

# A multi-methods toolkit for documentary research on ideophones

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## 5.1 Introduction

Ideophones are lexicalized depictions, meaning that they employ an analogical mode of representation that invites and affords the construal of iconic mappings between form and meaning (Dingemans 2012). For example, the Japanese ideophone *purupuru* depicts a jiggling movement, like that of a pudding. This meaning is not only conventional, but (to Japanese speakers at least) embodied by the sounds in the ideophone, from the softness of the /p/ to the quickness of the /r/. Since depictions are analogical, *purupuru* also implies the possibility of other ideophones, like *furufuru*, from which we can imagine an even gentler movement—the fluttering of feathers on a bird’s wing—or *buruburu*, a stronger movement, like the vibrating of a drill. These simple examples demonstrate how ideophones begin to form dense and complex networks of meanings, which can be difficult to capture using traditional lexicographic methods (e.g. Akita 2016; Badenoch, Osada, et al. 2021; Nuckolls et al. 2017; de Schryver 2009). As an illustration, one study found that speakers of Japanese can identify ideophones from their dictionary definitions in only fifty percent of cases (Akita 2016). This is not, despite some claims, because ideophones do not have identifiable meanings (e.g. Bodomo 2006; Moshi 1993; Okpewho 1992), but rather because the kinds of meanings that ideophones possess are not easily reduced to ordinary descriptive language (Badenoch 2021; Diffloth 1972; Samarin 1967). It is a problem stemming from the distinct mode of representation ideophones employ, and here we argue that its solution also requires distinct methods—and a more diverse documentary toolkit.

The standard paraphrase, for instance, is often much more powerful when accompanied by a depiction. This was illustrated in the Japanese study by combining dictionary definitions of ideophones with pictures and short videos, after which participants were able to accurately identify the ideophone in as many as ninety percent of cases (Akita 2016). Digital media also provides opportunities for rethinking the traditional dictionary structure to better accommodate the unique organisation of ideophone lexicons, where meaning does not only reside in individual lexemes but emerges dynamically from wider ideophone networks (see

Badenoch, Osada, et al. 2021 for some excellent examples of this in Mundari). In this chapter we synthesise effective techniques used to elicit ideophones and uncover their meanings, while simultaneously producing rich, polysemiotic representations of those meanings that can later feed into lexicographic projects. The techniques are chosen for the different viewpoints they offer, allowing us to explore the ideophone lexicon from both the emic and the etic perspectives. While each technique can stand on its own, there is a special advantage to combining them as together they offer cumulative insights and allow for methodological triangulation to bring the multifaceted semantics of ideophones into focus.

Figure 5.1 outlines the methods presented in the chapter, the analyses they afford, and the ways they can be combined to yield further insights. The first technique covered is MULTIMODAL CORPUS BUILDING. To use the other techniques, it is first necessary to be able to recognize and identify ideophones, and this knowledge is best gained through experience with ideophones in natural language use. We highlight specific speech styles to focus on, and discuss how to identify ideophones as lexicalized depictions. Emphasis is placed on the creation of *multimodal* rather than purely spoken or written corpora, as intonational and gestural cues are a vital resource for both the identification of ideophones and for determining their meanings and use.

Corpus data can then be complemented with data generated using more targeted elicitation techniques. STIMULUS-BASED ELICITATION is a particularly good pairing, as it allows researchers to target specific contrasts that may not appear as frequently in a corpus, but which can be used to investigate depictive conventions. It also offers a controlled way to collect comparable data on the use or non-use of ideophones across different semantic domains, and different languages and cultures, contributing to our understanding of the relative affordances and limitations of ideophones as spoken depictions (see e.g. Akita 2013; Dingemans 2012; McLean 2021). Where stimulus-based elicitation can be thought of as a tool to map out the edges of the ideophone lexicon, techniques like FREE-LISTING are a way to fill in the middle—including by applying the studied depictive conventions. This also establishes networks of related ideophones, which can then be investigated collectively. SIMILARITY JUDGEMENT TASKS are one excellent way to investigate relationships between ideophones and the structure of the ideophone lexicon, this time using a bottom-up approach. While the top-down approach employed in (e.g.) stimulus-based elicitation is useful for comparative purposes, similarity judgement tasks offer an opportunity to investigate the lexicon on its own terms. Stimuli can be taken from data generated using stimulus-based elicitation and free listing, which ensures broad coverage of key domains, as well as opportunities to look at fine-grained relationships between connected ideophones in more detail.

