Do people associate environmentally-friendly behavior with positive emotions?
Environmental association with environmentally-friendly behavior

Abstract

Environmentally-friendly behavior is sometimes seen as a sacrifice associated with negative emotions, as engagement in this behavior can be relatively uncomfortable. We argue this view is too narrow, as it overlooks that environmentally-friendly behavior can also be seen as virtuous, thereby providing meaning. In the current studies we show people seem to have a stronger positive association with environmentally-friendly behavior than with environmentally-unfriendly behavior (Study 1), and they implicitly associate environmentally-friendly behavior more strongly with positive than with negative emotions (Study 2). Furthermore we found that this positive association was stronger when the behavior is perceived as more virtuous and when engagement can be attributed to one’s own volition (Study 1). Together these results suggest that meaning may play an important role in the emotional association people have with environmentally-friendly behavior.
Introduction

The transition to a sustainable society is an important goal in the upcoming years. Besides political action and technological development, individual behavior changes are indispensable in this transition (IPCC, 2014), as they are an important driver behind environmental change (DuNann Winter & Koger, 2004; Gardner & Stern, 2002; Gifford, Kormos, & McIntyre, 2011; Hackmann, Moser, & St. Clair, 2014; Vlek & Steg, 2007; Weaver et al., 2014). An important question to answer, therefore, is what motivates people to engage in environmentally-friendly behavior.

Research shows that emotions play an important role in decision making (Loewenstein & Lerner, 2003; Pfister & Böhm, 2008; Schwarz, 2000; Zeelenberg, Nelissen, Breugelmans, & Pieters, 2008) and can influence engagement in environmentally-friendly behavior (Smith, Haugtvedt, & Petty, 1994). What kind of emotions people associate with environmentally-friendly behavior and what causes this association, therefore, are points of interest. As illustrated by the quote “The American way of life is not up for negotiations” by former U.S. president George H.W. Bush prior to the Earth Summit in Rio de Janeiro, it seems that environmentally-friendly behavior is sometimes perceived as a sacrifice that decreases quality of life; i.e. is associated with negative emotions.

We however argue viewing environmentally-friendly behavior as a sacrifice overlooks its positive eudaimonic aspects: environmentally-friendly behavior can be perceived as virtuous and thus as meaningful behavior. At the heart of this idea is Aristotle, who taught that well-being can be found in the expression of virtue or doing the right thing for the right reasons, e.g. out of your own volition (Ryan et al., 2008). Research shows that having pleasant experiences is indeed not the only route to positive emotions (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000; Ryan & Deci, 2000a; Sheldon, Elliot, Kim, & Kasser, 2001), having meaningful experiences can feel good as well (Peterson, Park, & Seligman, 2005). It may thus be these eudaimonic aspects that lead to a positive association with environmentally-friendly behavior.

Indeed, engagement in behavior that is personally perceived to be valuable or important can elicit positive emotions (Ryan & Connell, 1989; Ryan & Deci, 2000a; Sheldon, Kasser, Smith, & Share, 2002). Furthermore, engagement in moral or pro-social behavior, i.e. behaviors that are generally seen as valuable or important, in itself can feel good (Aknin et al., 2012; Andreoni, 1989; Andreoni, 1990; Batson & Powell, 2003; Dunn et al., 2008; Grant & Sonnentag, 2010). Environmentally-friendly behavior fits these categories as well: contributing to the environment has been classified as a manifestation of moral behavior (Feinberg & Willer, 2012; Howell, 2013; Pandey, Rupp, & Thornton, 2013; Thøgersen, 1996). For example, Americans strongly agreed
that nature has intrinsic value and that humans have moral duties and obligations to animals, plants, and non-living nature such as rocks, water, and air (Leiserowitz et al., 2005). Likewise, many people in the UK agreed that people have personal, social and moral responsibilities to address climate change (Lorenzoni et al., 2007). The choice for acting environmentally-friendly is therefore partly based on evaluations about what the right or wrong thing to do is (Lindenberg & Steg, 2007). Given that many consider protecting the environment a virtue, we expect that engaging in environmentally-friendly behavior will be associated with positive emotions, which in turn may promote acting this way.

