The Generalization of Mand

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Abstract The mand is a type of verbal operant whose response form is under control of a motivating operation (MO). It is the first verbal operant to be acquired, directly benefits the speaker, leads to the development of other behaviors, and may serve to replace problem behavior. Even though the topography of the mand is under the functional control of an MO, its occurrence is influenced by a multitude of variables functioning as discriminative stimuli (S^D s). Thus, the generalization of mands can occur across both MOs and S^D s. Additionally, the same MO may evoke new mand topographies—a form of response generalization. The purpose of this article is to distinguish and describe these types of mand generalization in order to encourage future research and influence practice.

Keywords Discriminative stimuli · Generalization · Mand · Motivating operation · Verbal behavior

Developmentally, the mand is the first verbal operant to emerge, it directly benefits the speaker, it may lead to the acquisition of novel verbal and nonverbal behaviors (e.g., when one mands for information), and it may serve to replace socially maintained problem behaviors (LaFrance & Miguel, 2014; Sundberg, 2007). Given its importance, the mand has been the most studied verbal operant (Pennington, Ault, Schmuck, Burt, & Ferguson, 2016). However, the distinction among the different forms of mand generalization, to my knowledge, has never been presented outside of Professor Jack Michael's unpublished course materials (Esch & Esch, 2016), which contain valuable insights about Skinner's analysis. It is quite possible that only those of us who have had the privilege to read *Verbal Behavior* (Skinner, 1957) under Michael's (or his intellectual descendants') tutelage have been exposed to this distinction. The celebration of the book's 60th anniversary seems to be the perfect opportunity to honor Jack Michael, the utmost expert on Skinner's book, by presenting his interpretation of Skinner's analysis

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of the different types of generalization of the mand. However, it is important to note that what follows is my own understanding of Skinner's and Michael's teachings.¹

The Mand Relation

Skinner (1957) defined the mand as “a verbal operant in which the response is reinforced by a characteristic consequence and is therefore under the functional control of relevant conditions of deprivation or aversive stimulation” (pp. 35–36). Michael (1988) refined Skinner's definition by recognizing the control of the motivating operation (MO) over specific response forms² (words spoken, signed, written, and so on³). The MO encompasses all variables that alter (a) the value of a stimulus as a reinforcer and (b) the frequency of previously learned behaviors that produced such a reinforcer and is therefore a broader concept than deprivation and aversive stimulation (Laraway, Snyckerski, Michael, & Poling, 2003). For instance, an unopened bottle of an ice-cold amber ale may momentarily increase the value of bottle openers as (conditioned) reinforcers, so any behavior that produces a bottle opener may be learned. The unopened bottle may also evoke (learned) behaviors that have produced bottle openers in the past, such as vocal mands. Clearly, an unopened beer bottle cannot be classified as deprivation or, in this situation, as an aversive stimulus. Thus, the mand is better defined as a type of verbal operant in which a particular response form is under the functional control of the motivating (establishing) operation relevant to that consequence (Michael, 1988). This functional control is developed when particular response forms (e.g., saying “bottle opener”) produced specific consequences (e.g., bottle openers).

Skinner (1957) also suggested that in the case of the mand, the form of the response has no specified relation to a prior stimulus, meaning that the word spoken (signed, written, and so on) is determined not by a discriminative stimulus (S^D) but by the MO (Michael, 1988). Saying “bottle opener” is evoked by the sight of the unopened amber ale functioning as an MO rather than an S^D given that in the past, unopened beer bottles were not differentially correlated with the availability of bottle openers when manding for one (discriminative function). Rather, unopened beer bottles have established bottle openers as more reinforcing (motivating function; Michael, 1982). Of course, the emission of the mand, like any other verbal operant, may be influenced by other stimuli functioning as S^D s. The mand “bottle opener” will occur in the presence of someone (a listener) who can hand the opener over to the speaker. In other words, the presence of a listener increases the probability that mands will occur, whereas the MO determines what will be said (written, spoken, and so on). Incidentally, the MO also serves to increase the evocative strength of any S^D present during reinforcement (Lotfizadeh, Edwards, Redner, & Poling, 2012; Michael, 1993; Miguel, 2013). Thus, the strength of stimulus control exerted by the listener or the object mandated for (if present) will vary depending on the MO.

