Educating Children to Environmental Behaviours with Nudges:

The Effectiveness of Social Labelling and Moderating Role of Age

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Abstract

Considering the global warming urgency, increasing the pace at which pro-environmental behaviors are learned and embraced is essential. To achieve this objective, it seems reasonable to consider children as potential "change agents" as, beyond today and tomorrow's actions, they influence others, in turn educating them to new behaviors. Yet, studies that consider these 'researched' remain scarce. This paper investigates original ways for children to learn and adopt "eco-friendly" behaviors, using social labeling. An experiment conducted among 115 preadolescents (children aged between 7–12 years) reveals that merely labelling them as "eco-friendly" is sufficient to "spill over" and trigger subsequent intentions to behave ecologically. Those intentions persist a week after the manipulation, although the label is not repeated, suggesting that children have integrated the behavior. Our findings also point that the most responsive age is above ten and describe the differences with adults' processes, ruling out alternative explanations.

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1. Introduction

For many years, scholars have invested energy in exploring the factors and processes (Biel & Thøgersen, 2007, p.^pp, Ölander & Thøgersen, 1995, p.^pp, Onwezen *et al.*, 2013, p.^pp.) as well as the effective solutions (Cornelissen *et al.*, 2008, p.^pp, Hilton *et al.*, 2014, p.^pp.) that may lead to pro-environmental behaviors. Potential positive spillover effects, or the ability of an event to influence subsequent, unrelated behaviors (adapted from Truelove *et al.*, 2014, p.^pp.), were also investigated (Thøgersen, 1999, p.^pp, see Truelove *et al.*, 2014, p.^pp. for a review). Yet, despite the evidence signaling the urgent need to curb the current climate change (Intergovernmental_Panel_on_Climate_Change, 2014, p.^pp.), attention to strategical targets, such as children, remains limited.

Children represent a large part of the world's population (5% of developed countries' population according to the United Nations in (2013, p.^pp.)), they are very a valuable target to traditional marketers (Economist, 2006, p.^pp.) but are surprisingly seldom considered in social marketers' actions protecting the environment. Still, focusing on children when promoting pro-environmental behaviors is however decisive for at least two reasons. First, children significantly influence the consumption patterns of the adults closely interacting with them (Ekstrom *et al.*, 1987, p.^pp.). As such, children are described as "change agents", influencing not only their parents' but also their siblings' and peers' attitudes and behaviors (Ballantyne *et al.*, 2006, p.^pp, Evans *et al.*, 1996, p.^pp.). Second, many attitudes and behaviors are formed during childhood (Bucciol & Veronesi, 2014, p.^pp, Palan *et al.*, 2010, p.^pp.), and the latter tend to be life-long, also in the context of environmental issues (Chawla, 1999, p.^pp, Wilson, 1996, p.^pp.). Encouraging children to adopt eco-friendly behaviors, now, may consequently have long-term impacts on the environment. As stated by Stern (2006, p.^pp.), today's actions and those of the next 20 years will have a profound effect on the climate of the second half of the century and on the potential negative economic

consequences of climate change. This certainly also explains a recent call made in this journal for further research on how to "encourage young people to engage in environmentally benign activities, including research on the formation of a pro-environmental behavior pattern in a young age" (Grønhøj & Thøgersen, 2012, p.^pp. 293).

In this perspective, we examine the potential of a simple tactic that falls under the "nudging approach". "Nudges" are simple, non-paternalistic tools that do not resort to long term education or taxes and that therefore guarantee individuals' freedom of choice (Thaler & Sunstein, 2008, p.^pp.). In this research, we consider how encouraging children's pro-environmental behaviors may merely rely on labeling children as "eco-friendly" and how this basic trigger allows them to climb on the "virtuous escalator" (Thøgersen & Crompton, 2009, p.^pp.) of spillover effects. Social labeling rests on theories that explain how people infer their dispositions from observing their own behavior. It proposes that when a label is being attached to an individual, either purportedly or effectively based on previous behaviors, it drives further behaviors to the condition that the label is perceived in accordance with these dispositions (Allen, 1982, p.^pp, Cornelissen *et al.*, 2007, p.^pp, Summers *et al.*, 2016, p.^pp, Tybout & Yalch, 1980, p.^pp.).