The current paper

In this study we first examine what kind of emotional association people have with environmentally-friendly behavior (Study 1 and Study 2). Second, we expect that if a positive emotional association is found, this association follows from environmentally-friendly behavior being meaningful. Therefore, we expect the strength of this association to depend on how meaningful the behavior is perceived to be. In the current paper, we study four different indicators of meaning. We expect that a positive emotional association with environmentally-friendly behavior is strengthened when the behavior is personally perceived as more virtuous, as indicated by the extent to which people value the environment (Study 1 and Study 2) and the extent to which people feel morally obliged to engage in environmentally-friendly behavior (Study 1). Furthermore, we expect that a positive emotional association with environmentally-friendly behavior is strengthened when the behavior itself is perceived as more virtuous, as indicated by the extent to which behavior is perceived to be environmentally-friendly (Study 1). Moreover, we expect that a positive emotional association with environmentally-friendly behavior is strengthened when engagement reflects more strongly on who you are, as indicated by the extent to which the choice for the behavior is volitional (Study 1). Lastly, we examine whether a more positive association with environmentally-friendly behavior is in turn related to stronger intentions to engage in this behavior (Study 1).
Results

We conducted two studies to examine people’s emotional association with environmentally-friendliness, testing how people thought they would feel after engaging in environmentally-friendly versus environmentally-unfriendly behavior (Study 1) as well as implicit associations between environmentally-friendliness and emotions to control for social desirability answering (Study 2).

In Study 1, we asked a general sample of inhabitants of a Dutch city (N = 132) to report how they would feel after engaging in several types of environmentally relevant behavior. For our manipulation, participants were randomly assigned to one of two conditions: half of the participants evaluated five behaviors that were environmentally-friendly (e.g., washing clothes at a low temperature), while the other half evaluated five versions of the same behaviors that were environmentally-unfriendly (e.g., washing clothes at a high temperature; further referred to as environmentally-unfriendly behavior). For each behavior, participants imagined engaging in the behavior out of their own volition (e.g., washing clothes at a low temperature) as well as out of situational constraints (e.g., washing clothes at a low temperature when it is the only available option on the machine), presented consecutively. Hence, all participants evaluated ten behaviors in total.

As our dependent measure, participants indicated on a five-point scale (1 = not at all, 3 = neutral, 5 = very strongly) to what extent they expected to experience six emotions after engagement in each of the ten behaviors: proud, satisfied and cheerful (averaged to represent positive emotions; α’s for the ten behaviors ranged from .87 to .93; α_{over_all_behaviors} = .97), and disappointed, frustrated and guilty (averaged to represent negative emotions; α’s for the ten behaviors ranged from .87 to .94; α_{over_all_behaviors} = .97). Furthermore, all participants indicated to what extent they intended engaging in the environmentally-friendly version of each of the five voluntary behaviors (1 = not at all to 5 = very strongly, α_{over_all_behaviors} = .76).

As indicators of meaning, our moderator variable, all participants completed a questionnaire on values (Steg, Perlaviciute, Van der Werff, & Lurvink, 2014), including a biospheric value scale (-1 = opposed to my principles, 0 = not important, to 7 = extremely important; α = .88; centered prior to the analysis) and indicated to what extent they thought these five behaviors were environmentally-friendly (1 = not at all to 5 = very strongly, α_{over_all_behaviors} = .78; centered prior to the analysis) and to what extent they felt morally obliged to engage in these five behaviors (1 = not at all to 5 = very strongly, α_{over_all_behaviors} = .81; centered prior to the analysis).
We first examined what kind of emotional association people have with environmentally-friendly behavior. Multiple analysis of variance suggests that participants who imagined engaging in the environmentally-friendly version of the behaviors anticipated feeling more positive emotions ($M_{pos} = 2.99$, $SD_{pos} = .80$) and less negative emotions ($M_{neg} = 1.48$, $SD_{neg} = .45$) than participants who imagined engaging in the environmentally-unfriendly version of those same behaviors ($M_{pos} = 1.85$, $SD_{pos} = .68$; $M_{neg} = 2.50$, $SD_{neg} = .81$; $F_{pos}(1,121) = 72.29$, $p_{pos} < .001$, $η^2_{pos} = .37$; $F_{neg}(1, 121) = 74.09$, $p_{neg} < .001$, $η^2_{neg} = .38$). When we looked at the emotions separately, we found no consistent differences for emotions that could be categorized as hedonic or eudaimonic: the same pattern of results was found for all emotions. These results are a first indication that people have a an overall positive association with environmentally-friendly behavior.