Although Skinner suggests that the form of the mand is not determined by a previous S^D , it is possible that the presence of the bottle opener would supplement a

¹ In other words, any errors or omissions are my own.

² The terms *form* and *topography* are used interchangeably.

³ According to Skinner (1957), “a ‘word’ . . . is a unit of behavior composed of a response of identifiable form functionally related to one or more independent variables” (p. 20).

response that would otherwise be weak. In this case, the unopened beer bottle would serve as an MO that would increase the value of stimuli that would lead to beer consumption (e.g., a bottle opener and a glass) as reinforcers. Thus, the presence of the bottle opener next to the unopened beer bottle may strengthen the response “bottle opener.” In this case, the vocal mand is under multiple control of the unopened bottle as an MO and the bottle opener serving as an S^D (tact). This type of combinatory or *convergent control* is discussed by Michael, Palmer, and Sundberg (2011).

Another important characteristic of the mand relation is that its controlling variable (the MO) may differ considerably from one instance to another, as in the case of asking for water when water deprived or after eating salty foods. Additionally, different MOs may also multiply control behavior. For example, sickness might decrease the value of food as a reinforcer, despite a long period of food deprivation. The same MO may also vary in strength from one occasion to the next. For example, mands related to water and food may occur at different levels of water and food deprivation, respectively. Moreover, the likelihood that the listener will provide reinforcement seems more variable with the mand than with any other verbal operant. Specific reinforcement may not always follow a mand; the listener may not have a bottle opener, for instance.

The fact that the MO present during the acquisition of a mand may never be reproduced again suggests that a response form acquired under a certain MO strength must later occur under control of a different MO strength. When teaching a child to mand for juice over the course of a day, each reinforced mand reduces the strength of the MO responsible for evoking the subsequent one. Thus, the second and third mands (and so on) occur under control of different values of the same MO, which may be considered a form of generalization.⁴

Stimulus and MO Generalization

When discussing mand extensions, Skinner (1957) makes the case that a specific response form is more likely to occur when environmental conditions are similar to those present during reinforcement: “Any aspect or feature of the present situation which resembles the situation at the time of reinforcement may be supposed to make some contribution to the probability of the response” (p. 46). Thus, he seems to be describing the conditions responsible for the occurrence rather than the topography of the mand. Earlier in that section, Skinner states, “When a mand is reinforced by a reduction in unconditioned or conditioned aversive stimuli, stimuli occurring prior to the response must, of course, be taken into account, but these serve a different function from the stimuli considered here” (p. 46).

Skinner’s (1957) first example of mand extension involves generalization across stimulus conditions:

“Extended stimulus control is seen when people mand the behavior of dolls, small babies, and untrained animals. .. they have enough in common with

⁴ Even though the variables controlling the topography of other verbal operants may also vary considerably from one occasion to the next, it may be the case that these variables (e.g., visual stimuli controlling textual responses) are not as transient as MOs, which, in some cases (e.g., food deprivation), may never be exactly reproduced.

listeners who have previously provided reinforcement to control response, at least when it shows appreciable strength” (p. 46)

In this example, the variable responsible for the topography of the mand is not being considered. We could imagine the mand “What’s your name?” originally trained in the presence of someone who responded to the question (reinforcement) later occurring in the presence of novel audiences who would not likely provide reinforcement for the mand (e.g., dogs, babies, animals).

