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## Encouraging ecological behaviour through induced hypocrisy and inconsistency

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► **To cite this version:**

Daniel Priolo, Isabelle Milhabet, Olivier Codou, Valérie Fointiat, Emmanuelle Lebarbenchon, et al..  
Encouraging ecological behaviour through induced hypocrisy and inconsistency. *Journal of Environ-  
mental Psychology*, 2016, 47, pp.166-180. 10.1016/j.jenvp.2016.06.001 . hal-04296032

**HAL Id: hal-04296032**

**<https://univ-montpellier3-paul-valery.hal.science/hal-04296032>**

Submitted on 5 Apr 2024

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Manuscript Number: JEP-15-480R2

Title: Encouraging Ecological Behaviour through Induced Hypocrisy and Inconsistency

Article Type: Full Length Article

Keywords: Social Norms, Hypocrisy, Ecological Behaviour, Cognitive Dissonance

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Abstract: Remembering one's past transgressions of a social norm is known as an effective paradigm for enhancing pro-social and ecological behaviours. Our study aimed to show that reminding norm transgressions can arise cognitive dissonance and can lead to behavioural change as induced hypocrisy does. In particular, we tested whether inconsistency between the self-concept and the remembered past transgressions is or is not likely to encourage behavioural change. To reach this goal, we conducted an experiment comparing induced hypocrisy, injunctive inconsistency and descriptive inconsistency with five comparison conditions. The results showed that, as observed with the induced hypocrisy paradigm, presenting a salient injunctive norm and its past transgressions enhances psychological discomfort, actual donation and donation amounts for an ecological association. The discussion addresses applied perspectives and theoretical implications.

**Acknowledgements**

We wish to express our gratitude to Rowland Martin, Vivian Waltz and Ann Greaves for their comments on this article. We also wish to thank Marine Brizzi and Jeremy Body for their great help.

Dear Professor Gifford,

Please find enclosed the revised version of our article “Encouraging Ecological Behaviour through Induced Hypocrisy and Inconsistency”, originally submitted to the Journal of Environmental Psychology on December 15, 2015 (Manuscript JEP-15-480).

First of all, we want to thank you and the reviewers for the detailed and constructive remarks. We have made modifications to take into account all reviewers’ feedbacks. Below you will find them along with our revisions. In the manuscript to highlight the modifications we have made, we wrote them in red. All the co-authors have seen and agree with its revised contents.

We believe this is an improved version of our article. We hope that you will like it and look forward to hearing from you.

Yours sincerely,

Daniel Priolo

Isabelle Milhabet

Olivier Codou

Valérie Fointiat

Emmanuelle Lebarbenchon

Fabrice Gabarrot

Dear Colleagues,

First of all, we would like to thank you for your comments. We have made modifications to take into account all your remarks. We believe this is an improved version of our paper. Below you will find your feedback along with our revisions (in red colour).

We hope that you will like this new version of the article and look forward to hearing from you.

## Reviewer #1: JEP-15-480R1

Well done to the authors on engaging with the review feedback and producing a much clearer paper throughout. Overall, the paper is now well-argued and offers interesting findings that have the potential to add to the literature. However, there are a few areas in which further improvements are needed. The main issue is that the primary objective of the paper needs to be described consistently throughout - the abstract talks about underlying mechanisms, the introduction talks about comparing two theories, the first line of the discussion appears to suggest the aim is replication, so the reader is left confused about exactly where the paper intends to contribute.

**The primary objective has been described consistently throughout the paper.**

Further specific points are as follows:

Abstract: Make link between past transgressions and induced hypocrisy clearer. The abstract sets the reader up to expect findings about 'the underlying processes' but the findings described don't appear to relate to this.

**We linked norm transgressions to induced hypocrisy. We omitted the sentence evoking "the underlying process"**

The highlights are weak - they don't adequately represent the study which is methodologically robust and well-grounded in theory.

**The highlights has been changed to a better representation of the study.**

The opening of the paper is now much stronger.

Explain injunctive and descriptive norms at first mention.

**P. 3: We explained injunctive and descriptive norms at first mention**

It is unusual to present the results in the opening paragraph - I would suggest omitting the final two sentences before 1.1 at this point.

**P. 4: We omitted the final two sentences before 1.1**

P. 7 "All research on induced hypocrisy..." omit "all" - published studies not yet read or unpublished studies may disagree.

**P. 7: We omitted "All"**

Clarify the direction of the measure 'psychological discomfort' e.g. is a higher mean greater discomfort?

**P. 13: We made these clarifications**

Discussion Section 4.1 "Transgressing an injunctive norm does not engender the same level of reported..." is somewhat confusing as it implies that the injunctive norm has less effect. It would be more effective to note that injunctive norms had a greater effect than descriptive.

P. 23: we modified the manuscript in a less confusing way.

'Hypothetical results' are irrelevant - use the findings here to argue or suggest the point that greater integration of norms results in greater discomfort from transgression.

P. 24: We replaced "hypothetical results" with "Such a prediction based on our results is consistent"

Support of Gawronski's proposals would be found in the pattern across all of the inconsistency conditions - better to discuss together rather than focus first on descriptive inconsistency, which is somewhat confusing.

P. 25: we discussed all the inconsistency conditions together.

Discussion of duration would be better placed in a paragraph on future work.

P. 27: We placed the discussion of the duration in the section limitations.

The evidence for "in our study, it is possible to imagine..." is not clear.

We replaced "it is possible to imagine" with "it is likely"

"Weakening of attitudes towards the environment" - not meaningful. Is what is meant "weakening of positive attitudes"?

P. 25: We added the adjective "positive" to be clearer.

The conclusions section should not include any new material or points. The discussion of the literature here would be better placed in the Discussion section.

P. 23: We moved the discussion of the literature in the discussion section.

Typo

P.4 "ecological one" should be "ones".

Modification done

Section 2.2.2 Note that all behaviours listed are pro-environmental except for littering.

P. 18 Term "prescriptive" occurs twice.

We replaced the term "Prescription" with the term "Injunction" each time "Prescription" occurs.

P. 23 Suggest "the amount of that" replaced by "the amount given".

The expression "amount of that" has been changed to "amount given"

### Reviewer #3:

Thanks to the authors for responding so carefully to the issues mentioned by the reviewers. This was previously a well-written paper in many respects, and it's great to see how the authors' revisions have strengthened some of the weaker sections of the paper, bringing the paper as a whole into line.

P.23-27-The restructured Discussion now reads much better than previously. Potential limitations of the study are now clearly outlined, which now offers a greater sense of balance in terms of readers evaluating your findings.

Conclusion now does more to link the study with other relevant work, i.e. that of Whitmarsh and Thøgersen, emphasising the relevance of the findings in light of other work.

**P. 23: as recommended by Reviewer #1, we moved a part of the conclusion in the discussion section.**

P.27-'She assumed that there may be a tendency to overestimate our actions to protect the environment and to underestimate our actions which damage the environment.' Need to specify what it is that is being over/underestimated, e.g. 'environmental impact'.

**We made the specifications asked**

A couple of typos remain; please ensure that the paper is proof-read fully. E.g:

**We read carefully the paper to avoid typos.**

P.4 (48/49) '...especially ecological one' should read '...especially ecological ones'?

**Modification done**

P.6 (19/20) 'Some of authors' should read 'Some authors'?

**The expression “some of Authors” has been changed to “Some authors”**

P.23 (11/12)-'The purpose of this paper was to produce similar effects as those found with the hypocrisy paradigm by making a social norm salient and reminded...' should this read 'reminding'?

**The term “reminded” has been changed to “reminding”**

P.27 (38/39)-'She explained this tendency by the reduction of cognitive that arouses...' Should this read 'arises'?

**The term “arouses” has been changed to “arises”**



## Highlights

- Reminding ecological transgressions of social norms generates cognitive dissonance
- Comparison of normative inconsistencies and induced hypocrisy
- Injunctive inconsistency and induced hypocrisy produce the greatest discomfort
- Cognitive dissonance can favour actual donations to an ecological association

Running head: Social norms and ecological behaviour

Encouraging ecological behaviour through induced hypocrisy and inconsistency

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Encouraging ecological behaviour through induced hypocrisy and inconsistency

**Abstract**

Remembering one's past transgressions of a social norm is known as an effective paradigm for enhancing pro-social and ecological behaviours. **Our study aimed to show that reminding norm transgressions can arise cognitive dissonance and can lead to behavioural change as induced hypocrisy does.** In particular, we tested whether inconsistency between the self-concept and the remembered past transgressions is or is not likely to encourage behavioural change. To reach this goal, we conducted an experiment comparing induced hypocrisy, injunctive inconsistency and descriptive inconsistency with five comparison conditions. The results showed that, as observed with the induced hypocrisy paradigm, presenting a salient injunctive norm and its past transgressions enhances psychological discomfort, actual donation and donation amounts for an ecological association. The discussion addresses applied perspectives and theoretical implications.

