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COMPARATIVE COGNITION & BEHAVIOR REVIEWS

Yes, We Are Studying Occasion Setting: A Configural Complement to Leising et al.

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The article "Are You Studying Occasion Setting? A Review for Inquiring Minds" offers a valuable and comprehensive look at how stimuli can influence or "set the occasion" for responding to another cue, organizing its discussion around four principal experimental tests. By distinguishing direct (excitatory or inhibitory) stimulus control from a more indirect, hierarchical form of stimulus modulation, Leising et al. (2025) make a strong case for why occasion setting warrants further study. Although they acknowledge both hierarchical-modulatory and associative-configural approaches, the article's emphasis on hierarchical terminology may inadvertently suggest that purely associative (configural) theories have less explanatory power. This focus can overshadow the potential theoretical and empirical contributions of configural models. With this commentary, we emphasize the strengths of so-called configural explanations and illustrate how they address the same core tasks, drawing on principles from Wagner's SOP with Replaced Elements (SOP-REM) model. Our hope is that this complementary view will further enrich the discussion on occasion setting and demonstrate the versatility of associative frameworks in explaining complex cue-modulation phenomena.

Keywords: Occasion Setting, Conditioning, Configural, SOP, Replaced Elements Model

Occasion setting has emerged as a core topic in associative learning, particularly in Pavlovian conditioning, by demonstrating how one conditioned stimulus (the "feature," or CS X) can determine or "set the occasion" for the conditioned responding of another conditioned stimulus (the "target," or CS A) without forming direct excitatory or inhibitory associations with the unconditioned stimulus (US; Holland, 1992; Rescorla, 1985). Similar effects have also been noted in instrumental conditioning, underscoring the broad impact of occasion setting across different learning paradigms.

Leising et al. (2025) provide a valuable and comprehensive overview of this phenomenon, detailing how researchers commonly distinguish "genuine" occasion setters (OSs) from stimuli that directly associate with the US. The authors organize their discussion around four diagnostic tests: (1a, 1b) response topography, (2) transfer or summation, (3) pre- and posttraining manipulations of the feature, and (4) an integrative comparison of Tests 1 to 3. This thorough review, accompanied by an annotated bibliography of studies and theoretical perspectives, is a significant resource for scholars studying occasion setting in various fields. Moreover, Leising et al.'s (2025) review complements other recent analyses (e.g., Bonardi et al., 2017; Fraser & Holland, 2019), further enriching the ongoing conversation in associative learning and comparative psychology.

Leising et al. (2025) devote extensive detail to modulatory (hierarchical) accounts of occasion setting, an approach that illuminates many findings. However, they provide relatively less illustration of how configural (or purely associative) perspectives might handle those same empirical tests. This focus offers an excellent opportunity to explore how configural models could align with the four tasks, potentially clarifying whether they match or expand on hierarchical explanations. Indeed, Leising et al. explicitly note that merely substituting the term *occasion setter* with *configural stimulus* often yields similar predictions. Yet, the step-by-step logic behind a configural approach remains less spelled out. A more detailed exposition could produce new insights into how temporally sensitive associative processes might also capture the essential features of occasion setting.

Leising et al.'s (2025) article also acknowledges cross-species examples, pointing to the potential evolutionary significance of occasion setting. Although they highlight the functional flexibility that occasion setting provides, further extending this idea to actual ecological or phylogenetic contexts might show whether such behavioral strategies consistently enhance fitness. For instance, in unpredictable foraging scenarios, animals that can selectively respond to specific cues may enjoy greater success. Following Leising et al.'s lead, one could further explore these adaptive dimensions, asking whether the ability to ignore irrelevant cues until a reliable feature appears confers particular advantages in natural habitats.

The aim of this commentary is to add a few key observations to Leising et al.'s article by illustrating how configural time-sensitive models can address the standard test battery for occasion setting and why they might stand as a coherent alternative to purely modulatory accounts. We also propose that closer dialogue between functional learning theories and comparative psychology could help clarify when and why different species rely on gating-like processes in more realistic ecological settings.

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Hierarchical versus Associative Accounts of Occasion Setting

The term *occasion setting* has been used in psychology in various ways, including as a theoretical process, a set of experimental procedures, and an empirical phenomenon (Fraser & Holland, 2019). This variation in usage can create confusion, making it essential first to define occasion setting behaviorally before engaging in theoretical distinctions.

