

Using emoticons to encourage students to recycle

Matthew D. Meng & Remi Trudel

To cite this article: Matthew D. Meng & Remi Trudel (2017): Using emoticons to encourage students to recycle, The Journal of Environmental Education

To link to this article: <http://dx.doi.org/10.1080/00958964.2017.1281212>



Published online: 23 Feb 2017.



Submit your article to this journal [↗](#)



View related articles [↗](#)



View Crossmark data [↗](#)

RESEARCH ARTICLE

Using emoticons to encourage students to recycle

Matthew D. Meng  and Remi Trudel

Boston University, Boston, Massachusetts, USA

ABSTRACT

Uncovering inexpensive, simple techniques to encourage students to act in a pro-environmental manner is of critical importance. Through a four-week field study at a large, environmentally focused elementary school, it was found that placing negatively valenced emoticons (i.e., red frowny faces) on trash cans increased the proportion of recycled material from 22% to 44%. Subsequently, through a controlled laboratory study at a recognized “green” university, it was found that the negatively valenced emoticon increased the percentage of students who recycled their provided paper from 46% to 62%. Therefore, using emoticons as a complement to existing environmental education may be an easily implementable technique to positively change the recycling behavior of both older and younger students.

KEYWORDS

recycling; behavior change; intervention; field study; experimental

Introduction

The aim of environmental education is to not only inform members of society to make decisions that can benefit the environment, but also to enable the development of pro-environmental competencies, attitudes, and affinities (Boyes & Stanisstreet, 2012). Our schools and other educational institutions are one of the most important factors in developing and protecting pro-environmental values in students (Prothero et al., 2011). An effective environmental education program should occur over a lengthy period, encourage initiative, and be working toward an achievable goal (Chawla & Cushing, 2007). Intuitively, schools that have a greater focus on environmental education are more able to increase students’ understanding of pro-environmental concepts (Barraza & Cuarón, 2004). However, students can fail to make the connection between their actions and the environmental impact (Blumstein & Saylan, 2007). Therefore, it is important to uncover techniques to activate existing environmental attitudes and knowledge to ensure the correct behavior is subsequently undertaken outside the classroom.

This research seeks to provide insight into the practicality of using point-of-decision prompts in boosting pro-environmental behaviors. Specifically, our objective is to test the usefulness of using negatively valenced emoticons (i.e., red frowny faces) as a complement to existing environmental education in encouraging students to recycle. Recycling is a particularly important behavior to examine as it is within the control of students, even very young children (Boyes & Stanisstreet, 2012), and their actions can be directly linked to subsequent environmental effects. However, more recently the percentage of materials being recycled appears to be plateauing, and 60% of what ends up in our landfills is material that could have been recycled (Environmental Protection Agency, 2013). Therefore, uncovering techniques to encourage pro-environmental behaviors is of critical importance.

The effectiveness of using emoticons to increase recycling behavior was tested across two experiments: a field study at an elementary school and a laboratory experiment at a university. In the

subsequent section, relevant literature is provided as support for our conceptual development, and then we present the results from our two experiments, which are followed by a discussion of the findings and implications.

Conceptual development

An effective technique to encourage specific pro-environmental behaviors is to prime the appropriate response at the point of decision (Geller, Witmer, & Tuso, 1977). In the consumer and environmental psychology literature, several factors have been uncovered with the implicit or explicit goal of positively changing behavior (e.g., Trudel & Argo, 2013). For example, researchers have used signs to remind people to turn off lights when leaving a room (Osaldiston & Schott, 2012), to encourage the use of stairs instead of the elevator or escalator (Lee et al., 2012), and to ensure the separation of recyclable materials from trash and food scraps during disposal (Tobias, 2009), all with some success. However, these and similar studies have focused on adults, so their effectiveness in influencing students' behavior is unknown.