*Keywords:* Social Norms, Hypocrisy, Ecological Behaviour, Cognitive Dissonance.

## 1 Introduction

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2 While environmental protection seems to be an important issue for the majority of  
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4 French people, this does not mean that most of them actually engage in ecological behaviours.  
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6 In a recent survey (Acxiom, 2009) which collected 400,000 answers from French internet  
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8 users about the environment, showed that, while 93% of the respondents believed that  
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10 environmental issues have become a major concern, only 38% of them reported adopting  
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12 environmentally friendly behaviours (e.g., recycling) or sustainable consumption choices  
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14 (e.g., buying fluorescent or LED lamps instead of standard incandescent lamps) . In other  
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16 words, although protecting our planet seems to be perceived as what we *ought to do*, it is not  
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18 what we *actually* do. On the basis of Cialdini's norm taxonomy (see Cialdini, Kallgren, &  
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20 Reno, 1991; Cialdini & Trost, 1998), it appears that, regarding the environment, there is a gap  
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22 between injunctive norms (i.e., *what ought to be done*) and descriptive norms (i.e., *what most*  
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24 *people actually do*).

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31 Common sense could argue that such a discrepancy is an obstacle to the promotion of  
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33 ecological behaviours. Social psychological research, however, shows that this kind  
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35 discrepancy can be used to enhance pro-environmental behaviours (Rubens, Gosling,  
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37 Bonaiuto, Brisbois, & Moch, 2015). Making a person aware that he or she knows what is  
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39 good for the planet, but does not actually do it, can encourage the adoption of ecological  
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41 behaviours. This is the idea behind Aronson's induced-hypocrisy paradigm (e.g., Aronson,  
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43 Fried & Stone, 1991). Stone and Fernandez (2008) assumed that the effectiveness of this  
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45 paradigm relies on the salience of the gap between a normative standard (i.e., a social norm)  
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47 and its transgression (i.e., past behaviours). It can encourage the adoption of future normative  
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49 behaviours. Dickerson, Thibodeau, Aronson, and Miller (1992) showed that the issue of water  
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51 conservation for instance could be promoted in this way.  
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The purpose of the present paper was to extend the induced-hypocrisy paradigm to one's past transgressions of a social norm and to propose new procedures that might encourage behavioural change. Besides the hypocrisy paradigm, we present and use two additional normative-inconsistency procedures (i.e., descriptive vs. injunctive inconsistency) to encourage donations to an ecological association. These procedures are based on the distinction between different kinds of social norms. We employ different norm taxonomies (Cialdini, et al. 1991; Thøgersen, 2006) to determine how social norms can be used to generate a psychological discomfort which leads to behavioural change. To design our experiment, we used descriptive norms (i.e., what most people actually do) and injunctive norms (i.e., what ought to be done). We made use of induced hypocrisy, as well as injunctive and descriptive inconsistencies, to encourage donations to an ecological association. Over and above the effects on environmental or sustainable behaviours, the results presented in the present paper can make a significant contribution to the theory, and be discussed with regard to two explanations of induced hypocrisy (Aronson, 1999; Gawronski, 2012).

### 1.1 *Induced Hypocrisy and Ecological Behaviours*

Aronson et al. (1991) were the first to present the induced-hypocrisy paradigm. Their procedure divided into two sequential steps. In the first step (i.e., the speech step), participants are asked to promote a pro-social behaviour (e.g., water conservation), usually by making a speech. In the second step (i.e., transgressions recall step), participants are faced with facts showing that they do not act according to their own recommendations. As a whole, the results of the studies using this paradigm have supported the effectiveness of induced hypocrisy for changing intentions and behaviours (see also Stone, Aronson, Crain, Winslow, & Fried, 1994; Stone, Wiegand, Cooper, & Aronson, 1997). This paradigm has been used to encourage various pro-social behaviours (Fointiat, 2004, 2008; Peterson, Haynes, & Olson, 2008; Priolo & Liégeois, 2008; Stone, Wiegand, Cooper, & Aronson, 1997), especially ecological ones.

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Induced hypocrisy has been used to promote recycling (Fried & Aronson, 1995; Fried, 1998), water conservation (Dickerson, Thibodeau, Aronson, & Miller, 1992) and general ecological behaviours (Rubens, Gosling, Bonaiuto, Brisbois, & Moch, 2015). Stone and Fernandez (2008) have identified two key elements involved in this paradigm. First, the participants must be committed to promoting the pro-social behaviour. Second, this behaviour has to be consistent with normative standards (i.e., to be a good person). This second element is very important because it is linked to the explanation of induced hypocrisy effects.

Aronson (1999) addresses the effects of induced hypocrisy in reference to the cognitive dissonance theory (Festinger, 1957). Aronson's explanation relies on his own revision (see Aronson, 1968) of cognitive dissonance theory, which assumes that most people have positive self-standards (e.g., I don't want to be a hypocrite). When people are reminded of their transgressions, they see themselves as hypocrites (Aronson, 1999). This perception threatens their self and creates an uncomfortable psychological state called cognitive dissonance (Thibodeau & Aronson, 1992). Cognitive dissonance needs to be reduced, which can be achieved by changing future behaviours or intentions (Fointiat, 1998). Festinger (1957) argued that people use the easiest way to reduce cognitive dissonance. In the hypocrisy paradigm, when people promote a pro-social behaviour, they are aware of the normative standards related to this behaviour. In this case, dissonance cannot be reduced, neither by changing the norm, nor by changing past behaviour. However, hypocritical participants can easily choose to engage in future pro-social behaviours, if this opportunity is offered. This could explain why induced hypocrisy has often been used as a tool to promote change in actual behaviours or behavioural intention (Dickerson et al., 1992; Fointiat, Priolo, Saint Bauzel & Milhabet, 2013). This idea is supported by Stone and Fernandez (2008) when they argue that beliefs about normative standards are more resistant to change than intentions or future behaviours.

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A central element in Stone and Fernandez's reasoning is the normative aspect of the behaviour promoted in the first step of the paradigm. The normative standards mentioned by these authors can be related to what Cialdini et al. (1991) referred to as injunctive norms (i.e., what ought to be done). Consequently, a parallel between induced hypocrisy and social norms can be drawn. Social norms can be used for a better understanding of induced hypocrisy. This is particularly interesting because social norms have been used to change ecological behaviour intentions (Von Borgstede, Dahlstrand, & Biel, 1999) and ecological behaviours (e.g., Cialdini, Kallgren, & Reno, 1991, Ölander & Thøgersen, 2014; Thøgersen, 2009)

### *1.2 Social-Norm Taxonomies and Ecological Behaviours*

Numerous studies have addressed the possibility of encouraging ecological behaviours using norms. Without being exhaustive we can mention reducing littering (Kallgren, Reno, & Cialdini, 2000), recycling (Schultz, 1999), organic product purchase (Thøgersen, 2002, 2006) and environmental protection (Cialdini, 2003). Many studies distinguish different types of norms. **Some authors** (Kallgren et al., 2000) have referred to the focus theory of normative conduct (Cialdini, Kallgren, & Reno, 1991). According to this theory, the term "norm" can refer to descriptive (i.e., what most people actually do) or injunctive norms (i.e., what we ought to do). A descriptive norm corresponds to what is commonly observed. An injunctive norm corresponds to beliefs as to what is or is not moral conduct.