In the late 70's and early 80's, two seminal pieces of research demonstrated that social labeling could encourage children's behaviors (Grusec & Redler, 1980, p.^pp, Miller *et al.*, 1975, p.^pp.). Yet, eco-friendly behaviors represent two major differences from the traditional ones expected in children. First, pro-environmental behaviors are considered particularly challenging (Pieters *et al.*, 1998, p.^pp, Rothschild, 1979, p.^pp.) as they involve a "social dilemma", a concept implying individual sacrifices for the sake of the society while personal benefits are not clearly perceptible (Pieters *et al.*, 1998, p.^pp.). Second, benefits are experienced through a "delayed gratification", as the positive results are not immediate. Children often experience difficulties in trading the one biscuit they can enjoy now for the

benefit of receiving more later (Mischel *et al.*, 1989, p.^pp.). One can therefore imagine what a demanding task closing the tap under the shower represents for young children, "saving the planet" being related to a much more abstract concept than "eating a biscuit".

The effectiveness of social labeling in pro-environmental contexts has nevertheless been demonstrated in adult contexts (Cornelissen *et al.*, 2007, p.^pp.). Interestingly, labeling children could avoid a major boundary condition to effectiveness identified in adult populations, as adding a cognitive load to the manipulation is necessary to limit identification of the latter. Due to children's stage of cognitive development (John, 1999, p.^pp, John, 2008, p.^pp, Valkenburg & Cantor, 2001, p.^pp.), this requirement could be alleviated (van Reijmersdal *et al.*, 2012, p.^pp.) and, consequently, the process should be eased.

In this paper, through an experiment conducted among 115 children aged 7 to 12, we therefore extend previous research in three important directions. First, we explore the potential of social labeling in behavioral areas that are reputedly difficult to foster in children, due to the delayed gratification, altruistic concerns and abstract concepts the pro-environmental options imply. Second, we bridge the gap between research on children and research on adults by investigating the moderating role of age and the persuasion process. Last, we contribute to the literature on "nudging approaches" as we propose to test an extremely simplified protocol in comparison to the one used on adults.

2. Theoretical background and hypotheses

2.2. Self-perception theory and behavioral spillover

When explaining underlying mechanisms of behavioral spillover, research commonly relies on cognitive dissonance (Festinger, 1957, p.^pp.) and self-perception (Bem, 1972) theories.

Both theories emphasize how an initial event may contribute to the salience of people's values and personality (Cornelissen *et al.*, 2007, p.^pp.), just as it may trigger behavioral spillover (Truelove *et al.*, 2014, p.^pp.). For example, Poortinga, Whitmarsh and Suffolk (2013, p.^pp.) demonstrate an increase in environmental identity in Wales after the introduction of the carrier bag charge, compared with England where no carrier bag charge was introduced. Van der Werff, Steg, and Keizer (2013, p.^pp.) show that reminding people of their previous environmentally friendly actions influences their current "green" product decisions, mediated by their environmental identity. These studies suggest that cueing people about the positive environmental outcomes of their behavior leads to perceptions that they are concerned about environmental issues (Cornelissen *et al.*, 2008, p.^pp.), and alters their self-concept, the representation that individuals have of themselves (Rosenberg, 1979, p.^pp.).

As a consequence of this change in self-concept, people may eventually adopt the range of behaviors consistent with this change, mainly to avoid cognitive dissonance which Festinger (1957) defines as a state of drive, need, or tension. More precisely, people try "to establish internal harmony, consistency, or congruity among … opinions, attitudes, knowledge and values" (Festinger, 1957, p. 260). People strive for consistency within themselves, between what they know or believe and what they do. In the presence of inconsistency between what they believe and what they do, they experience psychological discomfort that "gives rise to pressures to reduce that dissonance" (Festinger, 1957, p. 18). In turn, they can lessen the discomfort by changing one of the elements involved in dissonance, that is, by changing what they believe or changing what they do. Eventually, a change in their own self-concept urges them to align their behaviors with their new self-concept. Therefore, people's need for consistency explains the effectiveness of behavioral spillover (Truelove et al. 2014). It also supports conclusions that indicate global positive net effects of initial and

spillovers behaviors even if negative ones may punctually occur (Gillingham *et al.*, 2013, p.^pp, Truelove *et al.*, 2014, p.^pp.).

In research conducted on behavioral spillover, most of the interventions involve obtaining an initial concrete behavior to serve as a cue. Although such behavior may be encouraged (e.g., financially, by praise) and may not be spontaneous per se, consistent subsequent behaviors tend to occur (Lanzini & Thøgersen, 2014, p.^pp.). The self-perception theory (Bem, 1972, p.^pp.) states that people can get to know themselves by observing their own behaviors, as much as they would from other people's behaviors. If people believe that they acted without the pressure of external influences, they can use past behavior as a cue or heuristic to infer what to think about an issue and form attitudes to decide on subsequent behaviors (Cornelissen *et al.*, 2008, p.^pp, Lanzini & Thøgersen, 2014, p.^pp.), including behaviors in domains other than the one initially considered (Cornelissen *et al.*, 2008, p.^pp.). Consequently, one obvious challenge is motivating, in a nonintrusive way, the initial pro-environmental behavior that the person is supposed to attribute to genuine internal dispositions to subsequently modify his or her own self-concept.

