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## New Affordances for Language: Distributed, Dynamical, and Dialogical Resources

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### Abstract

In introducing the articles of this special issue on language, which grew out of the conference “Grounding Language in Perception and (Inter) Action,” we take the opportunity to reflect on fundamental aspects of speaking and listening to others that are often overlooked. The act of conversing is marked by context sensitivity, interdependency, impredicativity, irreversibility, and responsibility, among other things. Language entails real work: it involves real movements in physical, social, and moral orders that are distributed across a wide array of spatial-temporal scales (e.g., evolutionary, historical); yet there is a dimension of play “at work” as well. These workings of language are embedded and embodied in distributed ways that reveal the fundamentally social, public nature of the activity. It is a form of coaction that is dialogical and dynamic in ways that may point to deeper understandings of what it means for perception to be direct and for action to be specific. Language locates us.

### ON OPENING ONE’S MOUTH

Because this is a special issue on language, we begin with a conversation of sorts. In a recent interview published in this journal, Rod Swenson made a telling point—perhaps inadvertently—about language. In discussing the ontological and epistemic status of the second law of thermodynamics, he said the following:

Parmenides, you’ll remember, postulated a true reality of perfect symmetry.... The central problem was that he’d postulated a reality that had no place in it for him as a postulator, even as an illusion.... As soon as he opened his mouth, set down his pen, or had a thought, such an action entailed irreversibility ... nothing less than directionality, the ability to discern differences, intentionality, meaning, and the like. (Martínez-Kahn & Martínez-Castilla, 2010, p. 81)

When humans speak and listen, or write and read (as we are doing now), these actions *irreversibly place us*. They locate us in specific physical and social ecologies, and they emerge from temporal scales ranging from evolutionary and cultural to interpersonal and microneural. To postulate a question, a statement, or even to give a grunt or a groan is to locate oneself, to take a stance with respect to oneself, to others (including predecessors and successors as well as those to whom one now speaks or writes), and to the geographies and tasks within which those selves are located. Actions, including those of ordinary

conversations, are impredicative (Petruş & Turvey, 2010). Such actions cannot be done without pointing to oneself and to the responsibility entailed in speaking or listening.

Swenson's argument against Parmenides is a true *ad hominem* (Martin & Kleindorfer, 1991): it claims that the very existence and action of the man, Parmenides, as a responsible speaker is a refutation of his claim to exist in a world of perfect symmetry. Parmenides's action of asserting that reality—which includes him—is unchanging, cannot stand. If true, it will have no effect on his listeners if they are responsible: one cannot change one's thoughts or actions about reality if, as a part of that reality, there is no change. On the other hand—and this is Swenson's point—to speak as a responsible physical-social being is to engage in irreversible movements that constitute irreversible actions (i.e., movements that are situated in real physical, social, and moral ecologies). There is no need for argument in a perfectly symmetrical world. To speak (or to listen) is to act with real force in the world. It is to move so as to change things for better or worse. As Swenson puts it, speaking entails “nothing less than directionality, the ability to discern differences, intentionality, meaning, and the like” (Martínez-Kahn & Martínez-Castilla, 2010, p. 81). Symmetry, for all its beauty and power in mathematics and physics (e.g., Schumm, 2004), must answer to irreversibility (Martínez-Kahn & Martínez-Castilla, 2010).

## PLACING WHAT IS SAID IN THIS ISSUE, AND DISCERNING DIRECTIONS

The “conversation” between Swenson and Parmenides, with which we began, is a pithy exemplar of many of the concerns and issues that are addressed by the various authors included in this special issue. Before we locate the special issue more globally, we take a quick peek at the parts that make up the whole, pointing to their relations to issues such as placement, movement, multiple scales, and responsibility.

Martin and Fonseca (this issue) consider the playful movement that goes on in serious perception and in provocative conversation. In particular they analyze a famous conversational exchange and uncover its dialogical nature. The analysis is deeply similar to Swenson's argument against Parmenides but suggests that we grasp reality most comprehensively and precisely, not by refuting another's argument or persuading the other to agree with us, but by coming to appreciate the relative positions of others and ourselves, that is, our places in the dialogical array (Hodges, 2007a, 2009).

