A green paradox: Validating green choices has ironic effects on behavior, cognition, and perception

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HIGHLIGHTS

- We demonstrate ironic behavioral effects of validating green choices.
- Positive feedback on green choices leads to behaving less green (recycling less).
- We show that differential states of goal completeness account for this effect.

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ABSTRACT

Does validating the purchase of green products hamper subsequent green behaviors in people committed to the identity goal of being green? Positive feedback on purchasing green products led to less recycling compared to negative feedback, with no feedback participants lying in between (Study 1). Assuming that receiving positive feedback on buying green products results in a state of goal completeness, we hypothesized and observed that constructs (e.g., earth) related to being green were the least accessible in positive feedback participants as compared to no feedback and (even more so) to negative feedback participants (Study 2). This pattern of results also emerged with respect to the perception of the color green (i.e., a green patch was perceived the least green by positive feedback participants; Study 3). These findings suggest that being praised for buying green creates a state of goal completeness that hampers subsequent striving for the aspired-to identity goal.

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Introduction

Over the last decade, environmentalism has grown in prominence in the political and social agenda. Although consumers are generally receptive to and concerned about environmental issues (World Business Council for Sustainable Development [WBCSD], 2008), reports indicate that consumers are not adjusting their behaviors to the challenges posed by sustainable consumption. For example, it seems that after adopting a greener energy source, consumers less frequently adjust the use of air conditioning compared to before (WBCSD, 2008). Similarly, consumers who switched to a hybrid car tend to drive more miles than owners of gas-powered cars (WBCSD, 2011).

To elucidate such phenomena, we propose and test the possibility that positive feedback on having made green choices will hamper subsequent green behaviors. Relying on self completion theory (SCT; Wicklund & Gollwitzer, 1982), we argue that validating (vs. questioning) the choice to buy eco-friendly products (e.g., compact fluorescent lightbulbs) creates a state of completeness with respect to the goal of being green, and as a consequence, people are less (vs. more) likely to engage in eco-friendly behaviors (e.g., switching off the lights in unused rooms).

Given its theoretical and practical relevance, it is not surprising that an emerging stream of research has looked at issues related to sustainability and green consumption. Correlational research in environmental psychology has examined the relationship between attitudes and eco-friendly behaviors (e.g., Mannetti, Pierro, & Livi, 2004; McCarty & Shrum, 2001). Experimental research in social psychology has looked at what types of social norms are more effective in bolstering pro-environmental efforts (i.e., injunctive norms—what people typically approve or disapprove—aligned with descriptive norms—what people typically do; e.g., Reno, Cialdini, & Kallgren, 1993; Cialdini, 2003; Goldstein, Cialdini, & Griskevicius, 2008). More recently, research in consumer psychology has examined the effects of being exposed to (vs. selecting) sustainable products on the likelihood to subsequently engage in dishonest behaviors (Mazar & Zhong, 2010). Finally, research in economics has looked at rebound effects, which refer to the potentially adverse consequences of an increase in demand for a certain (eco-

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friendly) technology due to a decrease in its costs (Small & Van Dender, 2007; Sorrell, Dimitropoulos, & Sommerville, 2009). For example, if technology advances lower the cost of driving because of higher fuel efficiency, more people will drive, and the associated increase in fuel usage will in turn have negative consequences for the environment (Small & Van Dender, 2007).

No prior work has however examined the effect of validating (vs. questioning) consumers' shopping choices and empirically analyzed the association between such feedback and subsequent compensatory behavior. In particular, the present research extends self completion theory to the domain of consumer psychology and tests the hypothesis that environment-conscious individuals who receive favorable (unfavorable) feedback on their shopping choices will subsequently behave with less (more) regard for the environment. In Study 1, we tested the hypothesis at the level of overt behavior, and found that participants were less likely to recycle upon receiving favorable feedback. In Studies 2 and 3, we investigated whether the behavioral pattern observed in Study 1 corresponds to differential levels of goal completeness, as is postulated by SCT. To this aim, we employed an implicit measure tradiionally used in research on goals (i.e., a lexical decision task; Study 2), as well as a measure of motivated perception (i.e., distorted perception of the color green; Study 3).

Self completion theory

Self completion theory (SCT) posits that individuals committed to a certain identity goal (e.g., endorsing a green lifestyle, being a great mother, aspiring to become a successful businessman) can engage in a variety of activities to claim goal attainment (Wicklund & Gollwitzer, 1981, 1982). All of these activities qualify as identity symbols, as they can be used to indicate the possession of an identity to oneself as well as to others (e.g., Gollwitzer & Wicklund, 1985). For example, an environmentalist might symbolize her identity by making congruent consumption choices (e.g., only buying locally-sourced products), by flaunting material symbols embodying her identity (e.g., carrying a reusable shopping bag), by pursuing certain affiliations (e.g., membership in an organization committed to saving the planet), and by persuading others (e.g., rallying to promote awareness of environmental issues).