The remaining techniques (sensory ratings, exemplar listing, folk definitions) tackle the question of ideophone meanings from different angles. SENSORY RATING TASKS provide a very broad picture of the sensory modalities involved in an

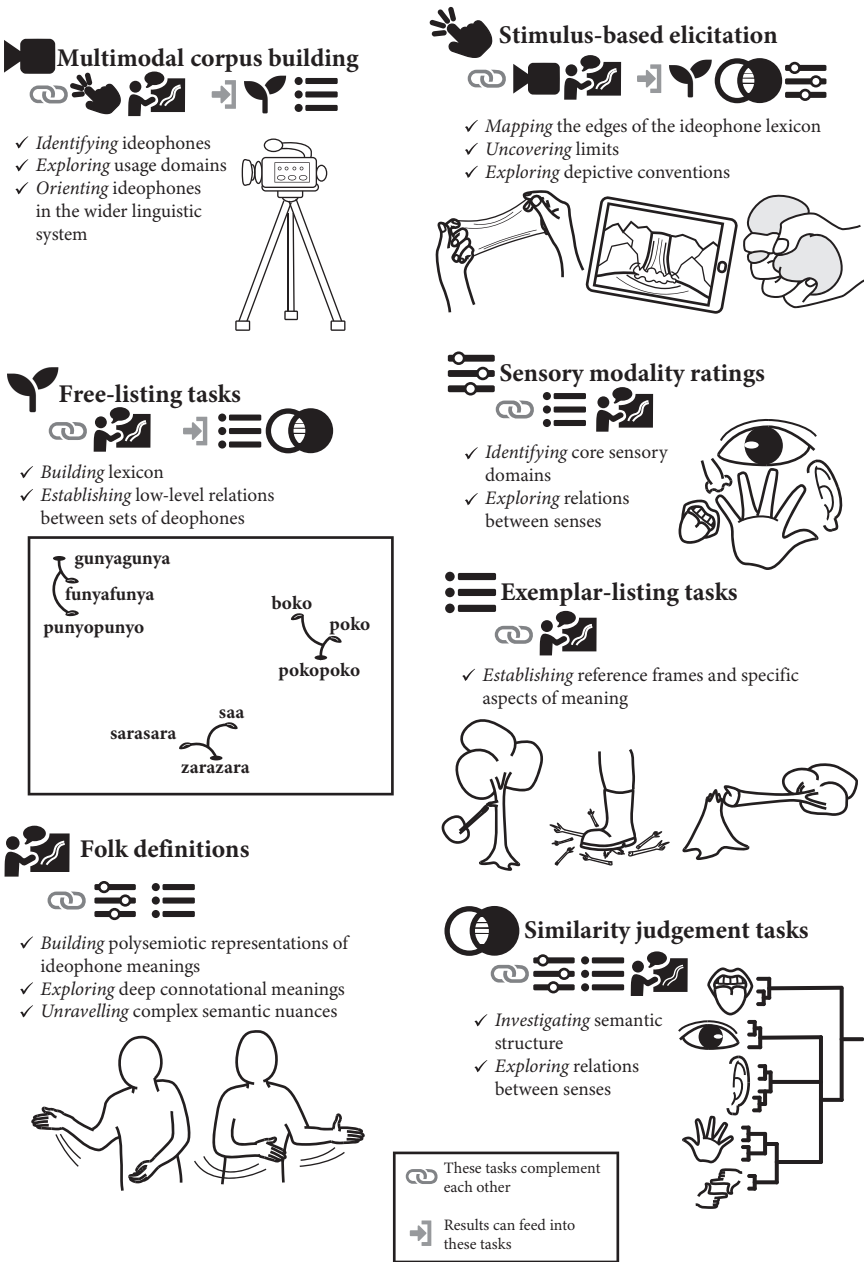


Figure 5.1 A multi-methods toolkit for documentary research on ideophones

ideophone's meaning from a quantitative, multisensory perspective. They can also inform the interpretation of results from other tasks, by providing a hint as to which aspects of meaning to focus on. EXEMPLAR LISTING is useful for establishing specific frames of reference, and for untangling relationships between similar ideophones. For this reason, it pairs well with free-listing data, as free-listing produces semantically close ideophones whose meanings can then be teased apart through a comparison of exemplars. Finally, FOLK DEFINITIONS round out the picture by bringing in an emic perspective on the contrasts most essential to ideophones in the language under study, as well as an opportunity to discuss deeper connotational meanings not touched on in other tasks (see e.g. Badenoch, Purti, and Choksi 2019; Choksi 2020a; Nuckolls 2010a, 2010b). Additionally, the relatively unstructured set-up in this task offers the flexibility to engage with a diversity of semiotic resources—gesture, drawings, stories, etc.—in explaining the meanings of ideophones.