Empirically, occasion setting is characterized by the outcome of a learning task in which a conditioned stimulus (CS) regulates the likelihood that another CS will elicit a conditioned response (CR) yet does not itself elicit or inhibit the CR directly (Holland, 1984; Ross & Holland, 1981). This phenomenon is demonstrated through specific discrimination paradigms in which a feature stimulus determines the behavioral significance of a target stimulus.

One well-established example is feature-positive discrimination (XA+A−), where the presence of a feature stimulus (X) allows a target stimulus (A) to predict reinforcement, whereas A alone does not. Conversely, in feature-negative discrimination (YA−A+), the target stimulus (A) is reinforced when presented alone but not when paired with a feature (Y), which signals the absence of reinforcement. In full discrimination (XA+YA−), two distinct stimulus compounds are trained, with XA consistently predicting reinforcement whereas YA does not. Across all these paradigms, the response to A depends on whether X or Y is present, even though X and Y themselves do not show behavioral signs of acquiring excitatory or inhibitory properties. This pattern distinguishes occasion setting from simple associative learning, in which all elements would be expected to acquire associative strength with the US independently. It is said, then, that X and Y are occasion setters.

An important factor in occasion setting is that for it to occur, the compound of stimuli must be presented in a sequential or serial arrangement (e.g., X → A+). Alternatively, if the feature and target are presented simultaneously (e.g., XA+), feature-positive and feature-negative discriminations can be resolved by acquiring direct associations between the features and the US. In this case, X and Y function as simple conditioned stimuli rather than OSs.

The left-hand plots of Figure 1, which are based on Fraser and Holland (2019), illustrate how simultaneous feature-positive and feature-negative discriminations are resolved when stimuli are presented as a simultaneous compound. In Panel A, solving the feature-positive discrimination requires the animal to form an excitatory

