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Author Reply: Why goal-directed cycles still explain most phenomena called emotions

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Abstract

This reply engages with five commentaries on my target article advancing the goal-directed theory (GDT). Stussi et al. expand the discussion by emphasizing epistemic goals, whereas Scarantino, Bonard, Pacherie, and Prinz resist my eliminativist conclusion to varying degrees by raising objections in the form of counterexamples (e.g., decisional paralysis, emotional recalcitrance, responding with vs. without emotional heath) and other puzzles (e.g., identity-based irrational emotions). By clarifying several misunderstandings about the GDT (e.g., about the revisability, automaticity, and complexity of goal-directed processes), I show how the theory can accommodate these objections, thereby further strengthening its viability.

Keywords

emotion, goal-directed, stimulus-driven, model-based, model-free, irrationality, recalcitrant, decisional paralysis, identity-based

I received five stimulating commentaries, of which one (Stussi et al., 2026) seems compatible with the goal-directed theory (GDT), while the others (Bonard, 2026; Pacherie, 2026; Prinz, 2026; Scarantino, 2026) exhibit various degrees of incompatibility. The latter can be framed as attempts to reduce the discrepancy between the commentators' goal to keep the scientific status of emotions intact (i.e., desired state) and my eliminativist conclusion (i.e., actual state). Several of these strategies count as assimilation: Scarantino (2026) and Bonard (2026) try to poke holes in the GDT by questioning its rationale and raising counterexamples or puzzles not addressed so far, while Pacherie (2026) attempts to salvage the distinction between emotions and nonemotions by replacing the stimulus-driven versus goal-directed dichotomy with the alternative model-free versus model-based dichotomy. The strategy taken by Prinz (2026) can partly be sorted under immunization insofar as it downplays the discrepancy by suggesting that eliminativism is not widely shared, at least not by the father of psychology, William James. I respond to each commentary within the allotted space.

Stussi, Gaudré, and Sander

Stussi et al. (2026) compellingly cast the spotlight on epistemic goals, of which the most basic is the goal to have information. This is compatible with the GDT because the theory places no constraints on the types of goals that agents may value. A lack of information may constitute a discrepancy with this goal, which may be reduced by selecting the behavior option of information seeking or consumption, provided it has a high expected utility. The goal for information can be seen as a meta-goal that broadly assists in—and is therefore instrumental to—the pursuit of all other goals (e.g., the goals to have food or be safe) as well as more advanced epistemic goals (e.g., the goal for truth or epistemic coherence). The goal for information can also be orphaned (i.e., decoupled from its instrumental origins) and hold intrinsic value. Like other intrinsic goals, it is difficult to distinguish from goals that are instrumental to a hedonic goal, since the fulfillment of intrinsic goals typically generates positive affect. Although epistemic goals have long been overlooked (i.e., hidden goals), a growing body of empirical research shows they are powerful drivers of behavior, including (seemingly) maladaptive behavior (Bromberg-Martin & Sharot, 2020; Sharot & Sunstein, 2020).

Scarantino

Scarantino (2026) criticizes the claim that "emotions are goal-directed cycles," treating it as a substantive identity claim. As should be clear from my explanatory approach, however, the

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"are" in this claim denotes an explanatory relationship. I started from a descriptive set of emotions—the phenomena that people call emotions—and sought an explanation for the members of that set. My explanation was that most of these members correspond to goal-directed cycles. In this light, the "emotions" in the claim refer to emotions in the descriptive, not the scientific, sense. The claim is thus shorthand for the claim "the phenomena that people call emotions are goal-directed cycles." This claim, moreover, expresses an asymmetric rather than a symmetric relation: *If* an agent calls an episode an emotion, *then* a goal-directed cycle is likely at play. The reverse does not hold: Not all goal-directed cycles are called emotions. The asymmetry reflects that so-called emotions (a) may correspond not only to full-blown goal-directed cycles but also to *partial* ones (e.g., lacking a behavior selection stage) and (b) form a *subset* of the entire set of goal-directed cycles, namely those in which the goals have a high value. I showed that these high-value goals can account for several properties listed in the descriptive definition of emotions: valence, intensity, urgency or control precedence, and some forms of irrationality, as captured by the more specific claim "so-called emotions are (full or partial) goal-directed cycles at the service of highly valued first goals." But even this more specific claim expresses an asymmetrical relation. The presence of a goal-directed cycle and a high-value goal may not be jointly sufficient to explain all the properties of the descriptive definition, even if they go a long way. In this sense, the GDT makes a heuristic identity claim, serving as the starting point of research rather than the end point (see McCauley & Bechtel, 2001). It should further be kept in mind that the descriptive properties of emotions listed were neither presented as exhaustive nor as enjoying full consensus.