At each step, the techniques provide results that can be used in the analysis and documentation of the ideophone lexicon, from semantic relations to polysemiotic illustrations. Moreover, the analytical insights from the free-listing, sensory rating, and similarity judgement tasks in particular, offer meaningful ways of structuring ideophone dictionaries that go beyond simple alphabetized lists of words, the inadequacy of which has long been noted (e.g. Samarin 1967).

We conclude the chapter with a discussion of ideophone lexicography, showcasing some of the most creative, pioneering examples of ideophone dictionaries today, as well as dreams for the dictionaries of tomorrow. Particular focus is given to *polysemiotic* representations of ideophone meanings—including different types of visual and aural media, gesture, metaphor, stories, and songs—and *dynamic* representations of lexical structure—achieved through tagged, networked lexical entries. From collecting ideophones, to determining their meanings, to representing them lexicographically, we hope that the toolkit presented in this chapter provides a useful guide for engaging with ideophones, those words that are 'such fun to use' (Welmers 1973) and so rewarding to study.

## 5.2 Collecting ideophones

Ideophones can be defined as 'marked words that depict sensory imagery'. If we wanted to strip this definition down to its most essential parts, we could say that ideophones are lexicalized depictions, as the markedness of ideophones and their connection to sensory imagery arises as a consequence of their depictive nature (for more discussion see Dingemanse 2012).

Looking for ideophones, then, is really about looking for lexicalized depictions. But what are depictions? The simplest way to think about depiction is as a mode of representation that involves *showing* rather than telling. Form–meaning

relationships in depictive signs are built on analogical resemblance: aspects of form correspond to aspects of meaning, and small changes in form correspond to small changes in meaning (Taub 2001; Tufvesson 2011). For example, when Japanese speakers hear the ideophone *korokoro*, they imagine a light object rolling. If they hear *gorogoro*, they imagine a heavier object rolling. This is very different to the interpretation of ordinary words, in which small changes in form can correspond to an entirely different meaning (cf. Japanese *koshi* ‘lower back’ versus *goshi* ‘etymology’), or to no meaning at all—a property known as lexical discreteness (Diffloth 1976).

The best place to look for depictions is natural language, which makes MULTIMODAL CORPUS BUILDING an important first step in establishing a class of ideophones in a language. Depictive signs, including ideophones, can be found both in the language of everyday conversation and at the highest levels of verbal art, but the common denominator is usually an attempt to communicate sensory experiences. In day-to-day use, ideophones are common in procedural discourse, particularly with tasks that engage the hands, body, and senses, such as cooking, healing, dancing, building, and crafting (e.g. Badenoch 2021; Hatton 2016; Mihas 2013; Muto 2003; Sakamoto et al. 2014; Tufvesson 2011; Yasui 2023). Ideophones also feature in verbal art, where they make narratives (e.g. Baba 2003; Badenoch, Choksi, et al. 2021; Lydall 2000; Noss 1970; Schaefer 2001), songs (Choksi 2020b; Ibarretxe-Antuñano 2017; Klassen 2000; Zide 1975), poems (Barrett, Webster, and Huumo 2014; Ibarretxe-Antuñano 2017; Kisku, Murmu, and Choksi 2020; Mphande 1992; Noss 1989; Nuckolls 2006; Webster 2008, 2017), and even jokes (Bermúdez 2020; Lydall 2000; Samarin 1969) and weather reports (Van Hoey 2018) more vivid and entertaining. Finally, ideophones feature in media, particularly comics (e.g. Gava 2018; Ibarretxe-Antuñano 2017; Pratha, Avunjian, and Cohn 2016), branding, and advertisements (Bahón-Araiz 2021; Ezejideaku and Ugwu 2010; Ibarretxe-Antuñano 2017; Medvediv and Dmytruk 2019), where they are used to engage and appeal to the senses. It hardly needs to be stated that a multimodal approach is ideal here, as researchers of ideophones have long noted that these are frequently accompanied by distinctive gestures and facial expressions which support their meanings (e.g. Diffloth 1972; Kita 1993; Klassen 2000; Kunene 2001; Dingemans 2015a; Mihas 2013; Nuckolls 2020). Zlatev et al. (2023) provide a detailed account of their building of a multimodal corpus of speech, gesture, and depiction in recordings of Pitjantjatjara and Paamese sand-drawing performances. Although the study doesn’t deal with ideophones specifically, it contains excellent methodological insights and strategies for working with and coding for polysemiosis in multimodal corpora, and as depictions the gestures and sand drawings are semiotically similar to ideophones (even though they occur in a different modality).