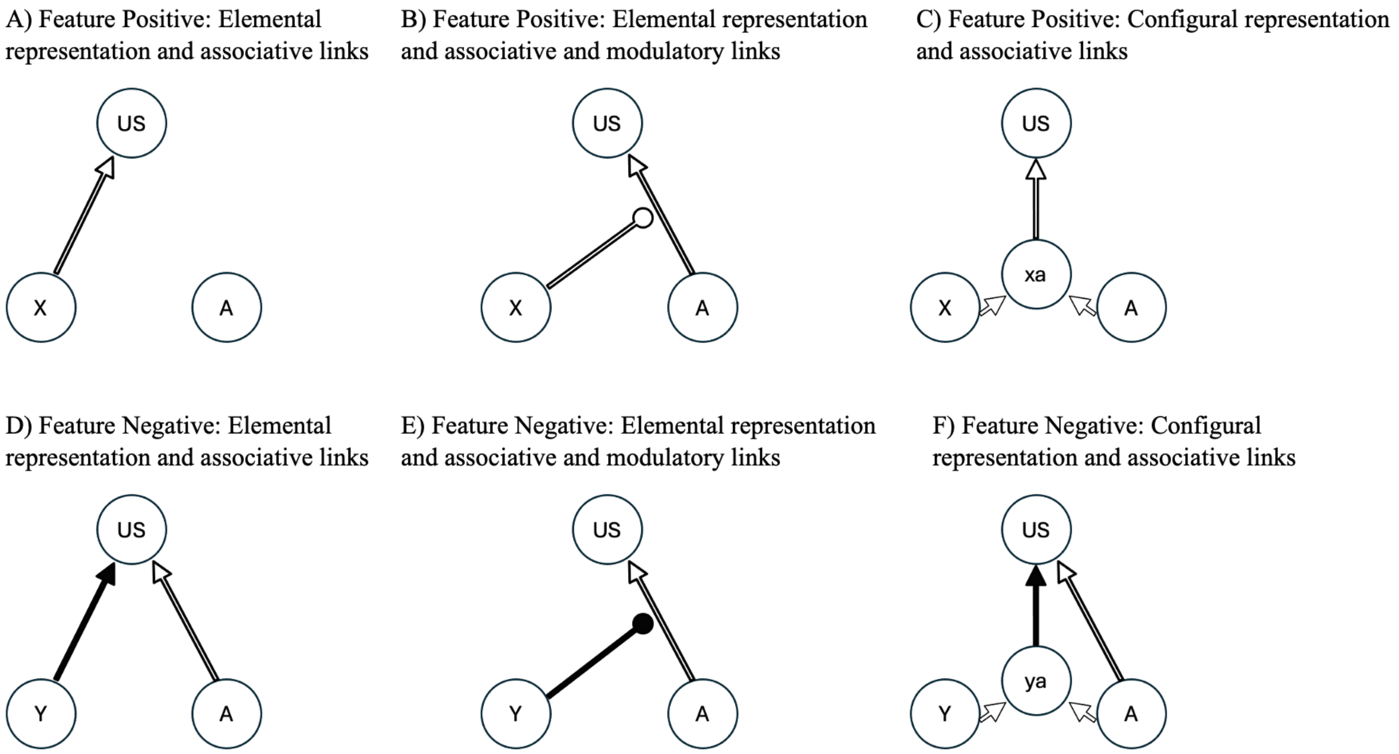

Figure 1. Theoretical Entities Involved in Occasion Setting According to Hierarchical and Configural Theories. Figure 1 illustrates the type of stimulus representation of the conditioned stimulus and the types of links governing their interactions in feature-positive (Panels A, B, and C) and feature-negative (Panels D, E, and F) scenarios. The left-hand plots represent the simple case, where only elemental representations of the stimuli and associative links are assumed (Panels A and D), which is the case of simultaneous compounds. The middle plots depict the hierarchical/modulatory approaches, where the stimulus representation remains elemental, but in addition to associative links, the stimuli interact through modulatory links (Panels B and E). The right-hand plots represent the configurational theories, where configurations represent stimuli, but only associative links are assumed. White and black lines ending in arrows represent excitatory and inhibitory CS–US associations, respectively. White and black lines ending in circles represent positive and negative modulation, respectively.

association between the feature and the US, whereas the target develops none. As a result, X and XA, but not A, will produce a CR. In contrast, for feature-negative discrimination (Panel D), the feature develops an inhibitory association with the US, whereas the target acquires an excitatory association with the US. Consequently, in feature-negative discrimination, A will produce a CR, whereas neither AY nor Y will.

However, the fact that these discriminations are not straightforwardly solved through direct associations between features and the US in serial compounds suggests the need for additional theoretical assumptions. Two broad approaches have been proposed to address this: the hierarchical-modulatory account and the configural account. Both approaches assume that stimuli form excitatory or inhibitory associations with the US, but they differ in the additional mechanisms proposed to explain occasion setting.

The middle plots of Figure 1 illustrate the assumptions of the hierarchical-modulatory approach with serial compounds. In this framework, OSs (X and Y in Panels B and E) act as higher-order cues that do not directly associate with the US but instead modulate the associative strength of the target stimulus (A), enhancing it in feature-positive discrimination and inhibiting it in feature-negative discrimination. Unlike standard associative learning, where stimuli form direct associations with the US, this approach introduces a modulatory mechanism: X and Y determine or gate whether A can activate its association with the US without themselves predicting reinforcement. Because X and Y are stored separately from A, this framework keeps stimulus representations relatively simple, but learning requires an independent modulatory rule to regulate how X and Y influence A's association. This is evident in feature-positive discrimination (XA+ A−), where X allows A's association with the US, and in feature-negative discrimination (YA−A+), where Y blocks A's ability to activate the US.

In contrast, the configural approach (right-hand plots in Panels C and F of Figure 1) proposes that feature-target compounds (e.g., XA and YA) are encoded as unified representations rather than as separate stimuli interacting through modulation. In this model, the presence of Feature X alters A's representation, forming a unique stimulus unit (xa), which is then associated with the US. Instead of relying on a separate modulatory mechanism, this approach treats each compound as a distinct stimulus, meaning that learning about XA does not necessarily generalize to A alone. The full discrimination paradigm (XA+YA−) emphasizes this distinction: XA is learned as an excitatory compound and YA as a neutral one, reinforcing that learning is stimulus specific rather than governed by an independent modulatory rule.