Emoticons, specifically negatively valenced emoticons, are an example of potential point-of-decision prompts. Preliminary research related to the use of “frowny faces” in changing behavior of students has been registered (e.g., Privitera, Vogel, & Antonelli, 2013). For example, teachers use frowny faces as feedback to link normative behaviors and social values (i.e., what is expected of the student) when they feel that a lack of effort or concentration is believed to be the cause of poor performance (Tunstall & Gipps, 1996). Moreover, disapproval-based feedback is often used to correct students' negative attitudes or behaviors and can often be provided using non-verbal means such as facial expressions (Tunstall & Gipps, 1996). Schultz, Nolan, Cialdini, Goldstein, and Griskevicius (2007) found that expressing an injunctive norm (i.e., social dis/approval of a behavior) using a frowny face emoticon along with descriptive norm information (i.e., prevalence of a behavior) to above-average energy consumers led them to decrease their usage. Therefore, using frowny faces could act as a proxy for showing disapproval of behaviors such as trashing recyclable materials.

These emoticons may be particularly effective if the image contains the color red, which is suitable for any point-of-decision prompt being used to interrupt a somewhat automatic negative behavior, such as trashing an object. This is due to the minimal prior knowledge needed, resulting in an ease of comprehension even by younger consumers (Lobstein & Davies, 2008). For example, the color red is used to indicate “stop” (e.g., traffic lights), “failure” (e.g., red ink used by teachers), or “warning” (e.g., machinery dials), and research has shown that red evokes avoidance behavior (Elliot, Maier, Binsler, Friedman, & Pekrun, 2009) and means “danger” (Elliot, Maier, Moller, Friedman, & Meinhardt, 2007). Pictures provide a more concrete representation (Amit, Algom, & Trope, 2009) and can increase learning and retention (Carney & Levin, 2002), particularly those with lower literacy skills such as students (Rothman et al., 2006).

Most research examining emoticons has used them to provide feedback *after* an action to encourage or discourage *future* actions (e.g., Czap, Czap, Khachatryan, Burbach, & Lynne, 2013; Schultz et al., 2007), but feedback after an action has been met with inconsistent findings, as some improve performance, some have no effect, and others can even worsen performance (Kluger & DeNisi, 1996). In contrast, the current research aims to use emoticons *before* a *current* action, which is predicted to have a positive influence on subsequent disposal behavior. According to the elaboration likelihood model (ELM; Petty & Cacioppo, 1986), these individuals are likely to be persuaded through the peripheral route, where the visual salience (Itti, 2007) of the red emoticons coupled with the lack of required cognitive processing could result in a rapid response that can be outside of conscious awareness. Antecedent strategies implemented before the occurrence of a behavior are more cost effective than consequence strategies implemented after the occurrence of a behavior (Dwyer, Leeming, Cobern, Porter, & Jackson, 1993), further supporting the use of such prompts.

In sum, point-of-decision prompts can be used to directly influence subsequent behavior, and negatively valenced emoticons and the color red can be used to convey injunctive norms related to pro-

environmental behavior. Therefore, we predict that using red frowny faces on trash cans will increase the rate of recycling. To test this prediction, we conducted a four-week field study at an elementary school as well as a controlled laboratory study at a university.

Study 1: Field study

Participants

Attendees (approximately 750) of Central Columbia Elementary School (CCES; coeducational; grades K-4; ages 5–10) in Bloomsburg, Pennsylvania (located approximately 130 miles northwest of Philadelphia) made up the participants of this field study. The students and faculty (other than the school's administrator, the librarian, and the custodian) were not aware that they were participants in this study. We partnered with CCES as they were already a part of the Pennsylvania-wide "Greensylvania" program (<http://www.greensylvania.org>), which aims to generate enthusiasm for recycling and educate students how recycling can benefit their school, community, and environment. Further, Bloomsburg was the first Pennsylvania community to offer curbside collection of recycling, and has since made recycling mandatory for all residents, businesses, schools, offices, and events (Town of Bloomsburg, 2013). This allows us to test the usefulness of the point-of-decision prompt among an audience who is highly familiar with environmental education.