2.2. Self-perception theory in social labeling

Among the techniques aiming at encouraging specific behaviors through enhancements or changes in individuals' self-concept, social labeling is a particularly interesting one to consider. Some studies indeed suggest that directly labeling people can be sufficient to change the self-concept (e.g. Cornelissen *et al.*, 2007, p.^pp, Tybout & Yalch, 1980, p.^pp.). Cornelissen et al. (2007, p. 279) define social labeling as "a persuasion technique that consists of providing a person with a statement about his or her personality or values (i.e. social label) in an attempt to provoke behavior that is consistent with the label." Interestingly, social labeling seems to rely on some ambiguity around the original motivations

of the initial behavior and to offer some ways to bypass the challenge discussed above. Cornelissen et al. (2007) show that labeling people on the basis of a manipulated behavior is sufficient to enhance pro-environmental dispositions and, consequently, to motivate further pro-environmental behaviors. Although consumers may select the most ecological television set primarily for reasons other than its ecological criteria (i.e., quality, price), stressing the pro-environmental dimension of the selected option enables them to reconsider their original motivations and to attribute their choice *also* to ecological concerns and their self-perceived pro-environmental dispositions (Cornelissen *et al.*, 2007, p.^pp.). Labeled a certain way, consumers would *re*attribute their initial behavior's motivation to the qualities stressed by the label (potentially in addition to the original ones) and, therefore, to themselves, their personality, and, more broadly, their self-concept. Going further, Tybout and Yalch (1980) study voting in local elections. Applying the social labeling technique, they suppress the burdensome manipulation intended to trigger an initial concrete behavior. Purportedly using participants' responses to a questionnaire, they randomly labeled voters as "above-average citizens" or "average citizens." Although the values and traits stressed by the label are plausible, they are neither associated with real behavior nor with the real motivations of the behavior. Eventually, labeling participants as above-average citizens (Tybout & Yalch, 1980, p.^pp.) or as eco-friendly (Cornelissen *et al.*, 2007, p.^pp.) on the basis of their purported previous behavior produced the desired behavioral spillover effects.

In line with extant literature conducted on behavioral spillover, research proposes that someone labeled a certain way considers the values or personality traits associated with the label as representative of him- or herself (Cornelissen *et al.*, 2007, p.^pp, Grusec & Redler, 1980, p.^pp, Tybout & Yalch, 1980, p.^pp.). Furthermore, research argues that this alteration to the person's basic self-concept leads to persistent changes in subsequent behavior (Kraut, 1973, p.^pp, Miller *et al.*, 1975, p.^pp.). Still, research suggests that the social labeling

technique is only effective when people do not perceive any persuasive intent (Becker, 1963, p.^pp, Cornelissen *et al.*, 2007, p.^pp, Kraut, 1973, p.^pp.). As mentioned previously, Tybout and Yalch (1980) use an "above-average-voter" label to enhance their participants' self-perception as "voters". They probably opt for this label because it is subtler and difficult to reject, notably because people do not know much about others' voting habits. They show that their label is only effective when people indeed perceive themselves as "good voters" (i.e., when the label is consistent with self-perceptions). This suggests that people who perceive themselves as "bad voters" could perceive the manipulation and reject it. Social labeling with adults indeed leads to subsequent behavior if a credible label has been proposed (Allen, 1982, p.^pp, Summers *et al.*, 2016, p.^pp.). The credibility of the label represents an essential condition to foster people's inferences about their own dispositions. That is, labeled individuals must perceive the characteristic underlined as plausible and the labeling not too peculiar. Beyond social labeling, persuasion tactics in general often elicit persuasion knowledge in sufficiently savvy people, triggering their ability to interpret, evaluate, and respond to persuasive attempts (Friedstad & Wright, 1994, p.^pp.), and potentially to diminish the effectiveness of the tactic. Therefore, when attributing the selection of a television set to their participants' eco-friendliness, Cornelissen et al. (2007) added a distraction task to the experimental protocol to hide the persuasive intent at play. Prevented from identifying the latter, participants did not reject the label, thus ensuring its effectiveness.