Skinner’s (1957) second example seems to describe generalization across variables responsible for the response form:

We acquire and retain the response “stop” because many listeners stop whatever they are doing when we emit it, but as a result we may say stop! to a car with faulty brakes or to a cue ball which threatens to drop into a pocket of a pool table. (p. 46)

In this example, the response topography—“stop”—was followed by the specific consequence of having listeners stop what they were doing (possibly something aversive), which would eventually place this mand form (the word *stop*) under functional control of a specific MO (likely some form of reflexive conditioned motivating operation [CMO]; Michael, 2007). When a new MO with similar characteristics is presented (e.g., a car with faulty brakes), the same response topography (“stop”) is emitted as an instance of MO generalization. Thus, Skinner seems to be discussing two different forms of mand extension—one in which the same response form occurs across different discriminative stimuli and another in which the same response form occurs across different MOs. Given that the mand is defined based on its functional relation with an MO and not an S^D , the *true mand extension* is observed when a topography acquired in the presence of one MO occurs in the presence of a slightly different one.

When Skinner (1957) discusses the tact extension, his examples are related specifically to variables responsible for the topography of the response. As with all verbal operants, with the exception of the mand, the tact is under the functional control of an S^D rather than an MO. More specifically, the tact is under the control of a nonverbal S^D , which includes any aspect of the environment other than products of someone else’s verbal behavior (i.e., verbal stimuli). According to Skinner:

A tact may be defined as a verbal operant in which a response of given form is evoked (or at least strengthened) by a particular object or event or property of an object or event. We account for the strength by showing that in the presence of the object or event a response of that form is characteristically reinforced in a given verbal community. (pp. 81–82)

The specific response topography “doll” is established as a tact by being echoically prompted and reinforced in the presence of a doll. The nature of this reinforcement must be nonspecific, such as generalized conditioned reinforcement, so as to establish a functional relationship between the specific

topography “doll” and the actual doll, and not any MO related to “wanting the doll.”⁵ In this case, an instance of tact extension would involve saying “doll” in the presence of a new doll (or maybe a person who looks like the doll). This is clearly an example of generalization across variables responsible for the form (what is said) rather than the occurrence of the response (when it is said).

Of course, tacts may also occur across conditions responsible for their occurrence, as would be the case of saying “doll” when Jim asks you what you are playing with and later saying “doll” when Linda asks you the same question. In this case, the actual doll is what controlled the behavior of saying “doll”—rather than saying “video game,” “puzzle,” and so on—whereas Jim’s and Linda’s questions served as opportunities for emitting the tact “doll,” which was solely determined by what you were playing with. Both the question and the doll served to (multiply) control the response form “doll” (Michael et al., 2011).

Even though I will not discuss the different forms of tact extension (generic, metaphorical, metonymical, and solecistic) presented by Skinner (1957, pp. 91–102; see also Sundberg, 2007), they all serve to describe a continuum of stimulus generalization across variables that are responsible for the form of the tact (what is said, written, signed, and so on). Logically, if a tact extension is defined as the emission of a specific topography in the presence of a novel nonverbal S^D responsible for its form, a true mand extension should also be described in terms of specific mand topographies occurring in the presence of novel variables responsible for their form and not their occurrence—namely, MOs.

A few studies have evaluated generalization across MOs (e.g., Groskreutz, Groskreutz, Bloom, & Slocum, 2014; Lechago, Carr, Grow, Love, & Almason, 2010; Lechago, Howell, Caccavale, & Peterson, 2013). For example, Lechago et al. (2010) taught three boys (4 to 7 years old) diagnosed with autism to complete different three- to six-step behavioral chains that involved a preferred activity. One of the chains consisted of removing items such as a cup, a spoon, and baking soda from a container; scooping out the baking soda with the spoon; placing it in the cup; and adding food coloring and vinegar to produce a chemical reaction resembling the eruption of a volcano. During mand training, the instruction to complete the chain was presented while one of the items (i.e., the spoon) was hidden from participants. The experimenters used an echoic prompt delay and contingent delivery of information that led to the item as a way to teach participants the target mand (e.g., “Where’s the spoon?”). After training the mand in the presence of the first MO⁶ (volcano chain), the experimenters conducted generalization probes with both the trained and two untrained behavioral chains that would also require a spoon (e.g., setting a table and preparing chocolate milk) and would thus control the same response topography. Additionally, to ensure that the response form was under control of the MO and not any other aspect of the environment, the experimenters exposed participants to a probe that involved an MO for a different item (e.g., a truck). Results showed that all participants engaged in the trained mand topography in the presence of new behavioral chains, suggesting generalization of mands across MOs.

