An Investigation of the Communicative Purposes of Road Signs: How Signs Do Things

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ABSTRACT

This study explores the important communicative roles carried out by road signs both directly and indirectly. The qualitative analysis is based on a corpus of 150 road signs collected from signage on state and local highways and roadways in seven U.S. states. Road signs were identified as either full, grammatical sentences or as block language. They were further analyzed as speech acts and their performativity was briefly explored in three areas: agency, lexis, and emplacement. Road sign ambiguity in regard to punctuation and syntactic ambiguity was also identified. The findings pointed to several areas for future research including drivers' behavioral reactions, road safety and wayfinding potential.

INTRODUCTION

Road signs are as taken for granted as the macadam or asphalt on which we drive – until there is an issue. Drivers' awareness of the actual road is understandably heightened when vehicle tires drop mercilessly into damaging potholes or as yellow or white pavement markers become illegible; otherwise, vehicles sail along without much consideration of the work involved in the "Under Construction" zones. Motorists are similarly accustomed to the presence of traffic or road signs (RSs) but rarely are these signs analyzed beyond a superficial level. Nevertheless, RSs fulfill a valuable role by promoting safe and effective vehicle navigation.

Interestingly, a recent study (Viganò & Rovida, 2014) emphasized that adding text to signs with only graphics can create communicative challenges for second language drivers as well as increase the time required for reading the signs, a situation these authors claimed is "incompatible with the traffic requirements" (p. 56). But, signs with only text can also create many other types of comprehension challenges for drivers. Cassell (2009) reported on a comical situation in which drivers were instructed by signs to "travel north or south and east or west to negotiate" a detour (p. 1, para. 5-7). These upset drivers were interviewed by a local reporter who discovered that their frustration stemmed not only from the actual road work which delayed them but also from not knowing how to interpret or apply the signs. One resident complained during his interview, "Why can they not just write *access one-way* and the other way *no entry*? How hard is it to do that? Unless you are in the army and have a compass you will have no idea where you are going. … I live round here and I don't know which way is which…"(Cassell, 2009, p. 1, para. 5-7). Clearly, road sign messages can have an important effect on motorists.

One reason is that signs function as significant yet often unacknowledged conversation partners. As in spoken conversation, sign designers create them for specific, one-way communicative purposes. Signs communicate to readers, readers receive the words, words carry the messages, and messages are presented in various ways. In transportation contexts, RSs serve as a kind of asynchronous conversational medium between the governmental authorities who authorize the signage and the drivers who read particular signs. Road planners and law enforcement personnel use RSs to

communicate important messages to drivers about their environment. Indeed, Koyuncu and Amado (2008) claimed that RSs are "used to regulate, warn, or guide the road users so as to provide safer traffic environments. By preparing the driver for a subsequent behavior necessitated by the road layout ahead the road signs facilitate the reaction required for the appropriate action" (p. 108). This perhaps simplistic definition of RSs acknowledges their complex role in promoting certain driver actions as well as highlights their genuine communicative purpose: to influence the behavior of drivers. By applying concepts and terminology long-established in research on pragmatics and investigations of grammar to the analysis of RS language, an underexplored area of written communication, the present study investigates the direct and indirect ways in which messages are conveyed to drivers through words on common RSs.

PREVIOUS RESEARCH

Drucker (1984) pointed out that signs, as part of the linguistic landscape, help readers understand their immediate surroundings. Emphasizing the link between signs of various types and societies focused on risk management, Mautner (2012) stated that signage "helps the supposedly vulnerable citizen navigate … space unharmed" (p. 194). Even with Global Positioning Systems (GPSs), drivers continue to depend on RSs to inform them of upcoming, or perhaps unexpected, road conditions (e.g., bumps, sharp curves, and decreasing speed limits) as well as to provide them with particular route guidance (e.g., mileage estimates to upcoming locations, left/right placement of approaching exit ramps, and the cardinal direction of a given highway). Though more recently some researchers (e.g., Scollon & Scollon, 2003) have created taxonomies for classifying signs with labels such as informational, promotional, and directive, many years ago, Drucker (1984) rightly claimed that language, including the language of signs, rarely serves only informational purposes. She used the example of an "informational" street name sign to demonstrate that even something so seemingly neutral often carries with it the much more legally complex ideas of "possession, maintenance, business, and civic order" (p. 10). That is, a posted street name sign communicates that the street is owned by someone; furthermore, this owner has the right both to name the street as well as to supervise what happens on it. Drucker (1984) further explored the instructive role of various types of signs specifically designed to direct behavior; RSs are a clear example of signs that communicate instructions, both explicit and implicit in form, as will be explored in future sections.