2.3.Social labeling, children and age

Based on the above, we assume that the effectiveness of the social labeling technique relies on two essential conditions. First, the technique requires that the target has a developed self-perception or self-concept. As indicated previously, behavioral spillover effectiveness is

based on the label's ability to make pro-environmental dispositions salient in a person's mind and to enhance his or her environmental identity. Being aware – or being made aware (Summers *et al.*, 2016, p.^pp.) – of one's identity trait is a necessary condition to influence subsequent behaviors. Second, to be effective, the social labeling technique requires that no persuasion knowledge is triggered or the target lacks persuasion knowledge so that he or she will not perceive any persuasive intent and reject the label.

Considering these two conditions, we propose that the social labeling technique will be effective among children and, more specifically, among preadolescents (7–12 years), which is considered a specific unit of analysis from a theoretical point of view in the children literature (John, 1999, p.^pp, John, 2008, p.^pp.). Various elements corroborate the assumption of an optimal "age window." First, self-concept tends to develop around the age of 7 or 8 years (Leflot *et al.*, 2010, p.^pp, Marsh *et al.*, 1984, p.^pp.) and, noteworthy increases with age (Campbell *et al.*, 1996, p.^pp, Marsh *et al.*, 1984, p.^pp.). This suggests that before preadolescence, children are not able to reattribute the eco-friendly label to their dispositions, because they do not have a clear sense of their identity. Second, preadolescents' limited cognitive resources (John, 2008, p.^pp, Valkenburg & Cantor, 2001, p.^pp.) tend to hinder the careful processing of persuasive message characteristics that trigger persuasion knowledge. Therefore, preadolescents display less persuasion knowledge than adolescents, young adults, and adults (van Reijmersdal *et al.*, 2012, p.^pp.). Furthermore, research argues that individuals entering adolescence (after 12) experience a rise in the level of reactance, which "arises to the extent that an influence attempt brings about felt pressure toward change" (Clee & Wicklund, 1980, p.^pp., p390) and often produces preferences for the "forbidden fruit" (Brehm, 1989, p.^pp.). It has been repeatedly found that pressure leads to reactance in adolescents (Van Petegem *et al.*, 2015, p.^pp.), especially when parental or patronizing tones

are used (Goldberg & Gunasti, 2006, p.^pp, Van Petegem *et al.*, 2015, p.^pp.), all these supporting the idea of intervening before adolescence.

Within this age bracket of preadolescence, we find individuals struggling with the development of their self-concept and search for individuality (Marsh *et al.*, 1984, p.^pp.). Self-concept indeed develops with age (Campbell *et al.*, 1996, p.^pp, Marsh *et al.*, 1984, p.^pp.), in a context of psychological and social developments that also evolve as children grow older (Bachmann *et al.*, 1993, p.^pp, Christie & Viner, 2005, p.^pp.). Those elements render the age group increasingly self-conscious (Chaplin & Roedder John, 2007, p.^pp.). Consequently, they seek elements that may potentially help them fight the insecurity they experience (Chaplin & Roedder John, 2007, p.^pp.). Research shows that young people often hold favorable environmental attitudes (Grønhøj & Thøgersen, 2012, p.^pp.). Therefore, we may expect that a label stressing the latter would be perceived as positive. It would signal their belongingness to a group they value and support their search for identity. As such, preadolescents might be particularly reluctant to act against this label. Of note, when social identity (i.e., the social dimension of the self-concept) is salient in the expected behavior, people tend to feel an additional "inner obligation to act" consistently, to remain in line with their group's objectives (Stürmer *et al.*, 2003, p.^pp.). Self-concept and search for identity increasing along with age -within the age bracket considered - one can therefore expect the effectiveness of social label to follow the same pattern.

Research conducted in the 1970s and 1980s provides evidence that social labeling may influence children's behaviors. In two pioneering studies, 10-year-olds were successfully encouraged to be tidier, and 7-year-olds were induced to persevere at school (Miller, Brickman, and Bollen 1975). Furthermore, Grusec and Redler (1980) enhanced sharing behaviors in 8- and 10-year-olds. In line with previous theoretical explanations, those two studies suggest that social labeling modifies children's self-concept and leads to persistent

behavioral changes. However, the researchers offer different views on what the optimal age is when applying labels, Miller et al. (1975) considering that the younger the better, suggesting that children's identity is more malleable, while Grusec and Redler (1980) think conversely. Nevertheless, although they incidentally discuss the question, they do not empirically compare and demonstrate their respective perspectives of this specific question. Furthermore, the studies used particularly extensive protocols. The label was applied a significant number of times, over several days, before its effectiveness was measured, thus limiting a large-scale application of the technique. Self-perception theory and prior findings on children's persuasion knowledge enable us to postulate that such a dense and burdensome process is not required. Therefore, we aim at replicating their results in an eco-friendly context, but also to demonstrate the effectiveness of social labeling using a simplified procedure as well as the moderating role of age. Thus, based on the abovementioned, we hypothesize the following:

H_1: An eco-friendly label will be effective among preadolescents.