It is also a good idea to establish a collection of media (videos and pictures) of the things ideophones are used to depict, which can later become a resource

for more targeted elicitation, or for the creation of dictionaries. This can be done alongside corpus building. See Section S1 of the online Supplementary Material for some examples.

When analysing corpora, there are three key strategies to look for which can indicate depictive speech. These are framing, foregrounding, and backgrounding (Akita 2021a). Examples of framing include the use of quotative particles, pauses, and isolated clauses to offset the depiction from the speech stream. Examples of foregrounding include the use of prominent intonation (distinctly high or low pitch), a marked voice quality (e.g. creaky voice, harsh voice, whisper), marked loudness (loud or quiet speech), marked speech rate (fast or slow), expressive morphology (e.g. lengthening, reduplication), and marked phonotactics to highlight the depiction. Examples of backgrounding include the use of low pitch, quiet speech, or fast speech to background the surrounding descriptive material and spotlight the depiction (for further discussion see Akita 2021a).

Pay attention to words that occur in these depictive constructions, and which look as if they might together form a coherent, open lexical class. Establishing such a class is usually (or most easily) done on morphophonological criteria. In many cases, it is even possible to identify a set number of morphophonological templates which ideophones employ (for examples see Abubakari 2017; Akita 2009; Diffloth 1976; Mihas 2012; Osada, Purti, and Badenoch 2020; Reiter 2012). Often, ideophones are phonotactically distinct from other native words. They might employ different syllable structures, or exhibit skewed phonotactic distributions. Feature harmony, particularly vowel harmony, is also common, while ideophones in tonal languages may show restricted tonal melodies (Dingemans 2012).

These differences arise because ideophones use the phonemes of the language differently to how they are used in prosaic vocabulary (Diffloth 1979)—they use them for depictive purposes. For example, Japanese ideophones frequently employ voiced obstruents in the word-initial position, which is exceedingly rare among other native words (Akita 2009). This unusual distribution arises because voiced obstruents serve an important depictive function in the Japanese ideophone lexicon, where alternations between voiced and voiceless obstruents are used to represent semantic differences in intensity (as in the *korokoro* versus *gorogoro* example from earlier) (Hamano 1998; see also Tufvesson 2011 for similar examples in Semai).

Depictive conventions are another key thing to look for when identifying a class of ideophones. Alternations in consonant voicing, vowel quality, tone (where applicable), and nasality are commonly used with evaluative intent to represent differences in suprasensory properties such as size, intensity, and brightness (see Marks 1978: 52ff.). with evaluative intent. For example, vowel quality is used in Korean ideophones to indicate positive or negative evaluations of different colours, smells, and tastes, while the intensity and depth of the taste/smell/colour is

depicted using Korean's three-way distinction between plain, tense, and aspirated stops (Rhee 2019; Rhee and Koo 2017).

Even more common are structural alternations such as lengthening and reduplication, or expressive morphology (Zwicky and Pullum 1987), which is commonly used to depict duration and aspect. When used depictively, these processes are often qualitatively and functionally different from their use in e.g. regular processes of inflection and derivation in other word classes. Specifically, they seem to offer more room for on-the-fly modification with analogical iconic interpretations. For example, while other uses of reduplication usually involve a set number of repetitions, depictive uses of reduplication in ideophones can involve varying numbers of repetitions, and even introduce pauses between repetitions, all with a very literal, iconic interpretation (e.g. Dingemanse 2015b; Osada, Purti, and Badenoch 2020).

Once you have uncovered depictive conventions operating in the ideophone system of a language, use of these depictive conventions is one of the best ways to identify particular forms as ideophones. It is also an excellent way to discover new ideophones. For example, for those who know how the Japanese ideophone system works, the existence of an ideophone like *korokoro* implies the possible existence of related ideophones like *gorogoro*, *kurukuru*, *guruguru*, *kirikiri*, *girigiri*, etc., all with related meanings.

The above methods for identifying ideophones are language-agnostic: they rely on the semiotics of depictive constructions and cross-linguistically attested properties of ideophonic lexical items to identify a lexical class of ideophones in a given language. Once such a class is identified, this will provide a view of relevant language-specific resources, for instance, particular grammatical categories or morphosyntactic devices (Akita 2017; Park 2020; Van Hoey 2023). Ideophones can constitute a distinct grammatical category in the language (e.g. Diffloth 1976; Doke 1935), but they can also straddle multiple categories (e.g. Abubakari 2017; Ameka 2001; Amy Pei-jung 2017; Newman 1968). Across languages, they are often associated with grammatical resources expressing properties and actions, such as adverbs, adjectives, converbs, and verbs, and existing grammatical descriptions may use such terms for ideophonic items.

