the general economy. Several studies associate workers' marijuana smoking with increased absences, tardiness, accidents, workers' compensation claims, and job turnover. Heavy marijuana users also show poorer complex attention functioning and memory deficits. In other countries that have legalized marijuana, (e.g., Canada) many large companies have noticed a catastrophic increase in losses due to marijuana-related employee issues, which is a real travesty.

The reckless way that we are legalizing marijuana so far is mind-boggling from a practical perspective. It's not a moral question but rather a practical one. Instead of rushing to enact new laws that are as nonsensical as the ones they replace, let's sort out the risks and rewards using current scientific knowledge. Perhaps then we'll avoid practices that bring problems to future generations.

Moral Arguments:

Legalizing Marijuana: Harmful and Immoral

As states continue to pass measures that legalize marijuana production, sale, and use, it is imperative to consider whether these new laws are ultimately moral. In the rush to legalize, we haven't fully thought through some of the ethical consequences of legalization, such as how it might hurt minorities and children, or the suffering caused by increased impaired driving. By legitimizing an exploitative industry, and disrupting our communities and greater society, legalizing marijuana so swiftly may have detrimental immoral effects. Although some believe that making marijuana legal will have practical benefits, it is unethical for the following reasons.

First, marijuana legalization is incredibly harmful to some of the most vulnerable and marginalized individuals in our society: namely, children, minorities, and those with a pre-disposition to mental illness. We know how dangerous marijuana is to the developing brains of adolescents, especially those with a family history of addiction or mental illness. It can lead to disease and mental impairment, and is especially damaging for those in marginalized communities, who lack resources to counter-act these effects. Heavy-smoking teens are 60 percent less likely to graduate from high school and are seven times more likely to attempt suicide. We need to have some integrity, show greater care for youth and minorities and not encourage these dangerous and unethical outcomes.

Second, legalizing marijuana could threaten the safety of society in general, as impaired driving is expected to surge if legalization takes effect. Millions of drivers and pedestrians would become vulnerable to injury or death caused by driving under the influence. In other countries that have legalized marijuana, (e.g., Canada) the incidence of impaired driving has doubled, and the deaths caused by high driving have increased by up to 25%. Those are innocent lives lost and families destroyed due to hasty marijuana legalization without taking precautions necessary to prevent senseless killing. People should be outraged at these immoral consequences.

Finally, another major concern is that if we're not careful, the marijuana industry could quickly become the next Big Tobacco. A large marijuana industry is likely to unjustly sacrifice the welfare of consumers in order to increase profits. In particular, a common tactic is to exploit people already using the drug heavily and irresponsibly, marketing aggressively to heavy pot users who may have a drug problem. This is similar to what's happened in the alcohol, tobacco, and pharmaceutical industries who make much of their profits from users with serious addiction issues.

The reckless way that we are legalizing marijuana so far is mind-boggling from an ethical perspective. It's not a practical question but rather a moral one. Instead of rushing to enact new

laws that are as immoral as the ones they replace, let's sort out what's right and wrong. Perhaps then we'll avoid practices that unfairly damage future generations.

Measured Variables

Demographics

- d_gen: Gender: (1 = Male; 2 = Female; 3 = Prefer Not to Say; 4 = Other [free response])
- d_age: What is your age? [free responses]
- d_lang: What is your primary language (i.e., the one you speak most of the time)?
 1. English
 2. Spanish
 3. Chinese
 4. French
 5. German
 6. Dutch
 7. Japanese
 8. Hebrew
 9. Swedish
 10. Other (specify) [free response]

Initial Attitudes

Pre-message attitude items were preceded by a brief introduction to the study's topic:

In recent years, the topic of marijuana legalization has become a popular topic. The legalization of marijuana means you can't be arrested, ticketed, or convicted for using marijuana if you follow the state laws as to age, place, and amount for consumption. Nine states and the District of Columbia now have legalized small amounts of marijuana for adult recreational use. Given the considerable conversation on this topic, in this study we'd like to hear from you to better understand people's attitudes and beliefs about marijuana legalization.

Please rate marijuana legalization on the following scales (-4 to +4):

- att1_1: Bad-Good
- att1_2: Dislike-Like
- att1_3: Negative-Positive

Attitude Bases

The following five items were presented in a random order. Our key predictor is the first item in this list. It is embedded among other "perceived attitude bases" so as not to arouse suspicion about the research aims.

All responses provided on 5-point scales (1 = Not at all; 5 = Extremely)

- base_mor: To what extent is your attitude about marijuana legalization based in your core moral beliefs and principles? (1 = Not at all; 5 = Extremely)
- base_prac: To what extent is your attitude about marijuana legalization based in practical concerns? (1 = Not at all; 5 = Extremely)

- base_cons: To what extent is your attitude about marijuana legalization based in what other people think about the issue? (1 = Not at all; 5 = Extremely)
- base_know: To what extent is your attitude about marijuana legalization based in your knowledge of the issue? (1 = Not at all; 5 = Extremely)
- base_emo: To what extent is your attitude about marijuana legalization based in your emotions? (1 = Not at all; 5 = Extremely)

Post-Message Attitudes

Please rate marijuana legalization on the following scales (-4 to +4):

- att2_1: Bad-Good
- att2_2: Dislike-Like
- att2_3: Negative-Positive

Cognitive Responses

Take a few minutes to use the response boxes on the next few screens to write any thoughts you had while reading the essay you just read that argued against marijuana legalization. Write down all of the thoughts you have, whether they are favorable, opposed, neutral, or irrelevant to the essay and its topic.

Please list one thought per box. You do not need to use all of the boxes available to you, but please list at least one thought and use as many as it takes to convey your reactions to the essay you read. When you have no more thoughts left to list, simply leave the box blank and hit the continue button.

[Six available thought-listing boxes.]

Message Perceptions

- essMoral: To what extent did the essay make arguments related to moral concerns? (1 = Not at all; 7 = Very much)
- essPrac: To what extent did the essay make arguments related to practical concerns? (1 = Not at all; 7 = Very much)
- essAQ: How strong were the arguments put forth that opposed marijuana legalization? (1 = Very weak; 7 = Very strong)

Political Orientation

- poli_soc: When it comes to social issues, where would you place yourself on a scale from "very conservative" to "very liberal?" (1 = Very Liberal; 5 = Very Conservative)
- poli_econ: When it comes to economic issues, where would you place yourself on a scale from "very conservative" to "very liberal?" (1 = Very Liberal; 5 = Very Conservative)

Thought Ratings

Instructions: Earlier in the survey, you wrote out the thoughts you had in reaction to the essay about marijuana legalization. We'd now like you to go through the thoughts you wrote and simply categorize them as whether each one was generally (1) in favor of marijuana legalization, (2) against marijuana legalization, (3) neutral toward marijuana legalization, or (4) unrelated to marijuana legalization.