In her article R czaszek-Leonardi (this issue) reviews an empirical study of how grammatical gender is located. The intriguing results suggest that it is not located in a single place: lexical gender cannot be confined to the semantics of a single language. Instead the evidence points to its distributed nature: it is grounded in multiple ways across multiple scales in multiple languages. It does not have a single origin or a singular effect. Thus, the grounding problem, which R czaszek-Leonardi highlights, is the placing problem, but her argument suggests that it is solved in a very different way if speaking and listening are seen as irreversible actions rather than as semantic codings of a symmetry system.

Whereas Martin and Fonseca's article might be said to be a study in the pragmatics of perceiving and conversing, R czaszek-Leonardi's could be construed as a study of the relation of semantics and syntax. By contrast, the articles by Fowler (this issue), Port (this issue), and, to a lesser extent, Worgan and Moore (this issue) can all be understood as addressing language at the level of its forms, that is, of phonemes or phonetic segments. Important differences among the articles aside, the authors of all three papers suggest that the gestures of speaking should be understood as being embedded in a much larger physical and social layout than is customary for most studies focused on phonemes, words, and other so-called basic units of language. In this larger context, Worgan and Moore go on to suggest that “interaction affordances” made available by speakers and perceived by listeners—both

of whom are intentional agents—emerge as having primacy over utterances manifest at the level of language form. Nonetheless it is clear that, even at the level of language form, speakers' utterances serve to place them in the context of speaking. Utterances are impredicative at the level of form as they are when viewed more broadly, as discussed earlier. By talking, among other kinds of information made available to interlocutors, speakers locate themselves in the current context and display their attitude and emotional stance with respect to what they are saying. More than that, their dialect makes public the history of their participation in a language community or communities, and, over the course of a conversation (see, e.g., Giles, Coupland, & Coupland's 1991 review) and at longer time scales than that of conversation, speakers display their affiliation or lack thereof with their interlocutors (e.g., in the case of the farmers in Martha's Vineyard in the study of Labov, 1963, discussed later).

## GROUNDING LANGUAGE: THE EMERGENCE OF NEW AFFORDANCES

This issue, and an expected second installment, grew out of a conference entitled "Grounding Language in Perception and (Inter) Action" held at Gordon College in June 2009. The 3-day meeting was sponsored by the Distributed Language Group (DLG), an international, grassroots group of scholars from a variety of disciplines (e.g., linguistics, psychology, artificial intelligence, philosophy, anthropology) that first met in 2005. In a variety of venues since then DLG members have worked toward developing viable alternatives to conventional views of language that treat it primarily as a formal symbolic system or a communicative code. An initial sample of the group's work is found in a special issue of *Language Sciences* edited by Stephen Cowley (2007b).

A primary purpose of the conference was to bring together three groups of scholars—distributed language researchers, ecological psychologists, and dynamical systems researchers—and articles included in this issue reflect these three traditions and others as well. Because readers of this journal are least likely to be familiar with what is meant by distributed language, we begin with that, using snippets from Cowley's (2007a) introduction to the special issue mentioned earlier. "Instead of focusing on mental states and linguistic forms," there is an attempt to "focus on [the] coupling between brains, bodies and the world" (p. 575). Language cannot be located in individual bodies, never mind in individual brains. Rather, language "arises as co-action" and "is a temporally situated process" that "exploits many time-scales" (pp. 576–577). A distinction is made between "first-order" and "second-order" language. First-order language refers to the dynamics of coregulation that is "tightly constrained by both our sensitivity to circumstances and our skills in using many second-order cultural constructs" (p. 576). Second-order language refers to stabilities that emerge from these dynamics in some community over time, which may come to be theorized as a system in the culture, leading to further cultural stabilization of patterns. A persistent theme of DLG members is that linguistic forms are not fundamental; rather, social-physical dynamics have priority, or, "how, together, individuals manage linguistic coordination" (Cowley, forthcoming [appears on p. 1 of revised manuscript]).

