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Experiences of Pride, Not Guilt, Predict Pro-environmental Behavior When Pro-environmental Descriptive Norms Are More Positive

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Abstract

Emotions can greatly influence behavior, yet research on links between incidental emotions and pro-environmental behavior is limited. The present study uses an experience sampling design to examine how pride and guilt relate to daily pro-environmental behavior. Ninety-six university students recorded their engagement in specific pro-environmental behaviors, and their feelings of pride and guilt about these behaviors, at four time points each day for three consecutive days. Results showed that pro-environmental behavior during a 2.5-hour time period was positively related to pride, and negatively related to guilt, during that same time period. Pride about environmental behavior was positively related to subsequent engagement in pro-environmental behavior (i.e., during the following 2.5-hour time period), but only for people who perceived more positive pro-environmental descriptive norms. Guilt was not related to subsequent pro-environmental behavior. We discuss implications for further research on the complex associations between daily experiences of moral emotions and pro-environmental behavior.

Keywords: pro-environmental behavior, emotions, pride, guilt, norms, attitude

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One of the most important challenges for psychologists is to understand which factors encourage greater engagement in behaviors that protect the environment and reduce our environmental impact (Gifford, 2014; Stern, 2000). Although emotions were identified as a potentially important influence on environmental behavior as far back as three decades ago (Vining, 1987, 1992), most empirical work has only recently started to investigate the role of emotions in shaping individuals' decisions to act in environmentally friendly ways (Bissing-Olson, Iyer, Fielding, & Zacher, 2013; Ferguson & Branscombe, 2010; Halpenny, 2010; Harth, Leach, & Kessler, 2013; Koenig-Lewis, Palmer, Dermody, & Urbye, 2014; Onwezen, Antonides, & Bartels, 2013; Passafaro et al., 2014; Rees, Klug, & Bamberg, 2015; Smith, Haugtvedt, & Petty, 1994; Wester et al., 2015). Studies have shown that both positive and negative emotions influence engagement in pro-environmental behavior. For example, people's negative anticipated emotions (e.g., feeling angry or frustrated) have been shown to reduce their desire to use public transportation and to engage in household recycling (Carrus, Passafaro, & Bonnes, 2008). In addition, positive emotions (e.g., feeling happy or optimistic) have been found to be an important predictor of green product purchases (Koenig-Lewis et al., 2014).

The specific emotions of pride and guilt—the focus of the current study—are important emotions to study in relation to pro-environmental behavior because they have been shown to guide moral and pro-social behavior more generally (Tangney, Stuewig, & Mashek, 2007; Tracy & Robins, 2007b). This recognition has led to a call for further research investigating the link between pride and guilt and pro-environmental outcomes (Bamberg & Möser, 2007). However, past research has not addressed the extent to which people experience guilt and pride about environmental behavior in their everyday lives, or the extent

to which each emotion independently predicts subsequent environmental behavior. These questions are critical because an individual's day-to-day decisions and actions add up to create their environmental footprint. Understanding the role of emotions such as guilt and pride in shaping everyday behavior would substantially contribute to scholarly knowledge regarding the predictors of environmental behavior.

In the current study, we examine the dynamic interplay between everyday emotions (i.e., the transitory emotions we feel about our behavior as we go about our day) and pro-environmental behavior over time. We draw on functionalist theories of emotion to examine three key questions: 1) Does environmental behavior elicit feelings of pride and guilt during a typical day? 2) Do feelings of pride and guilt lead to environmental behavior during a typical day? 3) Is the relationship between emotion and subsequent pro-environmental behavior influenced by features of the perceived social context, such as perceived social norms? We use an experience sampling study design to help us answer these basic questions, which, to our knowledge have not been addressed previously.

Pride, Guilt, and Pro-environmental Behavior

We expect that pro-environmental behavior will be associated with experiences of pride and guilt that, in turn, will influence subsequent behavior. According to appraisal theory, distinct appraisals (i.e., interpretations or evaluations) of situations and events induce specific emotions (Roseman & Smith, 2001). Individuals' experiences of self-conscious emotions, such as pride and guilt, are broadly based on their appraisals of their own behavior; assessments of such behavior are developed based on personally important standards of right and wrong (Tangney et al., 2007; Tracy & Robins, 2007b). If people believe that something they have done is moral and valued, they are likely to feel proud of this behavior. In contrast, if people believe that their behavior is immoral and inappropriate, they are likely to feel guilty about this behavior. Following from this premise, engagement in pro-environmental

behavior—a positive and socially-desired behavior (Gifford, 2014)—should result in feelings of pride, whereas lack of engagement when opportunities arise should result in feelings of guilt.

Previous research supports this reasoning. For example, it has been shown that when individuals are told that their own carbon footprint is larger than average, they feel personal guilt about their environmental impact (Mallett, Melchiori, & Strickroth, 2013). This also applies to collective feelings of pride and guilt (i.e., feelings about an in-group's behavior): Being confronted with an in-group's (e.g., national) larger-than-average carbon footprint (Mallett et al., 2013) or humanity's impact on climate change (Rees et al., 2015) have been shown to lead to feelings of collective guilt, and reading about one's country's responsibility for environmental damage or protection has been shown to induce feelings of collective guilt or pride, respectively (Harth et al., 2013).