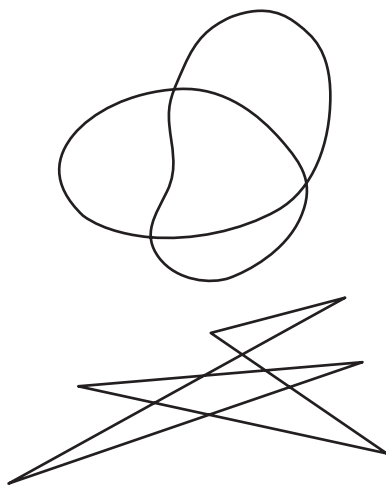
### 5.2.1 Targeted techniques

Once you have an idea of how to identify ideophones in the language—using knowledge of their depictive conventions, morphophonological structures, and grammatical categories—it becomes possible to adopt more targeted approaches to collecting them. These should be seen as a supplement to rather than a substitute for corpus building, without which it is impossible to achieve a proper understanding of the broader functions and place of ideophones in a language. However,

for internal investigations of the ideophone system, targeted experimental techniques can be very helpful. Here we discuss two such techniques—stimulus-based elicitation and free-listing tasks.

STIMULUS-BASED ELICITATION has its roots in the study of basic colour terms by Berlin and Kay (1969), where the naming of Munsell colour chips was used to identify abstract colour terms and compare their boundaries across languages. The purpose of the research was to identify universal constraints on the development of colour lexicons, although subsequent work has challenged the universality of the original claims (e.g. Haynie and Bower 2016; Levinson 2000; Lucy 1997). Since Berlin and Kay, researchers have expanded the model to investigate the naming of stimuli in a wide variety of sensory domains (e.g. Majid et al. 2018). Stimulus-based elicitation has much to offer investigations of ideophones. Since ideophones depict sensory imagery, stimuli that target sensory experiences are particularly effective at eliciting them (Tufvesson 2007). And the depictive mode of representation which ideophones employ is expected to lead to certain constraints on their reference (Akita 2013; Dingemanse 2012; McLean 2021), which can be probed with stimulus-based elicitation tasks. Using stimuli also provides an opportunity to design contrasts into the task that can be used to explore depictive conventions.

However, the kinds of stimuli traditionally employed in these tasks are not necessarily the most appropriate for ideophones, and so applying this methodology to ideophones requires some rethinking. Figure 5.2 is a typical example of the type of



**Figure 5.2** Unidimensional shape stimuli

*Source:* Köhler (1929)



stimuli used in these (comparative) studies.<sup>1</sup> The stimuli are designed to represent shapes, and so every other aspect of the stimuli—their size, colour, etc.—is kept constant. The shape of the stimuli then becomes the only thing participants can talk about. This design is very good for comparability, but it has some downsides when used with ideophones. One is that ideophones rarely encode single percepts. For example, there is an ideophone in Mundari that can be used for pointed things, *suisui*, but it's unlikely that a Mundari speaker would use it in response to the pointed shape in Figure 5.2, because it also encodes much more than that: it is used to talk about things like green rice shoots, and conveys a sense of health and vitality of something growing tall and well (Osada, Purti, and Badenoch 2019b). Rather than single percepts, the meanings of ideophones frequently encode *clusters* of sensations (e.g. Akita 2012; Badenoch 2021; Diffloth 1972; Nuckolls 2019; Samarín 1967), which are not necessarily evoked by abstract, unidimensional stimuli.

This is a well-known problem when imposing an etic perspective on language structure, to the neglect of the emic perspective (Pike 1967). On the other hand, without some kind of etic grid we lose the ability to make comparisons between languages (Dingemanse 2012). It is possible, however, to make space for both perspectives. One way is to standardize the structure of the elicitation task, but localize the stimuli (Tufvesson 2007).

Table S1 in the online Supplementary Material (<https://osf.io/q8a6n/>) presents a framework for how to structure a stimulus-based elicitation task to investigate the use (and non-use) of ideophones in key domains, while also exploring depictive conventions (semantic domains are based on previous work by Ibarretxe-Antuñano 2019; Van Hoey 2023). The domains are based on where we find *lexical gaps* in the ideophone systems of various languages. The distribution of these gaps across languages appears to be non-random, and driven by the depictive affordances of speech. This has led researchers to propose an *implicational hierarchy* for the semantic development of ideophone lexicons (Akita 2013; Dingemanse 2012; Kilian-Hatz 2001; McLean 2021): SOUND < MOVEMENT < FORM < TEXTURE < OTHER SENSORY PERCEPTIONS. The hierarchy predicts that languages possessing ideophones in one domain in the hierarchy will also possess ideophones in all domains *preceding* that domain. The last category in the hierarchy is deliberately vague, as the distribution of ideophones in these later domains is less predictable and is very likely influenced more by cultural preoccupations than depictive affordances (see discussion in McLean 2021). However, based on currently attested distributions, LIGHT, COLOUR, TASTE, SMELL, THERMOCEPTION, INTEROCEPTION, and EMOTION are suggested as relevant subcategories. Stimulus-based elicitation is an excellent means to test the predictions of the hierarchy in different languages, while also offering a starting point for exploring key corners of an ideophone lexicon.