The conference centered on the following question: "What can be learned about language if we view it, not as a closed, idealized, formal symbol system, but as an open, ecologically embedded, physically distributed dynamical system?" Recent work in complex dynamical systems (e.g., Van Orden, Kello, & Holden, 2010) has begun to clarify the meaning of claims that language is situated, distributed, and dialogical. From the perspective of complex dynamics, the fundamental character of linguistic activity is *context sensitivity* and *interdependency* rather than rule following and modularity. Van Orden et al. have proposed that the dynamics are *interaction dominant*; that is, they only come into existence in a specific space-time configuration rather than existing a priori or a posteriori in components.

“The skill, knowledge, or ability demonstrated cannot be located in a brain, a body, a set of instructions, a set of cultural practices, an experimental setting, or an evolutionary history. All of these and more may be involved, but only in the integrity of collective action can they generate the phenomena” (Hodges, 2009, p. 639).

Claiming that language phenomena are distributed and collective in this way may seem to contradict the “placing and locating” theme we identified earlier, but it actually strengthens it. Rather than understanding language as some general, universal skill, invariant across all humans, a more dynamical, distributed account treats it as far more tightly constrained by time and place, so that if we could measure it sensitively and comprehensively enough, it would always bear the marks of particularity and diversity (Evans & Levinson, 2009). Viewed in this way, speaking and listening always tend to *identify* and *specify*. Instead of the intractable non-specificity of a disembodied lexicon and grammar, real conversations are always embedded and embodied (Fowler, this issue).

Another claim emerging from dynamical system approaches to collective phenomena is that most theorists and researchers seriously underestimate the number of temporal scales that are actually involved in assembling cognitive activity (e.g., Hollis, Kloos, & Van Orden, 2008). Dialogical relations are distributed across a vast array of scales so that control is distributed, not localized. Research has revealed pervasive, long-range patterns in linguistic performances indicating that contexts are not a removable backdrop to intentional activities but play a constitutive role in their creation and sustenance. Thus, what appear to be independent segments, invariant rules, or fixed hierarchies of relations turn out to vary. These varying relations indicate that “context is constitutive of competences, not just performances” (Hodges, 2009, p. 640). If this ecological reading of complex dynamical systems is on the right track, then the distributed, socially situated nature of linguistic skill is far deeper than almost anyone has imagined. It suggests that context sensitivity goes all the way down. Pragmatics is central to linguistic activity, not an afterthought.

Trying to understand language as fundamentally pragmatic, always sensitive to context, underscores the irreversibility of speaking and the discernment of listening. We cannot engage in these activities “any way we please”; rather, we find ourselves obligated. Any individual must speak as who he or she is, being careful—this is a crucial dimension of pragmatics—to whom he or she is speaking, and to the occasion, with its past and its possible futures. To open one’s mouth is not something to be done lightly. Turning one’s attention to listen to another is no less daunting a responsibility.

## EMBEDDING AND EMBODYING NEW AFFORDANCES

The only prior issue of *Ecological Psychology* that highlighted theory and research on language was the second issue ever published (1989), and a handful of other articles since then have focused on some aspect of language (e.g., prosody, gesture phasing, speech production). Renewed attention seems more than justified. How do the concerns of the present group of articles relate to those of 2 decades ago? The focus of the articles in the 1989 issue all concerned the object of perception in linguistic activity. When we listen to someone talking to us, what is it that we are perceiving? Diehl and Kluender (1989) proposed an answer in terms of enhanced auditory information, Fowler (1989) in terms of articulatory actions (i.e., gestures), and Studdert-Kennedy (1989) suggested that it was neither auditory nor articulatory but amodal perceptuomotor mappings between sound and gesture. Remez (1989) proposed that linguistic utterances could not be “rationalized” but required a new appreciation for the “complexity” of utterances, including the ways in which they “compromise distinctiveness” (pp. 177–178).