The current study differs from past research in addressing the question of whether environmental behavior leads to feelings of pride and guilt, by focusing on individual engagement in specific environmental behaviors carried out during their everyday activities, and how these relate to personal feelings of guilt and pride felt about environmental behavior during that same time period. That is, the current study allows us to draw conclusions about whether, during a typical day, environmental behavior actually leads to feelings of pride and guilt (Research Question 1). Drawing on appraisal theory we develop the following hypotheses: Engagement in pro-environmental behavior will be positively related to pride (Hypothesis 1) and negatively related to guilt (Hypothesis 2) about environmental behavior.

We further expect that pride felt about environmental behavior should positively influence subsequent engagement in pro-environmental behavior. According to the broaden-and-build theory of positive emotions (Fredrickson, 2001; Fredrickson, & Branigan, 2005), positive emotions, such as pride, expand people's thought patterns to allow consideration of

new and alternative behaviors, as well as new ways of thinking. The emotion of pride, which arises from personal achievements, should therefore motivate further achievement (Fredrickson, 2001; Tracy & Robins, 2007a). Research on prosocial behaviors suggests that there is a reciprocal relationship between behavior and pride, with pride about the prosocial behavior reinforcing that behavior (Hart & Matsuba, 2007; Weiner, 1985). We know of only one study that has previously investigated this issue and it showed that pride about in-group pro-environmental behavior predicted a desire to donate money for environmental protection (Harth et al., 2013). The current study contributes to this line of research by focusing on feelings of pride as they relate to people's own personal behavior as opposed to collective in-group behavior and how these feelings of pride relate to subsequent actual (i.e., self-reported) pro-environmental behaviors. That is, the current study allows us to address the second research question that asks whether during a typical day, people's feeling of pride and guilt leads to environmental behavior. Based on the theoretical rationale outlined above and previous research: We predict that pride about previous environmental behavior will lead to engagement in subsequent pro-environmental behavior (Hypothesis 3).

Finally, also addressing Research Question 2, we expect that guilt about environmental behavior may be positively related to subsequent engagement in pro-environmental behavior. Guilt arises following a negative evaluation of a specific behavior that is based on personally important moral standards (Tangney & Dearing, 2002). According to functionalist theories of emotion, guilt leads to reparative action and increased future effort (Barrett, 1995; Tangney & Dearing, 2002). That is, guilt should motivate a desire to atone for prior wrong-doing. Previous empirical research has shown that collective guilt about past negative environmental behavior predicts willingness to conserve energy and pay green taxes (Ferguson & Branscombe, 2010) as well as a desire to repair environmental damage caused by one's in-group (Harth et al., 2013). It has also been shown that collective guilt predicts

personal pro-environmental behavior intentions as well as public expression of environmentally friendly attitudes (Mallett, 2012). What past research has not investigated is whether guilt about failing to engage in pro-environmental behavior spurs future pro-environmental behavior as opposed to intentions or attitudes.

Based on theory and past findings: We expect that guilt about previous environmental behavior will positively predict subsequent engagement in pro-environmental behavior (Hypothesis 4). That is, when people have not engaged in as much pro-environmental behavior as they could have, their subsequent feelings of guilt will increase their motivation to make up for this lack of behavior and, thus, they will engage in more pro-environmental behavior. We do not expect that pride or guilt about other targets will be related to pro-environmental behavior. We base this expectation on theorizing about construct specificity: The more specific the emotion, the better it should predict a specific behavior (Fishbein & Ajzen, 1975).

The Role of Perceived Social Norms

The current study seeks to answer a third and final Research Question: Do social norms influence the relationship between pride and guilt and subsequent pro-environmental behavior? Social norms are rules or standards for behavior among members of a group (Sherif, 1965; Turner, 1991) and they can be categorized in two main ways: as injunctive norms (i.e., perceptions of what people ought to do) and descriptive norms (i.e., what people actually do). We focus on descriptive norms in particular in this study, as they have been shown in previous research to predict a variety of pro-environmental behaviors, such as reduced littering (Cialdini, Reno, & Kallgren, 1990), increased recycling (Fornara, Carrus, Passafaro, & Bonnes, 2011; Nigbur, Lyons, & Uzzell, 2010; Schultz, 1999), use of public transport or bicycles rather than personal cars (Kormos, Gifford, & Brown, 2015), and energy

conservation (Göckeritz et al., 2010; Nolan, Schultz, Cialdini, Goldstein, & Griskevicius, 2008).

We expect that descriptive norms moderate the relationships between pride and guilt and subsequent engagement in pro-environmental behavior. According to Cialdini et al. (1990), descriptive norms reflect ideas about what is good or effective behavior. Generally, social norms can have a powerful impact on the development and expression of moral emotions because these stem from a sense of what is accepted in society (i.e., descriptive norms; Tangney & Dearing, 2002). According to functionalist theories, the feelings of pride and guilt arising from this sense of what is good or effective behavior can, in turn, motivate approach-oriented or prosocial behavior (Tangney & Dearing, 2002; Tracy, Robins, & Tangney, 2007).

Following from this, we propose that the motivation to engage in pro-environmental behavior should be heightened when people perceive more positive pro-environmental descriptive norms compared to when people perceive less positive pro-environmental descriptive norms. If this is the case, then pride about prior good environmental behavior or guilt about prior poor environmental behavior will be more strongly associated with subsequent pro-environmental behavior because pro-environmental descriptive norms will motivate people to want to conform to the norms. Thus, we hypothesize that: Pro-environmental descriptive norms will moderate the relationship between pride and guilt about environmental behavior and subsequent pro-environmental behavior, such that the relationship for pride will be stronger for people who perceive more positive pro-environmental descriptive norms (Hypothesis 5) and the relationship for guilt will also be stronger when people perceive more positively pro-environmental descriptive norms (Hypothesis 6).