In another example, Groskreutz et al. (2014) assessed generalization across both MOs and S^Ds when teaching children with autism to mand for the removal of aversive stimuli.

⁵ Technically, any environmental event or condition that would establish the doll as a reinforcer and evoke behaviors that have produced the doll in the past could be categorized as “MOs for doll.” These may include not having played with that doll for a while, seeing the dollhouse, being asked to find the doll, and so on.

⁶ Technically, a transitive conditioned motivating operation (CMO–T) that establishes the value of another stimulus (i.e., the spoon) as a conditioned reinforcer (Michael, 2007).

In their study, two school-age boys who engaged in escape-maintained problem behavior (e.g., ear covering, crying, throwing items) were trained the functionally equivalent signs “stop” or “finished” in the presence of different aversive stimuli (i.e., MOs).⁷ Once mand topographies had been acquired in the presence of the sound of a Dustbuster, training commenced in the presence of a subsequent MO (e.g., the sound of a peer yelling). For both participants, there was a decrease in training time across MOs. More importantly, mands did not have to be trained in the presence of the fourth MO (i.e., the sound of a vacuum or applause), showing evidence of MO generalization. Furthermore, the authors observed generalization of mands to untrained settings when an MO used during training evoked the same mand topography in a new context (classroom), suggesting generalization across (discriminative) stimulus conditions.

In summary, there seem to be two types of mand extensions. The first, *stimulus generalization of the mand*, refers to the occurrence of the mand in the presence of novel discriminative stimulus conditions (Fig. 1). The second, the *true mand extension*, refers to the occurrence of the mand in the presence of novel MOs (Fig. 2). Finally, both types of generalizations may take place simultaneously when a specific mand topography occurs in both the presence of an untrained MO and a novel stimulus condition (Fig. 3).

Response Generalization

A third type (with subtypes described later) of mand extension discussed by Skinner (1957) involves the emission of novel response forms that have either been accidentally acquired or developed on the basis of previously reinforced ones. This type of mand extension seems to be better described as *response generalization* or *induction*⁸ (Catania, 2013) rather than stimulus or MO generalization.

Skinner (1957) suggested that one way in which novel mands may emerge is through adventitious reinforcement; he referred to them as *superstitious mands*. These are response forms that may have produced the specified reinforcer through temporal contiguity rather than a contingent relation between behavior and the reinforcer. In his example, “The dice player exclaims *Come seven!*” likely because “merely intermittent reinforcement, such as that provided by chance throws of seven, is sufficient to maintain a response in strength” (p. 47). These superstitious mands are developed and maintained by spurious correlations, as when the sky clears up after someone asks for the rain to stop. However, it could be argued that most of these

⁷ Aversive stimuli establish their absence as a form of negative reinforcement and evoke all behaviors (escape and avoidance) that in the past have produced their removal. Given that aversive stimuli are correlated with differential effectiveness and not availability of their removal as reinforcers, they are best classified as MOs and not as S^Ds (Michael, 1982, 2007; Miguel, 2013).

⁸ Even though I am using the term *response generalization* to describe the emission of novel mand forms, the definition is not universally agreed upon and may not encompass all processes that may lead to the emission of a novel response (Stewart et al., 2013).

Fig. 1 In the presence of the sound of a peer yelling (MO^1) at the park (S^{D1}), the mand “stop” produces the removal of the aversive sound. When the same sound of a peer yelling (MO^1) at school (S^{D2})—a novel stimulus condition—evokes the mand “stop,” an instance of stimulus generalization of the mand has occurred. MO = motivating operation; S^D = discriminative stimulus; $Sr-$ = negative reinforcer

mands are acquired by some form of instruction, as when we observe (i.e., hear) others emit them.