Others have been based on norm activation theory (Schwartz, 1977; Schwartz & Howard, 1982). Schwartz (1977) makes the distinction between personal norms and social norms. Social norms are based on group expectations, and rewards and sanctions are externally defined and imposed. Personal norms are internalized social norms based on self-expectations, and rewards and sanctions come from within the actor. Thøgersen (2006) further subdivides personal norms into two types. The first includes superficially internalized norms, called introjected norms. The second includes deeply internalized norms, called integrated



1 norms. This author assumes that all types of norms can be placed on a continuum of  
2 increasing internalization and integration into the self. The less integrated norms are the  
3 descriptive norms, then the subjective social norms and then the introjected norms, the more  
4 internalized norms are the integrated norms.  
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9 The contributions of Cialdini et al. (1991) and Thøgersen (2006) help us to understand  
10 how norms can change behaviour. Reno, Cialdini and Kallgren (1993) showed that injunctive  
11 norms have a different impact than do descriptive norms on behavioural change. Injunctive  
12 norms induce changes that are more robust than those induced by descriptive norms.  
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19 Regardless of the nature of the impact, both types of norms can be used to increase  
20 pro-social behaviour. However, whatever its type is, in order to be efficient a norm has to be  
21 salient (Cialdini et al., 1990; Kallgren et al., 2000). The more salient the norm, the greater its  
22 potential to change behaviours (Kallgren et al., 2000). Thus, to ensure that a norm will  
23 influence behaviour in an expected way, it is necessary to remind the participants of the  
24 norm's characteristics (Cialdini & Goldstein, 2004). These findings show that not all the  
25 normative beliefs are directly accessible in memory. They have to be activated to be effective.  
26 This point is very important and may be linked to cognitive dissonance (Festinger, 1957) and  
27 induced hypocrisy. In this paradigm (i.e., induced hypocrisy), the role of the inconsistency  
28 between a past behaviour and a social norm can be specified.  
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### 43 *1.3 Induced Hypocrisy, Inconsistency, and Social Norms*

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45 According to Festinger (1957), two cognitions are inconsistent when one is the  
46 opposite of the other. For instance, if I think I act in an environmentally responsible way but  
47 prefer to take my car rather than public transport, then I have two inconsistent cognitions  
48 which are simultaneously accessible. For his part, Aronson (1968, 1999) assumed that  
49 cognitive dissonance exists if the individual's behaviour is inconsistent with the self-concept.  
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58 Research on induced hypocrisy tends to support Aronson's conception (1999), especially  
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studies involving self-esteem (e.g., Peterson et al., 2008) or self-affirmation (Stone et al., 1997).

It has been shown that induced hypocrisy engenders cognitive dissonance (Fried & Aronson, 1995). Nonetheless, Gawronski (2012) thinks that hypocrisy-paradigm effects can be explained by inconsistency alone. In line with Festinger (1957), Gawronski (2012) states that inconsistency is the core of cognitive dissonance. Gawronski considers that inconsistency is sufficient to generate cognitive dissonance and reference to self-concept is not necessary. To generate cognitive dissonance, the two inconsistent cognitions have to be simultaneously accessible. McGregor, Newby-Clark and Zanna (1999) showed that if the inconsistent cognitions are not simultaneously accessible, dissonance discomfort will be minimized. On the other hand, cognitive dissonance will be aroused when inconsistent cognitions are simultaneously available. Gawronski (2012) underlines the fact that in the induced-hypocrisy paradigm, general beliefs about an issue and thoughts about related past behaviours are simultaneously accessible. Any inconsistency between beliefs and thoughts about related past behaviours generates cognitive dissonance. With the current design of the induced-hypocrisy paradigm, it is not possible to reject Gawronski's hypocrisy view. To contribute to this debate, we need to analyse a situation in which inconsistency is less threatening for self-concept. If it generates psychological discomfort and cognitive and behavioural changes, then inconsistency is sufficient to engender cognitive dissonance. Conversely, if such a situation does not cause these effects, then inconsistency is not sufficient. Social norms are helpful in elaborating this situation, but before doing so, we must look at induced hypocrisy in a different way.

In the first step of the induced-hypocrisy paradigm, participants commit to advocating a pro-social behaviour (i.e., speech step). This step goes back to the work by Kiesler (1971). When presenting commitment theory, this author pointed out that commitment induced salient

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cognitions related to a behaviour. In induced hypocrisy, the first step can create salient cognitions related to a pro-social behaviour. In the majority of hypocrisy studies (e.g., Fried, 1998), the advocated behaviour represents what we ought to do (i.e., an injunctive norm). Stone and Fernandez (2008, p. 1026) speak of a “well accepted normative standard”. The cognitions made salient in the first step can be seen as cognitions related to an injunctive norm. Then recall of past transgressions of this norm should highlight inconsistent cognitions (i.e., norm and past behaviours). The discrepancy between the injunctive norm and the transgression can generate cognitive dissonance (Priolo & Liégeois, 2008).

This revised version of the hypocrisy paradigm supports an idea mentioned in the original formulation of cognitive dissonance theory (Festinger, 1957). Festinger suggested that cognitive dissonance could be aroused when a behaviour is not consistent with cultural mores. According to Festinger, a cultural more is something that is commonly approved in a particular situation. In our view, cultural mores correspond to injunctive norms. So, if a person recalls a social norm and remembers having transgressed it, then he/she will experience cognitive dissonance. This kind of dissonance can be generated by several procedures. One of them is induced hypocrisy. Another procedure could use a message to make an injunctive norm salient and a questionnaire to recall the transgressions. This should generate cognitive dissonance due to what we call injunctive inconsistency.

If injunctive inconsistency engenders cognitive dissonance, it could be explained by Aronson’s revision of the theory (1968). For most people, knowing what good people should do while not doing it can threaten one’s self-concept. Thøgersen (2006) assumes that descriptive norms are less well integrated into the self than are prescriptive (i.e., injunctive) norms. Consequently, transgression of the descriptive norm should threaten the self-concept less than transgression of the injunctive norm. According to Aronson’s conception of induced hypocrisy, the more the self is threatened the higher cognitive dissonance is. Thus,

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2 transgressions of a descriptive norm (i.e., descriptive inconsistency) should generate less  
3 dissonance than transgressions of an injunctive norm (i.e., injunctive inconsistency).

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5 Conversely, according to Gawronski's conception of induced hypocrisy, the inconsistency  
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7 between transgressions and a norm, no matter what, should generate cognitive dissonance.

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10 Consequently, the psychological discomfort and the behavioural changes reported by the  
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12 participants in both injunctive-inconsistency and descriptive-inconsistency conditions should  
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14 be greater than those reported by participants in a control group. We assume that it is possible  
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16 to reproduce the effects of induced hypocrisy by making an injunctive or descriptive norm  
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18 more salient and by confronting the persons with their own past transgressions. In other  
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20 words, participants who are reminded of their transgressions of a salient norm (i.e., induced  
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22 hypocrisy, injunctive inconsistency and descriptive inconsistency) should report more  
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24 psychological discomfort (hypothesis 1) and behave differently from other participants  
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29 (hypothesis 2 and 3). This is what we tested in our experiment.  
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#### 31 *1.4 Study overview*

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34 Participants were recruited by a member of a fictitious ecological association. One  
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36 quarter of the participants were asked to make a speech to promote ecological behaviour (i.e.,  
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38 "Speech" condition). They were told that their speech might be recorded and used in a radio  
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40 campaign promoting environmental protection. The second quarter of the participants were  
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42 required to read a message stating that ecological behaviour is what people should adopt<sup>1</sup> (i.e.,  
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44 "Injunctive Norm Salience" condition). The third quarter read a description of nine individual  
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46 profiles suggesting that a majority of people today adopt ecological behaviours (i.e.,  
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48 "Descriptive Norm Salience" condition). Nothing was required of the fourth quarter at this  
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51 stage (i.e., "No salience" condition). Then half the participants were reminded that they did  
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57 <sup>1</sup> Stone et al. (1994) showed that just reading a message does not generate the same level of dissonance as  
58 building and publicly delivering the message. Nevertheless in their study, the message read was not made to  
59 activate elements of an injunctive norm. Here, the message was pre-tested to ensure that it made elements of  
60 injunctive norms salient.  
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not always act in a manner that is consistent with environmental protection (i.e., “Recall” condition). The second half of participants was not subjected to this reminder (i.e., “No recall” condition). All participants were asked to answer a questionnaire measuring their psychological discomfort. After the questionnaire, the experimenter asked them if they wished to make a donation to the association and collected actual donations. This was followed by a debriefing.

## 2 Method

### 2.1 Pre-tests

#### 2.1.1 Pre-test 1

To ensure that we could increase the salience of the injunctive norm, we used a message. In this message a climate expert explained how scientists are now convinced that human behaviour is the cause of global warming. This was backed by statements made by French celebrities (e.g., Nicolas Hulot who presented a TV show on wildlife). They mentioned, for instance, that “protecting the environment is something we must do in order to leave a viable planet to our children”.