Data collection

Over a four-week period, we captured recycling behavior on 23 different school days. In lieu of a separate comparison group that could introduce confounding factors (e.g., knowledge, effort), the first two-week period served as the baseline, which allowed us to gauge regular recycling behavior without the prompt. Previous research related to longitudinal field studies have effectively used similar methodologies to create baseline periods to act as a proxy for a comparison group (e.g., Werner, Stoll, Birch, & White, 2002). The last two-week period served as the test phase to examine the impact of the point-of-decision prompt. Preexisting trash cans and recycling bins were already dispersed around the school in pairs (i.e., a trash can and a comingled recycling bin were placed next to each other at each location inside and outside the classrooms). To form our baseline, trash and recycling were collected separately and weighed daily using scales from November 13 to November 27, 2013. During this time, trash cans did not have emoticon stickers on them. During the Thanksgiving break, red frowny face emoticons were placed on all the trash cans in the school. The emoticons were glossy stickers with a diameter of $2\frac{1}{4}$ inches. The school contained different types of trash cans so the stickers were placed in the most visible location (e.g., on the lid; if there was no lid, high on the front of the can). Trash and recycling were again collected separately and weighed daily using scales from December 3 to December 19, 2013.

Results

To accurately express our findings, we calculated the ratio of recycling weight to total weight including trash by dividing the weight of recycling by the sum of the weight of recycling and trash. The resulting ratio is such that a higher number indicates a greater proportion of recycling. This was performed to rule out an overall increase in materials being disposed. Consistent with our hypothesis, a *t*-test revealed that the two weeks with the emoticons on the trash cans yielded a significantly higher recycling ratio ($M = .44$; $SD = .19$) than the comparison baseline condition ($M = .22$; $SD = .20$; $MSE = .038$; $t = -3.85$, $p < .001$, $\eta^2 = .25$). The change in proportion of recycling over the four weeks is shown in Figure 1. In the presence of existing environmental education efforts, simply placing a frowny face on trash cans doubled the proportion of materials recycled by these students. It should be noted that custodial staff examined the contents of the bins when weighing the material and informed us that there was no noticeable increase in trash being placed in the recycling bin, supporting the assumption that the extra materials placed in the recycling bin were recyclable.

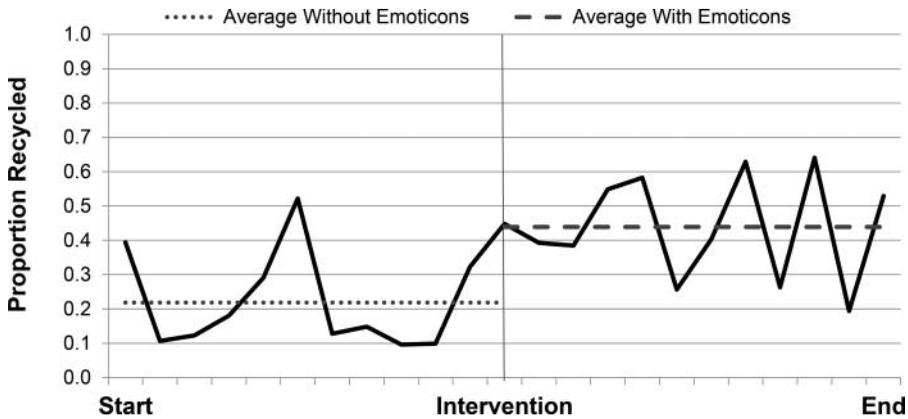


Figure 1. Recycling rates by students increased after the placement of emoticons on trash cans.

Study 2: Laboratory study

Participants and design

One hundred and ninety-two undergraduates at a large northeastern university participated in the laboratory-based study. The experiment involved two manipulated conditions (emoticon: absent vs. present) and was run across 12 one-hour sessions containing 15 to 20 participants per session. The condition participants were assigned was contingent on which session they had registered for (i.e., in the first session the emoticon was absent, in the second session the emoticon was present, and so on).