Three of the articles in this issue (Fowler; Port; Worgan & Moore) address this same issue, but all three indicate that current proposals and arguments have moved in a decisively social, dialogical direction from the earlier discussions and debates. The questions now are whether phonemes, at least as usually understood, exist at all, or put differently, whether the locus of the phenomena identified as phonemic are to be located in individuals and their cognitive processes or in communities and their cultural practices. Also questioned is whether phonemic perception is necessary to (what is argued to be) the “real” intentional object of ordinary “speech perception,” that is, the perception of social affordances. Even Fowler, who could be construed as the “traditionalist” (in an ecological sense) in this discussion is focused on highlighting the social nature of linguistic activities, and thus, the physically distributed character of those activities. Overall, then, one gets the impression that there has been movement over 2 decades.

But how far have we traveled? Have we moved decisively beyond earlier questions and explorations, or do we find ourselves circling back across old territory but with the advantage of seeing these places in new ways based on our more recent experiences? While preparing this introduction, the first author reread Fowler’s (1986) classic contribution to an ecological approach to language, her target article in *Journal of Phonetics*, and discovered—at least in hindsight—many resonances and anticipations of the insights found in our opening conversation between Swenson and Parmenides and other issues addressed here.<sup>1</sup> Three examples are noted to introduce and illustrate further some of the themes and challenges discussed in the articles of this special issue.

First, Fowler (1986) began by clarifying that, although her own research has often focused on the perception of phonetic gestures, she does not think that the “perception of speech events is primary or privileged in any sense” (p. 5) but is only one of the legitimate partitionings that can be used by listeners. Later she proposed that the object of perceiving is not the achievement of a percept but rather the acquisition of the information relevant to guidance of activity. She went on to claim that “most of the action” is not to be found at the level of phonetically structured vocal activity but in “the way the perception of the linguistic message guides the listener’s behavior” (p. 20). In short, action is distributed (i.e., it is not found at only one level of partitioning) and it is dialogical (i.e., it is about the relationship between speaker and hearer and the direction in which it takes their activity).

Second, Fowler (1986) cited a lovely example of the way in which speaking and listening place us. She noted that speakers and listeners show a “remarkable sensitivity” to conversational settings and their social, psychological, and linguistic dimensions, yet without being self-consciously aware of what it is that they are doing (p. 22). The example came from Labov’s (1963) study of dialect changes among the farmers and fishermen of Martha’s Vineyard, an island off the Massachusetts coast, in response to a massive influx of summer visitors as the island became a popular tourist destination. Labov discovered that some of the locals had an increasing tendency to shift their pronunciation of two common diphthongs in the opposite direction of what had been occurring historically, and that this tendency toward reversal was strongest in those whose livelihoods were most threatened and by those most resistant to the changes wrought by tourists. Thus, it appears that “native” islanders used linguistic variation as a resource for identifying themselves (those who “belong” to the Island and are “properly” placed there at that time) and differentiating themselves from visitors (those who did not belong but whose placement and timing were from elsewhere). Not only did this linguistic subtlety serve to identity and place, it also served as a marker of directionality and intentionality: among adolescents, those who

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<sup>1</sup>Readers should know that it was the first author who noted these relationships and who suggested their being discussed in this introduction. This is not a case of the second author making self-serving claims to being prescient in hindsight.

planned to stay on the island showed the shift more than those who planned to leave the island.

Labov's (1963) study reveals the way in which language is an embodiment of social, moral, and emotional concerns and not only a biologically programmed set of cognitive skills. These concerns are situated and directed such that "vocal-tract activity can only constitute a linguistic message in a setting in which, historically, *appropriately constrained vocal-tract activity has done linguistic work*.... Listeners apprehend the linguistic work that the phonetically structured vocal-tract constraint is doing by *virtue of their sensitivity to the historical and social context of constraint in which the activity is performed*" (Fowler, 1986, p. 23, italics added). Thus, language has real work to do, and it is for real people in real situations with real problems that it must be of real assistance. Language is needed to help identify and locate our problems—physical, social, and moral—and to assist in opening up possibilities for irreversible actions with the potential to solve those problems.

