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Did You Just See That? Making Sense of Environmentally Relevant Behavior

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Abstract

*We explored how social perceivers detect and explain others' environmentally relevant behaviors (ERBs). Participants watched short videos in which an actor performed an ERB (e.g., composting) or a control behavior (e.g., setting the table); they were then asked to explain why the actor had performed this behavior. Participants "detected" an (a priori classified) ERB if their explanation made explicit reference to the environmental relevance of the action. In a comparison of self-identified environmentalists and nonenvironmentalists, environmentalists detected significantly more ERBs (*d = *1.3). Relying on a recently developed theory of behavior explanations, we also classified explanations into two modes: Explainers can offer* reasons *and thereby "mentalize"—citing the subjective mental states (e.g., beliefs, desires) in light of which the agent chose to act; explainers can also offer* causal history *factors, referring to the broader background of that choice (e.g., personality, culture). When perceivers identified a behavior as environmentally relevant, they used significantly more causal history explanations, overlooking the agent's subjective grounds for acting. This effect was stronger for self-identified environmentalists. One interpretation of these results is that actions framed as environmental are seen less as reflecting conscious choices and more as belonging to a broad category of behavior. Focusing on causal background rather than on the agent's reasons may present obstacles for social perceivers' adoption of other people's environmental behavior.*

As social perceivers, humans are deeply interested in the behavior of others. They spend considerable time and energy trying to figure out why other people do what they do and whether they should follow their lead (e.g., Ross & Nisbett, 1991). Indeed, this process of attempting to make sense of others' behavior, traditionally termed *attribution* (e.g., Jones & Davis, 1965; Kelley, 1967) or more broadly *social cognition* (Fiske & Taylor, 1991), is so basic and core to the human species that philosophers and scientists have spent decades examining why and how people do it with such apparent ease (Heider, 1958; Malle, 2004). In that time, researchers have discovered and described many features of people's behavior attributions. For example, people use a sophisticated conceptual framework to explain others' behavior (e.g., Malle, 1999), explanations rely on inferences about the agent's mind (Malle, 2004; McClure, 2002; Read & Miller, 2005; Reeder, 2009), and people often use explanations to influence others (e.g., to improve one's reputation; see Edwards & Potter, 1993; Malle et al., 2000).

Unfortunately, psychological research on environmentally relevant behavior (ERB[1]) has not yet tapped into the vast literature on attribution and social cognition, despite historically close connections between social psychology and fields investigating ERBs (e.g., conservation psychology, environmental sociology). Within the psychological literature on ERB, references to attribution often refer either to vague connections between ERB performance and phenomena such as the "fundamental attribution error" (e.g., Winter & Koger, 2004) or else to attributions of responsibility regarding environmental protection (Bamberg & Moser, 2007). Environmental research has not examined in detail the fundamental fact that people observe and wonder about others' behavior, nor has it explored whether this wondering, and the subsequent explanations it leads to,

[1]We use the term *environmentally relevant behavior* to refer to any behavior that can be identified as having a significant direct or indirect impact, negative or positive, on the health and stability of natural (eco)systems.

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has significant impact on perceivers' own environmental behaviors (but see Corral-Verdugo et al., 2002, for one partial exception).

By contrast, the impact of the perceptions of other people's behavior on the perceiver's own actions has featured prominently in recent research in cognitive science, developmental psychology, and cognitive neuroscience. In the simplest case, observing another person folding a sheet of paper activates the perceiver's corresponding motor program of folding a sheet of paper, making the perceiver's equivalent action easier and more likely to occur (Decety, 2002). Directly relevant to our topic, research on goal contagion has demonstrated that social perceivers quite readily act on the goals of others (e.g., Dik & Aarts, 2007). Already, 18-month-old children recognize and copy another person's goal even if that person has not completed the intended action (Meltzoff, 1995). Thus, other people's actions provide a rather direct input to perceivers' own actions.

The extant research on the perception-action link has focused on relatively simple object-directed actions that do not require substantial interpretation. In most real-life circumstances, however, people interpret the *meaning* of another's behavior rather than merely observing the surface motor pattern (Baird & Baldwin, 2001). Likewise, perceiving and potentially adopting (or actively avoiding) other people's environmental actions is likely to involve the analysis of the action's meaning, which requires both the recognition of the behavior as intended to be environmental and the interpretation of the actor's relevant thoughts and goals in performing the behavior (Malle, 2004).

Thus, our primary aim in the present research was to add a social cognitive perspective to the extant literature on ERB. As an initial step, we address two central processes: the detection of other people's behaviors as environmental and the interpretation or explanation of those environmental behaviors.

Detection of ERBs refers to the ability and propensity of social perceivers to identify other people's actions as environmentally relevant. This process is important for at least two reasons. First, if behaviors are not detected as environmentally relevant, perceivers cannot analyze them for their worth and either support or oppose them as a function of their environmental significance. Second, if behaviors are not detected as environmentally relevant, perceivers cannot consider duplicating them *as environmental actions*—that is, they cannot adopt them as actions with environmental meaning (at best, they can blindly copy them, e.g., in an act of following norms). Our study represents a first exploration into the detection of ERB.

The second process, explanation of ERBs, refers to perceivers' (private or public) answer to the question of why an individual performed an environmental behavior. Explanation is significant because it provides the interpretation, the specific meaning of an observed behavior, which is usually given by the reasons for which the person performed the behavior (Malle, 2004). If social perceivers can grasp those reasons (and agree with them), their adoption of the environmental behavior may become more likely, because the cognitive accessibility of reasons for acting facilitates future behavior (Doll & Ajzen, 1992; McLachlan, & Hagger, 2011). By contrast, if perceivers lack cognitive access to relevant reasons for performing the given ERB, their conscious adoption of the behavior remains unlikely. Thus, detection and explanation of ERBs are likely critical pathways for the social transmission of environmental behavior.

Detection of ERB

Imagine you are walking down the street from where you have parked to pick up your child from school and you see two cars with their engines idling in front of the school building. One of the drivers is reading the newspaper; the other appears to be taking a nap. What do you notice in this scene? Which aspects of the drivers' behavior are most salient? Some people will focus on the drivers' likely goals (e.g., to learn about world events, to maintain a comfortable temperature), but others will also notice something else: Idling one's engine is a waste of gas and an unnecessary source of air pollution. Thus, some people will detect the environmental relevance of the drivers' behavior while others will not. But who will pick up on the environmental relevance?