As expected, regression analyses show that a positive association with environmentally-friendly behavior was more pronounced for people with stronger biospheric values ($B_{\text{behavior x values}} = .34$, $t(119) = 3.71$, $p < .001$). The same holds for people who felt more morally obliged to engage in environmentally-friendly behavior ($B_{\text{behavior x obligation}} = .44$, $t(119) = 3.00$, $p < .01$) and for people who saw the behaviors as more environmentally-friendly ($B_{\text{behavior x environmentally friendliness}} = .61$, $t(119) = 3.05$, $p < .01$; all tested in separate models). Furthermore, mixed model analysis of variance showed emotional associations were more positive for voluntary behaviors than for behaviors driven by situational constraints ($F(1, 121) = 31.92$, $p < .001$, $η^2 = .21$; see Figure 1). For negative emotions similar patterns of results occurred, although only the interactions between behaviotype and moral obligation ($B = -.37$, $t(119) = -.289$, $p < .01$) and behaviotype and volition ($F(1,121) = 26.71$, $p < .001$) reached significance. These results suggest that the positive association that people have with environmentally-friendly actions is stronger when people see the behaviors as more virtuous, and when engaging in the behavior can be attributed to one's own volition. This suggests that meaning indeed plays an important role in the emotional association people have with environmentally-friendly behavior.
Lastly, linear regression analysis was used to test the effect of anticipated positive and negative emotions (centered prior to the analysis) on people’s intentions to engage in environmentally-friendly behavior. The interactions between condition (environmentally-friendly versus environmentally-unfriendly behavior) and the strength of the anticipated positive and negative emotions over all behaviors (included in the same model) were significant: the less negative and the more positive people expected to feel about the environmentally-friendly version of the behavior, the stronger their intention to engage in this type of behavior ($B_{behaviortype \times negative} = -.68$, $t(117) = -3.10$, $p < .01$; $B_{behaviortype \times positive} = .73$, $t(117) = 4.30$, $p < .001$).

The results of Study 1 suggest that people have a positive emotional association with environmentally-friendly behavior, particularly when such behavior provides meaning. Furthermore, this positive association in turn seems to strengthen intentions to engage in environmentally-friendly behavior. However, as we contrasted environmentally-friendly behavior with environmentally-unfriendly behaviors, the question remains whether people indeed have a positive emotional association with environmentally-friendly behavior, or whether they mainly have a negative emotional association with environmentally-unfriendly behavior. Furthermore, as people are motivated to be seen as moral (Batson, Thompson, Seuferling, Whitney, & Strongman, 1999) we cannot exclude that these results, which are based on explicit answers, are caused by social desirability concerns. To rule out these alternative explanations,
we examined the association between environmentally-friendly behavior and positive emotions in an implicit way in Study 2, comparing this association to a neutral control condition.

First year psychology students of a Dutch university (N = 76) took part in a laboratory experiment in exchange for course credits. All participants first completed a questionnaire that included the biospheric value scale (Steg et al., 2014; α = .90). Next, participants took a computerized Implicit Association Test (IAT; for full procedure see Greenwald et al., 1998; Greenwald, Nosek, & Banaji, 2003). The IAT aims to measure people's automatic evaluation of a concept (Greenwald et al., 1998) – in the present paper the emotional association with environmentally-friendliness. The reasoning is that if people have a positive emotional association with environmentally-friendliness, categorizing environmentally-friendly words with the same key as positive emotions (considered to be congruent blocks) should be cognitively easier, and thus faster, than categorizing environmentally-friendly words with the same key as negative emotions (considered to be incongruent blocks; see Figure 2). A positive difference between participants' reaction time in the congruent and incongruent blocks therefore suggests a positive association with environmentally-friendliness.

Repeated measures ANOVA showed that reaction times were indeed lower for the congruent than for the incongruent blocks: when environmentally-friendly and positive words were categorized with the same key, participants responded faster ($M = 795.24$ ms) than when environmentally-friendly and negative words were categorized with the same key ($M = 902.82$ ms; $F(1,75) = 11.86, p < .01, \eta^2 = .14$; IAT effect $= 107.58$ ms; IAT D = .24). We did not find that a positive association with environmentally-friendliness was more pronounced for people with stronger biospheric values in this study.