An analysis of Burns' (1998) self-report data suggested that poor or unclear road signage accounts for at least some of the occasions in which drivers get lost. Researchers have investigated the effects of road signs on driving performance itself, suggesting that appropriately-placed and well-timed road signs might decrease accidents (Dewar, 1995; Milleville-Pennel, Hoc, & Jolly, 2007; Koyuncu & Amado, 2008); in more specialized settings, others specifically recommended that speech therapists incorporate road signs in driving rehabilitation exercises with stroke patients suffering from aphasia (Mackenzie & Paton, 2003). Several researchers in educational and therapeutic settings have designed curricula to improve the understanding of road signs by children who will be future drivers (Hollingsworth 1995; *Language Everywhere*, 1985), adults challenged by their own limited English proficiency (Stanyar, 1985; *Driver Education*, 1986), students with learning differences (Test & Heward, 1983), and older drivers whose reaction time, and perhaps receptive abilities, are more limited now than when they were younger (Dewar, 1995; Marottoli, Van Ness, Araujo, Iannone, Acampora, Charpentier, & Peduzzi, 2007).

Some of these curricula have been evaluated beyond their particular contexts. For example, Murph & McCormick (1985) assessed the effectiveness of one particular program designed to teach juveniles with limited reading proficiency how to read road signs. Their study revealed that successful interpretation of RSs cannot be limited to the lexical or syntactic level. That is, their adopted methodology highlighted the implied messages often found on public signs such as "SCHOOL CROSSING", a sign that, as argued by Drucker (1984), communicates more than mere information (i.e., the fact that this location is a school crossing), but rather is intended to affect drivers' behavior in light of this piece of contextual information. In turn, "SCHOOL CROSSING" was judged by Murph & McCormick (1985) to communicate the information and a resulting expectation that "students cross the street here going to and from school and if you are driving you should carefully watch for students so you don't hit them with your car" (p. 137). Their scoring rubric took this kind of implied expectation into account when determining if a research participant had interpreted a sign's message accurately.

The studies of Murph & McCormick (1985) and Rastall (2003) both identified three types of RSs. Their specific categorization varied but the generalization of the three RS types was the same; that is, RSs are 'predominantly verbal' ('worded'), 'non-verbal' ('no-word') containing symbols rather than words, or 'hybrid' ('combination') containing both words and symbols. Moreover, RSs are often color- and shape-coordinated depending on federal and state norms or regulations. These colors and shapes reflect various factors related to a RS's relevance and overall importance (e.g., directional markers, emergency-oriented information, tourist-related notices, etc.). Rastall (2003) pointed out that verbal RSs implement their own grammatical style characterized by a restricted vocabulary and short messages. Much like the related claim made by Viganò & Rovida (2014), he suggested that the "telegram style" (Rastall, 2003, p. 58) of RS language is necessary due to drivers' limited processing time both to see and identify the messages as well as to the abundance of other information drivers have to process simultaneously such as advertising notices, GPS information, radio transmissions, passenger conversation, other drivers' actions on the road, etc. The time drivers need to process road sign language also underpinned the analysis carried out by Viganò and Rovida (2014).

As an interesting sidenote, though they might represent obvious accommodations to contemporary English speak-

ers, certain grammatical adjustments made to RS language disturbed some 20th century observers of a more prescriptivist approach who criticized the increasing speed of vehicular traffic in the first place. For example, Amend (1927) stated that "Automobilists in their frantic rush to annihilate time and distance have succeeded in having the '-ly' of 'slowly' even more completely annihilated. 'Go Slo'—'Drive Slow' – 'Go Slow,' the Three Disgraces of the world of road signs" (p. 191-192). Most of Amend's criticisms were countered in a response later that same year by Rice (1927). Though his essay agreed that the abbreviated 'Slo' should be met with reprobation, Rice (1927) argued that the other two instances of 'Slow' (rather than 'Slowly') should be allowed given that English dictionaries, even at that time, included 'Slow' as a valid entry as both adjective and adverb. His response was motivated by a desire that Amend might "enjoy the road the better and leave us to enjoy it also" (p. 489). Even then, Rice (1927) emphasized that situational context should influence speakers' acceptance, or repudiation, of non-standard, less formal language.

Though contemporary motorists and researchers are probably much more open to abbreviated and even some non-standard forms presented on RSs, Rastall (2003) acknowledged the following grammatical issues among other typical RS characteristics: no pronoun use, limited articles, no conjunctions (except 'when'), no verb tenses or aspects in constructions with verbs, rare use of infinitives, no verbal agreement, few modals ('must' is an exception), omitted but grammatically obligatory language, and restricted punctuation (p. 58). Nevertheless, given the frequency, situational context and communicative purpose of these signs, it is probably rare that drivers even notice, much less feel annoyed by, these grammatical transgressions.

In addition to accepting and interpreting non-standard language without significant problems, drivers also accept and interpret RSs according to their respective contexts. In an indirectly related but highly relevant study, Shakir (1995) investigated the effects of schematic knowledge, particularly situational context, on the translation of particular signs. His research found that a given speaker's understanding of a sign depends on, among other factors, the way the sign is presented, the way the words are arranged, and the space and location of the sign. When translators were exposed to a sign in its natural or typical context, they were able to accurately communicate the sign's message, mirroring the sign designer's intention. However, translators' attempts to understand signs out of their real-life contexts often resulted in inappropriate translations in terms of register, rhetorical purpose, or cultural significance. Shakir's (1995) findings strongly illustrate the fact that the meaning of signs is often tied to their respective contexts, and RSs are no exception. This insight was echoed in Pavlenko & Mullen (2015) who stressed that the interpretation of a given sign is affected by other signs in the same and different environments both in the present as well as over time.