Examining the behavior of college-aged students allows us to generalize our findings beyond the elementary school-aged students from the initial field study. Given we aim to examine the practical use of a prompt as a complement to existing environmental education, participants were recruited from a recognized “green” university, which is based on “1) whether students have a quality of life on campus that is both healthy and sustainable; 2) how well a school is preparing students for employment in an increasingly green economy; and 3) how environmentally responsible a school’s policies are” (Princeton Review, 2015, p. 1).

Procedure

Before entering the laboratory, a pair of scissors and an 8.5" x 5.5" (half sheet) piece of paper was placed at each partitioned workstation. Similar to the method used by Trudel, Argo, and Meng (2015), participants were to test and evaluate the scissors under the guise of a market research study. Printed on the front of the paper was a description of the scissors (including brand name and specifications) and on the back were two perpendicular dotted lines running the width and height of the sheet. After reading the description, participants were instructed to test the scissors by cutting along the dotted lines, which ensured that all sheets of paper were cut into the same four smaller pieces, as paper size can influence recycling decisions (Trudel & Argo, 2013). Participants then completed a computer-based survey consistent with the cover story (e.g., “How well did the scissors cut the paper?”), and after completing a series of unrelated studies, they were instructed to “dispose of all paper on the way out.” Due to the varying total length of the studies, all participants naturally left one at a time. Outside of the laboratory in the hallway were two identical white flip-top bins; one labeled “Trash” and the other labeled “Recycling,” which were placed approximately three feet apart (with the trash can placed on the side closest to the path participants would take). In the sessions where the emoticon was present, the frowny face sticker was placed on the front of the flip-top lid where the trash is deposited. The frowny face was removed for the absent sessions, which acted as the control condition. Each piece of paper had a unique three-digit code in the top left corner which allowed the research assistant to determine the disposal decision of each participant. The dependent variable was whether participants placed their paper in the trash or recycling.

Results

Using a binary logistic regression model with disposal choice as the dependent variable (coded: trashed = 0, recycled = 1) and the experimentally manipulated emoticon condition (coded: absent = -1, present = 1) as the independent variable, it was shown that when the frowny face was present (62% recycled), participants recycled the paper significantly more than when the frowny face was absent (46% recycled; $\beta = .33$, $SE = .15$, $\chi^2 = 5.11$, $p = .02$). Results are depicted in Figure 2.

Discussion

Literature from other fields such as consumer and environmental psychology can be used to develop new behavioral interventions that can work as a complement to modern environmental education programs. In the initial field study, we found the presence of a simple frowny face was enough to encourage elementary school students to dispose of products in the appropriate receptacle (recycling bin vs. trash can). In the subsequent laboratory study, we replicated the results from the field study where the presence of the frowny face significantly increased the percentage of students recycling the provided paper. Although not explicitly tested, given previous experimental use of valenced emoticons (e.g., Schultz et al., 2007) it is assumed the associated injunctive norm that is regularly taught to the students (i.e., “Putting recyclable material in the trash is unacceptable”) was being automatically activated, resulting in more pro-environmental behavior in the form of recycling. This extends previous research that used emoticons to provide feedback *after* an action to encourage or discourage *future* actions (e.g., Czap et al., 2013; Schultz et al., 2007) by showing that using emoticons *before* a *current* action has a significant positive influence on subsequent disposal behavior.