These results indicate an implicit association between environmentally-friendliness and positive emotions, showing that our sample overall had a positive association with environmentally-friendliness. As we studied these emotional associations in an implicit way, it is unlikely that the found positive association exclusively stems from social desirability answering. In sum, these results again suggest a positive association with environmentally-friendly behaviors exists.
Discussion

The two studies described in this paper show that environmentally-friendly behavior is not as negatively viewed as may sometimes be believed. In contrast, people seem to have a stronger positive association with environmentally-friendly behavior than with environmentally-unfriendly behavior (Study 1), and they implicitly associate environmentally-friendliness more strongly with positive than with negative emotions (Study 2). Furthermore, as expected, we found that this positive emotional association was stronger when the behavior is perceived as more virtuous, that is, for people who more strongly endorse biospheric values (Study 1, but not Study 2), who feel stronger moral obligation to engage in environmentally-friendly behavior (Study 1), and who perceive the behaviors to be more environmentally-friendly (Study 1).

Also, the positive emotional association was stronger when engagement reflects more strongly on who you are, that is, when the choice for the behavior was volitional (Study 1). Together these results suggest that meaning may play an important role in the emotional association people have with environmentally-friendly behavior.

In turn, this positive association seems to affect intentions to engage in environmentally-friendly behavior (Study 1).

Although the current paper suggests people have a positive association with environmentally-friendly behavior, it does not exclude that such behavior may be seen as mainly a sacrifice by some people (e.g. climate-change deniers) or under some circumstances. An interesting question for future research therefore is what happens when the conflict between comfort and meaning aspects may be greater than in the current studies. While successful engagement in for instance high-impact but high-cost behaviors may be perceived as more fulfilling and meaningful, engagement may be perceived as a larger sacrifice as well. Future research is needed to study when and for whom the anticipated discomfort during engagement may no longer be outweighed by the meaning successful engagement is expected to bring, thereby discouraging people to engage in the behavior altogether.

Another interesting question for future research is whether there are ways to increase the meaning of environmentally-friendly behavior in general instead of increasing the meaning of specific environmentally-friendly behavior one by one. If meaning is indeed an important source for the positive emotions associated with engagement in environmentally-friendly behavior, which in turn may encourage engagement in this type of behavior, finding ways to increase the behaviors’ perceived meaning could be a fruitful way to increase people’s positive emotional association with and engagement in environmentally-friendly behavior. Our results suggest that strengthening biospheric values or the extent to which the behavior is seen as a moral cause may be routes to increase the extent to which environmentally-friendly behavior is generally
seen as meaningful. In contrast, the extent to which particular behavior is perceived as environmentally-friendly or autonomously chosen may increase the meaning of specific behaviors only. Future research could focus on studying the distinction between general and specific meaning aspects of environmentally-friendly behavior, and its consequences for spill-over to engagement in a broad range of environmentally-friendly behaviors in more detail.

We found that a positive emotional association increases intentions to behave in environmentally-friendly ways. This suggests that external incentives may not always be necessary to encourage people to act green; the positive emotions that result from engagement in meaningful behavior may be intrinsically motivating to act green as well (Taufik, Bolderdijk, & Steg, 2015; van der Linden, 2015). This suggests that the possible discomfort aspects of environmentally-friendly behavior should be put in perspective. Since environmentally-friendly behavior is not solely seen as a sacrifice associated with losses in comfort or convenience, decreasing or downplaying these aspects should not be the sole focus of campaigns to promote environmentally-friendly behavior (L. Evans et al., 2013; Thøgersen, 2013). As people evaluate environmentally-friendly behavior positively, highlighting its positive meaning aspects might provide a fruitful way to promote engagement in this behavior.

Materials and Methods

Ethics Statement
The Ethical Committee Psychology of the University of Groningen approved both Study 1 (approval number ppo-011-099) and Study 2 (approval number 11055-N). Informed consent was obtained from all participants in Study 1 and Study 2.

Study 1
Study 1 followed a mixed design, with environmentally-friendly versus environmentally-unfriendly behaviors as a between-subjects factor, and autonomous versus non-autonomous behaviors as a within-subjects factor. Additionally, we measured individual differences in biospheric values, feelings of moral obligation to engage in the behaviors and perceived environmentally-friendliness of the behaviors.