H_2: The effectiveness of an eco-friendly label depends on preadolescents' age, such that within this specific age bracket, a label applied to older children will be more effective than a label applied to younger children.

3. Method

3.1. Sample

To test our hypotheses, we conducted a single factor between-subjects experiment in a Belgian primary school over a three-week period. Working in a familiar environment and in the company of friends makes children more relaxed and opened (Rust & Hyatt, 1990, p.^pp.). Thus, testing children in school contexts is recommended and largely applied by researchers (Charry & Demoulin, 2012, p.^pp, van Reijmersdal *et al.*, 2012, p.^pp.). Data

collection included 115 children (M_{age}: 10 years, 54% female) attending different levels of primary classes. We selected the school because of its representativeness in terms of various socioeconomic backgrounds.

3.2. Procedure

We randomly assigned the children from each class to either the social labeling or the control condition. In the introductory phase (Phase 1), one week before the manipulation took place, teachers collected an initial set of data, including the children's environmental perceptions using four items from Larson, Green, and Castleberry's (2011, p.^pp.) eco-awareness scale (i.e., "Plants and animals are important to people," "Nature is easily harmed or hurt by people," "Plants and animals are easily harmed or hurt by people," and "People need plants to live"; α =.75). This variable is used as a covariate in the following analyses, as gender is. The questionnaire included several filler unrelated preferences. Using the same procedure as Tybout and Yalch (1980), this questionnaire is used to make sure that the label randomly applied in Phase 2 would be perceived as plausible; Therefore, phase 1 ensures the label acceptance (Cornelissen *et al.*, 2007, p.^pp, Guadagno & Burger, 2007, p.^pp, Tybout & Yalch, 1980, p.^pp.).

In the manipulation phase (Phase 2), the experiment took place in a specific room assigned by the school. Children were welcomed by two researchers, presented with a cover story (i.e., find out about children's current interests and opinions on a variety of topics such as preferences for school subjects and hobbies), and thanked for their answers to the first questionnaire a week before. Children in the social label condition were then presented with the label. Using the exact same wording across classes, the same researchers stated that from the first questionnaire, the research team was able to identify "how respectful of nature and how attentive to protect the environment they were." No mention was made of the children's

level of environmental concerns in the control condition. The analysis of information gathered on the children in Phase 1 indicates that there were no significant differences across the participants randomly assigned to one or the other condition during Phase 2 in terms of age ($F_{(1,112)} = .18$, $p = .67$), gender ($\chi^2(1) = .57$, $p = .45$), and environmental perceptions ($F_{(1,112)} = 1.75$, $p = .19$). After the experimental manipulation, the children took part in a paper-and-pencil study and answered five ad hoc questions measuring self-rated pro-environmental behaviors (i.e., "I throw cans of Coke in the 'good' bin"; "When leaving a room, I turn off the light"; "I save water by taking showers instead of baths"; "I save paper by writing on both sides of a sheet"; and "I help my parents to sort waste"; $\alpha = .54$). Children in both conditions answered exactly the same questions. The two researchers provided answers to individual questions, to ensure that all items were fully understood. They also verified that children provided personal answers.

In Phase 3, one week after the manipulation took place, teachers collected a final set of data, including children's self-rated pro-environmental behaviors using three items from Collado and Corraliza's (2015, p.^pp.) scale, developed specifically for the target: "I carry out activities to protect the environment"; "In school, I talk to my teachers and peers about the importance of doing things to protect the environment (e.g., recycling)"; and "At home, I help to separate and to recycle" ($\alpha = .69$). We added several filler unrelated questions to the scale, to dilute children's attention. The latter objective also motivates the use of different scales to measure self-rated pro-environmental behaviors in phases 2 and 3

We measured all constructs with four-point Likert scales, as prior research recommends (Peracchio & Mita, 1991, p.^pp.) and is generally observed in studies focusing on children (van Reijmersdal *et al.*, 2012, p.^pp.).