Forty participants (20 women, 20 men,  $M_{age} = 19.25$ , age range: 18 to 27) were equally balanced across conditions (Injunctive induction vs. No induction). Twenty participants read the message and 20 did not read anything (i.e., Control group). All participants answered a three-item questionnaire on a 7-point scale ranging from 1 “not at all” to 7 “absolutely”. They were asked to indicate their degree of agreement with the following assumptions: “Protecting the environment is a responsible behaviour”, “Protecting the environment is a legitimate behaviour”, and “Protecting the environment is a good thing to do” ( $\alpha = .72$ ).

1 We calculated an injunctive-norm score for each participant. The results showed that  
2 participants who read the message got a higher injunctive-norm score ( $M = 4.72, SD = 0.95$ )  
3  
4 than did the control group ( $M = 3.98, SD = 1.03$ ),  $t(38) = 2.34, p < .05, \eta^2 = .12, d = 0.73$ .

### 7 2.1.2 Pre-test 2

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9 To ensure that we could increase the salience of a descriptive norm, half of the  
10 participants read nine individual profiles. Six profiles described people who displayed  
11 frequent ecological behaviours. Two profiles described people who adopted ecological  
12 behaviours only occasionally. One profile described a person who never adopted ecological  
13 behaviours. The order of the profiles was counter-balanced.

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22 Forty participants (20 women, 20 men,  $M_{age} = 19.55$ , age range: 17 to 31) were  
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24 equally balanced across conditions (Descriptive induction vs. No induction). Twenty  
25 participants read the profiles (Descriptive induction) and 20 others read no profiles (i.e., No  
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27 induction). All participants answered a four-item questionnaire on a 7-point scale ranging  
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29 from 1 “strongly disagree” to 7 “strongly agree”. They were asked to indicate their degree of  
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31 agreement with the following items: “Most people adopt behaviours that protect the  
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33 environment”, “It is common to meet people who respect the environment”, “Ecological  
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35 issues are important for many people”, and “Environmental protection is what guides the  
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37 behaviours of many people” ( $\alpha = .78$ ).

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43 We calculated a descriptive-norm score for each participant. Participants who read the  
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45 profiles ( $M = 4.21, SD = 0.38$ ) obtained a higher descriptive-norm score than members of the  
46  
47 control group ( $M = 3.45, SD = 0.62$ ),  $t(38) = 4.67, p < .01, \eta^2 = .33, d = 1.37$ .

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51 To summarise, these two pre-tests ensured that the salience of the injunctive and  
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53 descriptive norms could be increased.

## 54 2.2 Study

### 2.2.1 Participants

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2 All the participants were approached in front of the science library of a French  
3  
4 university during a break. They were students of physics, biology, chemistry or geology. They  
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6 were not paid for their participation. One hundred and sixty young adults (80 women, 80 men,  
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8  $M_{age} = 21.01$ , age range: 18 to 26) were recruited by the experimenters to participate in the  
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10 main experiment of this paper. They were equally balanced across the eight conditions of our  
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12 experiment. Most of the participants agreed to participate. We did not count the number of  
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14 rejections but they were few.  
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### 2.2.2 Materials

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19 To increase the salience of the injunctive norm we used a message. It was pre-tested to  
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21 ensure that the injunctive norm became salient (pre-test 1). To increase the salience of the  
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23 descriptive norm we used 9 profiles. The effects of these profiles had been tested to ensure  
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25 that the descriptive norm became salient (pre-test 2).  
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31 In order to remind participants of past transgressions, we used a list of behaviours  
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33 drawn up by an actual ecological association. According to the association, a majority of  
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35 people often fail to execute these behaviours which include *recycling, littering, turning off the*  
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37 *lights when leaving a room, turning off the tap when brushing your teeth, switching off the TV*  
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39 *instead of leaving it on standby*. Participants had to specify how often they transgressed each  
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41 of these behaviours, with whom and on what day of the week. This method of addressing  
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43 transgression recall was introduced by Fointiat (2004) and ensures that the participants will  
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45 remember their transgressions.  
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51 In order to measure psychological discomfort, we adapted the Elliott and Devine  
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53 (1994) dissonance thermometer. This scale measures psychological discomfort, negative self,  
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55 positive affect, and anxiety-related affects. Because of their poor internal consistency, we  
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57 were not able to use results on negative self, positive affect, and anxiety-related affects. So,  
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2 we retained only five items measuring psychological discomfort. Participants were asked to  
3 report and quantify how *anxious*, *tense*, *bothered*, *embarrassed* and *uncomfortable* they felt  
4 on a 7-point scale ranging from 1 (“not at all”) to 7 (“absolutely”), **the higher the score, the**  
5 **greater the psychological discomfort**. This questionnaire exhibited a good reliability ( $\alpha = .78$ ).  
6  
7

### 9 2.2.3 Procedure and hypotheses

11 One hundred and sixty science students at the University of Nice Sophia Antipolis  
12 were approached by an experimenter (either male or female) pretending to be working for an  
13 environmental association called “Blue Region”. The experimenter asked for their  
14 participation as part of a promotional campaign addressing ecological behaviours. Participants  
15 were randomly assigned to one of eight experimental conditions, following a 4 (Norm  
16 salience: Speech vs. Injunctive Norm vs. Descriptive Norm vs. No Salience) x 2  
17 (Transgression recall: Recall vs. No recall) between-subject design. Participants were asked to  
18  
19 (1) make a speech that could be used in a radio campaign promoting ecological behaviours  
20 (i.e., “Speech” condition), (2) read a message designed to make the injunctive norm salient  
21 (i.e., “Injunctive norm” condition), (3) read a text describing nine individual profiles (i.e.,  
22 “Descriptive norm” condition), (4) do nothing (i.e., “No salience” condition). In other words,  
23 we made the norm salient (i.e., made the norm prominent) in three different ways: The speech  
24 (i.e., undefined normative beliefs), the message (i.e., injunctive norm) and the profiles (i.e.,  
25 descriptive norm).  
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28 The experimenter then told half the participants in each of these four groups that  
29 he/she would like to know the frequency at which they displayed non-ecological behaviours.  
30 In other words, this half of the participants were questioned about their transgression (i.e.,  
31 “Recall” condition). They confessed at least four of five selected transgressions. Nothing was  
32 asked of the other half of the participants (i.e., “No recall” condition). After this, all  
33 participants were required to answer the questionnaire measuring psychological discomfort.  
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Finally, the experimenter asked all participants if they would like to make a donation. In this case, the experimenter presented a closed donation box to the participant. Just before the participant put the money in, the experimenter recorded the donation amount, gave back the money and stopped the experiment. To summarize, we had two independent variables (Norm salience and Transgression recall). These variables were between subjects. We also had three dependent variables (Psychological discomfort, Donations and Amount of donations).

We had specific expectations about certain conditions. To simplify the presentation of our assumptions, we attributed a name to each experimental condition (see Table 1).

Table 1. Condition Names

	Speech	Injunctive norm	Descriptive norm	No salience
Recall	Hypocrisy	Injunctive Inconsistency	Descriptive Inconsistency	Transgression
No recall	Speech	Injunction	Description	Control

“Hypocrisy” was the condition in which participants were committed to promoting ecological behaviour and were reminded of their transgressions. “Injunctive Inconsistency” was the condition in which participants read the injunctive message and were reminded of their transgressions. “Descriptive Inconsistency” was the condition in which participants read profiles and were reminded of their transgressions. “Control” was the condition in which participants were simply required to answer the questionnaire measuring psychological discomfort. Participants who are made aware of the gap between a salient social norm and their own failures (i.e., past transgressions) feel more psychological discomfort (i.e., cognitive dissonance) than participants who are not made aware of this gap (Priolo & Liégeois, 2008). To reduce this psychological discomfort it is easier for the participants to adopt a new behaviour consistent with the social norm (Stone & Fernandez, 2008). Consequently, we

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expected participants in the “Hypocrisy”; “Injunctive Inconsistency”; and “Descriptive Inconsistency” conditions to feel the highest level of psychological discomfort. Their results should differ from the others, especially from the “Control” condition (Hypothesis 1). We also expected dissonance to influence participants’ future behaviour in such a way that students in the “Hypocrisy”, “Injunctive Inconsistency” and “Descriptive Inconsistency” conditions should be more inclined to donate to the association (Hypothesis 2), and they should be willing to give more (Hypothesis 3) than those in the other conditions

### 3 Results

#### 3.1 Psychological Discomfort

We attempted to assess our assumptions on this measure by using specific contrasts<sup>2</sup> but the residual variance was too high. Therefore, we opted for ANOVAs to test the effects of the variables “Norm salience” and “Transgression”. We had no particular expectations concerning the main effects of the independent variables. The results showed a main effect of “Norm Salience”,  $F(3, 152) = 4.42, p < .01, \eta^2 = .08$ . Participants who read the message enforcing the salience of the injunctive norm ( $M = 3.73, SD = 1.03$ ) reported higher psychological discomfort than those in the other conditions (see Table 2).