One broad and multifaceted factor that likely facilitates the detection of ERB is environmental identity (cf. Clayton, 2003). In part this is because environmental identity is closely linked with (and to some extent predictive of) environmental knowledge (e.g., Gambro & Switzky, 1999; Hines et al., 1986/1987; Schultz, 2002), which itself may play a critical role in ERB detection: An individual who is unaware of a behavior's environmental impact is unlikely to identify that behavior as environmentally relevant. In addition, individuals with strong proenvironmental attitudes (e.g., environmentalists) will tend to have both concern for and at least some experiences and beliefs regarding the environment (Clayton, 2003). Both of these features of attitudes likely increase the likelihood of ERB detection. People who are more concerned about the state of the natural environment will also be more concerned about actions that impact the environment. Concern, or personal relevance, is an important predictor of attention (Malle & Pearce, 2001), which in turn increases likelihood of detection. Further, the cognitive feature of attitudes sensitizes people to attitude-relevant objects (Fazio & Olson, 2003). That is, for elaborated attitudes, pertinent experiences and beliefs are more easily and more quickly accessible upon encountering an

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attitude object (e.g., a proenvironmental action), which will generally increase the likelihood of ERB detection. Thus, both the motivational feature (concern) and the cognitive feature (knowledge activation) of attitudes predict that environmentalists will show a higher likelihood of detecting ERBs. In the present study we adopt a simple measure of self-identified environmentalism to represent the interrelated factors of environmental knowledge and attitude that together may predict detection of environmental behaviors.

Detecting another person's behavior as environmentally relevant is only the first step in a sequence of social-cognitive processes. Research has shown many ways in which interpretation, the process of explanation that follows observation of another person's actions, influences both perceivers' responses to the actor's behavior and their own future actions (Fiske & Taylor, 1991; Quattrone, 1985; Ross & Nisbett, 1991). For example, Corral-Verdugo et al. (2002) showed that perceiving one's neighbors (among others) as wasteful water users predicted weaker motivation among their participants to reduce their own residential water consumption (here showing a negative effect of detection and interpretation on subsequent decision making); developing such beliefs about others' actions clearly requires both detecting the significance of the behavior in question and interpreting it in a specific (in this case, negative) way.

At a minimum, detection can lead to pure behavioral imitation or an unconscious preference for the action in the future as a result of exposure (Zajonc, 1968). However, some of the most significant ERBs do not lend themselves to simple imitation, either because they involve a complex analysis of facts, context-specific knowledge, or significant effort (e.g., Schultz et al., 1995) or because they require the adoption of specific goals, desires, and beliefs (e.g., Kaiser & Wilson, 2004). For example, simply seeing that one's neighbor has recently purchased a highly efficient dishwasher is unlikely to lead the perceiver to immediately purchase the same model due to simple imitation. However, as Gardner and Stern (2008) argue, these kinds of investment or efficiency behaviors, which require specific goals and knowledge about their environmental (and economic) impact, hold the most potential for reducing homeowners' energy consumption. Active interpretation of the observed behavior will identify goals and knowledge that can facilitate such action. We now turn to a model of this core proposed mediator between detection and action.

Interpreting behavior: a folk-conceptual perspective

When people observe behavior, they assign meaning to it (Malle, 2004). That is, they interpret the behavior's origin (its cause) or future (its goal or purpose). For example, when a person in a doctor's waiting room stands up and grabs a magazine from a wall rack, most onlookers cannot help but assign meaning to that behavior—such as the person's state of boredom and the goal of averting it by reading. One way of measuring assigned meaning is by asking people to *explain* behavior using natural, open-ended language (Malle et al., 2000). Just as wondering why a behavior occurred is a natural social-cognitive process, so too is the (private or public) act of finding an explanation (Malle, 2004). Although explainers may be objectively wrong about what motivated or brought about a specific behavior, the interpretation itself has crucial consequences for the perceiver's cognitive and social responses (Ross & Nisbett, 1991), such as sympathy, trust, and compliance (Quattrone, 1985; Weiner, 1995) and—importantly in the case of ERBs—whether to perform the behavior oneself (Rholes et al., 1982).

Behavior explanations fall into several distinct types, and we rely on the recent Folk-Conceptual Theory of behavior explanation to describe these types as deriving from the folk concepts people have about mind and behavior (Malle, 1999, 2004, 2011; Malle et al., 2000). Whereas traditional attribution theories claimed that people explain behavior by referring either to causes inside the actor or causes in the environment (e.g., Jones & Davis, 1965; Kelley, 1967), the Folk-Conceptual Theory posits that people make a fundamental distinction between behaviors they see as intentional and those they see as unintentional (Heider, 1958; Malle & Knobe, 1997). Each type of behavior is then explained in qualitatively different ways. Whereas people explain unintentional behaviors by mere causes, they explain intentional behaviors primarily by referring to either reason explanations or causal history of reason explanations (Malle, 1999). Intentional behaviors are the primary concern of the present paper, so we discuss these two explanation modes in more detail.

Reason explanations. refer to the subjective reasons for which the actor decided to perform an action. They are defined as "the contents of an agent's mental states in light of which and on the grounds of which the agent formed an intention to act" (Malle et al., 2007, p. 493). Thus, reasons reflect an observer's inferences about the relatively proximal explanation of an individual's actions. Importantly, to cite an actor's reasons is to take the actor's subjective perspective—explaining what was on *that person's* mind when deciding to act. In general, reasons are the preferred mode of explanation for intentional behaviors (i.e., upward of 70% of all explanations refer to reasons; e.g., Malle, 2004). Most reasons refer to one of two types of mental states: belief (e.g., "She thinks the plants are dry") or desire (e.g., "He wants to see her tomorrow"). Desires mention the actor's goals, wants, and needs, which are often inferable from the actor's movements and from cultural knowledge; hence they require little

explicit perspective taking. Beliefs, by contrast, often provide idiosyncratic information about the actor's reasoning process and are more difficult to infer.