SCT posits that experiencing the lack of a certain symbol creates a state of incompleteness, whereas acquiring identity symbols creates a sense of identity-goal completeness (e.g., Gollwitzer & Wicklund, 1985; Gollwitzer, Wicklund, & Hilton, 1982). Specifically, upon experiencing a setback in the pursuit of a cherished identity (e.g., by receiving unfavorable feedback), incomplete individuals are postulated to step up their goal striving by trying to attain alternative symbols aimed at reassuring that one possesses the indicators of the aspired-to identity (such compensation is referred to as *self-symbolizing*; Gollwitzer & Wicklund, 1985). In contrast, upon acquisition of an identity symbol (e.g., favorable feedback on an identity-relevant dimension), complete individuals should temper their identity-goal strivings. For example, an environmentalist who is made aware of some not-so-green choices (e.g., because her shopping habits are less environmentally conscious compared to other consumers) might more strongly strive for goal attainment in an attempt to resolve the experienced incompleteness (e.g., she might try harder to recycle). Conversely, on attaining a symbol of her aspired-to identity goal (e.g., favorable feedback on the greenness of her shopping habits), an environmentalist might reduce her identity-goal strivings because of the achieved state of completeness.

Study 1: Green choices and behavior

We designed Study 1 to measure the extent to which environment-conscious individuals adopt green behaviors after the greenness of their purchases was either questioned or affirmed. We experimentally manipulated participants' state of goal completeness by providing them with positive, negative or no feedback on the greenness of their

shopping choices, and then measured whether they engaged in pro-environmental behaviors (i.e., recycling).

Method

Green commitment

For course credit, we recruited 64 undergraduates (60 females) on the basis of their commitment to being green. At the beginning of the semester, we had measured participants' green commitment by including in a battery of tests 13-items capturing attitudes (e.g., *I am a person who endorses a green lifestyle*; 1 = *totally disagree*, 7 = *totally agree*), perceived effectiveness (e.g., *I feel I have enough knowledge to make well-informed decisions on environmental issues*; 1 = *totally disagree*, 7 = *totally agree*), relevant behaviors in the recent past (e.g., *How frequently, in the past two weeks, have you recycled and kept your garbage in separate piles of paper, plastic, glass*; 1 = *never*, 7 = *everyday*), and intentions to behave green in the near future (e.g., *How frequently, in the next two months, do you intend to avoid plastic bags and carry reusable shopping bags*; 1 = *never*, 7 = *everyday*). Consistent with previous research on SCT (e.g., Gollwitzer, Sheeran, Michalski, & Seifert, 2009), responses were averaged to form a green commitment scale (Alpha = .80). Only committed participants (mean score > 3.5 on the averaged scales) were invited to participate in our three studies; 87.2% of participants in our subject pool were above this midpoint.

Feedback manipulation

Study 1 consisted of two ostensibly unrelated parts. In the first part, we informed participants that we were studying the shopping habits of college students in New York City, and asked them to do their typical grocery shopping in an online supermarket developed specifically for this experiment. Participants were free to shop across several product categories (produce, meats, dairy, and groceries) with no time restriction. To manipulate beliefs about participants' standing vis-à-vis their identity goal, upon completion of their shopping experience participants received fictitious feedback on how green their shopping was. The feedback consisted of scores, plotted on answer scales ranging from *not at all* (1) to *very* (12), on eight dimensions related to the environment (health, quality, heritage, family farming, PETA, local, footprint, and sustainability), and of an average ("Greendex") of the individual scores. To ensure plausibility of the cover story, the instructions provided a definition of what each green dimension was, as well as how each dimension was computed. All scores were plotted along with the scores of a bogus average college student. The bogus average student's mean score was said to be 6.25 of 12 possible points; it anchored the participants' mean score (see below), suggesting that students similar in age, lifestyle, and disposable income made greener (or less green) choices. The feedback was unrelated to the actual choices and randomly assigned by the computer.

This procedure allowed us to establish three bogus feedback conditions: in the negative feedback condition participants' scores were, on most dimensions, lower than the bogus student's, with the total Greendex equal to 3.88 (i.e., 2.38 points below the bogus student's; $n = 21$), in the positive feedback condition participants' scores were, on most dimensions, higher than the bogus student's, with the total Greendex equal to 8.63 (i.e., 2.38 points above the bogus student's; $n = 22$), and in the control condition participants received no feedback on their shopping behavior ($n = 21$). To ensure that participants processed their standing vis-à-vis the bogus student, we asked them to compute the difference score on each dimension, and then sum all the differences. Finally, we asked participants to rate the extent to which they felt a certain way at the present moment (scales ranging from 1 = *not at all* to 5 = *very much*). We used twenty adjectives, ten of them were positive (e.g., *active*, *excited*, *proud*) and ten of them were negative (e.g., *upset*, *distressed*, *guilty*), with the order of positive and negative items counterbalanced across conditions (Watson, Clark,

& Tellegen, 1988). Factor analysis yielded two factors (positive and negative); both scales were reliable (Alpha = 0.89 and 0.81, respectively). This first part of the study ended with participants rating how involved in the task they had been, and how difficult they thought the task was (answer scales ranged from 1 = *not at all* to 9 = *very much*).