Whereas the configural approach simplifies the learning rule compared with the modulatory approach, it increases representational complexity by requiring the organism to encode each compound as a unique configuration rather than independent elements. In feature-positive discrimination (XA+ vs. A−), XA is learned as a single unit, with reinforcement attributed to the compound itself rather than X's ability to modulate A's association. Likewise, in feature-negative discrimination (A+ vs. YA−), YA is stored as a distinct nonreinforced representation rather than Y acting as a negative modulator.

In summary, although hierarchical and configural approaches offer viable descriptions of occasion setting, they differ in the added complexity across the learning process. The hierarchical approach maintains simple stimulus representations but requires a distinct modulatory mechanism, whereas the configural approach keeps the learning rule simple but demands flexible stimulus encoding.

By examining each figure, several important questions arise. One of the most fundamental is why direct associations do not develop when compounds are presented serially. The hierarchical-modulatory approach explains this by proposing that modulatory signals unfold over time, allowing X and Y's influence to become more effective before A is presented. In contrast, the configural approach suggests that serial presentations enhance the differentiation between XA and A alone, preventing interference from generalization.

For the sake of simplicity, Figure 1 does not explicitly depict these alternatives. However, within both the hierarchical-modulatory and configural approaches, numerous variations and strategies exist for quantitatively implementing these concepts. These variations range from different assumptions about how modulation occurs to distinct mechanisms for encoding stimulus representations. For a review of some of these theoretical implementations, see Bonardi et al. (2017), Bouton and Nelson (1998), and Fraser and Holland (2019).

In the next section, we present a few key points that are based on one of these alternatives within the configural approach.

SOP with Replaced Elements

The SOP-REM model provides a configural framework for explaining occasion setting by integrating principles from the Standard Operating Process (SOP) and the Replaced Elements Model (REM). SOP, originally developed by Wagner (1981), describes learning as a process in which stimulus representations transition through different states of activation (A1, A2, and inactive states). Although a detailed explanation of SOP is beyond the scope of this section, its key contribution to this topic is that it provides a time-variant function for representing stimuli, where learning depends on the temporal dynamics of stimulus presentation. This representation is crucial for the acquisition of both excitatory and inhibitory associations (see Jorquera et al., 2024; Mazur & Wagner, 1982; Uribe-Bahamonde et al., 2019; Vogel et al., 2019; Wagner, 1981, for further details).

The REM approach, in turn, provides a framework for describing how a stimulus representation changes depending on the presence or absence of other stimuli, forming a context-dependent representation. This concept is central to understanding occasion setting, as it proposes that some stimulus elements are replaced or modified on the basis of the presence or absence of other stimuli. Several associative learning models account for complex discriminations, such as negative patterning and biconditional discrimination, by assuming that stimulus compounds are represented by unique elements beyond those of their individual components (Wagner & Rescorla, 1972). REM refines this idea by proposing that stimulus representations dynamically change according to the presence of other stimuli, allowing for more flexible encoding of stimulus relationships (Brandon & Wagner, 1998; Brandon et al., 2000; Wagner, 2003; Wagner & Brandon, 2001; Wagner & Vogel, 2008).

In the integrated SOP-REM model, Wagner and his collaborators (e.g., Brandon & Wagner, 1998; Vogel et al., 2017) have described stimulus representation as influenced by both temporal and contextual factors. Temporal factors determine how the strength of representational elements changes over time (as described by SOP), whereas contextual factors influence the probability of activating specific elements on the basis of the activity levels of