Third, Fowler (1986) considered the deep and difficult issue of whether language can specify its intentional content. Can we directly perceive the meaning of what we hear others say to us? She proposed that the relation between utterances and what is specified is necessary but only under the condition that it is "uttered in an appropriate setting" (p. 24). She went on to note,

The necessity is not due to physical law directly, but to cultural constraints that have evolved over generations of language use. These constraints are necessary in that anyone participating in the culture who communicates linguistically with members of the speech community must abide by them to provide information to listeners and must be sensitive to them to understand the speech of others. (p. 24)

As these quotes make poignantly clear, for speaking to be direct, it must be responsible and caring (Hodges, 2007b). But Fowler (1986) indicated that even that is not enough: directness also requires that listeners must be sensitive to speakers and to the histories and intentions of those speakers. If this is a fair reading of Fowler, her claims provide delicate hints of more recent claims that speaking and listening are not merely lawful and/or rule-following but also values-realizing and that this is enacted and embodied in dialogical arrays (Hodges, 2007a, 2009). Thus, Fowler's courage in addressing face-to-face, as it were, the daunting question of meaning and value in speaking and listening, led her to a reconceptualization of directness. Directness lies not in some deductive certainty but in the subtle social and moral dynamics of real physical bodies, dialogically arrayed, that have directly shared and cared for a set of places and tasks over a common history, working to do the next thing that needs to be done for the good of those places, those tasks, and themselves. Conversing seeks good prospects (Hodges, 2007b).

## GOOD PROSPECTS FOR INTEGRATING ECOLOGICAL, DYNAMICAL, AND DISTRIBUTED APPROACHES

We believe that each of the articles in this issue, as well as those expected to follow, open up good prospects worth exploring. No reader, including us, will agree with every argument or interpretation, but we are convinced that all of the authors, read charitably, have some crucial insights that can contribute to a more ecologically adequate account of language. We now consider once again each article in turn, working to draw attention to dimensions and relations that we suspect will be of special interest to ecologically oriented readers.

Martin and Fonseca (this issue), who have done interesting work on Kant and self-organizing systems in relation to ontologies for information systems (e.g., Fonseca & Martin, 2004, 2005), offer an elegant argument about information flow in perception and

conversation. Although their citations are from the hermeneutical tradition of philosophy, the arguments they develop have much in common with discussions that have been going on in the ecological community over the past few years about ontology, intelligent systems, measurement, and control (e.g., Turvey, 2009). They begin with a quote from Bohr, move to the necessity of variance and invariance, and explore the dialogical nature of knowing, using examples from haptic activity and from conversational argument. Their argument suggests that knowing emerges temporally, not from some privileged perspective (e.g., objective or subjective, other or self) but from a playful dialogue between correlated and uncorrelated dimensions of experience. From this perspective play becomes a “mode of being” in which a “temporally distributed oscillation” is necessary for all acts of “measurement (the world informing the organism) ... [and] control (the organism forming the world)” (Martin & Fonseca, this issue). Having established the outlines of their analysis, they apply it to the Kuhn-Popper debate in a way that is itself playful, showing that both parties in the debate are caught, as it were, with their impredicative pants down. Both fall foul of the sort of self-referential fallacy that Swenson uses against Parmenides. What happens, though, when there is a double refutation? We let readers discover the answer, noting only that Martin and Fonseca’s answer points toward the incompleteness of individuals, the necessity of community, and an appreciation of self-organizing processes and an ontology of values.