Dependent measures

The second part of the study was allegedly about creativity. Participants were asked to create a party hat using the materials we provided: hat components (a paper hat silhouette, colored sheets of paper in a sealed envelope labeled "paper," plastic stickers in a sealed envelope labeled "plastic stickers") and a tool-kit (glue, markers, and scissors). Participants were instructed to only use the materials received, and return to the experimenter with the hat and the tool-kit. Thus, we requested they dispose of any discarded materials without directly mentioning disposal. After reading the instructions, participants were accompanied to a small room where they remained alone for the entire task. The experimenter measured task completion times unobtrusively. The room was furnished with a table and three bins (labeled "trash only," "paper only," and "plastic only") placed in random order next to the table. Once participants returned to the experimenter, a research assistant blind to the condition entered the room and coded participants' recycling behavior as follows: 1 = participant has recycled (paper and plastic are discarded in the corresponding bins; trash bin is empty) and 2 = participant has not recycled (paper and plastic are not discarded in the corresponding bins, or paper and plastic are discarded in the trash bin, or paper and plastic are used but left outside the bins). Participants were then thanked and fully debriefed.

Results and discussion

A greater proportion of negative feedback participants recycled (81.0%) compared to positive (18.2%) and no feedback participants (42.9%), $\chi^2 (2,64) = 17.20$, $p < .001$. Comparisons of proportions confirmed the hypothesized direction of the results (negative vs. positive feedback, $z = 5.29$, $p < .001$; negative vs. no feedback, $z = 2.76$, $p = .006$; positive vs. no feedback, $z = 1.82$, $p < .07$). As a supplementary analysis, we distinguished between (i) participants who were categorized as not having recycled because they left the materials outside of the bins (e.g., on the table, the chair, or the floor) and/or because they disposed of the materials in the wrong bin (e.g., paper in the trash bin), and (ii) participants who were categorized as not having recycled because they left the materials outside of the bins. One might argue that the latter participants should not be categorized as having failed to recycle, as these participants might simply be indolent or untidy. However, the proportion of indolent/untidy participants did not systematically differ across conditions, all $ps > .47$, and the pattern of results in Study 1 remains unchanged, for direction and statistical reliability, when indolent/untidy participants are excluded from the analysis, $\chi^2 (2,56) = 20.46$, $p < .001$; negative vs. positive feedback, $z = 6.78$, $p < .001$; negative vs. control, $z = 3.71$, $p < .001$; positive vs. control, $z = 1.78$, $p < .08$.

We also looked for systematic differences across conditions in the amount of materials used to make the party hat, and found no reliable difference, $p = .87$.[1] As participants were asked to compute the difference between their scores and the bogus student's scores, we looked at errors in computing this difference as indicators of strategic

processing (e.g., negative feedback participants willfully misconstruing or ignoring feedback discrepancies). However, we found no difference across conditions, as all participants computed the correct difference. To rule out other potential confounds, we analyzed differences in self-reported positive and negative affect (as measured by the PANAS scale[2]), task completion time, task involvement, task difficulty, and creativity of the output (as measured in a separate post-test by asking two independent raters, blind to the conditions, to rate the creativity of the hats; inter-rater correlation was high, $r(64) = .80$, $p < .001$), and found no difference across conditions, all $Fs < 1.22$ (Table 1). Thus, it seems that information processing differences, self-reported affect (as measured by the PANAS), task completion time, self-reported involvement, perceived task difficulty, and output creativity cannot account for the observed effects and thus these variables will not be discussed further.

Taken together, the sum total of our findings support our hypothesis that receiving positive feedback on the greenness of one's shopping behavior reduces engagement in recycling compared to receiving negative feedback. SCT would account for such decrease (increase) in striving for an identity goal after positive (negative) feedback by assuming a differential state of goal completeness in positive vs. negative feedback individuals. In other words, SCT assumes that people get closer to their identity goal (i.e., they are more complete) when they have successfully engaged in a behavior that is indicative of goal attainment; the reverse is true after the experience of relevant failures (i.e., they are incomplete; Gollwitzer et al., 1982). This assumption is at the core of SCT. Studies 2 and 3 tested this assumption by directly assessing participants' state of goal completeness using implicit measures.

Substantial research has shown that failure experiences increase the accessibility of goal-related constructs and the associated heightened accessibility is functional to successful goal pursuit (e.g., Förster, Liberman, & Higgins, 2005; Higgins & King, 1981; Lewin, 1926; Zeigarnik, 1928). Once a goal is attained, however, the accessibility of the corresponding constructs is reduced (e.g., Marsh, Hicks, & Bink, 1998; Rothermund, 2003; Shah, Friedman, & Kruglanski, 2002). With particular relevance to the present discussion, Förster et al. (2005) used lexical decision tasks as implicit measures of accessibility, and documented how goal fulfillment/goal discrepancy result in decreased/increased accessibility of goal-related constructs. Based on these premises, we hypothesized that constructs related to an identity goal are less accessible if a discrepancy to possessing the aspired-to identity is reduced (i.e., if one's identity is affirmed, as in the case of our positive feedback participants), and more accessible if a discrepancy is induced (i.e., if one's identity is questioned, as in the case of our negative feedback participants). We tested this hypothesis in our Study 2.

Study 2: Green choices and cognition

We designed Study 2 to assess the accessibility of constructs related to the identity goal of being green. Individuals striving for their green

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[1] As all participants started out with the same set of materials, and therefore the same weight of materials, we reasoned that we could assess differential amounts left for recycling by checking the weights of the created hats. We found no systematic differences in material usage, $p > .87$, suggesting that our manipulation did not affect whether participants used more or fewer materials, but instead only affected participants' readiness to recycle them.