The Current Study

In summary, the current study addresses the following research questions: During a typical day, does environmental behavior lead to feelings of pride and guilt? (Research Question 1); During a typical day, do feelings of pride and guilt lead to environmental behavior? (Research Question 2); and Do perceived social norms influence the relationship between pride and guilt and subsequent pro-environmental behavior? (Research Question 3). We provide hypotheses for these research questions above, but acknowledge that, as previous research has not examined the relationship between pride and guilt and pro-environmental behavior as they play out in a daily context, these hypotheses are tentative. We tested our hypotheses using an experience sampling design in which participants completed a short survey on a portable electronic device multiple times a day for three days. This allowed us to examine the extent to which pride and guilt and engagement in pro-environmental behavior related to each other over the course of the day. This experience sampling approach has previously been used to shed light on the frequency and correlates of pride and guilt in everyday life, although not how they relate to pro-environmental behavior (Baumeister, Reis, & Delespaul, 1995; Nakamura, 2013).

Perceived pro-environmental descriptive norms (the proposed moderator) and pro-environmental attitude were assessed in a one-time general survey at the beginning of the study period. Pro-environmental attitude was included as a control variable in the prediction of pro-environmental behavior because it has been shown to be an important predictor of pro-environmental behavior (Bamberg & Möser, 2007). Including pro-environmental attitude as a control variable allowed us to examine the unique predictive effects of guilt and pride independently of pro-environmental attitude. In line with previous research (Bamberg & Möser, 2007), we also expect that pro-environmental descriptive norms will be positively related to pro-environmental behavior.

To our knowledge the current study is the first to investigate the reciprocal relationships between the emotions of pride and guilt and everyday environmental behavior. In addition, we offer the first examination of the extent to which the relationships between these emotions and behavior are moderated by perceived social norms. Our contributions are both conceptual and methodological in nature. Previous research has only examined the emotions of pride or guilt induced through external feedback about a person's overall environmental behavior (Mallett et al., 2013) or the behavior of an in-group (Ferguson & Branscombe, 2010; Harth et al., 2013; Mallett, 2012; Mallett et al., 2013; Rees et al., 2015). Our use of an experience sampling study that prompts brief self-reflection about one's own behavior and emotions during a typical day more closely reflects people's everyday experiences. As we noted above, we believe that this is an important contribution to the research given that individuals' impact is made up of the behavioral decisions that they make in their everyday lives. Moreover, almost all previous studies measured pro-environmental behavior resulting from the experience of pride or guilt as the willingness, desire, or intention to engage in pro-environmental behavior as opposed to actual engagement in pro-environmental behavior. The current study extends on that research by examining self-reports of actual behavior as they occur during a day. Finally, the current study examines the relative importance of guilt and pride in relation to environmental behavior. Understanding whether one or the other emotion may be more strongly linked to environmental behavior provides insights that can inform the affective components of interventions.

Method

Participants, Design, and Procedure

Ninety-six Australian university students (M_{age} = 19.06 years, SD_{age} = 2.94 years) participated in this study for course credit. Sixty-one were female and 35 were male.

An experience sampling design was used, which included two stages over a period of three days. In the first stage, which always took place on a Monday, participants completed a paper-and-pencil survey assessing perceived pro-environmental descriptive norms and pro-environmental attitude. After completing these measures, participants were given hand-held electronic devices (iPod Touch) and instructions for the next part of the study.

In the second stage of the study, participants filled out a self-report survey each day for three consecutive days (always Tuesday, Wednesday, and Thursday) at four specific times: 10 am, 1 pm, 4 pm, and 7 pm. Each survey asked participants to report their engagement in environmental behavior during the preceding 2.5 hours, as well as any pride and guilt felt about this behavior. Such short time intervals were chosen to reduce retrospection and the possibility that pride and guilt felt about environmental behavior would be forgotten. The confidentiality of participants' responses was ensured by asking them to generate an anonymous code that did not include any personally identifying information; these codes were then used to link each individual's survey responses. Participants were given the option to receive reminders by email, text message, or both about completing the surveys at the requested times. Participants' email addresses and phone numbers were stored separate from any other type of identifying information (e.g., their names) and were deleted immediately after the study period. Eighty-nine participants opted to receive reminders and seven participants declined to receive reminders. Participants returned the electronic devices to the first author on Friday, when they were also debriefed.

General Survey Measures

Pro-environmental descriptive norms. The items used to measure pro-environmental descriptive norms referred to general engagement in pro-environmental behavior by important people in the participants' lives including friends and peers. The three items ($\alpha = .75$) were: "Most people who are important to me act in environmentally-friendly

ways," "Most people who are important to me try to conserve resources," and "Most of my friends and peers engage in environmentally-friendly behaviors." Participants rated their agreement with each item on a scale from 1 (disagree strongly) to 5 (agree strongly).

Pro-environmental attitude. Pro-environmental attitude was measured using all 15 items ($\alpha = .64$) from New Ecological Paradigm (NEP; Dunlap, Van Liere, Mertig, & Jones, 2000). Example items include "Humans have the right to modify the natural environment to suit their needs" (reverse-scored) and "If things continue on their present course, we will soon experience a major ecological catastrophe." Participants rated each item on a scale from 1 (disagree strongly) to 5 (agree strongly).