Consequently, interpreting a RS outside of its context can have unanticipated results. Consider, for example, the common orange, rectangular road sign found on U.S. highways: "END ROAD WORK".

(Figure One: End Road Work Sign)

When a driver reaches the end of a construction zone marked with orange rubber cones, workers in hard hats, and large machinery, most drivers have no trouble understanding that that they have reached the end of the marked work zone. However, if a sign with the same message were carried on a placard by a protester in front of a municipal building, the sign could mean that voters are voicing a complaint that too much tax revenue is being spent on road work or that road construction itself is somehow causing residents some kind of problem. Thus, context is necessary for accurate interpretation.

Additionally, depending on state laws, the first interpretation of the sign carries with it additional messages such as that the driver may now increase vehicular speed to previously established limits and/or may legally resume two lanes of traffic. The second interpretation of the protester's sign carries with it additional messages that the protester is unhappy with the current political administration and demands a policy change, suggesting that future support for those who make such decisions might be in jeopardy. Obviously, Drucker (1984) was correct that it is unlikely that a purely informational sign exists since many signs, if not all, carry other implied messages.

As another example, consider the common sign that simply states, "CHURCH" (See Figure Two below). Is it meant to be informative and directional or also instructive? That is, if a driver is trying to find a church, this sign helpfully informs, "There's one very close to here." Or, this sign might be further interpreted to imply instructions such as "Slow down. Watch for the church. You will need to turn in soon." But, perhaps it isn't to be understood in this context at all. Perhaps its purpose is to warn motorists who are approaching what could be, at least at certain times of the week, one or a set of busy church driveways and instructing drivers to be aware of the possibility of encountering multiple slow-moving vehicles entering or exiting the parking lot. Or maybe this "simple" one-word sign encompasses all those messages. These examples further confirm the legitimacy of Murph & McCormick's (1985) analysis of the multiple implied meanings of the sign "SCHOOL CROSSING."

(Figure Two: Church Sign)

Interestingly, philosophers and linguists share an interest in sign interpretation. For instance, Stjernfelt (2014, p. 373) reflected:

… the more general issue of how it is possible that a lone-standing sign with no apparent sender is able to make claims, perform speech-acts and direct traffic, all with reference to validity in a certain zone in the neighborhood of the sign. 'Parking prohibited' – yes, but how do we know it is prohibited here and now, and not somewhere else, not in general, not later, and not in some fictitious world?

Stjernfelt (2014) used an example from Peirce (1982) of a sign hung over a door stating "No admittance, except on business" (p. 374). One knows the particular door to which this sign implicitly refers because the sign hangs directly over said door. Though the door's identity is not explicitly stated, any reasonable adult reader of English would interpret this sign according to its co-localization; that is, its placement means that the sign's message is relevant to this particular door. Similarly, drivers interpret "Parking prohibited" in an analogous way, what Stjernfelt calls an "implicit 'here, now'" (p. 376), not to a prohibition against parking tomorrow, the next street over, or for all time in this world or in another. This effect was also observed in Mautner (2012) who cited a Scollon & Scollon (2003) example of one who found a soiled price tag stuck to the pavement and immediately and correctly concluded that the tag was out of place and that it did not indicate that this portion of pavement was for sale at any price. Mautner (2012) highlighted that a sign warning readers of "deep water" and a notice that "bicycles chained to these railings will be removed" refer to the water behind the sign and to the railings where the notice is posted, respectively. She referred to this co-localization of sign and meaning as 'exophoric deixis' (p. 198), marking a reference outside the text itself for the interpretation of meaning. Despite the lack of an explicit word or grammatical marking that usually signals exophora (e.g., these, here, etc.), RSs can function similarly. For example, most drivers know that "No Turns" does not mean that their cars must continue straight ahead forever in all locations and correctly understand that "No shoulder next 2 miles" means that the 'no shoulder zone' starts immediately following that same sign. Indeed,

if additional or explanatory comments such as "here" or "starting now" were added to these signs, drivers would likely respond with confusion or ridicule. Scollon & Scollon (2003) referred to this phenomenon as 'emplacement'; specifically, 'emplaced texts' are those that depend on their immediate physical context for interpretation of meaning.

As previously mentioned, RSs can be classified as predominantly verbal, non-verbal, or hybrid (Rastall, 2003). Though non-verbal and especially hybrid signs share many features of verbal RSs, the present analysis provides a detailed look at the language of verbal RSs and the direct and indirect messages they communicate. Rastall (2003) pointed out that though RSs represent one-way communication, drivers typically seek out and process these signs intentionally. Drivers do not (usually) respond verbally to RS messages but their communicative responses may best be understood by their resulting actions, a point to be considered in a later section.

THE PRESENT STUDY

Context

Data were collected over a period of 28 months on state and local highways and roadways in 7 U.S. states including Pennsylvania, New Jersey, New York, Connecticut, Massachusetts, New Hampshire, and Maine.

Data Types

The data consisted of a corpus of 150 road sign messages.