3.3. Results

The analyses conducted to test the hypotheses controlled for children's environmental perceptions (as measured in Phase 1) and gender. Floodlight analyses (Process, Model 1, with 1000 bootstraps, 95% confidence interval) using the Johnson–Neyman technique (Johnson & Neyman, 1936, p.^pp.) enable us to identify the region in terms of age in which the eco-friendly label significantly influences the self-rated pro-environmental behaviors measured right after the manipulation and one week after the manipulation. Table 1 presents the results of the floodlight analyses.

Regarding the self-rated ad hoc pro-environmental behaviors that we measured right after the manipulation, the analysis reveals a significant interaction between preadolescents' age and the eco-friendly label ($\beta = .19$, $t = 2.54$, $p < .01$). Among older preadolescents (i.e., older than 10 years and 3 months; $\beta_{JN} = .17$, $t = 1.96$, $p = .05$), a regression analysis shows that the eco-friendly label significantly increases pro-environmental behaviors ($R^2 = .36$; $\beta = .41$, $t = 3.25$, $p < .01$). Such an effect does not appear among the youngest ones of our preadolescent sample, in support of our hypotheses, with an immediate measure of self-rated pro-environmental behaviors.

Regarding the self-rated pro-environmental behaviors index that we measured one week after the manipulation, the analysis reveals the same interaction between preadolescents' age and the eco-friendly label, though the interaction is only marginally significant ($\beta = 1.43$, $p < .07$). Among older preadolescents (i.e., older than 9 years and 9 months; $\beta_{JN} = .27$, $t = 1.96$, $p = .05$), a regression analysis shows that the eco-friendly label significantly increased pro-environmental behaviors ($R^2 = .32$; $\beta = .31$, $t = 2.71$, $p < .01$). Here too, such an effect does not appear among the youngest participants, again in support of our hypotheses, with a delayed measure of self-rated pro-environmental behaviors.

To corroborate the representation of the interaction that emerged in the floodlight analyses, we split the sample according to the children's age and ran two analyses of covariance (ANCOVAs) with the two measures of self-rated pro-environmental behaviors successively. We labeled preadolescents younger than 10 years as "younger preadolescents" and the others as "older preadolescents." As we expected and show in Table 2, these analyses confirmed our previous results. Figure 1 displays the pattern of results corroborating our hypotheses.

4. Discussion

The results of the experiment presented in this paper offer new insights into the social labeling theory, behavioral spillover effects and the promotion of pro-environmental behaviors. They show that preadolescents (7–12 years) represent a promising target for interventions that foster pro-environmental behaviors.

Expanding traditional behavioral spillover studies (Truelove et al. 2014) and corroborating Tybout and Yalch's (1980) previous work on social labeling, we show that effectiveness is not necessarily bound to an initial behavior. Although this was assumed in the most commonly cited research in psychological literature that investigates cross-sectional correlations among multiple pro-environmental behaviors (e.g. Berger, 1997, p.^pp, Weber, 1997, p.^pp.), we show the effectiveness of a label based on a simple list of questions (without concern for the answers) and applied only once. This offers a much simpler protocol than the ones used in previous research, where the label was applied repeatedly over an extensive period of time (Grusec & Redler, 1980, p.^pp, Miller *et al.*, 1975, p.^pp.). Labeling children was sufficient at inducing pro-environmental behaviors, even though the labeled group did not differ from the control group in its level of attitudes toward the environment.

This study provides additional evidence that social labeling effectiveness is dependent on the degree to which people find the label "plausible" (Tybout & Yalch, 1980, p.^pp.). It also confirms the assumption that effectiveness of social labeling relies on the reattribution of the behavior to personal characteristics, as the effectiveness of social labeling techniques increases with age, that actually contributes to the development of self-concept.
This implies that the focus should not necessarily be on how to trigger the first behavior, as in the definition Truelove et al. (2014) propose, but on how to facilitate the reattribution. Thus, the challenge might not necessarily rest on how to hide the label but on how to ensure the reattribution.

We also offer a response to the unanswered question revolving around children's age and effective social labeling (Grusec & Redler, 1980, p.^pp, Miller *et al.*, 1975, p.^pp.). Confirming that preadolescents are particularly sensitive to persuasion attempts (van Reijmersdal *et al.*, 2012, p.^pp.) and especially to unconventional ones, we show that 10–12 years is the most effective age of children in our sample. As such, we argue that social labels will likely be less effective in the lower bound of our age group; specifically, younger preadolescents' self-concept may not be sufficiently developed (Campbell *et al.*, 1996, p.^pp, Marsh *et al.*, 1984, p.^pp.), and thus they should not be used as a reference for subsequent behaviors, as self-perception theory proposes (Bem, 1972, p.^pp.). Regarding the upper bound of the age group, as our sample did not contain children older than 12 years, we can only rely on previous research to infer how the label will operate with an older target. Older preadolescents are savvier in terms of persuasive intent (van Reijmersdal *et al.*, 2012, p.^pp.); therefore, it is possible that the social labeling tactic works differently and that reattributions require subtler techniques, as reactance may come into play (Grandpre *et al.*, 2003, p.^pp, Van Petegem *et al.*, 2015, p.^pp.). Furthermore, older adolescents may slowly grow out of the period in which labels reassure them and they seek security in external cues specific to their