Although the percentage increase was greater in the field study, the elementary school students who were persuaded by the emoticons to recycle may have each recycled a greater number of products. Alternatively, the increase in recycling rates by the arguably more knowledgeable and practiced college students beyond the already high control condition may have been suppressed by a ceiling effect. Regardless, the results of the laboratory study replicated and extended the findings of the initial field study in several ways. First, we found that more mature students, who are beyond the intellectual and social development changes experienced by the elementary school-aged children (Piaget, 1969) and are known to have similar awareness of environmental issues to adults (Boyes & Stanisstreet, 2012), are also positively influenced by the emoticons. Older students often respond less to environmental education programs than younger students (Liefländer & Bogner, 2014), resulting in a slower development

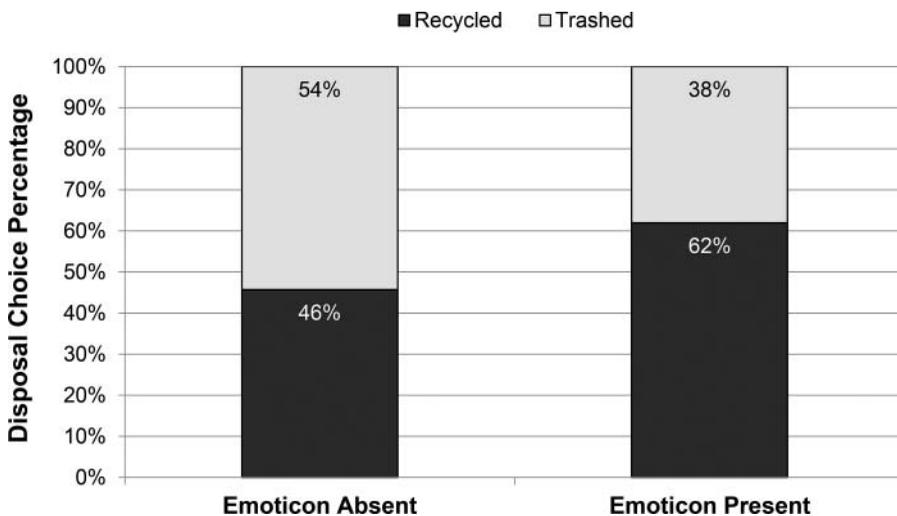


Figure 2. The percentage of students who recycled the paper increased in the presence of an emoticon on the trash can.

of environmental literacy (Stevenson, Peterson, Bondell, Mertig, & Moore, 2013). Our studies suggest that students, regardless of age, can be encouraged to act pro-environmentally using similar prompts. Second, we attempted to address three important situational factors related to recycling behavior: effort, materials, and social influence. Bins were kept in a constant location so each participant had to expend the same amount of effort to recycle (Reid, Luyben, Rawers, & Bailey, 1976); the material used in the lab experiment (paper) is the most well-known recyclable material (Planet Ark, 2014) meaning participants were not trashing the material due to a lack of knowledge and the increase in recycling rates cannot be attributed to erroneously placing trash in the recycling bin given there was only one material present; and participants left the laboratory naturally one at a time and could not see inside the bins until they made their disposal choice, removing any social influence (Staats, Wit, & Midden, 1996). Finally, we included an actual control condition, rather than relying on a baseline period, which produced results consistent with the field study. Altogether, the results of our two experiments provide robust evidence to support the use of point-of-decision prompts to encourage students' pro-environmental behavior. In doing so, we have uncovered a novel, inexpensive, and easily actionable point-of-decision prompt that can directly influence knowledgeable students to act in a pro-environmental manner.

Other known methods to impact recycling behavior such as buying new bins or increasing the number of bins can be costly and time consuming to install and maintain (without considering the extra materials used in the process). Further, interactive displays using emoticons, though effective at increasing recycling rates, require 8 to 12 months before investments are recouped (Berengueres, Alsuwairi, Zaki, & Ng, 2013). Even though redesigning the receptacles that we use for recycling is considered one of the more cost-effective aspects of recycling measures to alter (Cohen, 1993), small point-of-decision prompts are far less costly. Stickers and posters can be printed in bulk by schools themselves for a fraction of the cost and easily placed on existing trash cans. Therefore, using simple prompts as a complement to existing education efforts can greatly impact pro-environmental behavior without needing extra funds.

