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# Intentionality in Intuitive Versus Analytic Processing: Insights From Social Cognitive Neuroscience

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## Intentionality in Intuitive Versus Analytic Processing: Insights From Social Cognitive Neuroscience

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A recurring theme in attribution theory is that lay explanations for intentional and nonintentional behaviors diverge (Buss, 1978; Fincham & Jaspers, 1980; Kruglanski, 1975; Malle, 2004; White, 1991). In this vein, Reeder (this issue) proposes that they evoke different inferential paths that produce different attributional patterns. In response to nonintentional behavior, perceivers think like scientists, reasoning abstractly about causes, seeking parsimony by discounting personal forces given plausible situational forces. By contrast, in response to intentional behavior, perceivers think like storytellers, positing motives, aims, reasons, inside the actor's mind and drawing conclusions about personal dispositions that cohere with these imputed mental states. The contrast between these divergent paths provides a valuable framework for analyzing past streams of attribution research, interpreting recent findings, and exploring future directions.

This comment considers Reeder's proposal of diverging paths in relation to another duality in social inference research, spontaneous versus deliberate processing. Whereas earlier models of social perception often posited spontaneous and deliberate processes at different steps in an inferential sequence (e.g., Gilbert, Pelham, & Krull, 1988), many recent models hypothesize the existence of dual systems—an evolutionarily-old system of spontaneous, preconscious intuition and an evolutionarily-recent system of deliberate, conscious analysis (e.g., Kahneman, 2003; Lieberman, Gaunt, Gilbert, & Trope, 2002; Smith & DeCoster, 2000). Others, of course, have critiqued the dual systems thesis, holding that social inference processes merely range on a continuum of automaticity (Kruglanski & Orehek, 2007). Reeder allies himself with this unitary system view, asserting that the proposed divergent attributional paths hold regardless of whether the processing occurs spontaneously or deliberately.

In our view, Reeder's dismissal of the relevance of processing mode is a missed opportunity for theoretical integration and elaboration. Mounting evidence from social cognitive neuroscience (SCN) research has revealed networks of brain regions distinctively recruited in spontaneous and deliberate processing and elucidated functional components of each system (Satpute & Lieberman, 2006). The SCN literature, as we shall

see, suggests that intentionality-divergence arguments by Reeder and others may need to be qualified in some respects, for although both systems respect the difference between intentional and nonintentional behavior, they do so in different ways that yield different attributional outcomes. However, on the bright side, SCN research can inform aspects of Reeder's model that are currently underspecified, such as: How do perceivers register that a behavior is intentional versus nonintentional in the first place? And how do perceivers recognize "hard" versus "soft" situational constraints in order to draw different inferences from them?

### Two Systems

Some general features of intuitive versus analytic processing are worth noting before we focus on the components most relevant to intentionality divergence. *Intuition* works through association, matching the stimulus against patterns in memory, as in connectionist models of parallel constraint satisfaction (Kunda & Thagard, 1996). This happens spontaneously and pre-consciously, so it feels phenomenologically like perception rather than reasoning. *Analysis* works through serial processing of propositional representations, following consciously held rules for reasoning such as those related to logic and probability (Sloman, 1996). Analytic processing has the advantages of consciousness and control, although it is slower and narrower in bandwidth than intuition. Either system can handle intentional behaviors and nonintentional behaviors; intuition handles both through pattern-matching, and analysis handles both through rule-based reasoning.

The two systems, however, are not entirely separate and redundant; they also interact. Preconscious intuitive processing is triggered immediately by incoming stimulus information, as the perceiver matches it against memory patterns to identify what kind of event is being witnessed. So long as perceptual input can be matched to familiar patterns in memory, the perceiver may continue to make sense of it on intuitive autopilot. Yet sometimes the stimulus fails to match any familiar pattern, or it fits two contrary patterns equally well, or it fits a pattern different from the perceiver's expectation, creating doubt, suspicion, or surprise. This

mismatch sounds an alarm that triggers conscious analytic processing. The analytic system takes the partially interpreted stimuli from intuitive processing as its input and draws deliberate inferences based on rules of coherence, logic, and probability.