Daily Survey Measures

Pro-environmental behavior. Pro-environmental behavior was measured using a list of common pro-environmental behaviors that are shown in Table 1 (Bamberg & Möser, 2007). Participants indicated whether or not they carried out each behavior during the preceding 2.5 hours by checking "Yes" (coded as 1), "I could have, but I didn't" (coded as 0), or "I did not need to" (coded as missing data, as this response is not relevant to our research question). At each measurement point, the scores were averaged to create a composite score between 0 (participant did not carry out any of the pro-environmental behaviors when the opportunity arose) and 1 (participant carried out all pro-environmental behaviors that he/she had the opportunity to). The focus of this study is on pro-environmental behavior in general (as opposed to focusing on only one particular behavior). Thus, a list of a variety of behaviors was used in order to increase the probability that participants engaged in at least one of those behaviors during the previous 2.5 hours**.**

Table 1

List of Pro-environmental Behaviors Included in the Pro-environmental Behavior Index

Pro-environmental Behavior
Recycle paper/cardboard
Recycle plastic/glass/tins/containers
Conserve water (for example: took short shower, used as little water as possible while washing hands)
Save electricity (for example: turned off lights that weren't needed)
Reuse paper for taking notes
Use a reusable cup/container for drinking rather than using disposable cups
Use public transportation, walk or ride a bike instead of driving a car or other vehicle
Appropriately dispose of non-recyclable waste
Turn off digital devices (for example: computer, iPad)
Print to reduce paper (for example: printed double-sided, printed multiple pages per sheet)

Pride and guilt about environmental behavior. The measures of pride and guilt about environmental behavior were adapted from The State Shame and Guilt Scale (Marschall, Sanftner, & Tangney, 1994). Three emotion terms were used to assess each emotion: "proud," "content," and "pleased with myself" for pride, and "guilty," "remorseful," and "regretful" for guilt. Participants rated the extent to which they experienced each emotion term with regard to their "behaviors that impact on the environment" during the preceding 2.5 hours on a scale from 1 (not at all) to 5 (completely). The measures of pride and guilt had reasonably high internal reliability at each time point, ranging from $\alpha = .77$ to $\alpha = .91$ for the pride measure and from $\alpha = .57$ (two time points had an alpha below .60, the remaining time points had an alpha above .60) to $\alpha = .88$ for the guilt measure.

Results

Overview of Analyses

The data collected for this study have a multilevel structure in which multiple data points (i.e., within-person level) were collected for each participant (i.e., between-person level). That is, repeated daily measurements were nested hierarchically within participants (Bolger, Davis, & Rafaeli, 2003; Bolger & Laurenceau, 2013; Mehl & Conner, 2012). Thus, we used random coefficient modeling with hierarchical linear modeling software (HLM; Raudenbush & Bryk, 2002; Raudenbush, Bryk, & Congdon, 2004) to test our hypotheses. Consistent with recommendations by methodologists, pro-environmental descriptive norms and pro-environmental attitude, the between-person level variables, were centered at the grand mean. The within-person level variables—pro-environmental behavior, pride, and guilt—were centered at each person's mean (Hofmann, Griffin, & Gavin, 2000).

All the within-person variables (i.e., pro-environmental behavior, as well as pride and guilt about environmental behavior) were measured at each daily measurement time point. We examined the role of pro-environmental behavior as a predictor variable (i.e., in shaping feelings of guilt and pride reported at the same time-point) as well as an outcome variable (i.e., in being shaped by feelings of guilt and pride reported at the immediately preceding time-point). We use the terms, subsequent and previous, to indicate the chronological order in which the variables were recorded.

Our hypotheses specify three outcome variables: pride about environmental behavior (Hypothesis 1), guilt about environmental behavior (Hypothesis 2), and engagement in pro-environmental behavior (Hypotheses 3, 4, 5, and 6). For each outcome variable, we analyzed two models (presented in Table 3 and Table 4). Model 1 reports the outcomes for the direct effects of the predictor variables only. Model 2 reports the outcomes for both the direct effects of the predictor variables, as well as all two-way interactions between the predictor

variables. In analyses investigating the predictors of subsequent pro-environmental behavior, we also included previous pro-environmental behavior as a control variable. This allowed us to control for the influence of previous engagement in pro-environmental behavior on subsequent engagement in pro-environmental behavior (i.e., autocorrelation).

Preliminary Analyses

We asked our sample of 96 participants to complete 12 short surveys over three days at specific time-points (10 am, 1 pm, 4 pm, and 7 pm), potentially resulting in data from up to 1152 surveys (i.e., 12 surveys × 96 participants). Seventy-seven surveys from 37 participants were not completed during the study. In addition, 126 surveys (from 69 participants) were not included in analyses because they were submitted at incorrect times: either more than five minutes before, or more than 30 minutes after, the specified times. These cutoff times were chosen so that they corresponded to the time period that participants reported on their behavior and affect (i.e., the previous 2.5 hours). Taken together, 949 responses out of a possible 1152 were included in the final analyses (response rate of 82.38%). This response rate falls within the typical range for experience sampling studies (i.e., 70 to 90 percent; Fisher & To, 2012). Participants completed an average of 9.89 surveys out of 12 (SD = 1.81, range = 4 to 12).