Data Collection

Specifically, when the driver (the present researcher) or a passenger (there were either 1 or 2 passengers on various occasions) saw a sign thought not to have been previously documented, this person read the sign out loud and a passenger wrote down its exact words on a legal pad. If there was any doubt or question of memory regarding what the sign actually said (e.g., the inclusion of a particular word, a morphological ending, etc.), the token was crossed out and eliminated from the study unless the same sign was seen again and its message verified. For presentational purposes, some photographs of particular signs were also captured with an iPhone. As in Mautner's (2012) study, the data came from real-life examples and the "aim was to identify types, not count tokens – in other words, the pursuit was qualitative, asking *what* there is, rather than quantitative, asking *how much* there is of it" (p. 192). Consequently, it was not considered to be a limitation of the investigation's design if a particular RS went unnoticed.

Data Analysis

The complete list of RS messages was later entered in a Word document and alphabetized in order to eliminate doubles of which there were several. These RSs were identified individually as examples of full, grammatically-acceptable

sentences or as non-sentences. Individual RSs were analyzed within two frameworks: (1) speech act theory (Austin 1962) to explain how RSs perform certain actions; and, (2) indirect speech act theory (Searle, 1975) to explain how RS perform similar actions indirectly. Given the impossibility, and perhaps unnecessary nature of the task, of obtaining a complete set of all existing RSs and the present's study's overarching goal of understanding rather than categorizing, the present analysis of these RSs was qualitative rather than quantitative; that is, care was taken to select and analyze a variety of typical RS examples that illustrate concepts and explain those concepts by offering particular insights where possible rather than to group RSs in similar categories and offer an analysis that presents their general features in a comprehensive way (see Mautner (2012) for a similar approach).

FINDINGS

Block Language Road Signs: Examples and Possible Interpretations

RS messages are presented either as full, grammatically-acceptable sentences or as 'block language' (Quirk, Greenbaum, Leech, Svartvik, 1985, p. 845). Rastall (2003) argued that the characteristics of block language highlighted by Quirk et al. (1985) apply not only to newspaper headlines, advertisements, and other notices but also, more narrowly, to RSs which similarly "function as devices of economy through the omission of items of little informational value" (Quirk et al., 1985, p. 900). Block language messages "are most often non-sentences, consisting of a noun or noun phrase or nominal clause in isolation; no verb is needed, because all else necessary to the understanding of the message is furnished by the context " (p. 845). Quirk et al. (1985) added that items such as finite forms of the verb "Be," articles, and other words are typically omitted, all characteristics Rastall (2003) noted as typical in RS language. Though Quirk et al. (1985) themselves did not specifically identify RSs as examples of block language, their introductory list of illustrations included three entries that likely represent specific RSs: "No entry"; "50 mph limit"; and "Danger: falling rocks". Thus, it seemed useful to apply their term 'block language' to the present RS data.

In the present data, relatively few of the RS messages were presented as full sentences. Most were non-sentences that omitted certain lexical items. In fact, even the limited RSs that qualify as "grammatically-acceptable" sentences lack conventional punctuation (e.g., periods and exclamation points) required in full sentences. Consider, for example, the following 5 signs (S1-S5 below) that lack punctuation of all types (for identification purposes, S1, S2, etc. identify signs # 1, 2, etc. throughout the study):

S1: *All Traffic Must Turn Right*
S2: *Be Prepared to Stop*
S3: *Buckle Up Every Time*
S4: *Do Not Stop*
S5: *Don't Tailgate*

Analyzing even this small sample of 'full sentences', language prescriptivists such as Amend (1927) might also be tempted to note the non-standard and somewhat inconsistent capitalization patterns (e.g., 'to') and even the use of context-dependent colloquial expressions such as 'Buckle Up' (S3) that, given its transitive nature, could arguably require a direct object (i.e., 'your seat belt'), and 'Tailgate' (S5) that implies a subsequent 'other vehicles', easily predictable lexical items omitted from the signs themselves. Nevertheless, both driving speed and overall signage frequency require that RS language be as concise and limited as possible. Given the situational context, most drivers are likely able to supply these missing lexical items successfully without any risk of misinterpretation. As claimed by Quirk et al. (1985), the messages can be correctly interpreted through their respective contexts.

As noted by Rastall (2003), the following RSs (S6-S13) omit grammatically-required elements (e.g., verbs, articles, modals, pronouns, conjunctions, punctuation, other words) but again leave little room for misinterpretation (suggested omitted language is presented in italics below the relevant sign – note that additional language could also be included):

S6: *Headlights Must Be On When Wipers In Use*
(Headlights Must Be On When Wipers *Are* In Use.)
S7: *Highways Patrolled by Marked and Unmarked Police Cars – Please Obey Traffic Laws*
(Highways *Are* Patrolled by Marked and Unmarked Police Cars – Please Obey Traffic Laws)
S8: *Bridge Ices Before Road*
(*The/This* Bridge Ices Before *the* Road *Does*)
S9: *All Lanes Must Stop for Stopped School Bus*
(All Lanes *of Traffic* Must Stop for *a* Stopped School Bus)
S10: *Emergency Stopping 3000 ft*
(Emergency Stopping *in* 3000 ft)
S11: *Take A Break Stay Awake For Safety Sake*
(Take A Break *and* Stay Awake For Safety Sake)
S12: *Stay with Disabled Vehicle State Police Will Assist*
(Stay with *Your* Disabled Vehicle. State Police Will Assist *You*.)
S13: *Maine State Law Boaters Remove All Plants*
(Maine State Law: Boaters *Must* Remove All Plants)