Mands for emotional reaction may be also accidentally reinforced, but through a slightly different process. Although a speaker cannot ask a listener to cry, the mand

Fig. 2 In the presence of the sound of a peer yelling (MO^1), the mand “stop” produces the removal of the aversive sound. When the sound of a vacuum cleaner (MO^2)—a novel MO—evokes the mand “stop,” an instance of true mand extension has occurred. MO = motivating operation; $Sr-$ = negative reinforcer

Fig. 3 In the presence of the sound of a peer yelling (MO^1) at the park (S^{D1}), the mand “stop” produces the removal of the aversive sound. When the sound of a vacuum cleaner (MO^2) that is heard at school (S^{D2}) evokes the mand “stop,” both forms of generalization have occurred. MO = motivating operation; S^D = discriminative stimulus; Sr- = negative reinforcer

form may contain conditioned eliciting characteristics, including dynamic properties, such as loudness or intonation, that may be sufficient to produce (in this case, elicit⁹) the consequence. A speaker may ask a listener to cry by either including offensive content or by yelling, both of which may function as respondent conditioned stimuli that would elicit crying as a conditioned response. This eliciting effect would serve to maintain mand topographies that specify emotional reactions, “as if emotional responses could be ordered” (see Skinner, 1957, p. 48).

Other forms of mand extension include those that may have never been reinforced before, so their occurrence cannot be explained through adventitious reinforcement. Skinner (1957) referred to these mand forms that seem to be created “on the analogy of old ones” (p. 48) as *magical mands*. These may include mands that have never occurred before but once they do are likely to be reinforced by the verbal community, as well as mands that can never be reinforced. A boy who has never seen a skateboard before, upon seeing another

⁹ The term *elicit* is reserved to describe control of unconditioned or conditioned stimuli over reflexive unconditioned or respondent conditioned responses. It should never be used to refer to discriminative control of operant relations (Michael, 2004).

child riding one, could use his previously acquired repertoires to emit the mand topography “Can I have the skateboard?” for the first time. These repertoires include (a) generalized mand frames and (b) the specific response form as a tact. Generalized mand frames include common (autoclitic) frames such as “Can I have. ..” or “I want. ..” that have been present when different mand topographies have been reinforced. Consequently, the occurrence of these frames increases in the presence of MOs. When the boy sees something that he wants (MO), the mand frame “Can I have. ..” is evoked along with the previously acquired tact “skateboard.” A combination of these two repertoires results in the novel mand “Can I have the skateboard?” whose reinforcement strengthens not only this specific mand topography but also the further combination of these two repertoires for generating novel mands.

Consider a related example. A young girl who has learned to tact “teddy bear” (and is used to seeing her teddy bear lying on her bed) may say “I want teddy bear” for the first time when the teddy bear is missing. The absence of the teddy bear as an MO may increase the frame “I want . . .,” which has been associated with other reinforced mand topographies (e.g., “*I want milk*,” “*I want outside*”). Additionally, the stimuli that have been associated with the teddy bear (e.g., bed, pillows, blanket) likely also acquired control over the topography “teddy bear” given that these stimuli were present when the tact was either acquired or later reinforced.¹⁰ Thus, the missing item plus the aspects of the environment associated with it would converge to evoke the mand “I want teddy bear” for the first time (see Fig. 4).

This same combinatorial process seems to explain the emission of novel mands that could never be reinforced or *true magical mands*, such as “I hope tomorrow never comes” or “I want you to die!” Although these topographies may never contact their specified reinforcers, they still produce consequences—whether in the form of automatic or social reinforcement or emotional reactions on the part of the listener, all of which may serve to maintain them. Although Skinner referred to these topographies as mands, we must be cautious about classifying them as such. If a response form does not produce a specific reinforcer, it may never become under functional control of a relevant MO, and thus it cannot be classified as a mand. However, it may be the case that a response form such as the curse “Go jump off a cliff” could still be classified as a mand even though it may never produce the reinforcer of having the listener jump off a cliff. This is because this response form may still produce a specific reinforcer—in this case, upsetting the listener (e.g., visible emotional reactions, specific verbal responses, and so on). If the response form is followed by this characteristic consequence, it may, over time, become under functional control of any MO that establishes this consequence as a reinforcer. In this example, MOs that establish upsetting the listener as a form of reinforcement may evoke the curse as a magical mand.