A comparable lack of consensus may exist for the descriptive properties of specific emotions. I argued that different people may use different criteria for including phenomena in the descriptive subsets of "anger," "fear," or "sadness." For instance, some people call an episode *anger* because there is a discrepancy with any goal (i.e., obstacle criterion; Berkowitz & Harmon-Jones, 2004), regardless of the overt (e.g., aggression, apologizing, and reporting to HR) or covert behavior option (e.g., accommodation and immunization) an agent selects to reduce this discrepancy. Others call an episode *anger* because the discrepancy is with a particular set of goals, such as status or possession (i.e., offense criterion), again, regardless of how the agent deals with it. Still others may call an episode *anger* when the behavior option selected was aggression (i.e., aggression criterion), regardless of the first goal at stake (which could even be the goal for safety). And of course, people may also rely on a combination of these criteria, as Scarantino (2026) does when he argues that "accommodation and immunization cycles do not instantiate anger, because the prototypical components associated with anger [appraisal of offense plus an aggressive tendency] are missing in both cases" and when he argues that apologizing and reporting the offender to HR do not instantiate anger as long as the agent does not experiences "so much as a hint of aggression."

Scarantino (2026) also raises presumed counterexamples against the theory. The first is a case of decisional paralysis, where a mugger points a gun at an agent's head, but the agent does nothing and gets killed. Scarantino's (2014) motivational theory of emotions (MTE) explains this case as follows. The agent has an initial tendency to avoid, which is part of an innate stimulus-driven process—a "danger-avoidance" link—after which the goal-directed process required to translate the initial avoidance tendency into a more concrete action tendency is hindered because no concrete behavior option has sufficient expected utility. A second counterexample is a case of emotional recalcitrance, where a spider phobic withdraws from a spider behind glass in the zoo despite judging that the spider is not dangerous. According to the MTE, an innate "danger-avoidance" link is again activated. Due to the cognitive encapsulation of this link, it can coexist with the agent's judgment that the spider is not dangerous. The latter judgment prompts an attempt to downregulate the initial tendency but fails because the initial tendency happens to be stronger.

Although the initial tendency to avoid in these two cases cannot be directly observed, let us assume it is indeed present. Scarantino (2026) argues that because avoidance is not the behavior option with the highest expected utility, and it would be absurd to assume that the agent mistakenly believes that it is, this initial avoidance tendency cannot be caused by a goal-directed process but must be part of a stimulus-driven process. While the GDT does not exclude the existence of innate [S-R] connections (i.e., instincts), the possibility that the initial tendency to avoid is itself generated by a goal-directed process is not off the table yet.[1] To understand how, let me clear up two key misunderstandings about the GDT. A first misunderstanding is that goal-directed processes are one-shot decisions, so that they cannot account for cases in which initial action tendencies are different from the eventual behavioral output. This is a mistake. Agents may generate an action tendency based on initially accessible benefits and costs, but this may be revised when additional benefits and costs become accessible.

A second misunderstanding is that all goal-directed processes are so complex that they take more time than stimulus-driven ones. Again, this is a mistake. The GDT allows for goal-directed processes where only a single [S:R-O^v] representation is activated, either because the agent has only a single [S:R-O^v] representation in their repertoire or because time and/or other operating conditions are scarce and hinder the activation and comparison with other [S:R-O^v] representations. In these cases, the agent has to rely on the most accessible behavior option, which is often the one that was frequently selected in the past (see Buabang et al., 2023). Crucially, the limited availability of behavior options may be especially likely in so-called emotional

episodes, where high-value goals breed urgency and therefore self-imposed time pressure (Moors, 2025, 2026).

Thus, the decisional paralysis case may be explained as one where the high value of the goal to survive and the ensuing urgency prompt the initial decision to avoid, as this is the most accessible option given the self-imposed time pressure. If this abstract action tendency cannot be translated into a more concrete action tendency, the agent becomes stuck in decisional paralysis. A similar dynamic may be at play in the emotional recalcitrance case. The spider phobic's initial tendency to avoid could have been caused by a goal-directed process under self-imposed time pressure, prompting the initial decision to avoid. This initial tendency may thereafter persist if the cost is not deemed too high (e.g., the cost of being ridiculed) or not accessible (e.g., the long-term costs of avoidance for well-being; see Moors, 2025, 2026, Box 2, for a rebuttal of Pineda-Oliva's, 2025, objections, as cited by Scarantino, 2026).