### **Intuition: Spontaneous, Preconscious, Associative Processing**

Several components of the intuitive system are particularly pertinent to the current argument. Whereas the traditional person perception literature treated behavior identification as a single step of recognizing the potential trait-significance of a behavior, SCN research posits progressive waves of recognizing a behavior through matching the currently represented stimulus against increasingly higher order memory structures to infer increasingly greater social meaning. This progression, generally speaking, corresponds to the recruitment of distinctive cortical areas, beginning in the posterior portion of the brain and moving forward to more anterior regions

Identification of behavior begins as visual information reaching the eyes is sent to the primary visual cortex and then distributed to visual association cortices by way of two pathways—the dorsal and ventral visual streams (Ungerleider & Mishkin, 1982). The ventral pathway processes information used to identify “what” the stimulus is. The dorsal pathway processes information for determining “where” in space a stimulus is located and “how” it is moving. These “what” and “where/how” streams come together in the *superior temporal sulcus* (STS). Functional brain imaging studies link STS activity to visual perception of self-propelled movement characteristic of animate entities, and, more specifically, biological motion characteristic of humans and other animals that move themselves by walking (Grossman & Blake, 2002). Further, STS activity is associated not only with recognizing behavior but also with distinguishing kinds of behavior. The STS is particularly responsive to motion cues that signal goal-directed behavior, such as contingent movements of two targets (Blakemore et al., 2003; Schultz et al., 2003; particularly those featuring eye and mouth movements consistent with mutual attention and interaction; Hoffman & Haxby, 2000), hand movements toward an object versus toward empty space (Grèzes, Armony, Rowe, & Passingham, 2003), and changes of trajectory to avoid an obstacle versus swerving for no reason (Saxe, Xiao, Kovacs, Perrett, & Kanwisher, 2004). Critically, these STS responses to motion cues of goal-directed behavior occur spontaneously, without participants being asked to interpret the stimulus (Schultz, Imamizu, Kawato, & Frith, 2004). Single-cell recording studies with primate perceivers have identified populations of neurons in the STS that are selective to particular kinds of basic actions toward objects (e.g.,

reaching, lifting, pushing etc.; Jellema & Perrett, 2006; Perrett et al., 1989). Of importance, the neural firing hinges on the visible presence of the object (Jellema, Baker, Wicker, & Perrett, 2000) and cues to the target person’s awareness of it (i.e., gaze in the direction of the object; Perrett et al., 1989). Moreover, accidental behaviors such as tripping and dropping an object do not elicit this STS response (Perrett, Jellema, Frigerio, & Burt, 2001), suggesting that it involves identifying basic behaviors, not just identifying the proximity of a target with an object. Consistent with this, different movements directed toward the same goal elicit nearly identical firing patterns, whereas similar movements with diverging goals elicit distinct firing patterns (Jellema & Perrett, 2001, 2006; Zacks et al., 2001). In sum, through STS processing perceivers recognize human behavior, distinguish whether it is goal-directed, and identify types of goal-directed actions.

Although the terms *goal* and *intention* are often used interchangeably, we argue that it is useful to distinguish identifying goal-directed behavior from imputing intentions. Although one sets the stage for the other, they are not identical. Goal-directedness is matter of the organization of a target’s behavior; intentions are a matter of the mental states inside the target’s head. The STS mechanism for recognizing goal-directedness is likely the process exploited when a basketball opponent fakes to the left before driving to the right; we read the leftward goal from the other’s feint of head, eyes, and body. Notice that this is more a matter of *bodyreading* than *mindreading*. The STS functions to answer the question, “Where is this behavior going?” not the question, “Why is the person doing it?” In sum, perceivers can identify goal-directedness from movement cues in observed behavior without mindreading. Moreover, identifying goals is often sufficient for generating our response to others’ behavior; we don’t need to go inside their heads. Particularly for behaviors observed in the periphery when we are focused other tasks, intuitive processing may stop at bodyreading and not advance to mindreading.

Mindreading—imputing inner intentions, beliefs, and desires—recruits a more anterior region, the *medial prefrontal cortex* (mPFC). Mechanisms of the mPFC are employed when perceivers attempt to explain *why* an agent performed a given intentional behavior, an extended sequence of behaviors, or a pattern over time of such actions. Such explanations require a story about the minds of the characters, their intentions, beliefs, and desires, and perhaps their more long-standing motivations and character dispositions. Unlike displays of simple goal-directed movement, displays of complex intentional movement patterns give rise to activity in *both* the STS and the mPFC (Brodman Areas [BAs] 8/9/32; Castelli, Happé, Frith, & Frith, 2000; Schultz et al., 2003; see Frith & Frith, 2003). The mPFC is recruited in tasks that involve