Limitations and future research

As with most experimental research, these studies are not without their limitations. First, although the custodial staff did not alert us to any noticeable increase in trash being incorrectly placed in the recycling bin after the introduction of the frowny faces at the elementary school, we cannot rule out the presence of at least some unnoticed trash. Second, the somewhat "erratic" trend of Figure 1 may be due to weighing the trash and recycling at slightly different times each day, or the presence or absence of after-school activities, which could result in more or fewer materials being disposed of before measurement. However, this was addressed by using the total and average proportion of recycled materials, which shows a significant average increase. Finally, we could not rule out any effects related to the time of year in the field study. Students returning from their Thanksgiving break may have introduced confounding factors (e.g., family influence on environmental knowledge or behavior; Matthies, Selge, & Klöckner, 2012). These potential issues were addressed in the subsequent laboratory experiment, which provided further evidence of the usefulness of placing a negatively valenced emoticon on trash cans in influencing recycling behavior.

From a practical perspective, the purpose of this study was to develop a behavioral intervention using consumer and environmental psychology as a guide and systematically evaluate the usefulness of the intervention (Steg & Vlek, 2009). More specifically, we investigated whether the presence versus absence of negatively valenced emoticons on trash cans can increase recycling behavior in students. Although our prediction was supported, we have not ascertained whether interactions exist. That is, does the main effect differ across various levels of other variables (e.g., education level, age, emotion displayed, cultural differences)? We used purposive sampling (i.e., only used student from recognized "green" schools), but to extend these findings, it may be worthwhile examining whether this point-of-decision prompt works in locations that do not have a pro-environmental focus. Is existing environmental knowledge *required* to make the connection

between the frowny face and the negative outcome of trashing recyclable materials, or can all students ascertain this meaning on their own?

The purpose of including more conditions would be to test plausible alternatives, though our design was informed by previous research. That said, we only tested one negatively valenced emoticon (frown) without testing any *positively* valenced emoticons, which has also been used in previous research (e.g., Schultz et al., 2007). Using a smiley face on the trash can (i.e., the point of the focal decision) would not have conveyed the intended message (i.e., “Putting recyclable material in the trash is bad”) and could have been confusing (e.g., “Trashing is good?”). Alternatively, a smiley face could have been used on the recycle bin to positively reinforce recycling behavior. However, the objective of our intervention was to divert recyclable materials *from* the trash to the recycling bin, meaning those who trash recyclable material may not see a prompt placed on the recycling bin.

The emoticon prompt and recycling behavior employed in the current research is only one example, so to develop other behavioral interventions and advocate for their implementation, it is important for future research to use realistic field and laboratory experiments to test their usefulness. Theoretically, the use of emoticons could be just as effective for encouraging shorter showers, ensuring light switches are turned off when an individual leaves the room, or taking the stairs instead of the elevator, if there is an existing injunctive norm related to the focal behavior. Future results gleaned can be used to develop posters and signs that business, schools, and families can print out and use to encourage a variety of pro-environmental behaviors.

Conclusion

In sum, we developed, tested, and confirmed the usefulness of negatively valenced emoticons in increasing students’ recycling behavior, and in doing so we believe we have made several contributions. First, we drew from other fields, namely consumer and environmental psychology, to develop a novel and inexpensive pro-environmental behavioral intervention. Second, we have shown that in conjunction with existing environmental education efforts simple point-of-decision prompts shown before a behavior can ensure that individuals will act in a more pro-environmental manner. Third, we have shown that pro-environmental prompts can successfully alter the behavior of a wide range of students, including young children (an underrepresented population in conservation behavior research) and young adults (who are traditionally less influenced by environmental education programs). Finally, we have added evidence to support the continued use of field studies and experiments to test pro-environmental behavioral interventions on observed behavior, rather than relying on correlational data or self-reported measures.