In contrast, perceivers sometimes refer not to subjective reasons in light of which an actor performed a behavior but rather to (presumably) objective factors that may have brought about those reasons. These explanations are labeled *causal history of reason* (CHR) explanations and include factors such as an agent's personality, past behavior, culture, and subtle contextual forces. Using CHRs, an explainer takes a step back and examines more distal causal forces impinging on an agent's intentional action—forces that may be out of the actor's control and awareness. In this sense, CHRs are similar to what Trope, Liberman, and Wakslak (2007) refer to in their Construal Level Theory as high-level construals, because they reflect a relatively broad and nonspecific interpretation of another person's actions; this is in contrast to the lower-level construals present in reason explanations, which are often very detailed and specific but not necessarily well contextualized. In sum, *reasons* highlight what the perceiver infers to be actively "going on" in an actor's mind whereas *CHRs* focus on background factors (which can be internal or external to the actor) that the perceiver believes have not been explicitly on the actor's mind at the time of making the decision.

Whereas explainers who provide reason explanations assume that the actor was at least dimly aware of the cited beliefs and desires, they do not assume such awareness when providing causal history explanations. For example, in explaining why an individual threw a piece of trash on the ground, the perceiver may refer to a causal history factor, such as the actor's general attitude (e.g., "He just doesn't care about the environment") or knowledge (e.g., "He is ignorant of the benefits of recycling"). The explainer most likely did not see such an explanation as having been on the actor's mind at the time of the littering. Instead, the explanation subsumes the action under a superordinate category ("environmentally relevant behavior"), driven by general forces. Contrast this with reason explanations, such as "because he doesn't want to hold on to the sticky container" or "because he thinks there is already plenty of trash lying around." Here the explainer refers to a specific mental state that, the explainer assumes, was on the actor's mind when deciding to act.

Previous research has demonstrated that this distinction between reason explanations and CHR explanations marks important differences in cognition and behavior. For example, O'Laughlin and Malle (2002) showed that people use relatively more reasons (and fewer CHRs) when explaining individual actors' behaviors than when explaining whole groups' behaviors. Malle et al. (2007) found that when people explain their own actions they use more reasons (and fewer CHRs) than when explaining other people's actions. One common thread in these findings is that social perceivers use reason explanations when they have the knowledge (e.g., previous experience with an actor) and motivation (e.g., impression management goals) to consider the actor's specific deliberation in deciding to perform the action in question. When such knowledge or motivation is lacking, they use causal history explanations, which subsume the action or actor under a larger category, a node in a broader causal network. The use of CHRs over reasons also often suggests a less active engagement, on the part of the observer, with the person whose behavior is being interpreted: Coming up with CHRs generally requires less "mental work" than trying to delve into someone else's mind to find plausible reasons.

It is critical to keep in mind that when we distinguish between reasons and CHR explanations, what we are interested in is the way in which the *observer* thinks about and interprets the actor's behavior, not the objective motives that shaped that actor's actions. The vast majority of psychological research on ERB has focused on this latter, admittedly very important, process—indeed, nearly all psychological exploration of ERB is explicitly oriented to uncovering what motivates people to perform positive or negative environmental behaviors. In contrast, when we examine an observer's responses to questions about someone else's behavior, with a particular focus on the type of explanations people come up with, we are interested in what happens to the *observer*, not the *actor*. By examining the extent to which observers use reason versus CHR explanations, we learn something about how people immediately, and prior to their own behavior, react to others' environmental actions.

Detection and interpretation

The detection or nondetection of others' ERB holds important implications both for how individuals react to others' ERBs and for the social transmission of ERB. How does such detection map onto explanations of behavior, in particular the distinction between reasons and CHRs? Malle (2004, 2011) proposed that reasons are most frequent when the explainer accounts for the specific actor and the specific action he or she performed (the most typical case in social perception). By contrast, CHR explanations increase in likelihood when the explainer considers the specific actor as belonging to a series of actors (a group) or considers the specific action as part of a series of actions (a habit). Identifying an action as being "environmentally relevant" may therefore increase observers' use of CHR explanations because the explainer categorizes the observed action within a more abstract series—either a series of actions one might expect from this agent or a series of agents who act in a similar way.

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The present study

Here, we take a first step toward examining the detection and explanation of ERB. The present study examines two basic questions: Does environmental identity influence the detection and explanation of ERB, and does the detection of a behavior as environmental influence its subsequent explanation? Our primary hypotheses were twofold: First, stronger environmental identity will predict greater (more accurate) detection of ERB in others, both because of increased sensitivity to environmental issues (greater environmental concern) and greater knowledge of ERB among environmentalists; and second, detecting a behavior as environmentally relevant will tend to increase the use of CHR explanations relative to reason explanations, because detecting environmental relevance reflects a superordinate categorization of a specific, observed act.

Method

Participants

Sixty-three undergraduate students at a large public university participated in the study for partial course credit in introductory psychology or linguistic courses. The sample was predominantly White (81%), female (64%), and from suburban hometowns (56%; self-reported). The mean age of the sample was 19.7, and the mean GPA of the sample was 3.24. Participants signed up for the study without knowing its content.

Materials

In Part I of the study, participants watched 13 short (8–10 seconds long) digital video clips. In each clip, an actor performed a simple, everyday behavior (e.g., a woman waving a pedestrian on to cross the street). Eight of the videos depicted ERBs: (1) a woman walks out of her house, starts her car, and then walks back into her house without turning off the engine ("Car"); (2) a woman replaces an incandescent light bulb with a compact fluorescent ("CFL"); (3) a woman peels carrots and then throws the scraps in an unmarked compost bin ("Compost"); (4) a woman walks out of her house carrying a red recycling bin, which she then places on the curb and walks away from ("Recycling"); (5) a man brushes his teeth while running the water the entire time ("Brushing"); (6) a man throws a recyclable juice/soda bottle in a trash can after walking by a recycling bin ("Trash"); (7) a woman fills up a reusable water bottle at a water cooler ("Refilling"); (8) a man sits at a computer typing a letter to his senator about a logging plan, saying out loud what he is writing ("Logging"). Each video had unique actors. Five other short videos were included as filler stimuli (e.g., a woman at a hardware store chooses between two hammers) to make the content of the main stimuli somewhat less obvious; these videos were also 8–12 seconds long and were created by Holbrook (2006).

To gauge environmental concern, we used the 15-item New Ecological Paradigm (NEP: Dunlap et al., 2000) and the 14-item Connectedness-to-Nature Scale (CNS: Mayer & Frantz, 2004), which were presented together as a single 29-item questionnaire. Participants responded to all items using 5-point Likert scales, with the anchors *Completely disagree* (1) and *Completely agree* (5). Participants also indicated whether they identified themselves as environmentalists or not with a single item.