reasoning about the intentions of characters in cartoons and vignettes (Amodio & Frith, 2006; Brunet, Sarfati, Hardy-Baylé, & Decety, 2000; Gallagher et al., 2000); tasks that require judgments about whether another person performs particular actions (e.g., “run” or “lick”), which invite thoughts about their motives (Mason, Banfield, & Macrae, 2004); and tasks that require reasoning about others’ knowledge (“Would Christopher Columbus know how to use a VHS?”; Goel, Grafman, Sadato, & Hallett, 1995) and others’ false beliefs (e.g., “Sally purchased a train ticket because she believed the subway was running when it’s actually shut down for the weekend”; Saxe & Kanwisher, 2003). Of importance, the mPFC is distinctively recruited by judging the mental characteristics of a target person compared to judging internal physical characteristics that are also unobservable (Mitchell, Banaji, & Macrae, 2005). Consistent with Ames’ (2004) account of differential mindreading strategies, mentalizing about self-similar others activates a region of ventral mPFC linked to self-referential thought, whereas mentalizing about dissimilar others activates a more dorsal region of the mPFC (Mitchell, Macrae, & Banaji, 2006). In sum, the mPFC is recruited when perceivers imagine a target person’s mental interior in order to explain their behavior in a particular situation.

Although still the subject of debate, evidence indicates that not all goal-directed behaviors elicit mPFC activity. Tasks that involve detection of goal-directed movement without mentalizing recruit STS without the mPFC (Blakemore et al., 2003; Schultz et al., 2004). This region appears to be recruited only when perceivers interpret behavior by imputing mental states. In contrast to the STS, which responds to observed goal-directed movement regardless of whether perceivers have the processing resources (i.e., attention) to explain the observed behavior, mPFC responses are diminished significantly when perceivers are put under cognitive load (den Ouden, Frith, Frith, & Blakemore, 2005). These findings imply that judging *why* through mindreading is more attentionally demanding than judging *what* through bodyreading. Although mindreading can occur intuitively through matching a complex social behavior to a social script (e.g., the student is trying to ingratiate himself to the teacher; the spurned lover is taking revenge), this intuitive processing may require more cognitive resources than prior behavior identification. When perceivers react to verbal rather than visual stimuli, however, this constraint may not apply. Consider that, in spontaneous trait inference tasks, perceivers infer dispositions (“helpful”) automatically when reading descriptions of behavior (“Tom took the orphans to the zoo”; Winter & Uleman, 1984). In conjunctive explanation tasks, perceivers favor multiple-factor explanations over more parsimonious unitary explanations to explain described behaviors (Abelson, Leddo & Gross, 1987) perhaps because multiple-

factor explanations match more closely to their multiple script-based inferences. In sum, intuitive processing of visual behavioral stimuli may often stop short of imputing mental states and ascribing personality traits, whereas these inferences may occur more effortlessly and automatically with verbal stimuli.

### **Analysis: Deliberate, Conscious, Rule-Based Processing**

Despite the ease and efficiency that characterize intuitive processing, not all social inference can be accomplished effortlessly and in the absence of conscious control. Studies of tasks that evoke conscious reasoning about other’s behavior suggest that two neural regions in particular, the anterior cingulate cortex (ACC) and the lateral prefrontal cortex (LPFC), play a critical role in inferring others’ intentions. The ACC is responsible for detecting the need for top-down control, whereas regions of the LPFC implement it (see Lieberman, 2003). Not only are these regions highly interconnected (Fuster, 1980), ACC and LPFC activity tend to co-occur, which is consistent with the position that there is a tight functional link between these areas (Carter, Mintun, & Cohen, 1995).

The first of these cortical regions—the ACC—has been described as an *alarm system* that alerts the second region—the LPFC—to begin conscious analytic processing (see Botvinick, Braver, Barch, Carter, & Cohen, 2001; Lieberman, 2003, 2007). The alarm signals the presence of conflict or discrepancies, when there is no obvious solution to a problem (e.g., when there is more than one potential answer; Petersen, Fox, Posner, Mintun, & Raichle, 1988), when an expectation is violated (Carter et al., 1998), or when a relatively automatic but inappropriate response needs to be overridden (Carter et al., 1995; Pardo, Pardo, Janer, & Raichle, 1990). The sensitivity of the alarm likely decreases with situational factors such as attentional load as well as personality factors such as need for closure.