Note that S13 also has the potential of being understood as a descriptive rather than a prescriptive statement indicating that this is what generally happens in Maine because of the relevant State Law: The boaters generally remove all the plants. Or, similarly, the sign "Plows Use Caution" could be understood that this is what plows usually do rather than be interpreted in the vocative sense, addressing, of course, not the plows themselves which do not understand language, but rather the plow drivers who are instructed to use caution (Plow Drivers, Use Caution). Punctuation can indeed affect interpretation, especially for decontextualized utterances.

The following signs (S14-17) illustrate more interesting examples of omitted words, phrases or ideas that probably would not cause drivers confusion either. Nevertheless, these examples of missing possessive adjectives, syntactic awkwardness, and semantic vagueness or ambiguity could be interpreted sarcastically by drivers sensitive to linguistic issues or those wanting to debate the details of a particular

notice to argue a traffic ticket. Quirk et al. (1985) claimed that omitted language is usually of "little informational value" (p. 900); this is arguably the case in the following RSs but they still represent examples of more significant omissions than seen in S1-13 above:

S14: *Check Brakes*
(Whose brakes? My own or those of other vehicles?)

S15: *All Trucks Must Enter Weigh Station When Flashing* (When what is flashing? The truck I'm driving or the light hung adjacent to the sign or something else?)

S16: *Excessive Vehicle Noise Prohibited*
(What is 'excessive'? When it's too loud according to me?)

S17: *Travel on Shoulder Prohibited*
(Fine. How about piggy-back rides instead?)

As necessary 'devices of economy' (Quirk et al., 1985, p. 900), RSs cannot be expected to conform to conventional, grammatical requirements. Nevertheless, it is worth noting -- and minimizing to the degree possible -- the ways in which RSs are non-sentences to ensure that sufficiently clear messages are conveyed to drivers despite their omission of various linguistic features.

Direct and Indirect Road Signs: Examples and Possible Interpretations

Austin's (1962) speech act theory recognized that speakers use language to carry out such acts as complaining ("I hate eating chicken every night"), warning ("Careful, the coffee is hot"), placing an order ("I'll have a chocolate donut, please"), and inviting ("Would you like to go to the movie with me tonight?"). These locutionary acts can be carried out directly (Austin, 1962), as in the examples above, or indirectly (Searle, 1975) such as in these mirrored situations: "Can we have something other than chicken tonight?" (said to a spouse about to cook dinner); "Here, this coffee is hot enough to fuel a steamboat!" (said to friend while holding out a tall cappuccino); "I can't resist the chocolate ones" (said to an employee standing behind a donut counter); and, "I'm going to a movie tonight. Are you doing anything?" (said to a roommate on a rainy Friday afternoon). The situational context of these utterances allows for their successful performance of the same acts that were carried out directly in the examples above. The underlying purpose of any message is referred to as its illocutionary force (Austin, 1962). For example, the locutionary force of the statement "I can't resist the chocolate ones" is that the speaker is describing his or her typical behavior or preferences; its illocutionary force, given the context of the utterance and the respective identities of the interlocutors (i.e., customer and employee in a donut shop), is that of ordering a chocolate donut.

Similarly, in these data, some RS messages were conveyed directly, without implication, or indirectly, expecting inferences on the part of readers functioning within a driving context necessary for the intended interpretations. Some RSs express warnings, guidance, or even threats in very direct ways. Others function as indirect speech acts, serving both to inform (the locutionary force) as well as simultane-

ously to warn, guide, or threaten (the illocutionary force). For example, S4, S5, S18, and S19 tell drivers directly what (not) to do:

S4: *Do Not Stop*
S5: *Don't Tailgate*
S18: *Share the Road*
S19: *Reduce Speed in Inclement Weather*

Of course, many details are omitted from these signs for the sake of efficiently communicating clear commands; for example, limitations on the prohibition not to stop (S4) are not offered, this type of tailgating (S5) is not distinguished from the kind that takes place in stadium parking lots before sporting events, and the identities of those with whom drivers are told to share the road are not specified nor are ways to engage in road sharing (S18) or the characteristics of inclement weather (S19) defined. Yet, these messages are delivered in a much more straight-forward manner than the messages in the following signs (S6, S8, and S20-S22):

S6: *Headlights Must Be On When Wipers In Use*
S8: *Bridge Ices Before Road*
S20: *Watch for Moose in Roadway*
S21: *Falling Rock Zone*
S22: *Speed Enforced From Aircraft*

RSs such as these generally lack overt imperatives but the commands are implied, a phenomena also noted in Mautner (2012). For example, S6 is describing what sounds like a legal requirement; thus, drivers interpret this statement not as a declaration of fact but as an implied command that might have been expressed more directly, though perhaps not as effectively, as "Turn On Your Headlights If Your Wipers Are In Use."