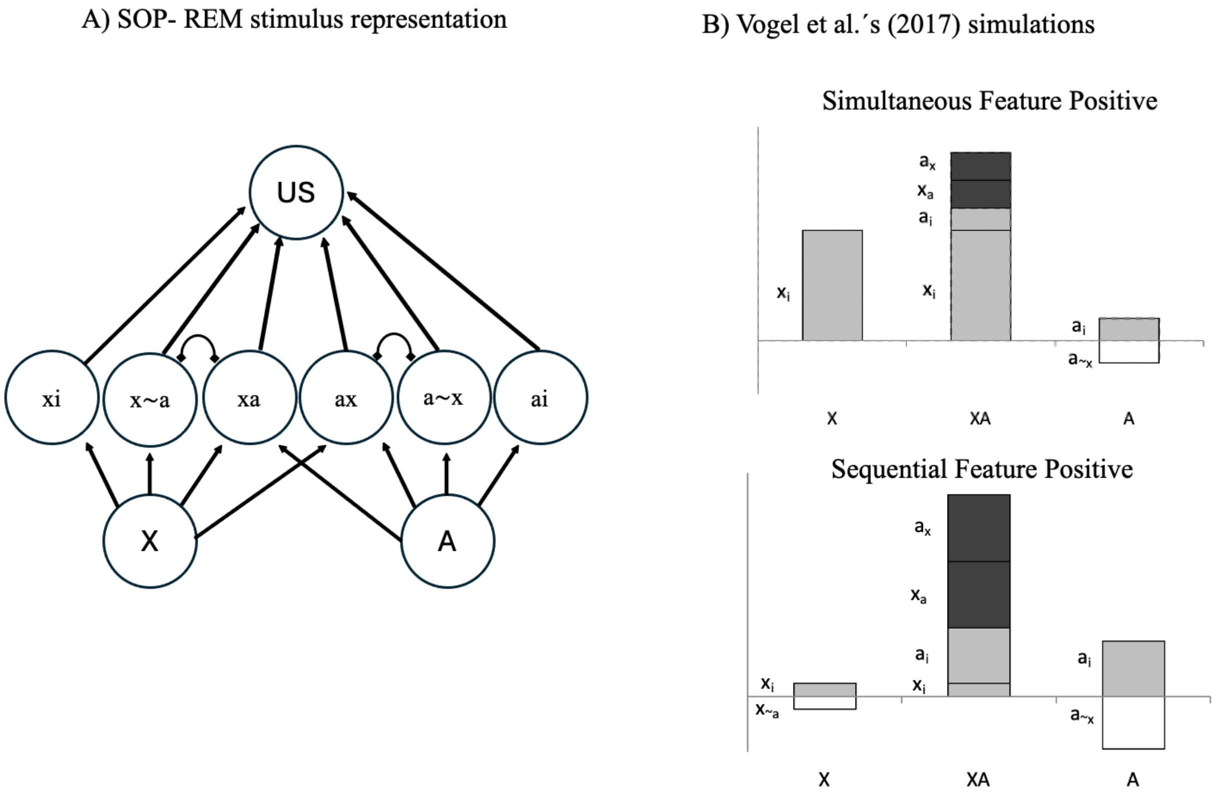

Figure 2. A Simplified Rendition of the SOP-REM Model for Feature Positive. Panel A illustrates the elements that can be activated by the presence of the feature (X) and the target (A). The context-independent elements (xi and ai) are activated whenever their respective stimuli (X and A) are present, regardless of the presence of the alternate cue. The context-dependent nonconjunctional elements (x~a and a~x) are activated when their corresponding stimulus is presented alone but become inactive when the alternate cue is present. The conjunctional context-dependent elements (xa and ax) are activated not only by their respective stimulus presentations but also on the basis of the activity level of the context-independent elements of the alternate stimulus. When activated, xa and ax replace x~a and a~x, respectively, as indicated by the lines with square ends in the figure. Panel B presents the results of computer simulations of feature-positive discriminations reported by Vogel et al. (2017, Figure 2), in which the target (A) is reinforced when compounded with the feature (X) but not when presented alone. The top histograms depict simulations of a simultaneous training arrangement, where both X and A were presented for 10 moments per trial (XA+/A−). The bottom histograms depict simulations of a sequential training arrangement (X→A/A−), where the feature (X) lasted for 80 moments, and the target (A) appeared during the final 10 moments of X's duration. This means that A began 70 moments after X, and the two cues terminated together in compound trials. In both simulations, the US was presented during the final moment of the compound (moment 80). The histograms illustrate the associative strength acquired by different stimulus elements across multiple probe compounds. The gray-colored segment represents the associations acquired by the context-independent elements (xi and ai), the white-colored segment represents the associations acquired by the non-conjunctional context-dependent elements (x~a and a~x), and the black-colored segment represents the associations acquired by the conjunctional context-dependent elements (xa and ax).

other elements (as described by REM). Vogel et al. (2017) demonstrated that this integration enables the model to account for key findings, including differences between simultaneous and serial feature-positive and feature-negative discriminations, the ambiguous cue problem, and the transfer of occasion setting.