When the ACC detects conflict or inconsistency, the LPFC is recruited to direct inferences through controlled, careful reasoning. The LPFC is involved when perceivers consciously reflect on specific information (Lieberman et al., 2002), try to overcome habitual responses (Dehaene, Posner, & Tucker, 1994), or strive to maintain attention on relevant cues as opposed to nondiagnostic distractions (MacDonald, Cohen, Stenger, & Carter, 2000). This is the center for controlled abstract symbolic thinking such as propositional reasoning (Goel & Dolan, 2000; Waltz et al., 1999), causal inference (Lieberman et al., 2002), and hypothesis formation (Christoff & Gabrieli, 2000).

For intentional behaviors, the rules invoked in LPFC processing may be those relevant to constructing a coherent narrative, namely conceptions of character and motive, as well as some more general rules of logic.

Consider the bias toward preserving impression valence: Perceivers impute consistently positive or negative motives and traits to a target person rather than inferring a mixed character (Roese & Morris, 1999). This may reflect that the logical rule of noncontradiction sharply constrains perceivers' inferences about states of mind and personality traits. In contrast to intuitive mindreading, which makes use of projection, there is evidence that a ventral portion of the LPFC is recruited when perceivers strive to actively suppress their own point of view to accurately analyze another's perspective (Samson, Apperly, Kathirgamanathan, & Humphreys, 2005; Vogeley et al., 2001). Although the LPFC seems critical to the metacognitive aspect of analysis, attributional analysis also activates regions used in intuitive processing such as the STS and the mPFC. Harris, Todorov, and Fiske (2005) replicated McArthur's (1972) design investigating attributional choice as a function of consensus, consistency, and distinctiveness information and found that patterns of STS and mPFC activation across conditions paralleled that of person attributions. mPFC activation is also seen in tasks requiring the anticipation of another's strategic intent in coordination games such as "rock, paper, scissors" (Gallagher, Jack, Roepstorff, & Frith, 2002; McCabe, Houser, Ryan, Smith, & Trouard, 2001) or mixed-motive games such as the Prisoners' Dilemma (Rilling, Sanfey, Aronson, Nystrom, & Cohen, 2004).

For nonintentional behaviors, LPFC processing most likely reflects reasoning in terms of the perceiver's rules about causality and probability (Nisbett, 1993). A basic rule is the discounting principle that one possible cause an effect becomes less likely given the presence of an alternative cause (Kelley, 1973). Participants follow this rule in attributional tasks that request precise judgments of causal probabilities (Morris & Larrick, 1995). Such tasks elicit this tendency toward parsimony from the same individuals who favor multiple-cause explanations in response to more intuitive tasks that invite pattern matching (Morris, Smith, & Turner, 1998).

In sum, there is evidence that deliberate analytic processing of behavior involves rule-based inference and that different rules constrain perceivers' storyteller-like explanations for intentional behavior versus their scientist-like explanations for nonintentional behavior.

### Qualifying the Proposed Attributional Paths

The picture of intuitive versus analytic processing emerging from SCN research suggests some qualifications to Reeder's claims about the attributional pathways evoked by intentional versus nonintentional behavior. That is, intentional behaviors may not always, or even typically, invoke mindreading followed by coherent storytelling, and nonintentional behaviors may

not always or typically invoke abstract causal reasoning. To assess, let us review the four possible cases:

1. *Intuitive processing of intentional behavior.* Although intuitive processing of intentional behavior can involve mPFC mindreading processes, it can also stop short of mindreading. For most of the mundane actions perceivers witness each day—pedestrians scurrying toward the waiting bus, waiters weaving through the restaurant tables, children playing tag in the playground—intuitive processing may end with STS identification of the directional goals organizing the action. Perceivers infer where the behavior is going and that's all that's needed. Unless the action is complex or the target person is of special interest, perceivers need not spend mental energy speculating about interior mental states.
2. *Analytic processing of intentional behavior.* Analytic processing is more likely to involve the search for a coherent narrative about motives, personal traits, and situational forces that Reeder's model portrays. Yet whereas Reeder implies that the coherence constraint enables prediction of perceivers' attributions about a stimulus event, the SCN view of analytic processing suggests that coherence will mean different things to different perceivers, depending on the rules to which they subscribe. To illustrate, Reeder describes (p. 11) recent findings that participants explain the behavior of Milgram teachers positively (Reeder, Monroe, & Pryor, 2008) as predicted from his model. He argues that after observing the situational pressure—the experimenter's imperative to continue for the sake of science—perceivers striving for coherence thereby impute positive pro-experimenter/science motives. Yet coherence itself does not suffice to generate this prediction—Would it not be equally coherent for participants to attend to negative aspects of the situational pressure (the experimenter's lack of compassion, for instance) and to impute negative motives to the teacher (sadism) that cohere along this different narrative theme? If perceived coherence depends on perceivers' rules for reasoning, it will vary with personal experiences, education, and cultural upbringing. To cite just one example, if the predominant folk theory of action in East Asian cultures is more interactionist than that in Western cultures (Norenzayan & Nisbett, 2000), then East Asian perceivers would be more likely, in general, to explain behavior in terms of situational factors that work in concert with personality factors, rather than discounting personality factors given situational factors. In sum, if the outcome of analytic processing depends entirely on the rules that are guiding it, then the attributional patterns it produces may take myriad forms rather than falling into a few predictable configurations.

3. *Intuitive processing of nonintentional behavior.* Contrary to Reeder's model, the SCN view suggests that nonintentional behavior may not evoke abstract causal reasoning so long as it is processed intuitively. Intuitive processing involves matching the stimulus to patterns, such as schemas for basic actions, scripts for routine events, and categories for basic types of people. Consider, for example, the nonintentional behavior of fidgeting during an interview. Gilbert et al. (1988) found that perceivers attribute the behavior to trait anxiety, consistent with a process of matching it to their prototype of a neurotic person rather than of reasoning abstractly.
4. *Analytic processing of nonintentional behavior.* When perceivers consciously analyze nonintentional behavior, however, the process of abstract causal reasoning may be evoked. Illustrating again with the findings of Gilbert et al. (1988), perceivers followed the discounting principle—reducing attribution to trait anxiety when given the situational factor of stressful interview questions—under the condition of low attentional load, which afforded analytic processing. The emphasis Reeder aptly notes on abstract causal reasoning in classic attribution research may reflect a focus on this case of analytic processing of nonintentional behaviors. For example McArthur's (1972) task poses questions such as, "What do you think caused Ralph to trip over Joan's feet?" along with covariational information such as, "Hardly anyone else trips over Joan's feet," "Ralph also steps on every other partner's feet," and "In the past Ralph would almost always step on his partner's feet," before asking participants to deliberate about the best attributional locus. When asked, in essence, to perform an intuitive analysis of variance, participants follow the covariation principle, attributing the outcome to Ralph's clumsiness only when the evidence from past episodes supports this attribution. Notice how this finding differs from those with spontaneous inference tasks (e.g., Winter & Uleman, 1984), which find that merely reading a sentence like "Ralph stepped on Sally's feet while dancing" spurs inferences such as "clumsy." Like the contrast between Gilbert's two conditions, the contrast between these two classic tasks illustrates the difference between deliberate versus spontaneous attribution of nonintentional behaviors.

### Elaborating the Intentionality Divergence Model

#### Detecting the Intentionality of Behavior

A critical issue for Reeder's model is how perceivers initially distinguish that a stimulus reflects intentional

versus nonintentional behavior. The proposal of divergent attributional paths implies a switch or filter early in the social perception process. In his discussion of this matter, Reeder references the work of Malle and Knobe (1997) probing folk concepts of intentionality. Some of their studies gave participants an abstract task much like a philosophy class midterm: "When you say that somebody performed an action intentionally, what does this mean? Please explain." Others asked participants to analyze whether particular behaviors described in vignettes were done intentionally or not. Both methods indicate that lay people analyze intentionality much as philosophers and judges do—a target acts intentionally when she or he *desired* an outcome, *believed* the action would bring about the outcome, *planned* the action, had the *skill* to accomplish the action, and was *aware* of accomplishing the outcome. Although it is interesting to know the criteria people use when reasoning analytically about intentionality, this analysis cannot be the initial switch that determines the processing track, for the plain reason that it requires input (imputed desires, beliefs, etc.) that are available only after a mindreading process. In other words, Reeder's proposition—perceivers respond to intentional behavior through imputing motives—risks tautology if the very way perceivers detect intentional behavior is through imputing motives.