<sup>1</sup> Taken from the classic malume-takete stimuli used in experimental research on sound symbolism (Köhler 1929).

It is also an excellent way to investigate depictive conventions, and added dimensionality is provided in Table S1 by contrasting suprasensory properties, particularly INTENSITY, QUALITY, DURATION, and EVALUATION (see Section S1 of the online Supplementary Materials for more details). Depictive language is particularly apt at encoding fine-grained, gradient distinctions in suprasensory properties. Eliciting contrasts in these suprasensory properties thus both encourages the use of ideophones, and also provides an opportunity to investigate depictive conventions and how these transfer between different sensory domains.

The stimuli chosen to represent these contrasts can then be decided on an individual basis, according to the goals of the particular study. For instance, comparative studies may wish to aim for a greater degree of standardization than studies of individual languages, where stimuli can be more localized. Our recommendation is to focus on ecologically relevant stimuli that evoke the rich, multisensory experiences of life. For example, Figure 5.3 presents some options for stimuli that may be better suited to elicit ideophones for curved and spiky shapes than the abstract unidimensional contrast of Figure 5.2. Further examples can be found in Section S1 of the online Supplementary Materials.

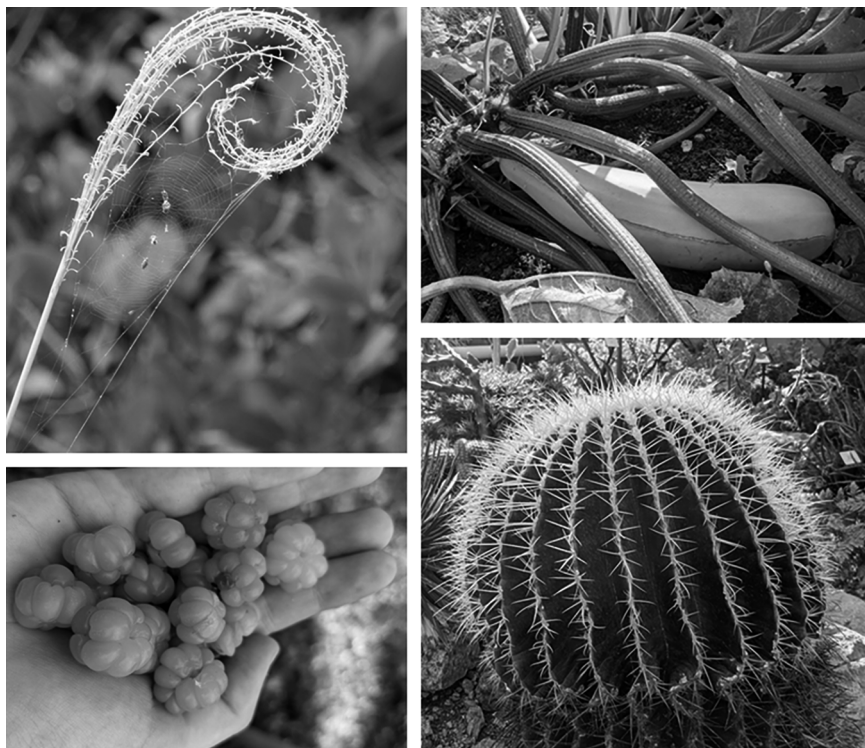


Figure 5.3 Multidimensional shape stimuli

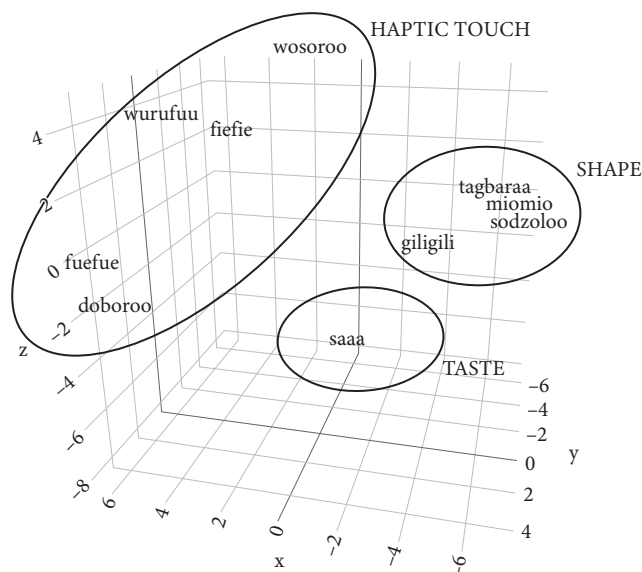
The main caveat when using multidimensional stimuli is that it introduces greater room for uncertainty around which aspects of stimuli the elicited ideophones respond to (Samarin 1967). For this reason, the meanings of ideophones elicited during these tasks should never be taken for granted, but investigated in their own right at a later date. It is recommended to keep the tasks of collecting ideophones and investigating their meanings separate, as asking too many questions about the meanings of ideophones elicited using a stimulus kit not only slows down the task, but could also lead participants to use fewer ideophones in their responses if they feel the researcher is not able to understand them (see discussion in Diatka 2014: 32). Further guidance on the use of stimulus-based elicitation in linguistic fieldwork can be found in Majid (2012).

Stimulus-based elicitation is a good technique to map out the edges of the ideophone lexicon, and establish its limits. It is also very good for investigating depictive conventions. However, one limitation of stimulus-based elicitation is that it forces ideophones into particular sensory domains, when in reality the meanings of most ideophones straddle multiple domains (e.g. Badenoch 2021; Badenoch, Osada, et al. 2021; Nuckolls 2019). This is why in Figure 5.1 we recommend combining stimulus-based elicitation with sensory rating tasks (Section 5.3), as the sensory rating task allows for the exploration of multisensory aspects of ideophone meanings. For example, the core sensory domains used for stimulus-based elicitation (e.g. the domains in Table S1 in the Supplementary Materials) can also be used as the sensory domains on which these elicited ideophones are rated during sensory rating tasks, allowing researchers to explore the overlap between different domains and patterns of multisensoriality. Of course, a limitation of the domains proposed here is that they are informed by a Western model of the senses, based on divisions made in English. They may not necessarily form natural divisions in other languages, which is why it is also important to also investigate the emic perspective on the structure of the ideophone lexicon using techniques like similarity judgement tasks (Section 5.4) and folk definitions (Section 5.3), which centre the perspectives of ideophone users themselves, as suggested in Figure 5.1.