The SOP-REM model treats each conditioned stimulus as a collection of elements whose activation follows SOP's temporal processing assumptions, with each element capable of forming excitatory or inhibitory links to the unconditioned stimulus. Some elements are context independent, meaning that they are activated whenever their corresponding CS is present. In contrast, context-dependent elements require that a second stimulus's representation be sufficiently active before they switch "on."

Figure 2A illustrates this logic for two CSs, X and A, that can be presented alone or in compound (as in feature-positive or feature-negative designs). When stimulus X appears, its context-independent elements (xi) become active in both the X-alone (X) and compound (XA) conditions. Similarly, the context-independent elements of A (ai) are activated whenever A is present, regardless of whether it appears alone or in a compound. These elements are independent because their activation is solely determined by the presence of their respective stimuli, unaffected by the presence or absence of another cue.

In addition, Stimuli X and A also contain context-dependent elements (xa, x~a, ax, and a~x), which depend on the presence or absence of the alternate cue. Specifically, x~a elements are active when X is present, A is absent, and the representational activity of A remains below a threshold. However, these elements are replaced by xa when X is present and the elements of A are sufficiently active. The same principle applies to A, where a~x elements are active when A is presented alone but are replaced by ax elements when X is also active. This mechanism implies that although xi and ai remain consistently active whenever their respective stimuli are presented, the activation of context-dependent elements dynamically adjusts based on the presence and activation level of the alternate cue.

Figure 2B reproduces simplified simulations from Vogel et al. (2017, Figure 1), showing SOP-REM´s predictions for a feature-positive task. The top plot depicts simultaneous training, where X and A overlap completely in time during compound trials (XA+), and the bottom plot shows sequential training, where X occurs first, and both cues end together during compound trails (X→A+). In both scenarios, the US is delivered at the target's final moment. During discrimination training, each representational element (xi, ai, x~a, etc.) gains excitatory or inhibitory strength according to whether it overlaps with the US's primary (A1) or secondary (A2) activation phase according to the learning rules of SOP. Elements that overlap more with the primary phase of the US tend to develop excitatory associations, whereas elements active mainly in the secondary phase may become inhibitory. These differences in temporal overlap led to distinct outcomes for simultaneous versus successive training.

Figure 2B summarizes the final associative strengths acquired by each stimulus component in simultaneous (top plot) and sequential (bottom plot) training conditions. The histograms reveal two contrasting solutions to the discrimination. In the simultaneous training condition, the discrimination is primarily learned through the context-independent elements of X and A (xi and ai, respectively). These elements acquire strong excitatory associations because they overlap more with the primary phase of the US during reinforced trials. However, during nonreinforced trials (A−), the ai elements experience substantial inhibition because of their overlap with the secondary activity of the US, leading to the extinction of ai and the development of conditioned inhibition to a~x. As a result, conditioned responding would be strongest to X when presented alone but weak or absent for A.

In contrast, sequential training leads to the discrimination primarily supported by the context-dependent elements (ax and xa), which consistently experience reinforcement in AX+ trials while avoiding extinction in A− trials, leading them to acquire the dominant excitatory association. Meanwhile, the context-independent elements (ai and xi) are weakened through partial reinforcement, making them less effective in controlling behavior. This pattern suggests that conditioned responding would primarily rely on the context-dependent elements of A and X (xa and ax) rather than on their context-independent elements that are equally active during single and compound occurrences of these stimuli.

In sum, Figure 2 demonstrates how SOP-REM explains the diverging patterns in feature-positive tasks. The model attributes differences between simultaneous and successive outcomes to whether context-independent or context-dependent elements overlap more with the US's primary phase, thereby receiving stronger excitatory learning and weaker inhibitory learning.

Leising et al. (2025) propose five tasks aimed at distinguishing direct stimulus control from true occasion setting. In Table 3 of their article, they review and categorize multiple models—evaluating whether each one passes or fails these tasks—and explicitly invite validations of their judgments. This table mentions the model proposed by Vogel et al. (2017), which is classified under the broader category of configural connectionist accounts. Leising et al. note that this category passes all the tasks they examined, although they do not distinguish between the specific models within it (Pearce, 1994; Vogel et al., 2017). Because of space constraints, a comprehensive analysis of these tasks is not feasible here. However, we offer a few comments on how the SOP-REM model, described by Vogel et al. (2017), might address each one.