When discussing the emission of “the ‘same word’ in different kinds of verbal behavior,” Skinner (1957, p. 187) describes a different type of response generalization in which a response form acquired as one verbal operant, such as a tact, may occur for the first time as a mand. This form of “transfer” between operants can also be explained by appealing to previously established repertoires. A child who does not have the appropriate mand or tact for the desired item may ask “What is that?” and upon hearing “It’s called a *skateboard*” can ask for it by using previously acquired mand frames in addition to the

¹⁰ Metonymical tact extension (or control). See Skinner (1957, pp. 99–102).

Fig. 4 In the presence of multiple MOs related to missing items (MO^n), the mand frame “Where’s . . .” plus the name of the item produces information that leads to the item (or the item itself) as a reinforcer. If, after a child learns to tact a specific item (S^{D1}) that is usually in the same place (S^{D2}), the absence of the item (MO^1) plus the location where it used to be found (S^{D2}) evokes the mand “I want teddy bear” for the first time, response generalization (magical mand) has been observed. MO = motivating operation; S^D = discriminative stimulus; Sr+ = positive reinforcer

newly acquired tact (see Skinner, 1957, pp. 187–190, for different reasons for the transfer, including the presence of an MO during tact training; Wallace, Iwata, & Hanley, 2006).

The behavior–analytic literature is filled with studies that have attempted to evaluate the emergence of new mand forms on the basis of other verbal operant training (see Gamba, Goyos, & Petursdottir, 2015, for a review). For example, Finn, Miguel, and Ahearn (2012) taught four preschool children with autism to either mand or tact the names of pieces that made up two different structures. During tact training, participants learned to label every single piece of the structure using the frame “It’s a . . .,” whereas during mand training, they learned to request the missing piece with the frame “I need. . . .” Subsequently, participants were tested for the emission of the same topography under the untrained condition (either mand or tact). Transfer between operants was observed in 3 out of 4 participants. The authors argued that the use of mand and tact frames may have aided in the transfer. For instance, when an item was unavailable (MO) during mand tests conducted after tact training, participants emitted the generalized frame “I need. . . .” which served to prompt the emission of one of the vocal topographies trained as a tact. This specific vocal topography was then evoked by the missing item and other environmental features present during both conditions.

The facilitative role of mand frames (e.g., “May I have [name of object], please?”) in the (response) generalization of mands has been directly evaluated by Hernandez, Hanley, Ingvarsson, and Tiger (2007). These authors found that training framed mands to children facilitated the emergence of novel mand forms that had been originally trained as tacts (tact-to-mand transfer).

The emission of novel mand topographies may also be developed through conditional discrimination training (Stewart, McElwee, & Ming, 2013). A series of studies (e.g., Halvey &

Fig. 5 In the presence of the sound of a peer yelling (MO^1), the mand “stop” produces the removal of the aversive sound. If, after learning that the response form “stop” is equivalent to the response form “quiet,” the sound of a peer yelling evokes the mand “quiet,” response generalization (more specifically, a derived mand) has been observed. MO = motivating operation; S^D = discriminative stimulus; Sr = negative reinforcer

Rehfeldt, 2005; Rehfeldt & Root, 2005; Rosales & Rehfeldt, 2007) has shown that after training a novel topography as equivalent to an already established mand topography, participants could use the new topography as a mand in the presence of the same MO . Rehfeldt and Root, for example, taught three adults with disabilities to mand using pictures of items. Subsequently, participants learned to select printed words and pictures in the presence of corresponding dictated names. After training, participants matched pictures to printed words, and vice versa, showing that these stimuli (dictated words, pictures, and printed words) were substitutable (equivalent) to one another. This substitutability led participants to use printed words instead of pictures to request the items,¹¹ which can be considered an instance of mand extension, or response generalization, usually referred to as *derived mands*¹² (Barnes-Holmes, Barnes-Holmes, & Cullinan, 2000; see Fig. 5). This study shows that the establishment of conditional relations among physically dissimilar verbal and nonverbal stimuli may lead to their functional equivalence. In other words, a child who learns to say “dog” as a mand to play with one may emit the novel mand “puppy” after learning that the auditory stimuli “dog,” “puppy,” and the actual dog are related, or the “same” (Miguel et al., 2015). This type of learning seems to occur during typical child–caregiver interactions, leading to the establishment of meaning and symbolic behavior (Home & Lowe, 1996; Miguel, 2016).