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<sup>2</sup> Standard analysis of variance provides what is called an omnibus test. It tests for all possible comparisons between the mean groups whether any of those means are significantly different from each other. However, experimenters may want to draw specific conclusions regarding the differences between the conditions. Such conclusions can be obtained from contrast analysis. A contrast tests for a specific question regarding the means. Specifically, a contrast is a prediction which is translated into a set of contrast coefficients. (Abdi & Williams, 2010). Usually, a contrast analysis consists of testing the specific contrast translating the researcher’s hypotheses, and a set of (m-2) other contrasts, called residuals, testing for all the possible orthogonal alternative patterns of means. Hence, while conducting a contrast analysis, the researcher tests his own model as well as every other orthogonal models that can account for the results. For the researcher’s model to be supported, the contrast of interest has to be significant, and the alternative contrasts / residuals have to remain non-significant.

Table 2. Effects of “Norm Salience” on Psychological Discomfort

Condition	Mean	Standard Deviation
Speech	3.29 <sub>a</sub>	0.91
Injunctive Norm	3.73 <sub>b</sub>	1.03
Descriptive Norm	3.16 <sub>a</sub>	0.98
No Salience	3.01 <sub>a</sub>	0.87

Note. The absence of letters in common indicates a significant effect at  $p < .05$ .

Our main interest lay in the breakdown of the interaction between “Norm Salience” and “Transgressions Recall”. Before addressing this point, it is interesting to note that a significant effect was found for “Transgressions Recall”,  $F(1, 152) = 5.15, p < .05, \eta^2 = .03$ . Participants who were reminded of their transgressions ( $M = 3.47, SD = 1.07$ ) reported higher psychological discomfort than those who had not been reminded ( $M = 3.13, SD = 0.85$ ). We tested the interaction effect between “Norm Salience” and “Transgressions Recall” on psychological discomfort. Results showed a marginal effect,  $F(3, 152) = 2.32, p = .07, \eta^2 = .04$ . We ran pairwise comparisons in order to compare all the conditions. These comparisons allow us to test our assumptions (see Table 3).

As a whole, the results were consistent with hypothesis 1. “Injunctive Inconsistency” elicited the highest amount of psychological discomfort ( $M = 3.83, SD = 1.19$ ) and it differed from the “Control” conditions (see Table 3). The “Hypocrisy” condition ( $M = 3.66, SD = 0.87$ ) induced more discomfort than did the “Speech” ( $M = 2.92, SD = 0.69$ ), the “Transgression” ( $M = 2.89, SD = 0.92$ ) and “Description” ( $M = 2.85, SD = 0.84$ ) conditions (see Table 3). Contrary to hypothesis 1, “Descriptive Inconsistency” did not differ from any other condition (see Table 3). This result supports Aronson’s (1968) assumption that dissonance exists if an individual’s behaviour is inconsistent with his/her self-concept.

Table 3. Psychological Discomfort Experienced by Participants in Each Condition.

Condition	Mean	Standard Deviation
Hypocrisy Speech and Recall	3.66 <sub>ab</sub>	0.97
Injunctive Inconsistency Injunctive norm and Recall	3.83 <sub>a</sub>	1.19
Descriptive Inconsistency Descriptive norm and Recall	3.48 <sub>abc</sub>	1.03
Transgressions No salience and Recall	2.89 <sub>c</sub>	0.92
Speech Speech and No recall	2.92 <sub>c</sub>	0.69
Injunction Injunctive norm and No recall	3.63 <sub>ab</sub>	0.86
Description Descriptive norm and No recall	2.85 <sub>c</sub>	0.84
Control No salience and No recall	3.13 <sub>bc</sub>	0.81

Note. *The absence of letters in common indicates a significant effect at  $p < .05$ .*

These results show that it is possible to reproduce the psychological discomfort of induced hypocrisy by ensuring that a injunctive norm becomes salient and by reminding the participant of his/her transgressions. One finding was quite unexpected, however: The psychological discomfort experienced by participants in the “**Injunction**” condition ( $M = 3.63$ ,  $SD = 0.86$ ) was similar to that experienced by participants in the “Injunctive Inconsistency” condition ( $M = 3.83$ ,  $SD = 1.19$ ). Nevertheless, the psychological discomfort in the “**Injunction**” condition does not induce changes in behaviour (see Table 4).

### 3.2 Donation

Table 4. Number of Participants Who Made a Donation in Each Condition.

	Number of participants	Frequency
Hypocrisy Speech and Recall	7/20 <sub>abc</sub>	35% <sub>abc</sub>
Injunctive Inconsistency Injunctive norm and Recall	10/20 <sub>a</sub>	50% <sub>a</sub>
Descriptive Inconsistency Descriptive norm and Recall	9/20 <sub>ab</sub>	45% <sub>ab</sub>
Transgressions No salience and Recall	4/20 <sub>bc</sub>	20% <sub>bc</sub>
Speech Speech and No recall	5/20 <sub>bc</sub>	25% <sub>bc</sub>
Injunction Injunctive norm and No recall	3/20 <sub>c</sub>	15% <sub>c</sub>
Description Descriptive norm and No recall	4/20 <sub>bc</sub>	20% <sub>bc</sub>
Control No salience and No recall	2/20 <sub>c</sub>	10% <sub>c</sub>

Note. *The absence of letters in common indicates a significant effect at  $p < .05$*

Our assumptions concerning this measure were as follows: “Hypocrisy”, “Injunctive Inconsistency” and “Descriptive Inconsistency” would encourage donations to an ecological association. In these conditions, we expected the number of participants who would give money to the association to be higher than in the other conditions. We used contrasts to test these assumptions (see Table 5).

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Running head: Hypocrisy, inconsistency and ecological behaviours

Table 5. Specific Contrasts Used in the Logistic Regression Analysis.

	Hypocrisy	Injunctive Inconsistency	Descriptive Inconsistency	Speech	Injunction	Description	Transgression	control
C1	5	5	5	-3	-3	-3	-3	-3
C2	-1	2	-1	0	-0	0	0	-0
C3	1	0	-1	0	-0	0	0	-0
C4	0	0	0	-1	4	-1	-1	-1
C5	0	0	0	3	0	-1	-1	-1
C6	0	0	0	0	0	2	-1	-1
C7	0	0	0	0	0	0	-1	1

Note. C1 was the contrast testing our hypotheses. It compares “Hypocrisy”, “Injunctive inconsistency” and “Descriptive inconsistency” to other conditions. C2 to C7 were residual contrasts.

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2 We regressed the number of people making a donation on our contrast codes using a  
3  
4 binomial logistic regression. Our first contrast C1 tests our hypothesis by comparing the  
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6 number of people donating to the association in the “Injunctive inconsistency”, the  
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8 “Descriptive inconsistency” and the “Hypocrisy” conditions with the other 5 conditions. The  
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10 other contrast codes C2-C7 test for all the possible alternative models that are orthogonal  
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12 (uncorrelated) to our own. The orthogonal contrasts are combined to test for all possible  
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14 alternatives at once. The contrast of interest here was significant,  $\chi^2_{wald} (1) = 12.09, p < .001,$   
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16  $R^2_{Cox\ and\ Snell} = .09,$  and the residual contrasts were not significant,  $\chi^2_{wald} (6) = 2.80, ns, R^2_{Cox\ and}$   
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18  $Snell = .02.$  These results support our hypotheses. In other words, more participants in the  
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20 “Hypocrisy”, “Injunctive Inconsistency” and “Descriptive Inconsistency” conditions made a  
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22 donation than did participants in the other conditions. We used pairwise comparisons with  
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24 Fisher’s exact test (see Table 4). They partially supported Hypothesis 2. More specially, there  
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26 was only a marginal effect between the “Hypocrisy” (35% of the participants donated) and  
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28 “Control” (10% of the participants donated,  $p = .064$ ) conditions. However, the results for  
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30 amount donated fully supported Hypothesis 3. Although, the omnibus effect was not  
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32 significant,  $\chi^2_{Kruskal\ Wallis} (7, N = 160) = 13.57, ns, \eta^2 = .08^3,$  the pairwise comparisons were all  
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34 consistent with Hypothesis 3 (see Table 6).  
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59 <sup>3</sup> As recommended by Green and Salkind (2008), we divided the *chi square* value by *N-1* to obtain an index  
60 equivalent to  $\eta^2$ .  
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Table 6. Amount of donation in € for each condition.