Descriptive statistics and correlations are presented in Table 2. On average, participants reported engaging in relatively high amounts of pro-environmental behavior when the opportunity arose, but there was also substantial variation in behavior (M = 0.78, SD = 0.17). The intra-class correlation coefficient (ICC) for pro-environmental behavior indicated that 37% of the total variance in pro-environmental behavior could be explained by mean differences between participants (i.e., stable characteristics such as pro-environmental attitude). This means that 63% of the total variance in pro-environmental behavior could be

explained by within-person or daily factors (e.g., the experience of specific emotions) as well as error variance.

Table 2

Descriptive Statistics and Correlations of Study Variables

Variable	M	SD	α	τ_{00}	σ^2	ICC	1	2	3	4
Within-person variables										
1. Pro-environmental behavior	0.78	0.17	—	0.02	0.04	.37	—			
2. Pride about environmental behavior	2.02	0.76	.77	0.53	0.39	.57	.18	—		
3. Guilt about environmental behavior	1.20	0.22	.69	0.04	0.13	.23	-.07	.17	—	
Between-person variables										
4. Pro-environmental descriptive norms	3.27	0.66	.75	—	—	—	.23*	.11	-.04	—
5. Pro-environmental attitude	3.59	0.33	.64	—	—	—	.24*	.11	.04	.12

Note. N = 96. The means, standard deviations, and bivariate correlations of the within-person study variables were calculated by aggregating each participant's data across all data collection time points. The reliability for the within-person variables, pride and guilt, Cronbach's alpha, was calculated using the data from the first data collection point (i.e., Tuesday at 10am). Pro-environmental behavior was measured using a formative scale of binary items; we, therefore, did not calculate internal consistency (Bollen & Lennox, 1991; MacKenzie, Podsakoff, & Burke Jarvis, 2005). The intraclass correlation coefficient (ICC) is calculated by dividing the between-person variance component (τ_{00}) of the null model (i.e., the model with no predictors at Level 1 or 2) by the sum of τ_{00} and the within-person variance component (σ^2) of the null model. The result is the percentage of the variance in the daily measure due to between-person differences (Bolger & Laurenceau, 2013). M = mean. SD = standard deviation. α = Cronbach's alpha.

* $p < .05$, ** $p < .01$.

Participants generally reported feeling "a little" proud of their environmental behavior ($M = 2.02$, $SD = 0.76$) during the preceding 2.5 hours. Participants also reported feeling little to no guilt about their environmental behavior during the preceding 2.5 hours, and interindividual variation was lower than for pride ($M = 1.20$, $SD = 0.22$). The ICCs for pride and guilt about environmental behavior indicated that 57% and 23%, respectively, of the total variance in these variables resided at the between-person level. Pro-environmental descriptive norms ($M = 3.27$, $SD = 0.96$) and pro-environmental attitude ($M = 3.59$, $SD = 0.33$) had means slightly above the scale midpoints.

We also assessed whether there was a tendency for participants to change their level of engagement in pro-environmental behavior as well as their level of experiencing pride and guilt from the beginning until the end of the study period. In other words, we examined whether taking part in the study influenced participants' reported emotion and behavior. We did this by correlating time (i.e., chronological order of data collection time point) with each of the study variables. There were no significant correlations between time and pro-environmental behavior ($\gamma = 0.03$, $p = .367$), pride ($\gamma = 0.01$, $p = .836$), or guilt ($\gamma = 0.05$, $p = .149$). In other words, there were no significant linear increases or declines of reported pro-environmental behavior, pride, or guilt from the beginning until the end of the study period.

Tests of Hypotheses

Predicting levels of pride and guilt about environmental behavior. Table 3 presents the results of HLM analyses for the outcome variables, pride and guilt about environmental behavior. Within time points (i.e., regarding data about behavior and emotions experienced during the same 2.5-hour period), pro-environmental behavior was positively related to pride about environmental behavior, and negatively related to guilt about environmental behavior ($\gamma = 0.66$, $p < .001$ and $\gamma = -0.45$, $p < .001$, respectively), providing support for Hypotheses 1 and 2.

Table 3
HLM Results for Models Predicting Pride and Guilt about Environmental Behavior

Predictor	DV: Pride about Environmental Behavior						DV: Guilt about Environmental Behavior					
	Model 1			Model 2			Model 1			Model 2		
	γ	SE_γ	p	γ	SE_γ	p	γ	SE_γ	p	γ	SE_γ	p
Intercept	2.04	.08	<.001***	2.04	.08	<.001***	1.21	.02	<.001***	1.21	.02	<.001***
Within-person variable												
Pro-env. behavior	.65	.13	<.001***	.66	.13	<.001***	-.44	.08	<.001***	-.45	.08	<.001***
Between-person variables												
Pro-env. descriptive norms	.08	.12	.496	.09	.12	.459	-.04	.03	.184	-.02	.04	.654
Pro-env. attitude	.23	.23	.316	.27	.24	.260	-.01	.06	.828	.04	.07	.625
Cross-level moderation												
Pro-env. behavior × Pro-env. descriptive norms				.09	.20	.636				-.18	.12	.148
Pro-env. behavior × Pro-env. attitude				.31	.39	.439				-.35	.25	.161

Note. HLM = hierarchical linear modeling; γ = unstandardized coefficient; SE_γ = standard error of γ. Pro-env. = pro-environmental.
* p < .05, *** p < .001.

Predicting pro-environmental behavior from prior feelings of pride and guilt.

Table 4 presents the results of HLM analyses for subsequent pro-environmental behavior as the outcome variable. Neither pride nor guilt about environmental behavior were directly related to subsequent pro-environmental behavior ($\gamma = 0.02$, $p = .240$ and $\gamma = 0.02$, $p = .680$, respectively). These findings indicate that Hypotheses 3 and 4 were not supported.