ORCID

Matthew D. Meng  <http://orcid.org/0000-0003-0388-0966>

References

- Amit, E., Algom, D., & Trope, Y. (2009). Distance-dependent processing of pictures and words. *Journal of Experimental Psychology: General*, 138(3), 400–415.
- Barraza, L., & Cuarón, A. D. (2004). How values in education affect children’s environmental knowledge. *Journal of Biological Education*, 39(1), 18–23.
- Berengueres, J., Alsuwairi, F., Zaki, N., & Ng, T. (2013). Gamification of a recycle bin with emoticons. In *Proceedings of the 8th AMC/IEEE International Conference on Human-Robot Interaction* (pp. 83–84). Piscataway, NJ: IEEE Press.
- Blumstein, D. T. & Saylan, C. (2007). The failure of environmental education (and how we can fix it). *PLoS Biol*, 5(5), e120.
- Boyes, E., & Stanistreet, M. (2012). Environmental education for behaviour change: Which actions should be targeted? *International Journal of Science Education*, 34(10), 1591–1614.
- Carney, R. N., & Levin, J. R. (2002). Pictorial illustrations still improve students’ learning from text. *Educational Psychology Review*, 14(1), 5–26.

- Chawla, L., & Cushing, D. F. (2007). Education for strategic environmental behavior. *Environmental Education Research*, 13(4), 437–452.
- Cohen, S. (1993). Reclaiming our Earth: Recycling and conservation. *Childhood Education*, 70(1), 44–46.
- Czap, N. V., Czap, H. J., Khachatryan, M., Burbach, M. E., & Lynne, G. D. (2013). Smiley or frowny: The effect of emotions and empathy framing in a downstream water pollution game. *International Journal of Economics and Finance*, 5(3), 9–23.
- Dwyer, W. O., Leeming, F. C., Cobern, M. K., Porter, B. E., & Jackson, J. M. (1993). Critical review of behavioral interventions to preserve the environment: Research since 1980. *Environment and Behavior*, 25(5), 275–321.
- Elliot, A. J., Maier, M. A., Binser, M. J., Friedman, R., & Pekrun, R. (2009). The effect of red on avoidance behavior in achievement contexts. *Personality and Social Psychology Bulletin*, 35(3), 365–375.
- Elliot, A. J., Maier, M. A., Moller, A. C., Friedman, R., & Meinhart, J. (2007). Color and psychological functioning: The effect of red on performance attainment. *Journal of Experimental Psychology: General*, 136(1), 154–168.
- Environmental Protection Agency. (2013). *Communicating the benefits of recycling*. Retrieved from <http://www.epa.gov/solidwaste/conserve/tools/localgov/benefits/index.htm>
- Geller, E. S., Witmer, J. F., & Tusio, M. E. (1977). Environmental interventions for litter control. *Journal of Applied Psychology*, 62(3), 344–351.
- Itti, L. (2007). Visual salience. *Scholarpedia*, 2(9), 3327.
- Kluger, A. N., & DeNisi, A. (1996). The effects of feedback interventions on performance: A historical review, a meta-analysis, and a preliminary feedback intervention theory. *Psychological Bulletin*, 119(2), 254.
- Lee, K. K., Perry, A. S., Wolf, S. A., Agarwal, R., Rosenblum, R., Fischer, S., ... Silver, L. D. (2012). Promoting routine stair use: Evaluating the impact of a stair prompt across building. *American Journal of Preventative Medicine*, 42(2), 136–141.
- Liefliänder, A. K., & Bogner, F. X. (2014). The effects of children's age and sex on acquiring pro-environmental attitudes through environmental education. *The Journal of Environmental Education*, 45(2), 105–117.
- Lobstein, T., & Davies, S. (2008). Defining and labelling “healthy” and “unhealthy” food. *Public Health Nutrition*, 12(3), 331–340.
- Matthies, E., Selge, S., & Klöckner, C. A. (2012). The role of parental behavior for the development of behavior specific environmental norms: The example of recycling and re-use behaviour. *Journal of Environmental Psychology*, 32(3), 277–284.