S8 also sounds like a description but, given context, drivers do not interpret the statement as part of a science lesson but rather as a warning that would require many additional words if expressed directly, "Be Careful On The Bridge Because It Ices Before The Road Does," perhaps with the parenthetical explanation "And Cars Can Slide On The Ice."

S20 is not overtly descriptive but its direct imperative nature requires some analysis. This command is also to be understood as a warning. Though tourists eager to see a moose in the wild might appreciate knowing they have entered an area where moose have been previously sighted, this sign is not an enthusiastic heads-up from a state-sponsored tour guide to watch carefully so that drivers do not miss out on an opportunity for observing wildlife. Rather, the command might be better stated with its particle forming the phrasal verb "Watch Out" as in "Watch Out for Moose in Roadway" since the sign's purpose is to warn motorists of their potential presence in order to avoid accident or death.

S21 shares a similar two-part, descriptive/warning message but also contains some interesting ambiguity for linguistically-sensitive drivers. At first read, the participle "falling" might suggest that drivers are warned to be aware of rocks in the process of falling; that is, "Watch Out For Rocks Above Your Car That Might Fall On You;" or, "falling" may merely be an indication of an action that regularly happens in this zone, one that has the potential of leaving dangerous debris in the roadway yielding, "Watch Out For Rocks That Often

Fall Here Because They Might Be In The Roadway." Perhaps this particular ambiguity promotes extra careful driving on the part of motorists who receive both interpretations and, in turn, avoid both potentially dangerous situations.

While all 4 of these signs carry other locutionary forces, S6 also serves as a command and S8, S20, and S21 as warnings. However, S22 is a three-part description/warning/threat. Drivers are indirectly warned to ensure they are driving within the legal speed limit; the fact that a driver's speed is monitored by aircraft suggests that something will happen to them if they are caught exceeding that limit. Though, "Your Speed Is Monitored From Aircraft So Slow Down Or You May Receive a Ticket" is more direct as a description, warning, and a threat, it is probably too wordy for a RS – especially for drivers already travelling too fast to read it. One wonders, however, if some drivers, rather than slowing down to drive within the legal speed limit (the intended message), might rather choose to interpret this sign as a warning to watch out for any such aircraft in order to avoid detection while they continue to speed.

The notion of legal requirement gently expressed in S6 with the modal 'Must' is implied more strongly in S21-S22 with lexical items such as 'Zone', 'Enforced' and 'Aircraft.' Legal-sounding language (e.g., 'Prohibited', 'Fines', 'Allowed', 'Zone', 'Penalties', 'Authorized', 'Prohibition') is also evident in other signs such as S23-S28:

> **S23:** *Hitchhiking Prohibited Do Not Stop*
> **S24:** *Work Zone Speeding Fines Doubled*
> **S25:** *Trucks Allowed In Left Lane*
> **S26:** *Active Work Zone When Flashing Increased Penalties*
> **S27:** *Emergency and Authorized Vehicles Only*
> **S28:** *End Left Lane Prohibition*

Again, sarcastic drivers might be tempted to wonder if S28 should be understood to mean that drivers are being asked to support a movement to end the prohibition against the existence of left lanes. Context certainly clarifies.

Legal force is stated much more overtly in many road signs. Consider, for example, the clear references to laws, law enforcement, and particular states in the following examples:

> **S7:** *Highways Patrolled by Marked and Unmarked Police Cars – Please Obey Traffic Laws*
> **S13:** *Maine State Law Boaters Remove All Plants*
> **S29:** *NH Law Buckle Up Under Age 18*
> **S30:** *Maine State Law No Excuses Buckle UP*
> **S31:** *Maine Has A Tough Drunk Driving Law For Your Safety*
> **S32:** *For Safety Buckle Up State Law*
> **S33:** *Buckle Up It's The Law*
> **S34:** *Keep Right Pass Left It's the Law*
> **S35:** *State Law Drivers Yield to Rotary Traffic*
> **S36:** *State Law Move Over For Emergency Vehicles*
> **S37:** *State Law Move Over For Stopped Emergency Vehicles*

Performativity

The connections between legal authority and signs was taken up by Mautner (2012) who explored the performative character of signs. Performativity, in this context, can be defined as the level of success a RS has to influence drivers' behaviors. Mautner (2012) pointed out that signs written on cardboard rather than displayed on official-looking materials are less likely to carry the same performative potential. She also noted that though some signs explicitly mention the law (e.g., S13 and S29-S37 above), many do not. Nevertheless, issues such as *agency*, *lexis*, and *emplacement* may also affect a sign's performativity; each will be considered below.

Agency

Explicit reference to law enforcement officers (S7) or to identified states who have established laws (S13 and S29-S31) arguably increase a RS's potential performativity. Even more generic mentions of the existence of the states behind the laws (S32 and S35-S37) remind drivers that authoritative bodies exist. S33 and S34 are more gentle reminders of legal power but commonly-recognized phrases such as "It's the Law" or "It's Our Law" carry both societal as well as political force.