Conditions	Mean	Standard Deviation	Mean Rank
Hypocrisy Speech and Recall	0.40	0.59	86.83 <sub>ab</sub>
Injunctive Inconsistency Injunctive norm and Recall	0.42	0.47	95.15 <sub>a</sub>
Descriptive Inconsistency Descriptive norm and Recall	0.68	0.92	96.68 <sub>a</sub>
Transgressions No salience and Recall	0.34	0.80	75.50 <sub>abc</sub>
Speech Speech and No recall	0.22	0.46	74.25 <sub>abc</sub>
Injunction Injunctive norm and No recall	0.30	0.57	78.98 <sub>abc</sub>
Description Descriptive norm and No recall	0.26	0.78	71.25 <sub>bc</sub>
Control No salience and No recall	0.06	0.23	65.38 <sub>c</sub>

Note. The absence of letters in common indicates a significant effect at  $p < .05$

Concretely, the “Control” group differed from the “Hypocrisy” group ( $\chi^2_{\text{kruskal Wallis}}(1, N = 40) = 4.03, p < .05, \eta^2 = .10$ ), the “Injunctive Inconsistency” group ( $\chi^2_{\text{kruskal Wallis}}(1, N = 40) = 7.81, p < .01, \eta^2 = .20$ ) and the “Descriptive Inconsistency” group ( $\chi^2_{\text{kruskal Wallis}}(1, N = 40) = 6.85, p < .01, \eta^2 = .18$ ). In other words, participants in the “Control” condition ( $M = 0.06\text{€}^4$ ;  $SD = 0.23$ ) gave less money than did those in the “Hypocrisy” ( $M = 0.40\text{€}$ ;  $SD = 0.59$ ), “Injunctive Inconsistency” ( $M = 0.42\text{€}$ ;  $SD = 0.47$ ) and “Descriptive Inconsistency” ( $M = 0.68\text{€}$ ;  $SD = 0.92$ ) conditions.

<sup>4</sup> Here, we reported the mean donation because it is more meaningful than a mean rank. The mean ranks are presented in Table 6.



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In summary, making a norm salient (injunctive or descriptive) and reminding people of their transgression of it increased the participants' desire to make a donation to the ecological association and increased the amount given.

#### 4 Discussion

The purpose of this paper was to produce similar effects as those found with the hypocrisy paradigm by making a social norm salient and reminding the participant his/her transgression of it. We did this in order to compare two conceptions of induced hypocrisy (Aronson, 1999; Gawronski, 2012). We conducted an experiment in which we compared induced hypocrisy with injunctive-norm transgressions and descriptive-norm transgressions and then measured psychological discomfort, the inclination to making a donation and the amount of the donation. As a whole, the results were consistent with our hypotheses. They show there, both injunctive-norm transgression and descriptive-norm transgression increased the number of donations, just like induced hypocrisy. However, we observed that, contrary to descriptive inconsistency, injunctive inconsistency and induced hypocrisy produced more psychological discomfort than most of other conditions.

##### 4.1 Theoretical implications

This pattern of results has several theoretical implications. Our work is in line with one of the four themes mentioned by Whitmarsh and Lorenzoni (2010) about divergences between perceptions and behaviour, specifically regarding behaviour change and behavioural responses. Our study suggests that ecological behaviour can be enhanced by using both kinds of norms or induced hypocrisy. This is consistent with Whitmarsh's remarks (2009). She assumed that there may be a tendency to overestimate our actions to protect the environment (e.g., recycling, buying energy efficient light bulbs; turning off lights when leaving a room) and to underestimate our actions which damage the environment (e.g., using car; keeping temperature above 21 degree Celsius in winter; buying paint based on linen oil). She

1 explained this tendency by the reduction of cognitive dissonance that arises from an  
2 inconsistency between knowing our negative impact on the environment and not changing our  
3 behaviours. Thøgersen (2004) provided an interpretation involving the cognitive dissonance  
4 of inconsistencies between environmentally irresponsible behaviours and the moral  
5 importance of behaving in a responsible way. In our study, we made salient this inconsistency  
6 to generate cognitive dissonance and encourage ecological behaviours.  
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14 First, the effects on psychological discomfort show that transgressing an injunctive  
15 norm engenders more reported psychological discomfort than a control group. Whereas  
16 transgressing a descriptive norm does not engender more psychological discomfort than a  
17 control group. These results can be explained by Aronson's conception (1999) of induced  
18 hypocrisy but they cannot be explained by Gawronski's conception (2012). The works of  
19 Thøgersen (2006) are useful to demonstrate this point. He states that descriptive norms are  
20 less integrated into the self than prescriptive (i.e., injunctive) norms. Therefore the  
21 transgression of a descriptive norm should threaten the self-concept less than the transgression  
22 of an injunctive norm. This could be the reason why psychological discomfort was greater  
23 when an injunctive norm and its transgression were made salient than when a descriptive  
24 norm and its transgression were made salient. In a future study, it would be interesting to  
25 compare the transgression of integrated, introjected, social and descriptive norms. Given our  
26 results, we can predict that the transgression of an integrated norm will induce greater  
27 discomfort than the transgression of a descriptive norm. This prediction based on our results  
28 is consistent with the idea that the more a norm is integrated into the self the more its  
29 transgression will generate psychological discomfort. This is consistent with the idea that the  
30 more the self is threatened the higher the dissonance is (Aronson, 1968). Although the results  
31 on psychological discomfort can be explained by Aronson's conception of induced hypocrisy  
32 this is not the case for the results on donations and donation amounts.  
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“Hypocrisy”, “Descriptive inconsistency” and “Injunctive inconsistency” are associated with more donations and higher amounts than a control group. These results are more easily explained by Gawronski’s conception of induced hypocrisy than by Aronson’s. According to Gawronski (2012) inconsistency is sufficient to generate cognitive dissonance. The inconsistency between social norms (descriptive and injunctive) and past behaviours could have generated cognitive dissonance which has been reduced by adopting a new behaviour consistent with these norms. Moreover, we assumed that the commitment made during induced hypocrisy caused an injunctive norm to become salient. We ensured that the injunctive norm became salient by using a norm specific message, and we obtained similar results for psychological discomfort and behavioural change. It seems that an inconsistency between an injunctive norm and past behaviours can engender cognitive dissonance. These findings support Festinger’s (1957) assumption about the discrepancy between social mores and behaviour. Several practical implications can be seen from this pattern of results.

#### 31 4.2 *Practical implications*

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First, it is possible to arouse dissonance in order to promote ecological behaviours without a face to face situation. This makes the application of the dissonance procedure in the field simpler. Dissonance could be applied to a mass campaign to encourage ecological behaviours (e.g., using public transportation, water or energy conservation). A television campaign could be run to achieve this purpose. It could begin with a sentence such as: “Please take two minutes to think about why conserving energy is important”. Then a question could follow and help people to recall their transgressions. For instance: “Do you always adopt energy saving behaviour?”. Then it could end with a final question: “So will you leave your television on standby or you will turn it off? Another kind of campaign could be run. First, a letter or an e-mail could be sent to people in order to make an injunctive norm salient. Then a questionnaire could be sent out, by post or e-mail, to the same people. Its role would be to

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remind them of their transgressions of the prescribed behaviour. At the end of the questionnaire, there could be a measure of the behavioural intention to use public transportation. By so doing so, behavioural intention could increase and people could be predisposed to use public transportation. The measure of behavioural-intention could be repeated to assess the robustness of the change. These campaigns should be supervised by an expert in this domain. Whitmarsh and O'Neill (2010) outlined the fact that if the gap between pro-environmental behaviours and desirable behaviours becomes too great it could lead to a weakening of **positive** attitudes towards the environment. Moreover, Fried (1998) warned professionals about using induced hypocrisy to promote pro-social behaviours. She pointed out that small changes in the application of this paradigm could lead to a boomerang effect. Protocols should be precisely designed and include an opportunity to change behaviour or intention. If this opportunity is not offered to the participants they could reduce dissonance in an undesirable way (e.g., weaken their positive attitude toward the environment). This is one of the reasons why these applications should be carried out using many precautions. Another one involves the limitations of this study.