Procedure

Groups of three to four participants came to the lab at a time, but each completed the study at a separate computer station. The researcher introduced the study as being about "how people understand and explain behavior that they see others perform." Participants were not told that the research pertained to ERBs. Signed consent was obtained from all participants. After putting on a pair of headphones, participants pressed "Begin" whenever they were ready. The rest of the study was fully computerized, followed by a personal debriefing.

The stimulus presentation software Medialab displayed the 13 short video clips. In order to prevent participants from immediately noticing the environmental aspect of the study, the filler videos were assigned to earlier positions in the order, namely 1, 2, 5, 7, and 10. Which specific ERB or filler video was displayed at a given position was randomized. Participants were only able to watch each video once, after which they were prompted with two open-ended questions. First they were asked, "In one sentence, describe what happened in the scene." Second, "In two to three sentences, why do you think the actor did what he/she did?"

After displaying all 13 videos, the computer paused briefly. Participants then examined still photos of each of the 13 videos they had just watched, and for each video they were asked: "While you were watching this video, did you think of the behavior that was performed as having any sort of environmental relevance?" Participants responded with "Yes," "No," or "Don't know" (the last response was used just 5% of the time across all 13 behaviors). After another short break, participants reported how often they performed each of 25 ERBs (on a 4-point scale), all relevant to college students living on or off campus, and eight of them corresponding to the stimulus videos shown earlier (e.g., "I use a reusable water bottle"). Participants also completed the NEP and CNS at this time. The order of the behavior and environmental concern measures was randomized.

After completing two other tasks unrelated to the present research, participants answered various demographic questions and the

identification question: "Do you consider yourself to be an environmentalist?" After completing all the tasks described above (which took most participants about 30 minutes), participants were fully debriefed.

Coding

Participants' responses to the open-ended explanation question ("Why do you think the actor did what he or she did?") were analyzed using two coding schemes. First, responses were coded for whether or not participants demonstrated recognition of the environmental aspect of a given behavior video. Any response that included a direct reference to the environmental significance of the behavior (e.g., "She did it to recycle and reduce waste") or a reference to the environmental disposition of the actor relevant to the given behavior (e.g., "He doesn't care for the environment") was classified as an environmental detection. When no such reference was made for a given video, the response was classified as a nondetection. Both coders were blind to participants' self-identification as (non)environmentalists. After brief training on about 10% of all responses, inter-rater agreement was 96% ($\kappa = .92$).

Next, we applied a comprehensive coding scheme of behavior explanations that includes the distinction between reason and CHR explanations and has been found to be highly reliable across a number of behavioral domains (Malle, 2007; Malle et al., 2000). Coders were again blind to participants' self-identified environmentalism. After an initial training period, reliability analyses were run for a subset of the sample on the primary parameter of interest, mode of explanation (CHR and reason explanation). Inter-rater agreement was initially 87% ($\kappa = .62$) for mode of explanation. Coders discussed disagreements, adopted conventions, and then independently coded the remaining responses. Final inter-rater agreement was 88% ($\kappa = .70$) for mode of explanation. In addition, reliability for classifying a given explanation as codeable was 95% agreement ($\kappa = .88$). (Ninety-eight percent of responses were codeable.) All disagreements were resolved through discussion.

Results

Reliabilities and relationships among measures of environmental identity

In the present sample, 22 individuals self-identified as environmentalists (35%), and 40 did not; one individual failed to respond to the question. Both measures of environmental concern (NEP, CNS) showed reliability of $\alpha = .83$. The mean NEP score for the entire sample was 3.83 out of a possible 5 ($SD = 0.58$), and the mean CNS score was 3.52 ($SD = 0.60$). These figures, which are similar to endorsement rates found in other student samples (cf., Mayer & Frantz, 2004), show our sample to be slightly proenvironmental leaning. We found no gender differences for either of the measures in the present sample ($ts < 1$). The CNS and NEP were significantly correlated: $r(63) = .52$, $p < .001$. Self-identifying as an environmentalist was positively correlated with both measures of environmental concern: for CNS, $r(62) = .53$, $p < .001$; for NEP, $r(62) = .44$, $p < .001$. AU1

We also explored the relationships of each of the environmental concern and identity measures with self-reported performance of environmental behavior. Endorsement of the 25 behavior items was clearly related to environmental identity. Except for one behavior (use of incandescent light bulbs), environmentalists reported more proenvironmental behavior than did nonenvironmentalists, and 12 of these mean differences reached significance. Although strong correlations are not expected between generalized measures of environmental concern and individual environmental behavior items (cf. Kaiser, 1998), environmentalist self-identification correlated significantly (at $p < .05$) with more behavior items (12) than did either the CNS (7) or the NEP (4) and had an average correlation of .25 ($SD = .13$) with the behavior items; the CNS and NEP had average correlations of .20 ($SD = .11$) and .16 ($SD = .10$), respectively. Following conventions in related literatures, we also calculated mean behavior scores for each individual across the 25 items. This aggregated measure of environmental behavior correlated strongly with environmentalism, $r = .54$, $p < .001$. Thus, our measure of self-identified environmentalism appears to be a solid indicator of both environmental concern and environmental behavior.

Detection of ERB

Our first research question was whether environmentalists and nonenvironmentalists differed in their detection of other people's ERBs. Figure 1 shows the percentage of participants who identified each of the eight behaviors as environmental as a function of self-identified environmentalism. Confirming our first hypothesis, nonenvironmentalists detected 3.72 ($SD = 1.41$) of the eight behaviors as environmental, whereas environmentalists detected 5.27 ($SD = 1.03$), $t = 4.51$, $p < .001$, $d = 1.25$. Figure 1 also shows that the eight stimulus behaviors elicited notably differing ERB detection rates in the sample as a whole, ranging from a low of 10% of participants for the Car video to over 90% for the Recycling video. F1

Explanations of ERBs

To examine participants' explanations of ERB, we coded 1,110 explanatory statements, an average of 2.2 explanations per person per behavior. Of these, 28.2% were CHR explanations [e.g., "It looked