[2] Additionally, we analyzed relevant single items of the PANAS that might be more directly linked to the manipulation we used. Specifically, we considered *proud* on the positive activation side, and *guilty*, *ashamed*, and *hostile* on the negative activation side. None of these effects was statistically reliable, all $ps > .34$.

Table 1
Critical dependent measures as a function of condition in Study 1.

	Feedback condition		
	Negative	Control	Positive
Proportion of participants who recycled (in %)	81.0	42.9	21.7
Self-reported positive affect	2.69 (0.60)	2.48 (0.57)	2.77 (0.84)
Self-reported negative affect (both answer scales 1–5)	1.25 (0.24)	1.13 (0.17)	1.32 (0.40)
Time to complete the creativity task (in min)	31 (8)	31 (7)	30 (6.5)
Material usage (as measured by the weight of the party hats; in g)	4.38 (1.54)	4.30 (1.56)	4.38 (1.54)
Self-reported involvement in the shopping task (answer scale 1–9)	6.62 (1.36)	6.57 (1.17)	7.09 (1.27)
Creativity of the party hat (answer scale 1–7)	4.98 (1.19)	4.71 (0.97)	4.57 (0.93)

Note. Standard deviations in parentheses.

identities may engage in different goal-directed activities. Just like a scientist may self-symbolize by both training students and presenting at conferences (e.g., Gollwitzer & Kirchhoff, 1998), an environmentalist may self-symbolize by both conserving energy and recycling waste. From a goal-system perspective (Kruglanski et al., 2002), such substitutability of goal-directed activities is mentally represented by the number of means of attainment linked to a certain goal (i.e., *equifinality*). Because of this linkage, activation spreads among goal-systemic elements (Kruglanski et al., 2002), and thus one can infer goal completeness (e.g., the completeness of the goal of being an environmentalist) by assessing the accessibility of the various corresponding goal means (e.g., the different ways of self-symbolizing). Consistent with these premises, and following the methodology used by Förster et al. (2005), we assessed the accessibility of goal-related constructs via a lexical decision task. We expected positive feedback participants to show lower accessibility of goal-related constructs (i.e., slower lexical decision times when presented with goal-related words) compared to negative feedback participants.

Method

We used the same criterion as that of Study 1 to invite 88 green-committed NYU undergraduates (70 females) to participate in a study consisting of two ostensibly unrelated parts. The first part, comprising the shopping task, was identical to that of Study 1 and resulted in random assignment to one of three feedback conditions: negative ($n = 27$), positive ($n = 31$), and no feedback ($n = 30$). In the second part, participants were presented with a go/no-go lexical decision task and asked to decide, as quickly and accurately as possible, whether presented letter strings were words or nonwords. A go/no-go lexical decision task has a few but critical distinctions with the standard yes/no lexical decision task. In a go/no-go lexical decision task, a person is to press a designated key if presented with a word, and *not press* any key if presented with a nonword. In a yes/no lexical decision task, a person is to press a designated key if presented with a word, and to press a *different* designated key if presented with a nonword. We chose a go/no-go lexical decision task as opposed to the standard yes/no lexical decision task in light of research highlighting the benefits of the former compared to the latter (Perea, Rosa, & Gómez, 2002). In particular, it seems that a go/no-go procedure allows for faster response times, more accurate responding, and fewer processing demands than does the yes/no task.

We developed our list of target, neutral, and non-words by conducting two independent pre-tests. In the first pre-test, 80 native English speakers named the first three words that came to their mind when thinking of "being green" (defined as "being concerned with, or supporting environmentalism"). We selected the three most frequently named words (earth, energy, and recycle) as potential target words and used their characteristics to develop a list of control words based on length, written frequency, and familiarity norms (Gilhooly & Logie, 1980; Kucera & Francis, 1967). In the second pre-test, 81 native English speakers rated these words for the degree to which they were green-related ($1 = $ *not at all*, $7 = $ *extremely*). The ratings verified the appropriateness of using earth, energy, and recycle as targets ($M = 6.73, SD = 0.58$); the 27 neutral words received comparatively lower ratings ($M = 2.84, SD = 1.09; t(80) = 30.72, p < .001$). Finally, we developed nonwords by transposing two letters or changing one letter of a word used in the experimental set. Each participant received a total of 74 trials, 14 practice (7 words; 7 nonwords) and 60 experimental (30 words, 3 targets and 27 neutral; 30 nonwords). All trials appeared at the center of the screen, preceded by a fixation point (a row of #s) for 200 ms. After a 50 ms blank, a lowercase letter-string was presented, and remained on the screen until participants decided the letter-string was a word (by pressing the key "b" with their dominant hand) or 2000 ms had elapsed. Inter-trial time was set to 400 ms. Participants went through a randomized order of trials with the option to take breaks every 20 trials.