social development (Chaplin & Roedder John, 2007, p.^pp, Christie & Viner, 2005, p.^pp.). Nevertheless, these explanations are only tentative. As such, further research should investigate the transitional period of adolescence.

Our results on the moderating role of age also enable us to rule out alternative explanations to the social labeling effect such as social desirability or demand effects. Seminal studies on social desirability and children indeed show that social desirability decreases with age. It would be more prevalent in grade 3 children than in the grade 6 ones, so more identifiable in 8 than in 12 year-olds (Crandall & Crandall, 1965, p.^pp.). This is consistent with recent research on internalization process of social behaviors (Kogut, 2012, p.^pp.). According to socialization theories (Grusec *et al.*, 2000, p.^pp.), 7-8 year old children merely comply with the requests to be approved and appreciated but as they grow older, they consider the behavior solicited in the norms or values and adoption of the behavior would be representative of their identities and inherent beliefs (Kogut, 2012, p.^pp.). Responses oriented by social desirability and demand effect would therefore be less often observed in older pre-adolescents in comparison to younger ones. Our results go in the opposite direction, as the oldest children in our sample are more responsive than younger ones. This supports the hypothesis of identities enhancement, and rejects social desirability and demand effect as alternative explanations.

Preadolescence is a particularly favorable period to instill new desirable behaviors. This time of development indeed entails the rise in autonomy in many consumption choices (Palan *et al.*, 2010, p.^pp.), and children generally prefer goods they have selected themselves (Freeman & Brucks, 2002, p.^pp.). However, pressuring children to behave in a specific way can frequently backfire, notably when the pressure comes from paternalistic sources (Goldberg & Gunasti, 2006, p.^pp.). Therefore, social labeling may work when other means fail as we showed that it was effective in the challenging context of the protection of the

environment. Referred to as a “social dilemma”, eco-friendly behaviors are difficult to motivate as this age group find hardly relevant long-term benefits (Pechmann *et al.*, 2003, p.^pp.). It is therefore worth underlying that the intentions to behave measured a week after the exposure to the label remained significantly eco-friendlier, which represent a really encouraging result.

Offering a protocol that does neither require cognitive load, techniques to trigger a first behavior, or a particularly high sensitivity to the cause, we demonstrate that applying social labeling to large audiences of preadolescents is easy and effective in enhancing pro-environmental intentions to behave. Pragmatically, this could be translated into Public Service Announcements that encourage parents or teachers to highlight children’s positive behaviors. The tactic could also be used on a large scale, through (video) games or apps, for example. Children could be invited to play a first round in which some pro-environmental decisions need to be made. An “encouraging” score would then be shown with a clear “label,” expecting that this will spill over into “real” prosocial behaviors. As stresses by Stern (2006, p.^pp.) ”what we do in the next 10 to 20 years can have a profound effect on the climate in the second half of this century”, every small steps count!

Our research therefore yields avenues for further research. Beyond the applications to be tested, there are many additional theoretical aspects that should be investigated. Although this research lends support to the theoretical explanation that self-perception and self-concept is at the root of social labeling, this remains to be empirically demonstrated. Researchers might also investigate how changes in people’s dispositions in favor of the considered cause can be favored. Our findings could also be extended by scrutinizing further the framing of labels. While cognitive load weighs on the operationalization of social labeling, an effective label may optimize the production of positive spillover effects.