In summary, novel mand topographies (response generalization) may be developed on the basis of adventitious reinforcement (superstitious mands) or through a combination of previously acquired skills, including echoic, mand, and tact repertoires (magical mands; Fig. 4), as well as through relational training (derived mands; Fig. 5) in which physically dissimilar topographies become functionally equivalent. However, in cases in which functionally equivalent mand responses include members that may be deemed

¹¹ Transfer of function.

¹² In this specific example, a selection-based mand.

inappropriate or dangerous (e.g., hitting, yelling, crying), generalization across these different topographies is not desired. Rather, discrimination through differential reinforcement of specific response topographies may be necessary so only a subset of (appropriate) responses are emitted in the presence of the specific MO (Carr & Durand, 1985).

Conclusion

The purpose of this article was to introduce the reader to the different types of mand generalization and their related processes. Because the mand is the only verbal operant under functional control of an MO, proper generalization is observed when a previously acquired mand occurs in the presence of novel MOs that have similar value-altering and behavior-altering effects. Like any other verbal operant, mands are most likely to produce reinforcement in the presence of listeners or other aspects of the environment that also acquired discriminative control over the mand (i.e., multiple control). These discriminative variables are usually related to the occurrence of the mand and not its topography. A listener increases the likelihood that the speaker will mand, but what is said (manded) is primarily the product of the current MO. A specific motivational variable (food deprivation) may evoke a group of responses belonging to the same class (e.g., “pasta,” “sushi,” “tacos”), which is a form of *divergent control*. The addition of a second variable (Japanese restaurant) functioning as an S^D may serve to strengthen one of these topographies (as a tact, “sushi”) while weakening others (“pasta” and “tacos”)—a form of *convergent control* (Michael et al., 2011). However, discriminative stimuli may also come to supplement the control exerted by the MO over a response topography, as in the case of the textual stimulus “sushi” printed on the menu.

In addition to generalization across MOs, it is important that mands occur in the presence of novel listeners, settings, and so on. Therefore, measures of mand generalization should include testing for the occurrence of the mand in the presence of novel MOs responsible for its form as well as novel S^D s responsible for its occurrence. When teaching a child to ask the teacher to tie her shoe, it is important to guarantee that the child can also ask for help in the presence of other difficult tasks (MO generalization), as well as with other adults, in different environments (stimulus generalization).

Mand generalization may also be assessed by the occurrence of new mand topographies in the absence of direct training (response generalization). The development of these new mands seems to depend on already-established verbal repertoires that may include a history of reinforcement of echoics, mands, and tacts, as well as a history of learning how to relate (equate, compare, and so on) environmental stimuli (including words) with one another (e.g., Murphy & Barnes-Holmes, 2010). A child who has never asked a teacher to tie her shoe before may do so for the first time after having learned to ask for help in difficult situations, combined with the recently acquired tact “tie shoe,” learned either by observation or via echoic prompt. The child may also learn to write “tie shoes” and then request it by writing a note to the teacher.

Given that generality of interventions is one of the dimensions that defines applied behavior analysis (Baer, Wolf, & Risley, 1968), it seems crucial that we understand how to achieve it (Stokes & Baer, 1977). When teaching a functional mand repertoire, we must guarantee that the same response topography can come under control of functionally equivalent yet distinct MOs (i.e., true mand extension) and that distinct topographies can come under control of the

same MO (i.e., response generalization). These mands should also occur across different people (listeners) and environments (i.e., stimulus generalization). Thus, when teaching mands, clinicians must guarantee that all types of generalization are being achieved.

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Compliance with Ethical Standards

Conflict of Interest The author declares that he has no conflicts of interest.

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