Results and discussion

In a mixed-design ANOVA, the two-way Word type (target, neutral) × Feedback (negative, control, positive) interaction effect was significant, $F(2,85) = 4.87, p = .01$. As expected, feedback affected lexical decision times for target words, $F(2,85) = 8.52, p < .001, \eta^2 = .17$, but not for neutral words ($p > .49$). Planned contrasts revealed that participants in the negative feedback condition were faster in detecting target words ($M = 510$ ms, $SD = 45$ ms) compared to participants in both the no feedback ($M = 542$ ms, $SD = 51$ ms, $t(85) = 2.11, p < .04$) and the positive feedback condition ($M = 573$ ms, $SD = 72$ ms, $t(85) = 4.13, p < .001$). Furthermore, participants in the positive feedback condition were slower in detecting target words compared to participants in the no feedback condition, $t(85) = 2.06, p < .05$ (see Table 2).

Feedback did not affect decision accuracy. As the task was a go/no-go lexical decision task, two types of inaccurate decisions were possible: (1) participants fail to press the designated key when presented with a word (i.e., either press a wrong key or let the 2000 ms elapse), or (2) participants press the designated key when presented with a non-word. We examined accuracy for both types of errors and found no difference across conditions. In particular, no participant let the 2000 ms elapse; and only in a small proportion of trials participants pressed a wrong key when presented with a word (0.19% of trials, no difference across conditions, all ps > .28). Similarly, only in a small proportion of trials participants wrongly pressed the designated key when presented with a nonword (1.70% of trials, no difference across conditions, all ps > .19).

As predicted, positive versus negative feedback resulted in differential levels of accessibility of goal-related constructs (decreased accessibility for positive feedback participants, and increased accessibility for negative feedback participants). This pattern of findings suggests that receiving positive feedback on the greenness of one's shopping choices indeed induces a state of identity goal completeness, whereas negative feedback leads to a state of incompleteness.

Study 3: Green choices and visual perception

Although much of what we perceive is assumed to result from bottom-up processes, a substantial body of research building on the functional perception hypothesis (Bruner, 1957) documents how top-down influences also inform visual perception (review by Balcetis & Lassiter, 2010). Specifically, work on motivated perception documents how a perceiver's motivational state plays a critical role in visual processing. For example, people represent desired locations as closer than, but undesired locations (Alter & Balcetis, 2010). Based on this research we hypothesized that a goal-laden color stimulus, such as a green patch, might be recalled in line with the strength of one's desire to be green. As individuals committed to the identity goal of being green should strive comparatively harder (less hard) to attain this goal when experiencing negative (positive) feedback, we expected negative feedback participants to recall a perceived green patch as greener than it actually was. We tested this hypothesis via a novel task paradigm.

Table 2
Mean lexical decision times (in ms) as a function of Word type and condition in Study 2.

Feedback condition	Word type	
	Target	Neutral
Negative	510 (45)	542 (66)
Control	542 (51)	557 (63)
Positive	573 (72)	562 (68)

Note. Standard deviations in parentheses.

Method

For course credit, 86 green-committed undergraduates (80 females) who were not colorblind participated in a study consisting of two ostensibly unrelated parts. We invited participants based on the same selection criterion used in Studies 1 and 2. The first part was identical to that of Studies 1 and 2 and resulted in random assignment to one of three feedback conditions: negative ($n = 28$), positive ($n = 29$), and no feedback ($n = 29$). In the second part, participants were tested individually on a computer screen. A fixation point appeared at the center of the screen and on a gray background for 2 s, followed by a green, red, or blue color patch for 5 s. The color patches were developed in the RGB-color space matching saturation and lightness, but with different hue values of green, red, and blue. Specifically, the hue value of the green patch was the midpoint of the green scale ($G = 127$), zero red and zero blue; the hue value of the red patch was the midpoint of the red scale ($R = 127$), zero green and zero blue; and, the hue value of the blue patch was the midpoint of the blue scale ($B = 127$), zero green and zero red. We chose red and blue as controls for green. Red is an optimal chromatic control because it is experienced as arousing, whereas people experience green as soothing (Goldstein, 1942). Blue is an optimal semantic control because, although physiologically similar to green, it has different psychological associations: "being green" is associated with environmentalism, whereas "being blue" with melancholy (Merriam-Webster, 2011). Following each color patch (green, red, and blue, in this order), participants were presented with a black patch and were asked to reproduce, as accurately as possible, the color of the patch they had just seen. Participants could change the color of the black patch by moving a knob under the patch. Moving the knob changed the color of the patch in a seamless continuum from one end-point of the hue scale to the other (i.e., from $G = 0$ to $G = 255$; from $R = 0$ to $R = 255$; and from $B = 0$ to $B = 255$).

Results and discussion

A one-way ANOVA, with linear contrasts using effects coding that mirrored our hypothesis (negative feedback = 1, no feedback = 0, positive feedback = −1), revealed a significant effect of feedback condition on green color recall, $F(2,83) = 3.86$, $p < .03$, $\eta^2 = .09$. Negative feedback participants recalled having seen a greener patch ($M = 122.52$, $SD = 13.30$) compared to positive feedback participants ($M = 132.06$, $SD = 8.29$, $t(83) = 2.62$, $p = .01$), and no feedback participants ($M = 130.24$, $SD = 17.89$, $t(83) = 2.12$, $p = .04$). We found no difference between conditions in recall of the other colors (i.e., blue and red); there were also no differences in task completion times (i.e., the time taken to reproduce the color patch), all $Fs > .41$.