- Osbaldiston, R., & Schott, J. P. (2012). Environmental sustainability and behavioral science: Meta-analysis of proenvironmental behavior experiments. *Environment and Behavior*, 44(2), 257–299.
- Petty, R., & Cacioppo, J. T. (1986). *Communication and persuasion: Central and peripheral routes to attitude change*. New York, NY: Springer.
- Piaget, J. (1969). *The child's conception of the World*. London, England: K. Paul, T. Trubner and Co. Ltd.
- Planet Ark. (2014). *7 secrets of successful recyclers*. Retrieved from <http://recyclingweek.planetark.org/documents/doc-1222-nrw14-seven-secrets-report-final.pdf>
- Princeton Review. (2015). *Guide to 353 green colleges: 2015 edition*. Retrieved from <http://az589735.vo.msecnd.net/pdf/greenguide2015.pdf>
- Privitera, G. J., Vogel, S. I., & Antonelli, D. E. (2013). Performance on a food health assessment using emoticons with pre-literacy-aged children. *American Journal of Educational Research*, 1(3), 110–114.
- Prothero, A., Dobscha, S., Freund, J., Killbourne, W. E., Luchs, M. G., Ozanne, L. K., & Thøregensen, J. (2011). Sustainable consumption: Opportunities for consumer research and public policy. *Journal of Public Policy & Marketing*, 30(1), 31–38.
- Reid, D. H., Luyben, P. D., Rawers, R. J., & Bailey, J. S. (1976). Newspaper recycling behavior: The effects of prompting and proximity of containers. *Environment and Behavior*, 8, 471–482.
- Rothman, R. L., Housam, R., Weiss, H., Davis, D., Gregory, R., Gebretsadik, T., Shintani, A., & Elasy, T. A. (2006). Patient understanding of food labels: The role of literacy and numeracy. *American Journal of Preventative Medicine*, 31(5), 391–398.
- Schultz, P. W., Nolan, J. M., Cialdini, R. B., Goldstein, N. J., & Griskevicius, V. (2007). The constructive, destructive, and reconstructive power of social norms. *Psychological Science*, 18(5), 429–434.
- Staats, H. J., Wit, A. P., & Midden, C. Y. H. (1996). Communicating the greenhouse effect to the public: Evaluation of a mass media campaign from a social dilemma perspective. *Journal of Environmental Management*, 45, 189–203.
- Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behavior: An integrative review and research agenda. *Journal of Environmental Psychology*, 29(3), 309–317.
- Stevenson, K. T., Peterson, M. N., Bondell, H. D., Mertig, A. G., & Moore, S. E. (2013). Environmental, institutional, and demographic predictors of environmental literacy among middle school children. *PLoS one*, 3(3), e595519.
- Tobias, R. (2009). Changing behavior by memory aids: A social-psychological model of prospective memory and habit development tested with dynamic field data. *Psychological Review*, 116(2), 408–438.
- Town of Bloomsburg. (2013). *Recycling: Bloomsburg recycling center celebrating 35 years of recycling*. Retrieved from <http://bloomsburgpa.org/recycle/>
- Trudel, R., & Argo, J. J. (2013). The effect of product size and form distortion on consumer recycling behavior. *Journal of Consumer Research*, 40(4), 632–643.

- Trudel, R., Argo, J. J., & Meng, M. D. (2015). Trash or recycle? How product distortion leads to categorization error during disposal. *Environment & Behavior*, *48*(7), 966–985.
- Tunstall, P., & Gipps, C. (1996). Teacher feedback to young children in formative assessment: A typology. *British Educational Research Journal*, *22*(4), 389–404.
- Werner, C. M., Stoll, R., Birch, P., & White, P. H. (2002). Clinical validation and cognitive elaboration: Signs that encourage sustained recycling. *Basic and Applied Social Psychology*, *24*(3), 185–203.