#### 4.3 *Limitations*

The generalizability of the results presented in this study could be questioned for several reasons. First, the constitution of our study sample is very specific. With twenty participants per condition, the sample size is quite small. The reproducibility of these results is uncertain despite using the exact same protocol. Moreover, the participants were all science students. They might be more sensitive to the arguments presented in the messages than other people. A replication with more diverse and numerous participants could reinforce these results.

Second, there was a bias of self-selection in this study. Indeed, we tested the effects of our procedure only on the participants who agreed to participate. Participants who refused to

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participate could be strongly opposed to the idea of protecting the environment. We cannot  
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know what our protocol would generate with them. In a future study, we could assess the  
attitude of participants toward ecological behaviours.

Third, the amounts of the donations were relatively small. In other words, the cost of  
this behaviour was very low. We cannot know how the participants would react to a bigger  
demand. The literature on induced hypocrisy suggests that our procedure could be applied to  
different kinds of behaviours. Induced hypocrisy can impact on everyday-life behaviours  
(e.g., Dickerson et al., 1992) or high-cost behaviours (e.g., Fointiat, 2004). However, another  
study with high-cost behaviours should be informative. The effects could be weaker but still  
interesting. If our protocol increased the proportion of persons who adopt ecologically  
responsible-behaviour by 10%, it could make a notable difference on a large scale.

Fourth, due to the credibility of the cover story of this study we did not use a baseline  
comparison. Consequently, we cannot be sure that the discomfort expressed can be due to  
manipulations. Nonetheless, the effects of induced hypocrisy on discomfort or negative  
affects have been demonstrated (Fried & Aronson, 1995; Yousaf & Gobet, 2013). It seems  
likely that our manipulations generate psychological discomfort. Another study with a  
baseline comparison should be useful to support this idea.

Lastly, the question of the duration of these effects can be raised. Reno, Cialdini and  
Kallgren (1993) provided some answers to this question. They showed that the changes  
induced by injunctive norms are more robust than the changes induced by descriptive norms.  
In our study, it is likely that behavioural changes due to “Descriptive Inconsistency” are less  
robust than those due to “Injunctive Inconsistency”. This assumption could be tested in future  
research.

## 5 Conclusion

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Some authors (Whitmarsh, 2009; Thøgersen, 2004) has shown that cognitive dissonance could explain phenomena which limit the adoption of environmentally responsible behaviours (e.g., not changing behaviours, underestimating our actions which damage the environment). In our study, we showed that cognitive dissonance can be used to encourage this kind of behaviours. For the requirements of this research we presented a descriptive norm and an injunctive norm in two different messages. According to Cialdini (2003), the most efficient way would be to ensure that both types of norms become salient. Thus, the imaginary campaigns we proposed could be adapted so as to make both types of norms salient in the same message, and then to remind the participants of their transgressions. The effectiveness of this action could be enhanced by policy measures. For instance, as recommended by Whitmarsh (2009), policy makers could take measures to reinforce normative motivations and lessen egoistic motivation to engage in pro-environmental actions. The changes should be stronger with this basis. This seems to be a good avenue for future campaigns aimed at promoting ecological behaviours.

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## Appendix A. Norm induction

### A.1. Injunctive Norm Induction

Julien Berthier's speech *Expert for NAC (Network Action Climate)*

The latest report of the intergovernmental panel on climate rise some recent doubts concerning the responsibility of human activities on climate change. Shorter periods of snow in Alpine regions is one of many examples. It is well-known that human activities also are responsible of an increase of two degrees on the average temperature of the globe. In addition to the loss of biodiversity at the level of 20-30% that this increase will cause, the whole ecological balance will be disrupted.

To counter this phenomenon, there are a multitude of small behaviors such as putting the TV on standby, turn off the room light when you leave, sort waste, turn off the water when brushing your teeth, do not throw waste on the floor, use bulbs with low energy consumption, take showers instead of baths, or use rechargeable batteries. It is time to be responsible and take these small actions every day. Everyone must realize that the earth is a legacy we leave to future generations and to care for the environment is a supportive attitude. Nicolas Hulot whose magnanimity is well-known, tried to promote environmental conservation, stating its environmental pact. Some helpful and friendly people answered his call and have signed the pact. They have therefore undertaken to produce the recommended behaviors. We are all able to show how we respect one another. To do this, we can preserve our environment by adopting these small daily actions as evidenced by the testimony of Sylvie "*I finally realized one day that the right thing to do was to respect the planet where we are. Gradually I produced the behaviors recommended by Nicolas Hulot's pact. I did not think that these innocuous actions could be ecological. I have fully integrated them into my lifestyle and today I feel bad when I see someone who does not follow what the pact recommends*".

A.2. Descriptive Norm induction

1  
2 *Thank you for reading very carefully the answers of people who answered a huge survey*  
3  
4 *about the environment. Because of the extent of questions and the very large number of*  
5  
6 *respondents, we selected some excerpts regarding four or five behaviors and ten*  
7  
8 *respondents. We selected them because their responses are particularly illustrative of the*  
9  
10 *responses we have encountered over the questionnaire.*  
11  
12

- 13  
14 - Anthony, 31 years, waiter, never makes ecological behaviors, he never practices selective  
15  
16 sorting. He tends to forget to turn off lights when leaving a room and to take baths instead  
17  
18 of showers. However, he does not throw paper on the floor.  
19  
20  
21 - Alice, 22 years, is a student. She occasionally sorts. She is careful not to waste water when  
22  
23 she takes a shower but she does not systematically adopt this behavior. However, she turns  
24  
25 the light off quite often [when leaving a room] and does not leave the TV in standby mode.  
26  
27  
28 - Sabrina, 36, teacher, cuts more and more water from the shower when it is not necessary that  
29  
30 it flows. From now on, she often thinks to make selective sorting and to turn lights off  
31  
32 when leaving a room and to not leave the TV on standby mode.  
33  
34  
35 - Kevin, 24, a top athlete, saves water more and more often and is extremely careful to turn  
36  
37 the lights off. Most often, he recycles and does not leave the TV on standby.  
38  
39  
40 - Denis is 45 years old. He manages a large entertainment complex. For years, he has been  
41  
42 adopting the sorting of garbage and car sharing systematically. Most often, he pays  
43  
44 attention to his use of water as well as electricity.  
45  
46  
47 - Luc, 52, a computer engineer, recycles, daily, very conscientiously for years he has been  
48  
49 paying particular attention to his water consumption by cutting systematically when he is  
50  
51 soaping. It has been years that Luc systematically turns the light off when leaves a room  
52  
53  
54 and he got used to never leave the TV in standby mode.  
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## Running head: Hypocrisy, inconsistency and ecological behaviours

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- Brigitte, 66, pensioner, has made recycling a priority. She is also a strong supporter of saving water, there is no question that she leaves the water running when she is soaping under the shower. However, it happens to her to forget to switch the TV off.
  - Anna, 23, business manager, recycles all the time and this before the installation of "yellow bins". She always stops water from her shower while she is soaping. It never happens to her to leave a room without turning the light off and she never leaves the TV in standby mode.
  - Jean-Pierre, 39, firefighter, systematically sorts waste. He always thinks to cut water in the shower when he is soaping and turns the light off when leaving a room. Moreover, he does not leave the TV on standby.

## Appendix B. Scales

### B.1. Injunctive Norm Measure

---

We ask you to answer to these questions.

Answer as spontaneous as possible, without looking for good or bad answers, going back to your previous answers.

To answer please follow this procedure: Circle one and only one value of the scale ranging from 1 (= « not at all ») to 7 (= « absolutely »). Circle the value that fit better with what you think.

Lastly, be sure that your answers will be confidential and anonymous.

Thank you for your participation

---

Protecting the environment is a responsible behaviour:

Not at all Absolutely

1	2	3	4	5	6	7
---	---	---	---	---	---	---

Protecting the environment is a legitimate behaviour:

Not at all Absolutely

1	2	3	4	5	6	7
---	---	---	---	---	---	---

Taking care of the environment it's being united:

Not at all Absolutely

1	2	3	4	5	6	7
---	---	---	---	---	---	---

Protecting the environment is a good thing to do:

Not at all Absolutely

1	2	3	4	5	6	7
---	---	---	---	---	---	---

*1.1.Thank you for your participation*



## B.2. Descriptive Norm Measure

---

We ask you to answer to these questions.