Participants (N = 132; 60 female, 65 male, 7 unknown; Median\textsubscript{age} = 30.5 years) completed a questionnaire that was distributed door-to-door in diverse neighborhoods in a city in the Netherlands, and recollected after approximately half an hour. The data of 9 participants were not included in the analysis because they had missing values on at least one of the dependent or independent variables.
For our manipulation, participants were randomly assigned to one of two conditions: half of the participants indicated how they would feel after engagement in five behaviors that could benefit the environment (further referred to as environmentally-friendly behavior), while the other half evaluated five versions of the same behaviors that could harm the environment (further referred to as environmentally-unfriendly behavior). These five behaviors were respectively: turning the light off in an empty room (leaving the light on in an empty room); buying organic products in the cafeteria (buying non-organic products in the cafeteria); separating waste at work (throwing all types of trash in the same bin at work); using the bike for short distances (using the car for short distances) and washing clothes at a low temperature (washing clothes at a high temperature). For each of these behaviors, participants were first asked to imagine engaging in the behavior out of their own volition (e.g., washing clothes at a low temperature) and next to imagine engaging in the behavior because of situational constraints (e.g., washing clothes at a low temperature when it is the only available option on the machine). Hence, in total participants evaluated either 10 environmentally-friendly versions, or 10 environmentally-unfriendly versions of behavior.

As our dependent measure, participants indicated on a five-point scale (1 = not at all, 3 = neutral, 5 = very strongly) to what extent they expected to experience the following six emotions after engagement in each of the 10 behaviors: proud, satisfied and cheerful (averaged to represent positive emotions; α’s for the ten behaviors ranged from .87 to .93; αoverall = .97), and disappointed, frustrated and guilty (averaged to represent negative emotions; α’s for the ten behaviors ranged from .87 to .94; αoverall = .97). These emotions were chosen as they represent eudaimonic (proud, guilty) as well as hedonic (satisfied, cheerful, disappointed, frustrated) emotions. Furthermore, all participants indicated to what extent they intended engaging in the environmentally-friendly version of each of the five voluntary behaviors (1 = not at all to 5 = very strongly; M = 3.96, SD = .74, α = .76).

As indicators of personal meaning attached to environmentally-friendly behavior, participants completed a value scale including four biospheric value items (respecting the earth, unity with nature, protecting the environment and preventing pollution; Steg et al., 2014). The importance of biospheric values were rated on a 9-point scale ranging from -1 = opposed to my principles, 0 = not important, to 7 = extremely important (M = 4.18, SD = 1.47; biospheric values were centered prior to the analysis). For half of the participants the value scale was included before people rated anticipated emotions about engagement in the behaviors, and for the other half the value scale was included after these behavior evaluations. This order did not affect any of our results. Furthermore, all participants indicated to what extent they felt morally obliged to engage in the environmentally-friendly version of each of the five
autonomous behaviors (1 = not at all to 5 = very strongly; $M = 3.49$, $SD = .90$, $\alpha = .81$; moral obligation was centered prior to the analysis).

As indicator of the extent to which the behavior itself was perceived to be virtuous, participants indicated to what extent they thought these five behaviors were environmentally-friendly (1 = not at all to 5 = very strongly; $M = 4.23$, $SD = .65$, $\alpha = .78$; environmentally-friendliness of behavior was centered prior to the analysis).

**Study 2**

First year psychology students ($N = 76$; 67 female, 9 male; $Median_{age} = 19.0$ years) took part in a laboratory experiment in exchange for course credits. All participants first completed a questionnaire that, besides the same value scale used in Study 1 (Steg et al., 2014; $M_{biospheric} = 3.60$, $SD_{biospheric} = 1.46$), included a measure of regulatory focus (Hamstra, Bolderdijk, & Veldstra, 2011; Van Stekelenburg, 2006) and two questions on meat consumption (“How many days a week on average do you eat meat with your main dish?” and “How many grams meat do you on average eat with your main dish, when it contains meat?”). Results on these last two constructs are not reported here, as they are not relevant for the goal of the current paper.