These encouraging results notwithstanding, research on labeling children implies a careful consideration of the ethical implications of such practice. Deontologists, who largely agree that an absolute perspective on every issue is the only perspective acceptable (see Hunt & Vitell, 2006, p.^pp. for a discussion), could argue that subtle persuasion cannot be tolerated, whatever the objective. As such, they would likely reject the "ends justify the means" advocated by teleologists. Although we do not regard the means–ends theory driven by prosocial objectives as more acceptable, we largely agree with this teleological view here. In accordance with previous research on ethical acceptance of persuasion tactics addressing children for positive outcomes (Charry *et al.*, 2014, p.^pp.), we indeed believe that appraising a child for his or her deeds in the hope of subsequent recommendable behaviors, though potentially exaggerating the merits, should not be of ethical concern. To support this, we refer to Grusec and Redler (1980), who also name social labeling "the appraisal approach". Research has extensively demonstrated that appraising a child is beneficial (Mueller & Dweck, 1998, p.^pp.). Beyond enhancing their intrinsic motivation (Koestner *et al.*, 1987, p.^pp.) and self-esteem (Koestner *et al.*, 1987, p.^pp, Murray *et al.*, 2003, p.^pp.), it also helps them acquire skills (Schunk, 1994, p.^pp.). Along the way, labeling ensures benefits to the targets themselves. If labeling a child can lead to positive personal outcomes in addition to protecting the environment, stakeholders will likely lean toward a positive evaluation of the technique.

5. Conclusion

With this research, we aid stakeholders engaged in the design of effective tools to protect the environment and, inch by inch, we contribute to another economic perspective. Without requiring a revolution in people's behaviors, we add an unconsidered, though relevant,

segment of consumers to the current basis of already involved citizens: preadolescents. Beyond the determinant role of preadolescents' current and subsequent consumption and their significant influence over their peers' and families' consumptions, young people's favorable attitudes towards environment (Grønhøj & Thøgersen, 2012, p.^pp.) certainly represent a fertile ground for social labeling. Yet, it should be considered as a complement to other public policies, as the latter probably largely contribute to these positive dispositions. All in all, we believe that this is very promising in a situation that is much in need of effective actions.

6. References

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Table 1. Floodlight Analyses

	Self-Rated Pro-environmental Behaviors	
	Index Measured Right After the Manipulation	Index Measured One Week After the Manipulation
Manipulated Variables		
Label	1.72***	1.43
Age (continuous)	.17***	.27***
Label x Age	.19***	.17*
Covariates in the ANCOVA		
Environmental perceptions	.23***	.12
Gender	.01	.19*
Johnson–Neyman point	10 years and 3 months	9 years and 9 months

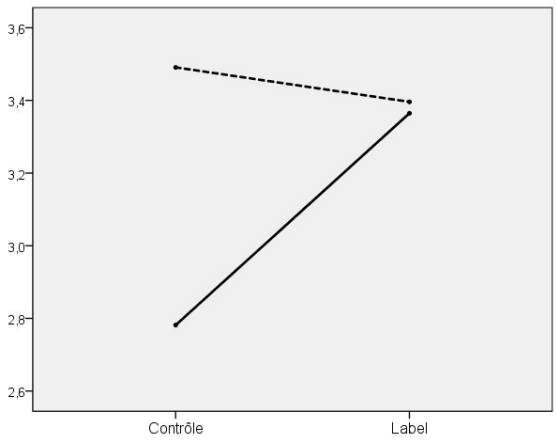
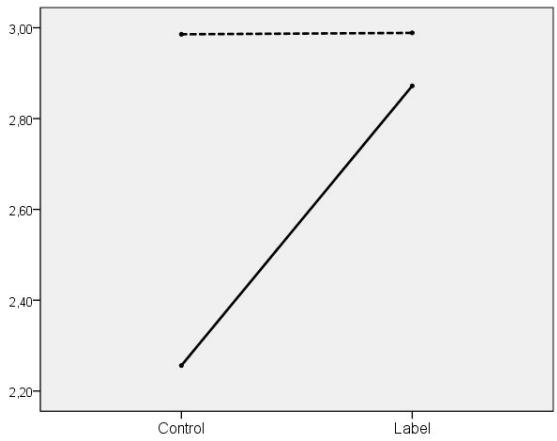
*p < .10; **p < 0.05; ***p < 0.01 (two-tailed).

Table 2. ANCOVAs Full Results (F-Ratios)

	Self-Rated Pro-environmental Behaviors	
	Index Measured Right After the Manipulation F(1, 103)	Index Measured One Week After the Manipulation F(1, 107)
Manipulated Variables		
Label	3.02*	5.53**
Age (continuous)	3.50*	10.36***
Label x Age	8.05***	5.32**
Covariates in the ANCOVA		
Environmental perceptions	9.69***	.45
Gender	.03	2.00

*p < .10; **p < 0.05; ***p < 0.01 (two-tailed).

Figure 1. Interaction between label and age

Self-rated pro-environmental behaviors (index measured right after the manipulation)	Self-rated pro-environmental behaviors (index measured one week after the manipulation)
	

Key code:

----- older preadolescents

- - - - - younger preadolescents.