Lexis

Mautner (2012) identifies the inclusion on signs of lexical items such as "fine" and "a court of law" on what she calls the 'textual surface' as written clues to sign readers that failure to observe these notices might carry legal consequences. RS language in S23-S28, described above, likely serve a similar purposes. The inclusion of the word "law" in S7, S13, and S29-S37 comes at the beginning, middle or end of the text, a feature that may affect these signs' potential performativity. S31 and S32 remind drivers that the laws exist "for safety" purposes but the explicit inclusion of "law" on these signs serves to separate S31 and S32 from a different sign that also mentions safety; it has the tone of a state recommendation, but not one with legal consequence: "Take A Break Stay Awake For Safety Sake".

Emplacement

As previously mentioned, the notion of emplacement (Scollon & Scollen, 2003; Mautner, 2012) draws an important connection between a text and its immediate physical context for the interpretation of meaning. RSs such as these already analyzed are clear examples:

> **S1:** *All Traffic Must Turn Right*
> **S4:** *Do Not Stop*
> **S25:** *Trucks Allowed In Left Lane*
> **S10:** *Emergency Stopping 3000 ft*
> **S21:** *Falling Rock Zone*

S1 obviously does not mean that all traffic everywhere must turn right but only that traffic in the area governed by the sign, an area designated by the actual placement of the sign itself (i.e., emplacement). The situation with S4 and many other signs is similar. The command not to stop is clearly not to be exaggerated beyond the physical environment regulated by the presence of the sign. S25 is not a

generalization that trucks are always allowed in the left lane but rather in this particular left lane, signaled by the presence of the posted sign. S10 and S21 offer additional lexical support for their emplaced nature. The designation of 3000 feet and the inclusion of the word "zone" suggest that these signs are to be interpreted with their physical placement in mind. Drivers are expected to interpret these signs logically, according to common sense understandings of driving conditions and norms. For that reason, drivers are likely to understand that the following two signs (S2 and S5), and many other like them, are meant to encourage particularly careful driving in the zones they regulate, but drivers would be unlikely to argue that their messages are to be ignored in other areas.

    S2: *Be Prepared to Stop*
    S5: *Don't Tailgate*

Thus, it is this notion of a sign's emplacement that distinguishes a driver's interpretation of "End Road Work" from that of a protester.

Additionally, other contextual clues are also relevant for a sign's successful interpretation. Much like the situations of S1, S4, and S25, emplacement causes drivers to understand that S38 (below) does not mean vehicles should never stop on pavement but that in this particular zone, drivers should not stop.

    S38: *No Stopping on Pavement*

That said, in the case of a traffic jam resulting in a long line of stopped cars near S38, drivers intuitively know to disregard the RS's instruction rather than to drive on the surrounding grass, run into other cars, or any other such illogical reactions. Thus, though emplacement is certainly influential, context again proves to be a significant influence on accurate interpretation.

Ambiguity

In order to avoid ambiguity of various types, RS language often directly addresses those for whom the message is specifically intended. For example,

    S39 *Motorcycles Use Caution*
    S40 *Oversized Loads Right Lane*
    S41 *Plows Use Caution*
    S42 *Trucks Test Brakes*
    S43 *Trucks Use Right Lane*
    S44 *Wide Loads Keep to Far Right*

Though the above RSs lack conventional punctuation after each form of address (i.e., a comma), most drivers do not interpret these signs as statements of fact but rather as instructions to drivers who are members of the group addressed (e.g., motorcycles, oversized loads, plows, trucks, and wide loads). Moreover, drivers who are non-members of the addressed group know to simply ignore the sign and are able to disregard its message quickly since the vocative word or phrase is in initial position.

Even with such safeguards, signs can still be ambiguous. To illustrate with an anecdote: one passenger, who was not involved in data collection and was unaware of the purpose of this study, upon passing S36 (below) happened to remark that she found the state law to be unusual.

    S36: *State Law Move Over For Emergency Vehicles*

She commented that it used to be customary to move to the right and stop one's vehicle to allow an ambulance or a police car to pass more easily. After some thought, another passenger responded that it was her belief that the sign's intended meaning was that cars should move away from emergency vehicles (such as a police car) who were themselves stopped on the side of the road, perhaps to oversee a traffic violation or to assist at an accident scene. Thus, a sign that expressed a clear message to one reader created confusion on the part of another.

One final example illustrates potential syntactic ambiguity also present in some road signs. Compare the two signs presented side-by-side in Figure Three below:

Sign "A"   Sign "B"
(Figure Three: Syntactic Ambiguity)

Sign A warns drivers that a person who is blind lives or works in the geographical area and may be crossing the street, thus encouraging drivers to take extra care for what might be a particularly vulnerable pedestrian. Sign B does not warn drivers of a pedestrian who is somehow elevated or "raised" but rather of a significant bump in the road that slows down vehicular traffic at the site of a crossing designed for pedestrians. Note that the present of the word "Blind" on road signage does not always correspond to people. Consider the common warning sign "Blind Driveway" that signifies that drivers' visibility may be compromised by the contour of the road, the presence of a bridge, the growth of thick foliage, etc. Syntactically, the adjective "blind" in Sign A modifies the immediately following noun "pedestrian", not the second noun "crossing"; i.e., the crossing is not a blind crossing but a pedestrian who is walking in the street might be visually impaired. The adjective in Sign B modifies the second noun "crossing" which is also modified by the previous adjective "pedestrian". Whatever effect these syntactic differences have on motorists, these short noun phrases are meant to identify sites of potential danger to pedestrians and/or vehicles.