Tasks 1a and 1b (Response Topography)

These tasks examine whether the feature exerts a distinct influence on the form of the conditioned response. Although SOP-REM does not explicitly model the response form, it does not preclude the possibility that each conditioned stimulus (X or A) could elicit different CRs from the same US. If we accept that X and A can each acquire distinct topographies, we can infer from Figure 2B how these might manifest under simultaneous versus sequential training.

In simultaneous training (top histogram), the xi elements dominate performance in an eventual test with the XA. As a result, the CR in XA compounds might resemble X's typical response more than A's. By contrast, under sequential training (bottom histogram), responding in an X→A compound is driven mainly by A's elements, ai and ax. This suggests that when XA is tested, the CR may align more closely with A's response topography than that of X. Although the SOP-REM model has not been extended in detail to instrumental tasks, the same reasoning could, in principle, apply to Test 1b, given that the underlying representation and associative processes would operate similarly in an operant setting.

Task 2 (Transfer or Summation)

This test examines whether occasion setting transfers between feature-positive or feature-negative discriminations. When animals are trained with two such discriminations, involving different features and targets, there is often substantial transfer—meaning that a feature modulates responding to a novel target more than a partially reinforced control cue. Vogel et al. (2019) acknowledge that SOP-REM, in its standard form, does not fully account for this effect.

The theoretical challenge lies in explaining why training with one feature-positive discrimination makes the feature and target more likely to interact similarly with elements from another feature-positive discrimination compared with a partially reinforced alternative. As shown in Figure 2b, the lack of transfer in SOP-REM arises because a novel transfer compound (e.g., Y→A, not shown) does not include the context-dependent elements that encode the conjunctions X→A (xa, ax) or Y→B (yb, by). These elements develop the strongest excitatory associations during training, making them critical for the discrimination.

However, there is no fundamental reason to assume that the representations of two features are entirely disjoint. In practice, features used in most experiments tend to share some properties, even when designed to differ in modality. Vogel et al. (2017) demonstrated that if some degree of similarity between features is assumed—referred to as the Common Cue Model—SOP-REM can successfully account for the observed transfer effects (see Vogel et al., 2017, Figure 4). Nevertheless, this means the model passes this test only if a post hoc assumption about feature similarity is introduced.

Task 3 (Pre-/Posttraining Modifications of the Feature)

This task examines whether reinforcing or extinguishing the feature independently of its role in occasion setting affects its OS function. The bottom histograms of Figure 2B illustrate that training the feature alone will lead to either an increase (in the case of reinforcement) or a decrease (in the case of extinction) in the low associative strength of elements xi and x~a acquired during feature positive training. However, because xi has only a minimal impact on responding to the X→A compound, primarily governed by elements xa, ax, and ai, such manipulations would likely have only a subtle effect. Nevertheless, even if minimal, a change in responding to X→A is predicted compared with a control compound.

This suggests that SOP-REM does not fully pass this test, as some degree of modification in the response to X→A is expected. It is important to emphasize that the model does not predict that features lose their ability to function as OSs following independent extinction or reinforcement. Instead, these procedures influence the magnitude of the response to the compound by altering the associative strength of specific elements.

Task 4 (PostTraining Transfer with Extinction of the Feature)

This test, as it combines all the previous tests, presents similar challenges to SOP-REM, particularly in that it requires the assumption of a common cue among all potential feature-like stimuli and the assumption of differential CRs to different cues involved in training. We have not explicitly simulated all these assumptions in the specific experimental outcomes described by Leising et al. (2025), so their applicability remains open to further theoretical analysis.

Overall, the preceding analysis indicates that although SOP-REM addresses a substantial portion of occasion-setting phenomena, it also encounters certain gaps that may require additional assumptions, such as generalization across features, to account for particular empirical findings. Nonetheless, the model's reliance on dynamically replaced elements remains a promising approach to explaining how cues interact in occasion setting, especially given its success in several other conditioning topics.