After completing the questionnaire, participants took part in a computerized Implicit Association Test (IAT; Greenwald et al., 1998). The IAT measures people’s automatic emotional association with a concept (Greenwald et al., 1998) – in the present paper with environmentally-friendliness. The assumption made in an IAT is that if people have a positive association with environmentally-friendliness, categorizing environmentally-friendly words with the same key as positive emotions (which we consider to be congruent blocks; see example Block 3 in Figure 2) should be easier, and thus faster, than categorizing environmentally-friendly words with the same key as negative emotions (which we consider to be incongruent blocks; see example Block 5 in Figure 2).

In order to compare response times in the congruent and incongruent blocks, environmentally-friendliness had to be contrasted to another category. Typically the opposite category, which would in this case be environmentally-unfriendliness, is chosen for this purpose. However, as one of the goals of the current study was to test whether a positive association with environmentally-friendliness, and not only a negative association with environmentally-unfriendliness exists, we contrasted environmentally-friendly to neutral words. This procedure still allows comparison with a contrasting category, while making it possible to test specifically whether people have a positive association with environmentally-friendliness (Nosek, Greenwald, & Banaji, 2007).
A pilot test was conducted to choose the words to be categorized under the labels “sustainable” and the contrast category “neutral”, respectively. In the pilot participants indicated to what extent they associated the included words with the label “sustainable” and to what extent they associated them with positive and negative emotions. Words that were strongly associated with the label sustainable were selected for the “sustainable” category. As Table 1 shows, the words included in this category reflect environmentally-friendly words. Words that were not associated with the label sustainable, nor with positive or negative emotions were selected for the “neutral” category.

Participants completed seven blocks, each consisting of 20 Trials, in which they had to place the words shown in Table 1 in the correct category, as illustrated in Figure 2. Words could be placed in the category that appeared on the left by pressing the “Z” key on the keyboard, or be placed in the category on the right by pressing the “M” key on the keyboard. The categories used in the different blocks were the following:

- Block 1: Positive—Negative
- Block 2: Sustainable—Neutral
- Block 3: Sustainable/Positive—Neutral/Negative
- Block 4: Sustainable/Positive—Neutral/Negative
- Block 5: Neutral—Sustainable
- Block 6: Neutral/Positive—Sustainable/Negative
- Block 7: Neutral/Positive—Sustainable/Negative
Table 1.
Categories and Words Used in the IAT

<table>
<thead>
<tr>
<th>Positive</th>
<th>Negative</th>
<th>Sustainable</th>
<th>Neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plezier (Fun)</td>
<td>Ongelukkig (Unhappy)</td>
<td>Zonne-energie (Solar-power)</td>
<td>Spiegel (Mirror)</td>
</tr>
<tr>
<td>Voldaan (Fulfilled)</td>
<td>Schaamte (Shame)</td>
<td>Energiebesparing (Energy saving)</td>
<td>Gestreept (Striped)</td>
</tr>
<tr>
<td>Prettig (Contented)</td>
<td>Naar (Miserable)</td>
<td>Milieubewust (Environmentally concious)</td>
<td>Alfabetisch (Alphabetical)</td>
</tr>
<tr>
<td>Trots (Proud)</td>
<td>Ontevreden (Dissatisfied)</td>
<td>Hervebhuik (Reuse)</td>
<td>Elastisch (Elastic)</td>
</tr>
<tr>
<td>Gelukkig (Happy)</td>
<td>Schuldig (Guilty)</td>
<td>Recycling (Recycling)</td>
<td>Figuurlijk (Figurative)</td>
</tr>
</tbody>
</table>

The IAT was conducted in Dutch. English translations of the used words are included in brackets.

The words were presented in randomized order within each of the seven blocks and the order of the blocks was counterbalanced between participants: all participants started with Block 1, after which half of the participants were first presented with the congruent blocks (Block 2, 3 and 4; Sustainable/Positive) while the other half of the participants were first presented with the incongruent blocks (Block 5, 6 and 7; Sustainable/Negative).

The emotional association people have with environmentally-friendliness was tested by comparing the average reaction time in Block 3 and 4 – where “sustainable” and “positive”, and “neutral” and “negative” were categorized with the same key – with the average reaction time in Block 6 and Block 7 – where “sustainable” and “negative”, and “neutral” and “positive” were categorized with the same key.

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