Scarantino (2026) further criticizes the GDT's alleged inability to explain the difference between dealing with discrepancies with high-value goals in *emotional* versus *nonemotional* ways. An example is reporting an offending boss to HR *angrily* versus *nonangrily*, where only the former is accompanied by the experience of anger. The GDT offers several options to account for this. First, the experience of anger may stem from the behavior selection stage in which an aggressive behavior option was contemplated but either not selected or initially selected and then suppressed because additional costs appeared on the agent's radar. Second, the GDT is open to the possibility of "leaky integration," blurring the distinction between the stages of behavior selection and action tendency. Here, the contemplation of aggressive and other behavior options already partially activates their corresponding action tendencies, which compete for manifestation (Klein-Flügge & Bestmann, 2012). A third option is that the agent chooses a behavior that combines an overt part of reporting to HR with a covert part of imagining aggressive behavior because this combination satisfies more goals than any of the noncombined behaviors alone. Adding the covert aggression part may increase some of the benefits typically associated with aggressive behavior (e.g., relief from venting) without incurring the costs associated with overt aggression (e.g., retaliation).

Tackling a different issue, Scarantino (2026) argues that the hybrid processes in the MTE (i.e., an initial stimulus-driven process followed by goal-directed regulation) are more adaptive than the purely goal-directed ones in the GDT because they are *more* automatic (due to the stimulus-driven component) and *just as* flexible (due to the goal-directed component). In his words, "[i]t is hard to conceive of a better strategy to deal with mortal threats than one which begins with a pre-determined tendency to avoid them," and which can later be regulated by a goal-directed process. This is not always true, however: In cases where the stimulus-driven process is maladaptive and costly regulation is required, skipping the stimulus-driven process and moving directly to the goal-directed process would in fact be more adaptive (Moors, 2022, p. 186). For instance, when a rodent is cornered by a predator with no possibility to escape, its best option is to attack immediately rather than first prepare for escape and then switch to attack (Blanchard et al., 1998). If Scarantino (2026) rejects this purely goal-directed scenario based on doubts about the automaticity of goal-directed processes, he also weakens the adaptiveness of his own hybrid scenario. This entails, in the hybrid scenario, that the rodent can enjoy either automaticity without flexibility (if there is only enough time for the stimulus-driven process) or flexibility without automaticity (if time-consuming regulation takes place), but not both. Scarantino's (2026) statement that goal-directed regulation can occur "within milliseconds," however, suggests that he is not willing to accept this consequence.

Note that if Scarantino's (2026) "danger-avoidance" link were cast at the highest level of abstraction as "danger–undo danger," our disagreement would melt away. At this level of abstraction, this link would be indistinguishable from the discrepancy-detection stage in the GDT, where an anticipated discrepancy with a first goal for safety (danger) activates a second goal to reduce that discrepancy and return to safety (undo danger) (Moors, 2022, p. 220).

Bonard

Bonard (2026) introduces "identity-based irrational emotions" as ones that defy the explanations of the GDT in terms of hidden goals and theoretical irrationality. One illustration is a kleptomaniac's *momentary* goal to steal cheap objects despite their *identity* goal of not stealing. Another illustration is Göbbels' occasional compassion with Nazi victims, reflecting the *momentary* goal to help them despite his *identity* goal to destroy them. Bonard (2026) argues that identity-based irrational emotions reveal a mismatch between circumstantial (i.e., context-dependent) and identity goal hierarchies. He envisages three paths that the GDT can take, each with its own challenges: coexisting circumstantial and identity hierarchies, identity hierarchy plus fragmentation, and ignoring the identity hierarchy. I propose a fourth path, arguing that the phenomena referred to as identity-based irrational emotions do not stem from a mismatch between goal *hierarchies,* but rather from a conflict between (behavioral) *goals* that belong to different branches within the same hierarchy. Goals situated higher in the hierarchy tend to be more stable and resistant to accommodation, while those lower down are more circumstantial and more easily replaced. The hierarchy is also marked by fragmentation. Some goals drive behavior but remain hidden (i.e., they pass a first but not a second threshold of activation). Examples include the kleptomaniac's goal for rebellion or for experiencing relief after the risk of getting caught, as well as Göbbels' prosocial goal.[2] Other goals, while driving behavior and being fully conscious in most contexts (because they passed the second threshold of activation), fail to do either in other contexts or initially (because they remained below the first threshold). Examples here include