R czaszek-Leonardi’s (this issue) theoretical concern is to develop Pattee’s (2008) claim of the mutuality of symbols and dynamics in living systems. In earlier work, she sought to rethink how “information-bearing entities that emerge under pressures of communicative needs” demand more than a “purely synchronic analysis of a system” (R czaszek-Leonardi & Kelso, 2008, p. 193). She suggests that a reciprocal play between mutually constraining processes, symbolic and dynamic, will be required to account for the flexibility and effectivity of linguistic actions. One upshot of this reciprocal dance of symbolic and dynamic processes is that it “may not be explainable at the level of an individual and his/her knowledge” but will emerge only as a “cooperative phenomena” (R czaszek-Leonardi & Kelso, 2008, p. 205). Seen in this light, R czaszek-Leonardi’s offering in this issue has much in common with Martin and Fonseca’s article despite the marked differences in citations and styles. She contrasts symbol-dependent and symbol-free accounts of adaptive growth and development, proposing a “third way” in which there is play (in Martin & Fonseca’s sense) between rate-independent processes and context-dependent dynamics. The former act as selection constraints on the latter, and the latter, in turn, ground the symbolic processes. She argues that these dialogical, self-organizing activities form a complex system that functions across a wide array of temporal-spatial scales. To ground her theoretical claims she reviews research she and her colleagues have done comparing grammatical gender across Polish and Italian speakers (e.g., *drill* is masculine in Italian and feminine in Polish). Three space-time scales—cultural evolution, historical, and online processing—are examined, leading to her surprising conclusion that the “same forces” are operative across levels. If this is so, languages may be even more systematic than has been assumed; perhaps they are fractal, as Van Orden et al. (2010) have suggested. In addition, R czaszek-Leonardi’s results indicate that symbols are more grounded than standard accounts of symbol grounding (Harnad, 1990) could have guessed: a dynamical analysis points to symbols being constrained at multiple levels, and yet this greater complexity yields greater specificity, not less.

## LANGUAGE USE AS PUBLIC (INTER) ACTION

The contributions by Port, Fowler, and Worgan and Moore (this issue) are about the importance of attention to the observation that language use is a between-person public activity. Outside of the fields of linguistics and psycholinguistics and in the context of this special issue, this may seem an obvious assertion. However, linguistic and psycholinguistic

studies of language and of language use by speaker/hearers have, since Chomsky's (1959) forceful and influential critique of Skinner's (1957) effort to explain "verbal behavior," focused to a large extent on the study of the (private) human mind.

For Port (this issue), the observation that language use consists fundamentally of public activities by members of language communities is especially consequential. He makes the argument that the language forms that traditional linguistic theory identifies as elements of speaker-hearers' linguistic competence are not. Rather, they emerge in the communicative interchanges of members of a language community as components of distributed language. For their part, the knowledge systems of individual language users are different one from the other and are richly detailed, unlike the low-dimensional characterization of language forms provided by linguistic theory, and are perhaps more aptly ascribed to the language community than to individual knowers and users of language. The general tendency to ascribe the forms to individual language users, in Port's view, stems from the influence of our knowledge of alphabetic writing systems on our thinking about the spoken language.

This view is interesting and radical, but it may or may not be required by the evidence (e.g., Fowler, 2010; however, also see Port, 2010).<sup>2</sup> In an account of the relation of phonology to phonetics in knowledge systems of language users, Gafos and Benus (2006) invoke the idea of a tiered dynamical system, very much like the more general notion of tiered dynamical systems that R. C. C. Leonard invokes following Pattee (2008). In the account of Gafos and Benus, there is a low-dimensional phonological tier that serves as a source of constraint on a higher dimensional phonetic tier. Although Gafos and Benus do not anticipate incorporation of the rich *nonlinguistic* detail that Port argues constitutes knowledge of language forms, there is nothing to prevent that kind of rich detail in such a system. Accepting the view that language users preserve rich phonetic and nonlinguistic detail about utterances they encounter does not prevent accepting the idea that, in tiered dynamical memory systems, high-dimensional detail at one level of description of the system is complemented by low-dimensional entities at another. This kind of idea provides a way to understand how the somewhat individual-specific knowledge of language on the lower tier can give rise to a more common system at the phonological level. Sufficient commonality, after all, is required for efforts at communication to have a chance to succeed.