Concluding Reflections and Ecological Perspectives

Leising et al. (2025) present an extensive review of how different cues can "set the occasion" for another cue's predictive value, showing that this learning phenomenon appears across multiple taxa. Although they briefly note the potential evolutionary importance of occasion setting, their discussion leaves room for more explicit integration of functional and comparative perspectives. Indeed, transitioning from their laboratory-based findings to a broader ecological context invites us to ask why these mechanisms might confer adaptive advantages in real-world settings, such as more efficient foraging or finer predator avoidance.

Their survey relies on controlled experimental protocols, discrete stimuli carefully arranged by experimenters, to uncover basic regularities in associative processes. This approach has undoubtedly clarified certain learning principles, yet it also raises questions about how well standardized laboratory conditions replicate the more complex, overlapping cues that animals face in nature. Leising et al. (2025) document a wide range of procedures and species, which naturally suggests future studies examining contexts such as irregular foraging conditions, fluctuating social pressures, or broader interindividual variation in learning. These explorations could clarify whether convergent or conserved processes underlie the parallels that Leising et al. identify across species.

Although Leising et al. (2025) helpfully distinguish modulatory (hierarchical) from configural (direct-association) theories, they focus predominantly on the hierarchical viewpoint, devoting less detail to how configural accounts handle the same empirical tests. They acknowledge that substituting the term *occasion setter* with *configural stimulus* often yields similar predictions, yet they do not provide a step-by-step illustration of purely associative models in identical protocols. This gap can be viewed as an invitation to pursue more direct comparisons, given that configural solutions might be equally parsimonious in some situations. Indeed, if subtle environmental or developmental cues influence occasion setting, it remains an open question which theoretical framework—hierarchical or configural—proves more flexible under the varied ecological scenarios where animals actually live.

Leising et al. (2025) also indicate that "occasion setting has played an important role in evolutionary fitness" (p. 5) but do not elaborate on which selective pressures might favor gating-like behaviors. For instance, in an unreliable foraging environment, an organism that can selectively respond to signals (features) denoting high resource availability might outcompete others that rely on a more general or less precise response. Similarly, in predator avoidance, animals capable of ignoring irrelevant cues until a reliable danger signal (feature) is detected might reduce false alarms and conserve energy. If such situations repeatedly arise, the gating-like mechanisms central to occasion setting may offer a shared adaptive solution across distinct taxa.

Another area that Leising et al. raise, yet leave open for further exploration, is individual variation. Because most experiments employ uniform protocols, differences in personality, prior experiences, or social hierarchies can remain masked. It would be fruitful to see how individuals vary in their gating-like abilities under more dynamic or multidimensional contexts, which might better approximate the animal's ecological reality. Although Leising et al. document a remarkable consistency in laboratory-based findings, one wonders whether certain individuals or species exhibit more robust occasion setting in the wild, benefiting from alternatives for stimulus selectivity that align with local environmental demands.

To build on Leising et al.'s comprehensive account, researchers can explicitly adopt a functional-comparative lens that investigates how occasion setting fosters adaptive outcomes under realistic conditions. Doing so could deepen our understanding of whether and how occasion setting truly promotes evolutionary fitness across distinct lineages. Their references to invertebrates and tasks like match-to-sample already hint at a vast horizon for testing occasion setting significance, but applying such procedures in more ecologically relevant settings could reveal whether a feature that modulates cues in the lab likewise functions as a critical environmental marker in nature, helping animals thrive in complex, ever-changing habitats.

Finally, it may be that functionalist theories provide a valuable framework for unifying these observations by emphasizing that learning processes often serve domain-general needs such as efficient resource location, predator avoidance, or social coordination. If so, continuing to explore how occasion setting confers survival or reproductive benefits will clarify whether this recourse amounts to a truly adaptive learning strategy rather than merely another associative phenomenon. Researchers might ask whether individuals or species possessing stronger occasion-setting abilities gain advantages in ecologically relevant tasks, thereby substantiating Leising et al.'s assertion of occasion setting's evolutionary importance. By interconnecting ecological questions with controlled empirical designs, scholars can transform current insights into a richer view of how occasion setting reflects not only robust associative principles but also vital strategies for real-world problem solving.

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