Table 4
HLM Results for Models Predicting Subsequent Pro-Environmental Behavior

Predictor	DV: Subsequent Pro-Environmental Behavior					
	Model 1			Model 2		
	γ	SE_γ	p	γ	SE_γ	p
Intercept	0.77	.02	<.001***	0.77	.02	<.001***
Within-person variables						
Previous pro-environmental behavior	.04	.06	.496	.03	.06	.555
Pride about environmental behavior	.01	.02	.655	.02	.02	.240
Guilt about environmental behavior	.03	.04	.466	.02	.04	.680
Between-person variables						
Pro-environmental descriptive norms	.04	.03	.133	.05	.03	.068
Pro-environmental attitude	.18	.06	.001**	.17	.06	.003**
Cross-level moderation						
Pride about EB × Pro-env. descriptive norms				.10	.02	<.001***
Pride about EB × Pro-environmental attitude				-.08	.05	.128
Guilt about EB × Pro- env. descriptive norms				-.06	.05	.241
Guilt about EB × Pro-environmental attitude				.10	.10	.337

Note. HLM = hierarchical linear modeling; γ = unstandardized coefficient; SE_γ = standard error of γ. Pro-env. = pro-environmental. EB = environmental behavior.
** p < .01, *** p < .001.

Hypotheses 5 and 6 predict that pro-environmental descriptive norms would moderate the relationships between pride and guilt about environmental behavior and subsequent pro-environmental behavior, such that these relationships would both be stronger for people who perceive more positive descriptive norms. Table 4 shows a significant cross-level interaction effect between pro-environmental descriptive norms and pride about environmental behavior on subsequent pro-environmental behavior ($\gamma = 0.10$, $p < .001$). We examined this interaction effect using a simple slope analysis for cross-level interactions (Preacher, Curran, & Bauer, 2006): Subsequent pro-environmental behavior was regressed on pride at more positive (i.e., one standard deviation above the mean) and less positive (i.e., one standard deviation below the mean) values of pro-environmental descriptive norms (see Figure 1). Results showed that the simple slope for participants who perceived more positive pro-environmental descriptive norms was positive and significant (B = .07, SE = 0.03, t = 2.80, p = .005). In contrast, the simple slope for people who perceived less positive pro-environmental descriptive norms was non-significant (B = -.04, SE = 0.02, t = -1.80, p = .072). Together, these results support Hypothesis 5: The impact of pride on subsequent pro-environmental behavior is strengthened for people who perceive that the social context (i.e., the perceived behavior of others) promotes pro-environmental behavior.

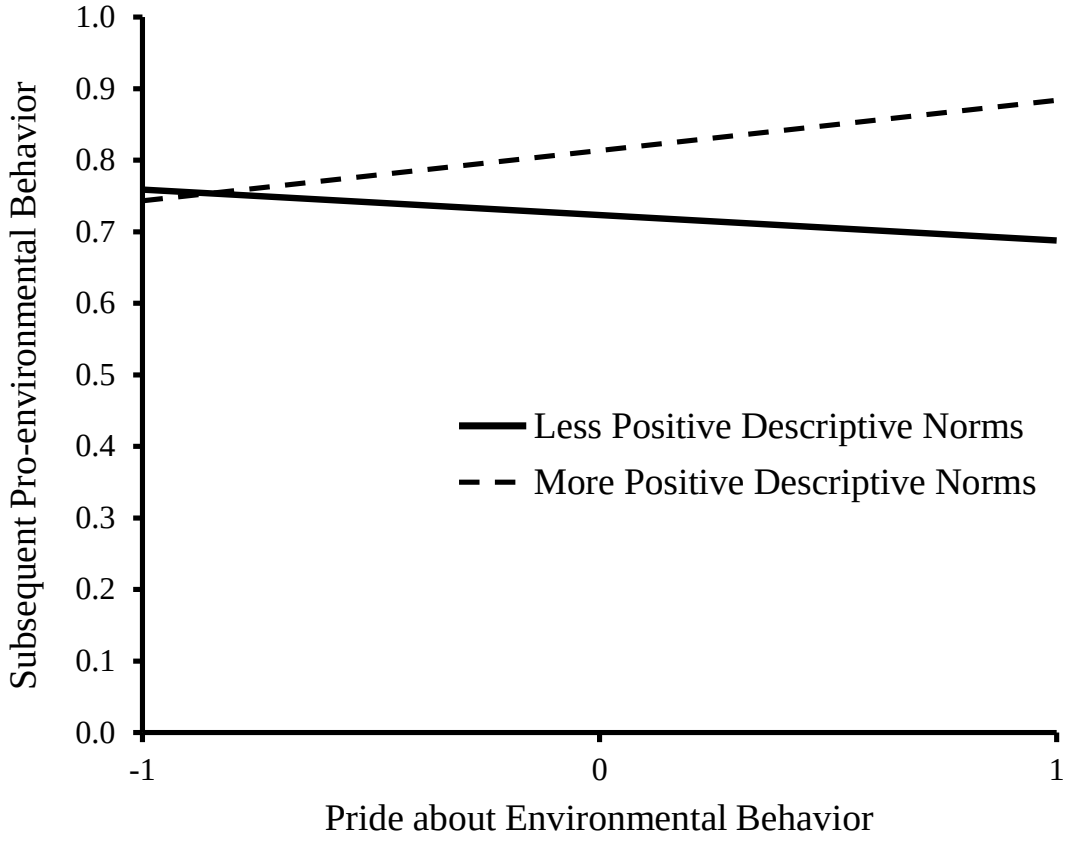

Figure 1. Graph of the moderating effect of pro-environmental descriptive norms on the relationship between pride about environmental behavior and subsequent pro-environmental behavior.