Answer as spontaneous as possible, without looking for good or bad answers, going back to your previous answers.

To answer please follow this procedure: Circle one and only one value of the scale ranging from 1 (= « strongly disagree ») to 7 (= « strongly agree »). Circle the value that fits better with what you think.

Lastly, be sure that your answers will be confidential and anonymous.

Thank you for your participation

---

Most people adopt behaviours that protect the environment:

Strongly disagree Strongly agree

1	2	3	4	5	6	7
---	---	---	---	---	---	---

It is common to meet people who respect the environment:

Strongly disagree Strongly agree

1	2	3	4	5	6	7
---	---	---	---	---	---	---

Ecological issues are important for many people:

Strongly disagree Tout à fait

1	2	3	4	5	6	7
---	---	---	---	---	---	---

Environment protection is what guides the behaviours of many people:

Strongly disagree Tout à fait

1	2	3	4	5	6	7
---	---	---	---	---	---	---

*1.2. Thank you for your participation*

### B.3. Dissonance Thermometer

Below are words that can describe different types of feelings. For each word, please indicate how much it describes how you are feeling right now by circling a number on the scale. "1" means "does not apply at all" and "7" means "applies very much" to how you are feeling right now. Don't spend much time thinking about each word, just give a quick, gut-level response.

**Content:**

does not apply at all applies very much

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**Uncomfortable:**

does not apply at all applies very much

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**Angry at myself:**

does not apply at all applies very much

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**Shame:**

does not apply at all applies very much

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**Uneasy:**

does not apply at all applies very much

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**Negative:**

does not apply at all applies very much

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**Friendly:**

does not apply at all applies very much

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**Disgusted with myself:**

1  
2 does not apply at all applies very much  
3  
4 

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**Concerned:**

5  
6  
7  
8 does not apply at all applies very much  
9  
10 

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**Embarrassed:**

11  
12  
13  
14 does not apply at all applies very much  
15  
16 

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**Bothered:**

17  
18  
19  
20 does not apply at all applies very much  
21  
22 

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**Optimistic:**

23  
24  
25  
26 does not apply at all applies very much  
27  
28 

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**Annoyed at myself:**

29  
30  
31  
32 does not apply at all applies very much  
33  
34 

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**Frustrated:**

35  
36  
37  
38 does not apply at all applies very much  
39  
40 

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**Tense:**

41  
42  
43  
44 does not apply at all applies very much  
45  
46 

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**Disappointed with myself:**

47  
48  
49  
50 does not apply at all applies very much  
51  
52 

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**Happy:**

53  
54  
55  
56 does not apply at all applies very much  
57  
58 

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**Guilty:**

does not apply at all applies very much

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**Anxious:**

does not apply at all applies very much

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**Self-critical:**

does not apply at all applies very much

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**Energetic:**

does not apply at all applies very much

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**Distressed:**

does not apply at all applies very much

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**Regretful:**

does not apply at all applies very much

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**Good:**

does not apply at all applies very much

1	2	3	4	5	6	7
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## Appendix C. Transgression Salience

### C.1. Transgression Recall

*In the last two months, did you fail to recycle a recyclable item?*

If you answered yes:

- How many times?
- Were you alone?
- Where were you?

*In the last two months, did you litter?*

If you answered yes:

- How many times?
- Were you alone?
- Where were you?

*In the last two months, did you let the light turned on after leaving in a room?*

If you answered yes:

- How many times?
- Were you alone?
- Where were you?

*In the last two months, did you ever not turn off the water while you were brushing your teeth?*

If you answered yes:

- How many times?
- Was it morning, midday or evening?
- Were you at home?

*In the last two months, did you ever put your TV in the standby mode instead of tuning it off?*

If you answered yes:

- How many times?
- Were you alone?
- Where were you?

## Tables

Table 1. Condition Names

	Speech	<b>Injunctive</b> norm	Descriptive norm	No salience
Recall	Hypocrisy	<b>Injunctive</b> Inconsistency	Descriptive Inconsistency	Transgression
No recall	Speech	<b>Injunction</b>	Description	Control

Table 2. Effects of “Norm Salience” on Psychological Discomfort

Condition	Mean	Standard Deviation
Speech	3.29 <sub>a</sub>	0.91
<b>Injunctive</b> Norm	3.73 <sub>b</sub>	1.03
Descriptive Norm	3.16 <sub>a</sub>	0.98
No Salience	3.01 <sub>a</sub>	0.87

Note. *The absence of letters in common indicates a significant effect at  $p < .05$ .*

Table 3. Psychological Discomfort Experienced by Participants in Each Condition.

Condition	Mean	Standard Deviation
Hypocrisy Speech and Recall	3.66 <sub>ab</sub>	0.97
Injunctive Inconsistency Injunctive norm and Recall	3.83 <sub>a</sub>	1.19
Descriptive Inconsistency Descriptive norm and Recall	3.48 <sub>abc</sub>	1.03
Transgressions No salience and Recall	2.89 <sub>c</sub>	0.92
Speech Speech and No recall	2.92 <sub>c</sub>	0.69
Injunction Injunctive norm and No recall	3.63 <sub>ab</sub>	0.86
Description Descriptive norm and No recall	2.85 <sub>c</sub>	0.84
Control No salience and No recall	3.13 <sub>bc</sub>	0.81

Note. The absence of letters in common indicates a significant effect at  $p < .05$ .

Table 4. Number of Participants Who Made a Donation in Each Condition.

	Number of participants	Frequency
<b>Hypocrisy</b> Speech and Recall	7/20 <sub>abc</sub>	35% <sub>abc</sub>
<b>Injunctive Inconsistency</b> Injunctive norm and Recall	10/20 <sub>a</sub>	50% <sub>a</sub>
<b>Descriptive Inconsistency</b> Descriptive norm and Recall	9/20 <sub>ab</sub>	45% <sub>ab</sub>
<b>Transgressions</b> No salience and Recall	4/20 <sub>bc</sub>	20% <sub>bc</sub>
<b>Speech</b> Speech and No recall	5/20 <sub>bc</sub>	25% <sub>bc</sub>
<b>Injunction</b> Injunctive norm and No recall	3/20 <sub>c</sub>	15% <sub>c</sub>
<b>Description</b> Descriptive norm and No recall	4/20 <sub>bc</sub>	20% <sub>bc</sub>
<b>Control</b> No salience and No recall	2/20 <sub>c</sub>	10% <sub>c</sub>

Note. The absence of letters in common indicates a significant effect at  $p < .05$



Table 5. Specific Contrasts Used in the Logistic Regression Analysis.

	Hypocrisy	Injunctive Inconsistency	Descriptive Inconsistency	Speech	Injunction	Description	Transgression	control
C1	5	5	5	-3	-3	-3	-3	-3
C2	-1	2	-1	0	-0	0	0	-0
C3	1	0	-1	0	-0	0	0	-0
C4	0	0	0	-1	4	-1	-1	-1
C5	0	0	0	3	0	-1	-1	-1
C6	0	0	0	0	0	2	-1	-1
C7	0	0	0	0	0	0	-1	1

Note. C1 was the contrast testing our hypotheses. It compares “Hypocrisy”, “Injunctive inconsistency” and “Descriptive inconsistency” to other conditions. C2 to C7 were residual contrasts.

Table 6. Amount of donation in € for each condition.

Conditions	Mean	Standard Deviation	Mean Rank
Hypocrisy Speech and Recall	0.40	0.59	86.83 <sub>ab</sub>
Injunctive Inconsistency Injunctive norm and Recall	0.42	0.47	95.15 <sub>a</sub>
Descriptive Inconsistency Descriptive norm and Recall	0.68	0.92	96.68 <sub>a</sub>
Transgressions No salience and Recall	0.34	0.80	75.50 <sub>abc</sub>
Speech Speech and No recall	0.22	0.46	74.25 <sub>abc</sub>
Injunction Injunctive norm and No recall	0.30	0.57	78.98 <sub>abc</sub>
Description Descriptive norm and No recall	0.26	0.78	71.25 <sub>bc</sub>
Control No salience and No recall	0.06	0.23	65.38 <sub>c</sub>

Note. The absence of letters in common indicates a significant effect at  $p < .05$