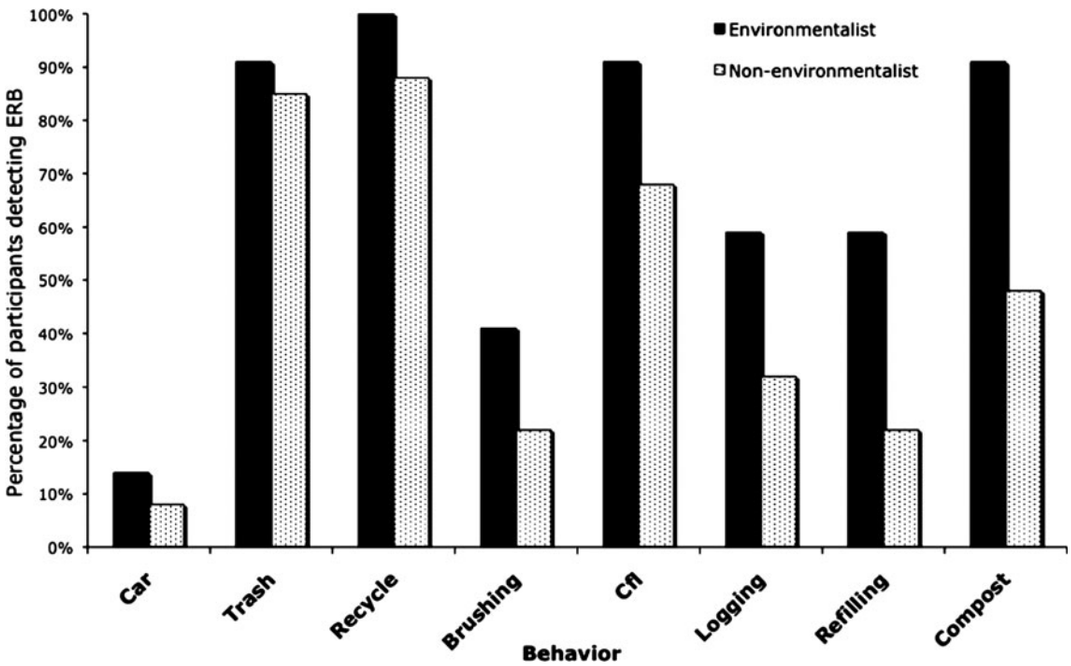

Fig. 1. Percentage of environmentalists and nonenvironmentalists who identified each behavior as environmental. Absolute difference between environmentalists' and nonenvironmentalists' detection rates increases from left to right.

like a fairly cold day" (Car); "She is environmentally conscious" (Composting); "He wasn't aware he was wasting water" (Teeth)], and 71.8% were reason explanations[2] [e.g., "He is trying to be rebellious by not recycling" (Trash); "She was trying to conserve energy" (CFL); "She had a lot of papers to get rid of" (Recycle)]. These proportions are similar to those found in past research (e.g., Malle et al., 2007). Relative use of CHR and reason explanations varied considerably from behavior to behavior, ranging from 12.9% CHR explanations for Logging to 57.3% CHR explanations for Trash.

Primary analysis. Our second major research question was whether participants' relative use of CHR and reason explanations differed as a function of two factors: environmental identity (between subjects) and detection of environmental relevance (within subjects). We began by calculating each participant's mean number of CHR and reason explanations separately for those behaviors that were "detected" by this participant and those that were "undetected" (irrespective of which particular behaviors, and how many, this participant had detected). For example, if an individual identified behaviors CFL, Brushing, and Trash as environmental, her CHR score for "detected behaviors" would be the average of the number of CHRs she provided for those three behaviors; that individual's mean CHR score for "undetected behaviors" would be the average number of CHRs she provided for the five other target behaviors. Corresponding calculations produced reason scores. Thus, for each participant we constructed four scores that made up a 2×2 within-subject array: CHR/detected, reason/detected, CHR/undetected, reason/undetected.

These scores were entered into a 2 (environmentalism, between subjects) $\times$ 2 (detection, within subjects) $\times$ 2 (CHR vs. reason, within subjects) ANOVA to test for possible effects of detection and environmentalism on explanations, specifically the relative use of CHR versus reason explanations. Environmentalism had no effect on explanations, $F(1, 60) = 0.06$, $p = .81$. Environmentalists provided 0.66 CHRs and 1.58 reasons across all behaviors, and nonenvironmentalists

[2]Just 6 out of the 1,110 explanations were cause explanations, indicating that in very few cases did participants interpret the target behaviors as unintentional.

provided 0.61 CHRs and 1.59 reasons. However, detection had a marked effect on explanations, $F(1, 60) = 10.66$, $p < .01$, $d = 0.57$. Participants provided 0.48 CHRs and 1.76 reasons for behaviors not detected as environmentally relevant but 0.73 CHRs and 1.52 reasons for behaviors detected as environmentally relevant. Thus, supporting the second hypothesis, explainers increased their relative use of CHR explanations when categorizing behaviors as environmentally relevant. Environmentalism and detection showed no interaction effect on explanations, $F(1, 60) = 0.97$, $p = .33$.

Possible effect of valence on the detection-CHR link. Past research has shown that negatively valenced behaviors tend to produce relatively more CHR explanations than do positive or neutral behaviors (Malle, 2004). In addition, Fig. 1 shows that at least one of the negative behaviors, Trash, showed very high detection rates. Thus, the observed effect of detection on CHR use may have been driven by the inclusion of negative behaviors in the set of stimuli or by a unique response to negative behaviors when identified as environmentally relevant. It is also plausible that environmentalists and nonenvironmentalists reacted differently to behaviors as a function of valence (but only when behaviors were detected)—for example, environmentalists may strongly disapprove of behaviors identified as environmentally negative.

To test these possibilities, we further broke down the behaviors into a 2 × 2 array: detected/negative, detected/positive, nondetected/negative, and nondetected/positive. For each of these behavior types we computed CHR scores and reason scores, and the relevant means are presented in Table 1. We then conducted an ANOVA as reported above, with one added within-subjects factor: behavior valence.[3] The results showed an expected effect of valence on explanations, $F(1, 43) = 44.80$, $p < .01$, such that participants used significantly more CHR explanations (relative to reasons) for negative behaviors. The only other impact of valence was an interaction effect with detection on explanations, $F(1, 43) = 6.05$, $p < .05$, indicating that the effect of detection on increasing CHR explanations (supporting hypothesis 2) was amplified for negative behaviors. [The highest-order interaction did not reach significance, $F(1, 43) = 2.60$, $p = .11$, nor did the interaction between environmentalism and valence, $F(1, 43) = .28$, $p = .60$.] Figure 2 shows that the detection effect held up across all conditions of valence and environmentalism but did vary in strength. The increase in CHR explanations was strongest among environmentalists for negative behaviors ($d = 1.74$) but still considerable among nonenvironmentalists for negative behaviors ($d = 0.65$), among environmentalists for positive behaviors ($d = 0.57$), and among nonenvironmentalists for positive behaviors ($d = .41$).