AREAS FOR FUTURE RESEARCH

One might wonder what effect other signs have on drivers' interpretations and certainly their behavioral reactions. Mautner (2012) reminded readers of her study that one caveat of the term "performativity" when applied to RSs is that no matter how clear a message is, even performative acts can be 'subverted' (p. 203). She pointed out that even when a sign meets all the linguistic conditions required for its success

as a speech act, "it is by no means certain whether people will actually do what it tells them to do" (p. 203). Many factors are at play ranging from drivers' own willingness to obey traffic laws to their interpretation of elements of the actual RSs. For instance, are signs more effective when they explicitly reference a state law or mention law enforcement personnel or other legal lexical items (e.g., fines, authorized, etc.)? As just one specific example, what effect do these similar, but different, messages (a and b below) have on drivers' actually wearing their seat belts (see Figures Four and Five below):

A. *Buckle Up Every Time*
B. *Buckle Up It's The Law*

(Figure Four)

(Figure Five)

RS A suggests the importance of making this one's regular practice and RS B invokes the authority of law.

On perhaps a simpler level, do drivers pay equal attention to RSs that specify their physical reference in an explicit way (RS C below) or to a RS that simply states the issue about which they are being cautioned (RS D below)?

C. *Cross Winds on Bridge*
D. *Cross Winds*

Note that both C and D read as descriptive statements; in both cases, the actual directive to be careful is implied.

Is punctuation important? If it is found that drivers truly do not need punctuation to distinguish RSs with vocatives (e.g., Trucks Test Brakes) as directives to truck driv-

ers rather than as descriptions that in this location, trucks generally test their brakes, does punctuation have any affect? For example, does sign E have more of an effect on drivers' speed than sign F (below)?

E. *DO NOT STOP*
F. *Do Not Stop*

The directive is quite explicit but does its written delivery influence the degree to which drivers notice and/or obey the sign's message?

Returning briefly to the issue regarding S21 ("*Falling Rock Zone*"), do morphology and lexicon have any effect on readers? That is, do drivers respond differently to signs G, H, and I (below)?

G. *Fallen Rock*
H. *Falling Rock*
I. *Falling Rock Zone*

Do morphological differences such as –en and –ing result in drivers being more aware of rocks that have already fallen or rocks that might be in the process of falling? Does referring to the affected area as a "zone" influence their processing or reaction time?

And finally, though many additional examples of such signs could be explored, do drivers take more notice of a sign that threatens doubled traffic fines or are they more influenced by a more narrow message that warns of doubled speeding fines (signs J and K below)?

J. *Work Zone Traffic Fines Doubled*
K. *Work Zone Speeding Fines Doubled*

Does the more general semantic category of "traffic fines" cause drivers to behave differently from being exposed to the particular type of fine (i.e., speeding fine) that is typically of most concern in construction zones?

All of these questions are areas for future research. Ideally, linguists would have opportunities to collaborate with researchers in other areas such as psychology, urban planning, and criminal justice and even with law enforcement personnel to explore these issues fully. The interpretation of RSs is certainly important when it comes to actual driving behaviors. Successful interpretation of RS affects road safety and even drivers' wayfinding potential. It is likely that RS interpretation is different for older drivers, drivers whose language proficiency is lacking in respect to the language of the RSs, and those with reading or language-processing difficulties. There is also technology being developed to link non-verbal RSs with GPS instructions to provide oral information, including instructions, to drivers in real-time (Prieto & Allen, 2009). This technology does not yet incorporate verbal RSs but that would be a next logical step.

RETURNING TO THE DETOUR

This analysis would not be complete without revisiting the Cassell (2009) example that introduced this article. In that situation, drivers were upset by signs that included instructions based on cardinal directions (i.e., east, west, north, south). That detour, and the frustrated drivers interviewed by the reporter, were in the U.K. but the American signage in this corpus provided similar findings. (See Figures Six and Seven below.)

(Figure Six S45)

(Figure Seven S46)

When encountering the road sign in Figure Six, drivers who are unsure which direction is west would do well to stop and look carefully in all directions before proceeding. The placement of the "End Detour" sign, on the wrong side of the road and on the back of signs facing the opposite direction, does make one wonder if, instead of marking the end of a detour route, this sign was indeed placed by someone protesting this and other detours.

CONCLUSIONS

The present analysis has demonstrated that road signs, as important elements within our linguistics landscape, do indeed "do things" as one-way communicators. It was confirmed that RS language rarely consists of full, grammatically-acceptable sentences but rather reflects characteristics of block language found in previous research (Quirk et al., 1985). RS messages, sometimes simultaneously, performed both direct and indirect speech acts such as informing, warning, directing and even threatening drivers in various contexts. The performativity of RSs may be affected by issues such as agency, lexis and emplacement, all contexts identified as areas for future research. Potential effects of punctuation on ambiguity were also identified.

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