For Fowler (this issue), recognizing that language use is a social, public action has different implications than it has for Port. It is not (or not only) that our *knowledge* of language forms is richly interleaved with our *knowledge* of nonlinguistic information provided in the same encounters with other language users. Rather, public communications involving language richly intermix such nonlinguistic sources of information for interlocutors as deictic points (including vocal ones requiring sound localization to be understood), manual gestures, head movements, eye gaze, and more. Understanding a communicative act requires more than understanding the syntactically structured word sequences that a speaker may utter. At a slower time scale, public language use shapes the sound inventories of languages, and, at a larger grain size, it shapes the development of the lexicon; new words are coined, familiar words are shortened (e.g., Zipf, 1935).

As we noted earlier, the first special issue on language published in this journal focused on meaningless language forms. Elsewhere, Fowler (1986) remarked that, although it is not inappropriate for ecological researchers to pay attention to these forms, in very important respects they are significantly incomplete. The contribution of Worgan and Moore to this issue constitutes an effort to move toward an understanding of public communications as

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<sup>2</sup>The reader is invited to consult both Fowler's (2010) challenges to Port's refutation of the idea of discrete phonological language forms being known by individual members of language communities and Port's (2010) rejoinder.



intentional linguistic actions produced by talkers and perceived by listeners. They introduce the idea of “interaction affordances” as central to an understanding of language use at this more macroscopic level of description. They define interaction affordances as “the set of affordances produced by the perception of an intentional agent within the environment.” There is something a little surprising about this definition. Affordances are not generally seen as being “produced by ... perception.” In Gibson’s (1979/1986) ecological psychology, for example, affordances are affordances whether or not someone perceives them. In the present context, interaction affordances might better be seen as possibilities for action made available to a listener by a talker and detected or not by the listener. However, either way, a focus on speech acts and on the uses to which interlocutors put them is a welcomed and needed contribution to an ecological theory of public language use. Worgan and Moore’s approach might profitably be embedded in the larger context of the developing ecological theory of social action (e.g., Marsh, Richardson, Baron, & Schmidt, 2006) in which social affordances (presumably including interaction affordances) are seen as manifest in dynamical systems that minimally include two participants and their environment.

An important idea that arises in considering public language use, in which talkers provide and listeners may detect interaction affordances, is that of “parity” (e.g., Liberman & Whalen, 2000; Mattingly & Liberman, 1989). That is, for speech acts to be effective (i.e., to achieve the talker’s intentions in talking), a minimal requirement is that listeners have to perceive with sufficient faithfulness the affordances that talkers provide. As Worgan and Moore (this issue) put it,

In coupling direct perception and direct production we propose that perception is dependent upon the perceiver’s understanding of production.... Perception proceeds through an unbroken loop between speaker and listener.<sup>3</sup>

From an ecological perspective, what makes that unbroken loop possible is public vocal (and other communicative) action in which (among other actions) public language forms causally structure such informational media as air and light, specifying in turn the language forms (e.g., Goldstein & Fowler, 2003) and, through them, interactional affordances.

## WORKING TO SAY BETTER WHAT IT IS WE DO IN CONVERSING

Within the ecological approach to perception and action, the topic of language has received limited attention. The ordinary activity of conversing, central to science itself, offers many challenges to an ecological approach. We are encouraged, however, by the dialogues that have emerged from the conference, “Grounding Language in Perception and (Inter) Action.” The dialogue initiated among researchers from the distributed language, ecological, and dynamical systems communities holds promise for the development of more ecologically apt understandings of language that go beyond traditional approaches. The articles in this special issue and in an anticipated forthcoming issue constitute early products of what we hope will be a continuation of that dialogue.

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<sup>3</sup>We have omitted from this quotation some intervening misapprehensions of claims of the motor theory of speech perception and direct realism in which they are proposed to suggest that symbols are somehow involved in perception of speech.

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