Table 1. Mean CHR and Reason Explanations Per Behavior as a Function of Detection, Valence and Environmentalist Group Identity

	DETECTED		NOT-DETECTED	
	CHR	REASON	CHR	REASON
Positive				
Non-environmentalists	0.51	1.73	0.26	1.84
Environmentalists	0.51	1.64	0.08	1.84
Across groups	**0.51**	**1.70**	**0.21**	**1.84**
Negative				
Non-environmentalists	1.23	1.15	0.82	1.53
Environmentalists	1.66	0.81	0.60	1.88
Across groups	**1.39**	**1.02**	**0.74**	**1.65**
Mean across groups and valence (weighted)	**0.73**	**1.52**	**0.48**	**1.76**

Discussion

This article takes a first step toward providing a social cognitive perspective on the study of environmentally relevant behavior (ERB). Starting with the fundamental fact that people routinely observe and wonder about others' behavior, we postulated that people's own environmental actions can be influenced by the perception and interpretation of others' actions, following a growing body of literature (e.g., Corral-Verdugo et al., 2002; Dik & Aarts, 2007). Our study focused on the first phase of this perception-action link: people's detection of ERBs performed by others and the subsequent explanations of those behaviors. Our results showed that individuals who self-identified as environmentalists detected more ERBs than did their nonenvironmentalist counterparts. Detection of environmental relevance, in turn, increased the relative use of CHR explanations (which provide a distal perspective on the causal network surrounding an action) at the expense of reason explanations (which consider an agent's subjective perspective in deciding to act). This relative shift toward greater CHR use, which amounted to a 50%

[3]Given that some people identified all the negative behaviors as environmentally relevant, missing data reduced the total *N* for this analysis to 45.

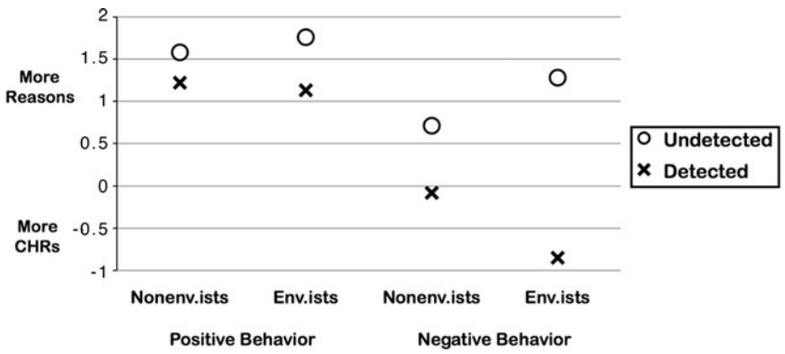

Fig. 2. Difference score *Reasons - CHR* plotted for undetected behaviors (o) and detected behaviors (x) that were either positive or negative, broken down by environmentalist and nonenvironmentalist perceivers. The relatively greater number of CHR explanations when interpreting detected rather than undetected behaviors holds for all comparisons (o always above x) but is strongest for environmentalists judging negative behaviors.

increase in CHR explanations on average, held for both environmentalists and nonenvironmentalists and for negative and positive behaviors but was particularly strong for environmentalists when observing negatively valenced behaviors.

Detection and explanations of ERBs

Previous research on determinants of ERB perception (e.g., Corral-Verdugo et al., 2002; Sadalla & Krull, 1995) explicitly identified stimulus behaviors as ERBs, leaving little room for studying the psychological processes underlying people's detection of everyday behaviors as environmentally relevant. In the present study, participants had the opportunity to observe multiple behaviors of which only some were ERBs so that we could examine antecedents and consequences of the detection process. We found that the propensity to identify behaviors as environmental varied considerably in our sample and that some of this variability was explained by environmentalism. Self-identified environmentalism presumably combines at least two elements—knowledge about and strong attitudes toward the environment. We cannot say which of these elements of environmentalism (or possibly both) influenced ERB detection, which does constitute an interesting question for future research.

The study's most intriguing finding is that identifying an action as environmentally relevant results in an important shift in the way perceivers subsequently explain the actor's intentions, namely, away from specific explanations of the particular actor and the particular action toward relatively broader, more abstract explanations (i.e., high-level construals; see Trope et al., 2007; Vallacher & Wegner, 1985). Categorizing a behavior as environmental seems to push perceivers to focus less on what was on the actor's mind—what reasons the actor may have had for acting (which is the "default setting" for social perceivers)—and more on broad background factors, such as personality, values, context, identity, or the type of action being performed. This was the case for all eight stimulus behaviors used in the study. For example, perceivers who framed the cutting and moving of vegetables as a meal preparation often cited reason explanations such as "she wants to cook" or "the peels were garbage." In contrast, when perceivers framed the same behavior as composting, they offered CHR explanations such as "she is earth-conscious" or "has a garden." It is important to note that both modes of explanation provide entirely reasonable responses to the question of why an actor has performed a behavior; the interesting question is what pushes observers toward one mode over the other and what downstream consequences this shift may have.

What might explain the effect of detection on CHR use? When people use CHR explanations, they do not consider the particular agent's subjective perspective in performing the particular action but rather consider the *category* of action or the category of agent in question (Malle, 1999; Malle et al., 2007). CHR explanations are well suited to tie together either multiple actions performed by the same agent or multiple agents who perform the same action (O'Laughlin & Malle, 2002). In each case, the explainer abstracts from the individual agent's mind and focuses on general causal forces (e.g., personality, culture), thus foregoing individuation in favor of stereotyping (Fiske & Neuberg, 1990). When participants in our study identified a behavior as environmental, then, they appear to have adopted an interpretation less concerned with the specific agent performing the specific action and more concerned with the type of people who perform that action or the type of action it is. Supporting this conclusion, previous work demonstrates that stereotypes of "environmental actors" exist and that these stereotypes exert a (negative) influence on perceptions of those individuals (Sadalla & Krull, 1995). To the extent that our participants came into the lab holding preexisting stereotypes about environmental behavior and actors, such stereotypes may have been at least partially responsible for the effect of detection on the use of CHRs (as previous research shows that stereotyping increases CHR use; see O'Laughlin & Malle, 2002).