the kleptomaniac's goal to be morally upright and Göbbels' goal to be a model Nazi. Finally, note that the concept of stable goals does not fully overlap with the notion of identity goals. Identity goals are typically (even if not always) accompanied by the agent's explicit endorsement. Since endorsement itself can be seen as a mental act, it may be circumstantial and diverge from the agent's stable behavioral pattern.

Pacherie

Pacherie's (2026) strategy to vindicate the set of emotions involves replacing the stimulus-driven versus goal-directed dichotomy as the basis for demarcating emotions from nonemotions with the model-free versus model-based dichotomy. She thereby follows Miller et al. (2018), who reject the early alignment between the two dichotomies and propose conceptualizing model-based and model-free processes as two varieties of goal-directed processes that differ in complexity (model-free ones rely on accumulated behavior values; model-based ones rely on mental models, including states, transition probabilities, and rewards in states) and therefore also in their degree of automaticity (model-free computations are more automatic than model-based ones; Miller et al., 2018). I agree that the two dichotomies do not align—model-based aligns with goal-directed, but model-free does not align with stimulus-driven—and that model-based and model-free processes differ in complexity. Yet it is hard to figure out whether model-free ones count as a variety of goal-directed ones because authors typically fail to specify the precise content of the representations at play in model-based and model-free processes. Model-free processes could involve [R^v] or [S:R^v] representations, which are not identical to the [S-R] representations in stimulus-driven ones, but neither to the [S:R-O^v] representations in goal-directed ones. Then again, model-free [S:R^v] representations could be hard to distinguish from [S:R-O^v] representations in which the [O^v] is positive affect. This marks a first, conceptual problem in Pacherie's (2026) proposal. A second problem is that it is empirically challenging to differentiate between, on the one hand, a model-free agent, and on the other hand, a model-based agent who relies on a simplified model (mimicking model-free behavior) or a biased model (deviating from the optimal model; Feher da Silva & Hare, 2020). This and other arguments have cast doubt on the fruitfulness of the dichotomy itself—whether it captures a meaningful mechanistic distinction or merely a *general* difference in complexity. Thus, if Pacherie's (2026) experimental test were to show that episodes with high-value goals (labeled by people as "emotional") lead to less complex action selection strategies (labeled by researchers as "model-free"), this would match the idea discussed earlier that cycles with high-value goals may induce self-imposed time pressure, thereby constraining the complexity of behavior selection. More problematic for Pacherie's (2026) proposal, however, is that a lack of complexity in behavior selection is not uniquely tied to high-value goals, and therefore to episodes labeled as "emotional." Poor operating conditions constraining behavior selection may arise from factors other than high-value goals, such as externally imposed limits on time and attention. This would undermine the conclusion that "emotions" map onto model-free processes.

Pacherie (2026) goes on to argue that the values of the goals in emotional episodes—which reflect personal significance—are of a different nature than those in nonemotional episodes—which reflect expected utility independent of personal significance. In the GDT, personal significance and expected utility are not of a different nature. Let me clarify using the example of a goal-directed cycle in which the first goal is to be rich—which has personal significance—and the third goal is to work hard—which has a high expected utility for the goal to be rich (see Moors, 2026, Figure 1c). The only difference between these two goals is that they are cast on a different level in the goal hierarchy. While the value of the goal to work hard equals the expected utility of this goal for the one-level-up superordinate goal to be rich, the value of the goal to be rich equals the expected utility for the one-level-up superordinate goal to be happy, for instance.

What about Pacherie's (2026) illustration that even a person who does not value the goal for money can still rank the expectancies of different behavior options for that goal? There is no doubt that people can evaluate expectancies for nonvalued goals using hypothetical thinking (i.e., imagining that they or someone else would value the goal). In the GDT, however, it is not the values of goals per se that generate affect, but the fate or satisfaction status of valued goals (i.e., presence or absence of a discrepancy). Note that the fate of goals need not be actual but can also be anticipated or imagined. The key difference with the hypothetical thinking case above is that here, the goal is genuinely valued and the fate is imagined. In the hypothetical thinking case, on the other hand, the goal is nonvalued, but its value is imagined. This distinction may matter for the intensity of affect. Note, moreover, that engaging in the covert behavior of evaluating expectancies for nonvalued goals has to stem from the discrepancy with *some* kind of goal, such as the goal to comply with someone's request to do so. Succeeding at complying with this request would generate positive affect, even if receiving €100 or €10 would not.