Another limitation of stimulus-based elicitation is that it is quite involved and time-consuming, which can be tiring for research participants. Stimulus-based elicitation is thus not a practical way to collect large numbers of ideophones. If this is the aim, then it is better to use less involved methods, like *FREE-LISTING*. There are two ways in which free-listing can be used as a technique to study ideophones. The first is to decide on a set of semantic domains (e.g. water sounds, animal movements, textures of food, etc.—see Table S1 for more ideas), and ask participants to list all the ideophones they can think of in each domain. A second way is to decide on a set of ideophones, and ask participants to list all the other ideophones that come to mind in relation to each of these ideophones. As Felix Ameka once said, ‘ideophones are first and foremost a type of words’ (Ameka 2001: 26), and speakers usually have a metalinguistic awareness of this that makes

it possible to ask for ‘more words of the same kind.’ The technique can even be applied in a brute-force way to elicit examples of any kind of ideophone (regardless of semantic domain) (e.g. Murasugi and Akita 2021). However, as with all the methods presented here, the lexical status of elicited items should never be taken at face value. The ideophone class in any language can have fuzzy boundaries, and participants can include non-ideophonic words that show formal or semantic similarities to ideophones in their responses to these tasks. Morphophonological tests and semiotic analysis (as discussed in Section 5.2) can help to clarify the status of elicited words. Further analysis may also provide valuable evidence about folk conceptions of word classes and linguistic structures, and bring to light processes of language change that enable traffic between ideophonic and prosaic lexical strata.

Free-listing is not only a means of data collection. Although on the surface the technique appears very simple, the data produced in free-listing studies can be quantitatively analysed in ways that yield rich insights into the structure of different corners of the ideophone lexicon. Psychologists have long used free-listing data to study the organization of the mental lexicon (e.g. Deese 1965), which can then be visualized using techniques like multidimensional scaling (see Figure 5.4 for an example). Medin et al. (2010) illustrate the application of this technique to free-listing data on ‘animals.’ Several Japanese studies have also applied these techniques to data from stimulus-based elicitation, in the domains of food textures (Hanada 2020), surface textures (Doizaki, Watanabe, and Sakamoto 2017;



**Figure 5.4** MDS plot showing relationships between Siwu ideophones

Sakamoto and Watanabe 2017), and surface appearance (Hanada 2016). However, these are all lab-based studies using very large stimulus kits, which may be difficult to replicate in a fieldwork setting. The MDS plot in Figure 5.4 was built using data from a similarity judgement task (see Section 5.4), and shows different sensory-based clusters of Siwu ideophones. As suggested in Figure 5.1, similarity judgement tasks make good follow-up studies to free-listing tasks, as the free-listing data can be used as stimuli for the similarity judgement task.