The relatively greater use of CHR explanations upon detection may also reflect a lack of motivation on the part of the perceivers. A quick identification of a behavior as broadly "environmental" may have invited a shortcut to cognitively simple explanations. Unlike reason explanations, finding CHRs does not require the often-demanding work involved in attributing specific mental states (i.e., beliefs, desires) to another person; that is, it does not involve perspective taking. The fact that environmentalists, people who care deeply about the natural world, used relatively more CHR explanations specifically for detected negative environmental behaviors supports this admittedly post hoc explanation: Once an environmentalist identified an actor's behavior as negatively affecting the environment, that individual likely lost any motivation to further attempt to "get into the mind" of the "bad" actor. Instead, the easiest way to complete the task of finding an explanation was to rely on a broad characterization of the agent or action in the form of the CHR.

Environmentalism and behavior explanation

In contrast to the robust effect of detection on explanation, we found little evidence of an independent effect of self-identified environmentalism on explanation: Environmentalists did not use reasons any more often than nonenvironmentalists did. What might explain the lack of a direct link between environmental identity and relative use of explanation modes (CHR vs. reason)? One hypothesis is that our sample limited the variance of environmental concern because college students cluster at the high end of environmental attitudes. Such restricted variance makes it difficult to capture any effects of attitude on explanation. To test this hypothesis, future research should use broadly distributed community samples. A second hypothesis is that our participants, both environmentalists and nonenvironmentalists, had no special motivation to portray the actors in any particular way—either to take their perspective or to stereotype them. Perhaps environmentalists have such a motivation, for example, impression management, when social stakes are higher—such as in a contested town hall meeting or a private debate. The absence of such impression management motives may in part be due to the experimental setup, as the study was described as being about behavior explanation, not about the environment. Also, participants did not identify as environmentalists until after the detection and explanation portions of the experiment (although this was necessary in order to avoid any priming effects of reporting environmental dispositions *before* watching the stimulus tapes). To test this impression management account, future studies could explicitly instruct participants to portray actors as rational or socially desirable, which should lead to increased reason explanations (Malle et al., 2000), and more so among environmentalists, whose own identities would be positively affirmed by these portrayals.

Implications of perception for action

The broader research context for examining the detection and explanation of environmental behaviors is the goal of understanding the determinants of environmental behavior itself. According to the social cognition perspective, processes of perception and interpretation exert significant influence on the perceiver's own actions. The present study focused on the perception side of the equation, but research paths for the action side are clearly needed.

There are some indications in the literature that explanations do exert such an impact on the perceiver's own behavior. Quattrone (1985) and Weiner (1986) reported that explanations of one's own behavior have a substantial impact on motivation and action. Moreover, considering oneself as an agent with reasons for acting increases motivation and persistence (Bandura, 1986), and making specific if-then plans for a goal (e.g., eating more fruits and vegetables) increases the likelihood of achieving it (Stadler et al., 2010). In addition, some evidence (e.g., Grant & Dweck, 2003; Molden & Dweck, 2000) shows that AU2
people who explain their own behaviors and outcomes in "incremental" ways (corresponding to reason explanations) are more motivated in pursuing achievement goals and subsequently sustain their behavior longer than those who explain their behaviors in dispositional ways (one form of CHR). Although indirect, these findings suggest a link between the CHR-reason distinction and behavioral change, of which performing proenvironmental actions is one plausible example.

In general, the ability to recognize a behavior as environmentally significant is a critical ingredient for the adoption (and implementation) of environmental goals and behaviors. Some mechanisms of social transmission of behavior operate unconsciously (e.g., priming, goal contagion, norms activation), leading to an unreflected imitation of observed behaviors. However, these mechanisms are highly sensitive to changes in context, so imitated conservation behaviors will be dependent on exposure to the right contexts. Sustained conservation behavior may require that an individual actively hold environmental goals, attitudes, and values (Crompton, 2008; Maiteny, 2002). An important route by which individuals may come to adopt conservation-related goals and behavior is by detecting such behaviors in others and explaining them by reference to the other's goals, desires, and beliefs. That way, the representation of the other person's reasons for acting becomes available to the perceiver as reasons for his or her own action.

However, our study suggests that identification of a behavior as environmental by no means guarantees that the perceiver will

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represent—much less adopt—the other person's reasons for action. Instead, we found a tendency for people to shift from reason explanations to more distal CHR explanations when they identified a behavior as environmental. This shift may reveal perceivers' stereotyping of either the agent or the action at hand. In the case of proenvironmental behaviors, such stereotyping may reduce the likelihood of the perceiver's purposively adopting the proenvironmental action. Consistent with this concern, past research has found that perceivers make less favorable personality judgments of actors who perform positive environmental actions, for example, drying clothes on a clothesline, than of actors who perform environmentally negative versions of the same action, for example, drying clothes in a dryer (e.g., Sadalla & Krull, 1995).

In communicative settings, too, when a speaker explains to a listener another person's proenvironmental behavior, the use of CHR explanations will be less persuasive than the use of reason explanations. That is because reasons imply deliberation and rationality (reasons are often *good* reasons), whereas CHR explanations do not; reasons evoke a listener's simulations of the third person's mind, whereas CHRs do not; and reasons could be directly adopted by the listener and lead to action, whereas CHRs cannot. "He recycled because he's an environmentalist" is neither persuasive nor motivating.

The impact of observing environmentally detrimental behaviors is no less important. Corral-Verdugo et al. (2002) showed that, in a commons situation, residential water users' perceptions of others' wasteful behavior was predictive of the perceivers' negative conservation intentions. However, perceivers did not themselves engage in detection and explanation because the researchers made other people's wasteful actions explicit and thereby also provided "social proof" (Cialdini, 2003). Thus, it is unclear exactly what process—perception, communicated interpretation, or social proof—caused the change in behavioral intentions. Nonetheless, the results are suggestive of an important role for social-cognitive processes.