Prinz

The discrepancy between my eliminativist conclusion and the goal of upholding the scientific status of emotions not only sparked a variety of assimilation strategies but perhaps also a form of immunization. Prinz's (2026) commentary, which rejects my portrayal of James (1890) as taking a skeptical approach, can be seen in this light. Prinz (2026) may, together with Scarantino (2026), argue that the large variety in bodily responses can be organized using abstract

action tendencies that characterize vernacular emotions, but I have not come across any indications in James's (1890, p. 454; see also Moors, 2022, pp. 107–109) writings that he was on the same page. On the contrary, he wrote that "any classification of the emotions is […] as true and as 'natural' as any other, if it only serves some purpose." Several other elements suggest that James (1890) did take a skeptical—or at least investigative—approach: He tried to explain which mechanisms might underlie the entities people call emotions. For him, these were the feelings supervening on the bodily responses generated by instincts and habits (innate and learned [S-R] links). As James (1890, p. 449) thought these mechanisms are general-purpose, it is not likely he saw them as a sufficient ground for endowing emotions with scientific status.

Conclusion

To conclude, the GDT is well-equipped to withstand the objections raised against it. In several putative counterexamples raised by Scarantino (2026), the stimulus-driven explanation of the MTE can be pitted against an explanation of the GDT in terms of an old, overtrained, and therefore highly accessible goal-directed process. Adjudicating between the two explanations cannot be done purely based on intuition or muscular rhetoric, but requires careful empirical testing. Decades of empirical efforts have not produced convincing evidence for the existence of innate stimulus-driven processes dedicated to emotions known as affect programs. Prinz's (2026) AI-generated images, despite not being convincing at face value (the "regret" pictures could easily be confused with shame, guilt, sadness, and distress), do nothing to push the case for affect programs. Compare this to gestures such as pointing with a finger or turning up the nose. The shared recognition of these gestures within and across cultures may suggest shared meaning, but this does not prove their innateness nor their emotionality (Fridlund, 2017; Moors, 2022, p. 140). Conversely, support for the role of goal-directed processes in emotional and other behavior is growing (Buabang et al., 2023; Fischer et al., 2020; Köster et al., 2024; Moors et al., 2019).

Awaiting the empirical verdict, the GDT can also draw on arguments from plausibility. While the GDT does not deny the existence of innate stimulus-driven processes (i.e., instincts), they do not seem unique to the entities we call emotions, and their role must be limited. Once an organism has experienced and encoded the outcome of its behavior, there is no reason why this information would get lost. In James's (1890, p. 390) words,

> It is obvious *that every instinctive act, in an animal with memory, must cease to be "blind" after being once repeated*, and must be accompanied with foresight of its "end" just so far as that end may have fallen under the animal's cognizance.

Even in the rare case that a stimulus-driven process would not get embedded in or overwritten by a goal-directed process, it is unlikely to win the competition from goal-directed processes, whether this is for reasons of "evolutionary design" (goal-directed processes being more adaptive than stimulus-driven ones) or because the representations in goal-directed processes are simply stronger (Fischer et al., 2020; Moors, 2022, p. 224).

Finally, the most intriguing "emotional" puzzles are perhaps not those where a gun is held to our heads, but rather those in which agents dance the dance of weighing costs and benefits in their own or the group's best interests. Drawing a firm line between "emotional" and "instrumental" dances seems ultimately untenable. Counterintuitive as this may sound at first, once one begins to see behavior through a goal-directed lens, it becomes difficult to unsee it. My eliminativist conclusion may not be palatable to many emotion aficionados, as Pacherie (2026) observes, but just like intuition, palatability should not be our ultimate guide.

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Notes

1. Even in the two cases that I identified as potentially stimulus-driven—cited by Scarantino (2026)—I put forward alternative goal-directed explanations (see Moors, 2022, pp. 224–225).
2. If we assume that even the most ruthless war criminals have prosocial goals toward selected others they deem human, this goal may be activated when Göbbels is confronted with the humanity of his victims (one context) but not when they are out of sight (another context).

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