Finally, we validated that 122.52 is perceived as greener than 132.06 in a separate post-test by asking 73 non-colorblind individuals to choose which patch was greener. Seventy-one percent chose $G = 122.52$ as greener; comparisons of proportions confirmed that the patches were significantly different from each other ($z = 5.05$, $p < .001$) and from chance ($z = 2.50$, $p = .01$).

This pattern of results is consistent with that of Study 2. It further supports our hypothesis that validating a person's green choices creates a state of identity goal completeness. Moreover, it suggests that the behavioral differences observed in Study 1 between participants who had received positive versus negative feedback on their green shopping behavior were due to changes in participants' state of completeness with respect to the aspired-to identity goal of being green.

General discussion

We conducted three studies testing the hypothesis that positive feedback on having purchased green products may dampen subsequent green behaviors. The results were in line with our predictions. In Study 1, green-committed individuals who received favorable feedback recycled less often compared to individuals who received unfavorable feedback; participants with no feedback were lying in between. While Study 1 showed this ironic behavioral effect, in Studies 2 and 3 we explored the underlying processes. We found that the pattern of behavioral responses established in Study 1 mirrors the state of the identity goal completeness/incompleteness (Study 2) and the strength of the goal of being green (Study 3). Positive feedback participants showed decreased accessibility of goal-related constructs compared to negative feedback participants, suggesting that feedback validating one's purchasing choices is associated with heightened goal completeness (Study 2). Similarly, positive feedback participants recalled a green patch as less green compared to negative feedback participants, suggesting that the motivation to attain the identity goal of being green was weakened by positive as compared to negative feedback (Study 3). It is worth noting that in both follow-up studies the degree of goal completeness and the strength of the goal to demonstrate being green (i.e., self-symbolize to be green) were assessed using implicit measures: in Study 2 we used a lexical decision task, and in Study 3 we used a color perception task. Importantly, the pattern of results for Studies 2 and 3 was in line with the pattern observed for the behavioral measures obtained in Study 1.

Theoretical contribution

Implications for research on self completion theory

From a theoretical perspective, these studies add to research on SCT and nonconscious compensatory behavior. Over the past thirty years, SCT has been used to explain why individuals react to shortcomings in self-defining areas by attempting to influence others (Wicklund & Gollwitzer, 1981), by failing to admit weaknesses (Gollwitzer et al., 1982), by bolstering their self-descriptions so as to increase the overlap with an ideal (Gollwitzer & Wicklund, 1985; Wicklund & Gollwitzer, 1982), by performing better on a subsequent task that is identity-relevant (Brunstein & Gollwitzer, 1996), by showing off behavioral and material symbolic indicators of a self-definition (e.g., hobbies, sport activities, vacation spots, Braun & Wicklund, 1989; subscription of journals, Schiffmann & Nelkenbrecher, 1994; publications, citations, and departmental rankings, Harmon-Jones, Schmeichel, & Harmon-Jones, 2009), by stating relevant behavioral intentions (Gollwitzer et al., 2009), and by engaging in moral activities and less cheating (Jordan, Mullen, & Murnighan, 2011). More recently, research has focused on the role of nonconscious responses related to the pursuit of identity goals. For example, Moskowitz and Li (2011) showed that people with egalitarian goals automatically compensate for the potential pitfall represented by stereotyping: people who hold egalitarian goals proactively inhibit stereotype activation even when they lack awareness of suppressing stereotypes and of their egalitarian-identity goal. Similarly, Moskowitz, Li, Ignarri, and Stone (2011) showed that egalitarian-identity goals also nonconsciously heighten a person's sensitivity to detect opportunities to act egalitarian, and thus suppress stereotype formation even when such suppression impaired a focal task performance.

Our studies contribute to and extend research on SCT in two important ways. First, the present Studies 2 and 3 use implicit cognition paradigms to reliably assess the degree of identity-goal completeness (Study 2) and the motivation to self-symbolize (Study 3). In doing so, we tested and found support for one of the core assumptions of SCT: that differential compensatory behavioral responses (as observed in past SCT research) map onto differential levels of identity-goal completeness and the motivation to self-symbolize (Wicklund & Gollwitzer, 1982). More specifically, SCT lays its foundation in the Lewinian principle of goal tension (Lewin, 1926), and proposes that an individual's commitment to a certain identity goal generates a readiness to act toward the attainment of that goal. When individuals committed to a certain identity goal are interrupted or fall short in their self-definitional attainments, they experience a state of incompleteness and a readiness to self-symbolize that persists until the person has the opportunity to perform substitute

activities directed at achieving the same identity goal (Wicklund & Gollwitzer, 1981). Although such assumptions of goal incompleteness/completeness and the corresponding readiness to self-symbolize are at the core of SCT and underlie most prior work in this area, the studies we report here are the first to directly test and validate them. Importantly, we tested the level of goal completeness unobtrusively relying on a classic implicit task paradigm (i.e., a lexical decision task) and the motivation to self-symbolize by developing a novel implicit task paradigm (i.e., a color perception task).