We did not find an interaction effect between pro-environmental descriptive norms and guilt about environmental behavior on subsequent pro-environmental behavior ($\gamma = -0.06$, $p = .241$). Thus, Hypothesis 6 was not supported.

In line with previous research, pro-environmental attitude ($\gamma = 0.17$, $p = .003$) was directly and positively related to engagement in pro-environmental behavior. In contrast, pro-environmental descriptive norms were not directly related to pro-environmental behavior ($\gamma = 0.05$, $p = .068$; Table 4). Subsequent pro-environmental behavior was also not predicted by previous pro-environmental behavior ($\gamma = 0.03$, $p = .555$; Table 4).

Discussion

The goals of this study were to examine relationships between pro-environmental behavior and experiences of pride and guilt that people experience during their day, and the role of perceived pro-environmental descriptive norms in moderating these relationships. Specifically, we aimed to answer the three following research questions: During a typical day, does environmental behavior lead to feelings of pride and guilt? (Research Question 1); During a typical day, do feelings of pride and guilt lead to environmental behavior? (Research Question 2); and, Do perceived social norms influence the relationship between pride and guilt and subsequent pro-environmental behavior? (Research Question 3).

Pride and Guilt as Outcome Variables

In line with expectations, results showed that engagement in pro-environmental behavior was positively associated with feelings of pride and negatively associated with feelings of guilt about environmental behavior (Hypotheses 1 and 2). This supports theorizing on pride and guilt suggesting that pride and guilt arise following engagement in socially-desired behaviors, such as pro-environmental behavior (Tangney et al., 2007; Tracy & Robins, 2007b). These findings also allow us to answer Research Question 1 in the affirmative: During a typical day, engagement in pro-environmental behavior is associated with increased feelings of pride and decreased feelings of guilt about environmental behavior. As pro-environmental behavior, pride, and guilt were measured during the same time period, we are unable to make definitive claims about causality. The current study is the first to show that personal feelings of pride are related to one's own engagement in pro-environmental behavior; previous work has only demonstrated that feedback about an in-group's behavior invokes a feeling of pride (Harth et al., 2013). The current study is also the first to demonstrate that findings about the relationships between pride and guilt and pro-

environmental behavior generalize outside of an experimental setting (see Harth et al., 2013; Mallett et al., 2013; Rees et al., 2015) to people's experiences as they live their daily lives.

Subsequent Pro-environmental Behavior as Outcome Variable

Contrary to expectations, feelings of pride about previous environmental behavior did not have a direct effect on subsequent engagement in pro-environmental behavior (Hypothesis 3). We did, however, find a moderating effect of pro-environmental descriptive norms on this relationship (Hypothesis 5): When participants perceived that people who are important to them do more for the environment (i.e., more positive pro-environmental descriptive norms), the pride the participants felt about their previous behavior predicted continued engagement in pro-environmental behavior, even after controlling for prior levels of environmental behavior. This finding accords with functionalist theories of moral emotions which state that the feelings of pride and guilt arising from a sense of what is good or effective behavior (i.e., descriptive norms) can, in turn, motivate approach-oriented or prosocial behavior (Tangney & Dearing, 2002; Tracy et al., 2007). Thus, when participants perceived more positive pro-environmental descriptive norms, the motivation to engage in pro-environmental behavior should be stronger, leading to more subsequent pro-environmental behavior. In other words, our finding suggests that the norms of the group may be particularly important for feelings of pride about environmental behavior to translate into continued pro-environmental action.

We did not find a direct effect for guilt about environmental behavior on subsequent pro-environmental behavior (Hypothesis 4), nor did we find an interaction effect between pro-environmental descriptive norms and guilt about environmental behavior on subsequent pro-environmental behavior (Hypothesis 6). This lack of effects of guilt could be due to the low levels of guilt that participants in our study felt about not engaging in environmental behavior. The low guilt experienced by participants could arise for a number of reasons: The

lack of pro-environmental action during any small period of time might not be enough to make most people experience more than weak feelings of guilt in relation to their environmental behavior. As suggested by previous research (Harth et al., 2013; Mallett, 2012; Mallett et al., 2013; Rees et al., 2015), perhaps feedback on lack of action over a longer period of time or about larger, more impactful behaviors is required to elicit feelings of guilt that are strong enough to trigger subsequent action. Another possibility is that in the course of their day, perhaps people find other ways to alleviate their guilt and this releases them from the need to take reparative action by engaging in subsequent pro-environmental behavior. For instance, people might engage in cognitive emotion regulation strategies (e.g., downplaying the negative impact of their bad behavior, or reducing their own responsibility for this bad behavior), or engage in easier behavioral strategies to reduce guilt (e.g., doing something good in another domain that is easy and low-cost to make themselves feel better) (Parkinson & Totterdell, 1999). Finally, feelings of guilt about not engaging in pro-environmental behaviors may be limited due to the perception of contextual constraints around these behaviors. Such constraints may be due to low physical access (e.g., no local options for public transport) or increased costs (e.g., high prices of organic food relative to standard offerings). The existence of such constraints allows individuals to develop an external attribution (or causal explanation) for their low levels of pro-environmental behavior; as a result, individuals would feel less personally responsible for their environmental behavior and thus be unlikely to experience guilt about it.