Implications for intervention development

The effect of detection on explanations documented in our study suggests that if we want to encourage social perceivers to adopt other people's environmental goals and actions, we have to combat their tendency to explain environmental behavior in broad and distal ways. People must be induced to actually focus on the actor's mental states, especially beliefs, desires, and intentions. If they do not, detection and explanation of environmental behavior may not exert the promoting influence on the perceiver's own actions that has so amply been documented in cognitive science research.

One aspect of our findings alleviates this concern somewhat. Even though detecting behaviors as environmental leads people in general to use CHR explanations, the group that is most likely to detect ERBs is environmentalists, and their own environmental behavior is already well under way. We have to worry more about those who are halfway along the path: They have begun to recognize behaviors as environmental but still stereotype them, interpreting them as something broad and categorical, not as concrete actions supported by specific beliefs and desires that they may consider adopting.

To increase the incidence of proenvironmental behavior among such individuals who are halfway along, researchers and practitioners have utilized many psychologically informed techniques, including providing feedback (e.g., Abrahamse et al., 2007), clarifying social norms (see Cialdini, 2003), providing information (e.g., Fujii, 2007), and encouraging goal setting (e.g., Siero et al., 1996). Many of these techniques supply target persons with reasons for why they should change their behavior. Our proposal is consistent with these approaches but highlights two additional points: First, individuals who are not yet practicing ERBs may think of environmental behavior in broad, categorical terms, so successful interventions should strive to provide people with concrete reasons for acting rather than with general value statements (e.g., "It's the right thing to do"; "Save the earth"). Second, in addition to directly providing, in persuasion contexts, target persons with concrete reasons for acting, successful interventions would expose targets to other people who act proenvironmentally and make their reasons transparent, behaviorally or verbally. Doing so would instigate people's fundamental interest in other people's minds and help translate perception into action (in part, perhaps, by making relevant and supportive reasons more salient and thus readily accessible for adoption by individuals).

Strengths and limitations

One of this study's primary goals was to examine detection and explanation of ERB in an ecologically valid yet controlled setting. Videotaped stimuli and open-ended response formats allowed participants to indicate what they saw in each behavior vignette without being explicitly prompted to think about the environment. Thus, the present study captures detection the way it more typically occurs in real life. Additionally, participants explained a mix of environmental and nonenvironmental actions, thus making actual discriminations rather than treating all behaviors as environmentally relevant.

At the same time, the present study has limitations. For one thing, the sample consisted of college students, who are not representative of the general public. Detection and explanation of environmental behaviors may vary by culture, geography, education, age, and other

factors. Likewise, the representativeness of this study's eight video stimuli is difficult to determine. We aimed at selecting behaviors that our participants might likely encounter in everyday settings, but additional research with a broader range of behaviors would increase confidence in the results.

A second possible limitation of the research involves our measurement of ERB detection. Detection was assessed by scanning people's verbal responses for relatively explicit references to the environment. This set a high bar for participants to demonstrate detection, and some participants who did not make an explicit reference might still have identified the behavior (consciously or not) as environmental. For example, perhaps nonenvironmentalists demonstrated a lower detection rate because they set a higher threshold for linguistically marking a behavior as environmentally relevant. One finding that speaks against this possibility is that the effect of environmentalism on detection was also observed in participants' closed-ended detection responses (collected after participants had watched all videos). Nevertheless, it is important to note that factors other than objective detection of environmental relevance may have influenced participants' verbal marking of behaviors as environmental, which represents a potential confound for the analyses presented here.

Participants' responses to the close-ended detection questions may appear to be an attractive alternate indicator of detection. However, there are too many concerns associated with these questions to use them for this purpose. In particular, after having watched all the videos, people's differentiation into detected and undetected items is an imprecise and unreliable retrospective report. Moreover, being asked explicitly about the "environmental-ness" of the observed behaviors creates a suggestion or even demand to report having detected such items, and that demand may be even greater for nonenvironmentalists who had not detected many items. Such demand characteristics also disqualify the variant of asking about environmental detection after each video was shown; in this case, participants would have quickly become sensitized to the nature of the research. Clearly, future research would benefit from the use of methods that reliably capture environmental detection without such problems.

Finally, the psychological mechanisms underlying the reported results are not yet known. Keener detection of ERBs by self-identified environmentalists may stem from knowledge structures, interest levels, or emotional concerns. Differences in explanations have been shown to reflect both cognitive and motivational processes (Malle et al., 2000; Malle et al., 2007), and both sets of factors may contribute to the increase in CHR explanations for detected ERBs.

Future directions

Our findings hold a number of implications for future work. First, research on ERBs would benefit from the expanded methods employed in our study, such as the use of videotaped behavioral stimuli and the analysis of open-ended verbal responses. Video stimuli allow for a more naturalistic display of environmental behavior, they feel comfortable to participants (because they most often encounter behaviors visually), and videos enable researchers to conduct studies that are not blatantly "environmental." Open-ended responses capture people's ordinary thoughts and sentiments unconstrained by response options that are usually infused with theoretical assumptions. The concept of CHR explanations, for example, was unknown until discovered in open-ended behavior explanations (Malle, 1999).

Second, our study opens up new questions regarding people's perception and interpretation of environmental behavior, such as cross-cultural, geographical, and generational comparisons. Moreover, it sets the stage for the second element in the perception-action link—research on the behavioral consequences of detecting and explaining environmental behavior.

Third, relationships between the detection and explanation of environmental behaviors on the one hand and the powerful and well-studied influence of social norms on the other should be investigated. Examining when individuals detect environmental behaviors and how they interpret and explain them may elucidate how social norms for environmental behaviors form and what changes may need to take place for the normative behaviors to spread in a given community.

Finally, the social cognition perspective and our findings more specifically can inform environmental communication and intervention design. The fundamental human interest in other people's minds must be activated and harvested for both motivational and cognitive benefits. Behavior change cannot be left solely to mechanisms of priming, imitation, and disincentives. If people can be encouraged to observe others' environmental actions and grasp their mental states, their reasons for acting, then the powerful perception-action link may pave the way for the social transmission of proenvironmental behavior.

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AU1 *t*s correct as written?
AU2 Grant & Dweck 2003 and Molden & Dweck 2000 not found in reference list. Please reconcile.
AU3 Please add page numbers for Clayton 2003.
AU4 Please add retrieval month date, year.
AU5 Malle 2001 not found in text. Please reconcile.