To avoid circularity, the model needs to specify how perceivers can detect intentional behavior prior to imputing specific motives and intentions. The SCN literature we have reviewed offers valuable insights about how this may happen in preconscious intuitive processing. For simplicity, let us assume the condition of visual rather than verbal behavioral stimuli. Early components of preconscious intuitive processing distinguish goal-directed behavior from accidental or random behavior. As goal-directedness almost always goes along with intentionality, this process may serve as the switch determining whether processing takes the intentional versus nonintentional track. In sum, identifying a stimulus as goal-directed behavior from movement cues via mechanisms of the STS sets the stage for subsequent mindreading and trait inference via mechanisms of the mPFC.

#### Identifying Different Kinds of Constraints

Another key distinction in Reeder's argument concerns different kinds of external constraints on behavior ("soft" vs. "hard") that perceivers treat differently in their discounting inferences. His insight, which may help to clarify past debates about discounting, is that perceivers treat some kinds of some external constraints as a warrant for discounting the target's motives and traits, whereas they treat others as a warrant for imputing motives. Reeder hypothesizes that perceived "soft" constraints have impact on behavior through the

actor's motivations, whereas "hard" constraints have their impact in opposition to the actor's motivations. Yet a problem arises in how soft constraints are defined: "The defining characteristic of soft situational constraints is that they elicit motive-relevant behavior" (Reeder, this issue, p. 6). Defining soft constraints in terms of their consequences risks circularity, and it also fails to illuminate how perceivers identify these different kinds of constraints.

The SCN literature suggests some classes of situational constraints or influences on behavior that perceivers can immediately distinguish from movement cues. To see this, let us consider Reeder's primary example of the two kinds of constraints, which comes from a study of attributions for a soccer player's kicking performance in the presence/absence of different kinds of external forces—a \$200 incentive to succeed (soft constraint) or a 30 mile per hour tailwind (hard constraint). Participants in the Reeder, Hesson-McInnis, Krohse, and Scialabba (2001) study reasoned differently about these two kinds of constraints: an external tailwind prompted them to discount both types of internal causes—ability and effort—as the external cause is sufficient to account for the performance, whereas an external incentive prompted them to discount ability yet attribute *high* effort, as this external cause is assumed to work through amplifying the kicker's effort level. A notable difference between the two forces in this example is that wind works through physical causality whereas incentives work through social causality. This is also true of Reeder's other examples such as ship captain who fails because of insufficient reward (social causality) versus because of being knocked overboard by a wave (physical causality). People can affect each others' behaviors through both means: Persuasion involves working through the motives and intentions of the other person; coercion involves using brute physical force.

That perceivers spontaneously distinguish situational forces involving social versus physical causality is consistent with the SCN literature. As we have reviewed, early STS processing of behavioral stimuli responds to basic movement cues of goal-directed and social behavior, such as contingency of movements in response to objects and other targets, movements of the head, eyes, and limbs, and so forth. At the same time, other neural regions detect stimulus trajectories corresponding to physical causality dynamics, for example, the spatiotemporal contiguity that characterizes mechanical causation, as when one billiard ball launches another one (Blakemore et al., 2003). Even when the external situational forces on a target's behavior are other persons (rather than inanimate entities such as a falling rock or an ocean wave), movement cues often reveal whether the influence involves social (persuasive) versus physical causality (coercive) force. Picture the trajectories and contingencies of people's bod-

ily movements during a sales transaction as opposed to a mugging, or during a seduction versus an assault. Movement cues reveal a lot about whether the influence in an interaction involves persuasion (social causality) as opposed to coercion (physical causality). Hence perceivers may recognize this distinction in spontaneous, intuitive processing. This distinction may be useful in fleshing out Reeder's argument that different kinds of constraints give rise to different discounting inferences.

### The Past and Future

Reeder's article not only advances a model but also questions some emphases in past attribution research. Given the centrality of intentional behavior to social interaction, why has there been so much focus on perceivers' scientist-like reasoning about causes of accidental or highly constrained behavior? Perhaps in the social psychologists' traditional vision of the lay perceiver as running intuitive analyses of variance there is an element of self-projection. Perhaps in their denunciations of lay perceivers' personality attribution errors are shades of their earlier critiques psychology. Regardless of whatever disciplinary biases have limited past attribution research, the multidisciplinary SCN approach promises an open, exciting future.

### Note

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