The findings above shed some light on our final two Research Questions, and highlight avenues for future research. With respect to Research Question 2, we did find that feelings of pride, but not guilt, led to further pro-environmental behavior in the course of participants' daily activities. However, this relationship was found only when people perceived more positive pro-environmental descriptive norms. This finding also provides an

affirmative answer to Research Question 3: Yes, perceived social norms can influence the relationship between pride and subsequent pro-environmental behavior. The lack of a relationship between guilt and subsequent pro-environmental behaviour in everyday situations suggests the need for research to examine how people experience and cope with guilt about their environmental behavior during the course of their day. This is an important question as an individual's overall environmental impact is made up of these moment-to-moment environmental decisions. It may also be fruitful for future research to consider how different types of norms, in addition to descriptive norms, interact with feelings of pride and guilt in predicting pro-environmental behavior. For example, previous research has shown that personal norms (i.e., personal or internalized standards for behavior; Schwartz, 1977) are important for pro-environmental action (Onwezen et al., 2013; Thøgersen, 2006, 2009). Thus, personal norms may be important factors in heightening or reducing the impact of pride and guilt on subsequent pro-environmental behavior.

In general, the current study contributes to the emerging literature on emotions and pro-environmental behavior in three ways. First, our findings show that individuals' engagement in specific pro-environmental behaviors during the course of their day is associated with feelings of pride and guilt about that environmental behavior. This confirms but extends previous research that has shown that external feedback about one's own or an in-group's overall pro-environmental behavior is related to feelings of pride or guilt. Second, we found that pride, for people who perceive more positive pro-environmental descriptive norms, seems to be a more important predictor of pro-environmental behavior than guilt. Thus, our findings provide some evidence that perceptions of the social context are important for feelings of pride to translate into pro-environmental action. Third, through the use of an experience sampling study design, we were able to examine the dynamic relationships between pro-environmental behavior and emotion outside of experimental contexts. That is,

we were able to assess the dynamic relationships between pro-environmental behavior and emotion as they play out during a typical day and show that such relationships really do occur in everyday life.

Limitations

Despite its strengths, this study has some limitations that should be considered. First, pro-environmental behaviors were assessed using self-report measures. Doubts have been raised about the accuracy and validity of such measures (Kormos & Gifford, 2014), as participants' responses may be biased (e.g., due to a tendency to over-report behavior or to fail to accurately recall behavior). However, our use of a dichotomized response scale should minimize such bias: Research suggests that pro-environmental behavior can be more objectively reported by participants through the use of dichotomized response options for rating engagement in specific behaviors (Kaiser, Doka, Hofstetter, & Ranney, 2003). We also sought to increase the accuracy of participants' responses by minimizing the period of retrospection (to the 2.5 hours) prior to completing the survey, thereby improving recall accuracy (Schwarz, 2012).

A second limitation may be measurement reactivity. Because participants were asked to complete surveys multiple times each day, it may be possible that some participants satisficed. That is, participants may have been more likely to be fatigued or hurried when completing the multiple short surveys, and thus responded to questions inattentively (Barta, Tennen, & Litt, 2012; Krosnick, 1991). We attempted to minimize this possibility by limiting the length of the individual surveys and the overall study period, as well as using concrete, objective items, thereby constraining retrospection to recent and specific experiences that may be more easily recalled (Reis & Gable, 2000).

Third, study participants self-monitored their behavior over time, which may have led to unintended changes in behavior as a result of increased awareness of, and reflection on,

their behavior (Barta et al., 2012; Reid, Hunter, & Sutton, 2009). As we noted in our results section, though, there were no changes in the frequency of reported behaviors and emotions during the study period. This suggests that participants were not overly influenced by the study. In addition, behavior and emotions were tracked over a relatively short time period of three days.

The current study focused specifically on the moderating role of descriptive norms, because this type of norm has previously been shown to be an important influence on environmental behavior (Cialdini et al., 1990; Fornara et al., 2011; Nolan et al., 2008). It is possible, though, that other norms—such as prescriptive or proscriptive norms—may also moderate the effects of emotions on environmental behavior. Future research that examines the relative importance of these different norms in moderating emotions would be beneficial. Finally, we must acknowledge that our sample comprised university students who are young and highly educated and therefore may not be representative of the general population (Henrich, Heine, & Norenzayan, 2010). The homogeneity of the sample may mean lower variability in responses that could increase the importance of within-subjects variance. Future research is therefore needed with samples that are more broadly representative to confirm the current findings.

Conclusion

Numerous studies suggest that emotions can be powerful triggers of behavior (Dolan, 2002; Mauss, Levenson, McCarter, Wilhelm, & Gross, 2005). In the current experience sampling study, we contribute to the growing literature on emotions in the field of environmental psychology by showing that people are experiencing pride and guilt as a result of their engagement in pro-environmental behavior in their everyday lives. However, only when people perceived more positive pro-environmental social norms did experiences of pride about environmental behavior translate into subsequent pro-environmental action. In

contrast, experiences of guilt did not result in more or less subsequent pro-environmental behavior in our study. Overall, our findings suggest the need for more research on the complex links between everyday experiences of moral emotions such as pride and guilt and engagement in pro-environmental behavior, and that this research should take individuals' perceptions of their social context into account.

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