Second, we apply SCT to the domain of consumption and shopping behavior, and use an every-day life setting (i.e., an online grocery store developed ad hoc for this study) to simulate a realistic shopping experience. Participants were instructed to do their typical grocery shopping by choosing among over 200 items across several product categories (e.g., Dairy, Eggs, & Substitutes) and subcategories (e.g., Milk & Milk Alternatives). Thus, our feedback manipulation closely resembles what happens when consumers are reassured (or threatened) regarding the question of whether their shopping choices fare vis-à-vis their identity goals. Our research has therefore important implications for consumer psychology, as it suggests a novel reading of all purchases and choices (e.g., investment decisions, charitable donations) as potentially identity-driven. When purchasing aligns with an identity goal, buying may be one means by which individuals can pursue their identity goals, and inadvertently reduce enactment of other identity-relevant behaviors.

Implications for research on licensing and sequential choice

Considering research on compensatory processes, our studies also speak to the existing literature on licensing and sequential choice. In their seminal work, Monin and Miller (2001) have shown how establishing one's credentials as a non-prejudiced person (e.g., by disagreeing with sexist statements) may lead to greater lassitude in subsequent moral decisions (e.g., by recommending a man for a traditionally male job). Similarly, imagining an altruistic action (e.g., doing community service) may lead to choosing a subsequent less virtuous indulgence (e.g., a pair of designer jeans vs. a more functional vacuum cleaner; Khan & Dhar, 2006). In a more recent paper, Mazar and Zhong (2010) showed that after choosing among sustainable (vs. conventional) products people were less likely to act altruistically (i.e., evenly share money with a stranger) and more likely to display dishonest behaviors (i.e., cheat and lie about the results of a computer game). Thus, both our work and that on licensing speak to the phenomenon of compensatory responses. Despite these similarities, however, our research differs from research on licensing in a few important ways.

A first point of departure is the theoretical framework. The governing variable in research on licensing is whether a person uses a situation to establish her credentials as a moral person; such establishment is posited to induce a self-image boost, and license subsequent less altruistic or unethical behaviors (Khan & Dhar, 2006; Mazar & Zhong, 2010). In contrast, the governing variables in SCT originate outside of the immediate, credential establishing situation, as they pertain to a person's commitment to an aspired-to identity (Gollwitzer, Marquardt, Scherer, & Fujita, 2013). Importantly, SCT does not point to a general self-image boost or decline as the cause of compensatory responses, but to a state of completeness/incompleteness with respect to a specific aspired-to identity (i.e., a self-defining goal; e.g., Ledgerwood, Liviatan, & Carnevale, 2007; Gollwitzer et al., 2013).

A second point of departure pertains to the role of priming a certain self-concept on subsequent choices. Research on licensing proposes that a credential-establishing situation primes constructs related to a certain self-concept, but it is somewhat ambivalent on the directional predictions based on such priming. For example, in Khan and Dhar (2006), priming a certain moral self-concept (e.g., imagining to volunteer one's time for community service) leads to contrast effects (i.e., to less altruistic behaviors). On the other hand, in Mazar and Zhong (2010), priming a certain moral self-concept (e.g., via mere exposure to the products of a store carrying mostly sustainable products) led to assimilation effects and more altruistic behaviors. Our research and theoretical framework may resolve this apparent ambiguity. The feedback manipulation we used in our studies should have primed a certain self-definition in all our participants. Whether such priming led to contrast or assimilation effects was contingent, however, on whether the feedback validated or questioned our participants' identity-relevant strivings. Thus, it is by adopting a broader perspective on identity-goal pursuit that one may be able to predict whether priming a certain identity has assimilation or contrast effects on subsequent behavior.

A third point of departure is one of scope: while research on licensing typically focuses on punctual, sequential decisions that are better analyzed within the short term, SCT adopts a long-term approach. The acquisition of a certain identity is not limited to a single, post-decisional period, but entails a long-lasting endeavor (often lifelong as is the case for instance with the identity goal of being a great mother) and thus involves a prolonged accumulation of symbols (Gollwitzer & Kirchhoff, 1998). It is only when an individual feels inadequate on a certain indicator of identity-goal attainment (i.e., feels incomplete) that the process of acquiring alternative indicators gains momentum.

Finally, while work on licensing often (though not always) considers choices across different domains (e.g., an altruistic choice and preference for a luxury item, Khan & Dhar, 2006; selection of sustainable products and immoral behavior, Mazar & Zhong, 2010), self-completion processes always pertain to the same domain. Acquiring a symbol (i.e., buying green products) of a cherished identity (i.e., endorsing a green life-style) is expected to lead to a reduction in behaviors (e.g., recycling) related to that same identity only (e.g., Ledgerwood et al., 2007; Moskowitz et al., 2011).

Implications for research on the positive consequences of negative feedback

On a broader level, our studies also add to research on the positive consequences of negative feedback. Spearheaded by classic expectancy-value theorists (e.g., Atkinson's risk-taking model, 1964), and echoed by helplessness researchers (Mikulincer, 1994; Seligman, 1975), by Bandura's (1986) self-efficacy theory, by theorists of the action/outcome-expectation model (Heckhausen, 1977; Vroom, 1964), and by research on test anxiety (Wine, 1971), a hefty body of research has documented the detrimental effects of failure feedback on subsequent effort and performance. However, an equally extensive amount of research has looked at how failure feedback may stimulate effort and sustain performance. For example, in Carver and Scheier's (1991) cybernetic model, failure feedback in conjunction with high outcome expectations is posited to mobilize individuals to exert more effort toward achieving the desired outcome, as failure feedback highlights a discrepancy between the desired future outcome and the present status. Similar approaches to the motivating role of failure feedback are proposed in goal-setting theory (Locke & Latham, 1990) and in the action phases model (Gollwitzer, 1990, 1999; Heckhausen, 1991). Within this debate, SCT takes a unique perspective as it simultaneously accounts for both increase and decrease in performance subsequent to negative feedback. In particular, negative feedback in an identity-irrelevant domain is assumed to hinder performance but negative feedback in an identity-relevant domain is assumed to enhance performance (e.g., Brunstein & Gollwitzer, 1996). The research we report here is a prime example of the latter case: negative feedback induced individuals to recycle more often compared to positive feedback and no feedback. Thus, the present research extends existing work on the effects of failure on subsequent performance when such performance is functional to restoring a threatened aspired-to identity.

One might then wonder about the role of positive feedback in the pursuit of identity goals. When does positive feedback sustain and when does it hinder identity-congruent responding? This is a question that remains to be addressed in future research. One instance in which positive feedback could sustain (and not hinder) identity-related

responding is when the feedback indicates successful task achievement to a person who is still hesitant to commit to a given identity goal. The positive feedback might indicate the feasibility of pursuing such a goal thus fostering goal commitment and subsequent performance. Another possibility pertains to the role, yet to be explored, of lay theories within a SCT framework (Gollwitzer & Kirchhoff, 1998). In this vein of theorizing, Dweck and Leggett (1988) proposed that people may hold entity or incremental beliefs about their talents and skills. Entity theorists tend to see their skills as fixed and thus they set *performance* goals, while incremental theorists tend to see their skills as malleable and thus they set *learning* goals (Dweck & Leggett, 1988). Such a distinction between performance and learning goals may apply to identity goals as well. If so, both positive and negative identity-relevant feedback might foster goal striving in incremental theorists, as their goal striving is characterized by a learning orientation.

Applied contribution

The present findings are also highly relevant to the domain of green consumption and have substantial implications for social welfare. As environmental issues gain relevance, green options are more readily available. Eco-friendly labels, product certifications (i.e., Energy Star appliances), and chain-stores (i.e., Whole Foods) increase the chances that consumers will gain favorable feedback on the greenness of their shopping choices, which in turn might enhance the possibility that consumers will adopt fewer green behaviors. Debunking this green paradox remains an open empirical question worthy of future research. Interventions sway from punishing actions that harm the environment (e.g., until recently, the British government charged citizens for waste production) to commending people on making green choices (as we did in our studies). Neither approach seems to work well: citizens resented the British government's stance so strongly that the government was forced to eliminate the charges, and the present studies show that rewarding consumers for making green choices may backfire as it creates the motivation-reducing state of goal completeness. Instead, it seems that a more effective approach would be to remind consumers of their higher-order goal (i.e., to protect the planet), at an exogenous (e.g., through initiatives promoted by governments and policy makers) as well as endogenous level (e.g., through self-regulatory strategies enacted by the individual). Pertaining to the latter, recent research has explored how implementation intentions (i.e., if-then plans linking a specific critical situation to a goal-directed response; Gollwitzer, 1999; Gollwitzer & Sheeran, 2006) can be used to successfully re-activate a long-term goal when it is needed (Kroese, Adriaanse, Evers, & De Ridder, 2011; Van Koningsbruggen, Stroebe, Papies, & Aarts, 2011).

Limitations and future directions

Our goal was to test the possibility that validating the shopping choices of green-committed individuals will be counterproductive vis-à-vis the subsequent enactment of eco-friendly behaviors. The choice to select green-committed participants was grounded in classic work on goal striving and its interruption (e.g., Lewin, 1926; Mahler, 1933; Ovsiankina, 1928) as well as previous work on SCT. Specifically, self-definitional incompleteness and the self-symbolizing efforts ensuing from receiving negative feedback should only be observed "as long as the person is psychologically involved in the pursuit of the goal" (Wicklund & Gollwitzer, 1981, p. 92). Indeed, previous research on SCT has shown that individuals who are not or only weakly committed to a certain identity goal will not engage in compensatory self-symbolizing (e.g., Gollwitzer et al., 2009; Gollwitzer et al., 2013; Wicklund & Gollwitzer, 1982). Theoretically, we would expect weakly committed individuals to not exhibit the effects observed in our studies. However, because we restricted our investigation to committed

participants, we are not able to draw firm conclusions: future research should therefore test the moderating role of commitment directly. Future research might also further explore the role of affect in SCT. Although we did not find our manipulation to influence self-reported affect (as measured by the PANAS), it seems possible that measures more directly linked to the feedback manipulation would be better suited to illuminate the role of affective responses in self-completion processes.

Conclusion

Overall, the effects documented in the present research have important theoretical and practical implications. Theoretically, we add to research on SCT by testing the implicit cognitive consequences of both self-definitional incompleteness and the motivation to self-symbolize. On the more applied side, the current research sheds light on the unintentional adverse consequences of validating green choices. Although it is undoubtedly important to commend people who behave in an ecologically-responsible manner, doing so might backfire. Future research should concentrate on resolving this apparent and yet consequential paradox.

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