### 5.3 Determining the meanings of ideophones

One of the most challenging aspects of working with ideophones involves understanding and explaining their meanings. As an illustration, the authors of one Zulu dictionary found that entries for ideophones took an average of three times longer to compile than the entries for any other word class (de Schryver 2009). In this section, we introduce three types of data that can make unravelling the meanings of ideophones more manageable: sensory ratings, exemplars, and folk definitions.

SENSORY RATING TASKS, in which participants are asked to rate on a Likert scale how strongly they experience the meaning of different words through the various senses (e.g. by hearing, by seeing, by touching, by tasting, by smelling, etc.), are increasingly common in psycholinguistics, but have so far been underused in research on ideophones (though see Iida and Akita 2023; Yaguchi 2011 for some examples)—a key opportunity given the complex clusters of sensory information encoded in ideophones (see e.g. Diffloth 1972; Nuckolls 2019), and the burgeoning popularity of perceptual norming studies (e.g. Lynott et al. 2020). Early studies used the traditional five-senses model (e.g. Chen et al. 2019; Lynott and Connell 2009; Miklashevsky 2018; Morucci, Bottini, and Crepaldi 2019; Speed and Majid 2017), but recent approaches have introduced ratings of interoception (experienced ‘by sensations inside the body’) as well (Speed and Brybaert 2021). As we have already seen, interoceptive senses can also be relevant to the meanings of ideophones, and so a six-sense model is recommended for ideophones as well. As the visual domain is very broad, with subcomponents that do not appear to be equally treated in ideophone lexicons worldwide (McLean 2021), researchers applying this method to ideophones may also wish to further subdivide the visual domain into components like movement, form, light, and colour (see Table S1 in the online Supplementary Materials for examples).

Sensory ratings provide a means of representing the multisensory aspects of ideophone meanings. For example, the Japanese ideophone *āzaraāzara* receives equivalently high ratings in the visual, auditory, and tactile modalities (with mean ratings of 4.56, 4.89, and 4.36 respectively) (Yaguchi 2011). It is used for things like bangles and keys and coins, and conveys a holistic impression of jangling

sounds, the hardness of the objects, and appearance of things all jumbled up. Sensory ratings can also be helpful when trying to understand connections between the variety of situations in which an ideophone is used, which can sometimes be confusing. For example, Badenoch (2021: 20) discusses the Santali ideophone *sāi-sāi*, which he found referred to such seemingly diverse situations as pre-boiling water, the darting forward of a snake as it strikes, and the flight of an arrow to its target. He eventually identified three core components of meaning linking these disparate uses: a *whiish* sound (of the small bubbles in the water, the snake moving across the ground, and the arrow moving through the air); a quick, straight movement (of the bubbles shooting to the surface, the snake shooting forward, or the arrow shooting through the air); and a sense of anticipation (of the water boiling, the snake biting, and the arrow hitting its target). Sensory ratings can facilitate such semantic investigations by providing a hint as to which *aspects* of the holistic sensory experiences depicted by ideophones are most central to their meanings, whether the sound, the image, or the emotions evoked in each situation.

The collection of these sensory scenes can also be formalized in EXEMPLAR LISTING TASKS. In an exemplar listing task, participants are provided with a list of ideophones and, for each ideophone, are asked to provide examples of things or situations to which the ideophone can refer (e.g. O'Meara, Kung, and Majid 2019; Ruts et al. 2004; Samarin 1970; Shepard 1999; Wnuk, Laophairoj, and Majid 2020; Wnuk and Majid 2014). As with the Santali example above, key elements of the ideophone's meaning can then be extracted from the variety of situations in which it is used. Exemplar listing data can also be helpful when dealing with sets of related ideophones as relevant aspects of meaning often become clear when items in the set are contrasted (Badenoch 2021; Samarin 1967). Again, Badenoch (2021) provides an illustration of this, in a comparison of Mundari ideophones for different textures of *dal*, a type of lentil curry:

*lidapada*—perfect dal, thick enough to scoop with roti (flatbread) without it falling off, beans are full and soft. Thick and stiff.

*ladapada*—dal that was *lidapada* but has been overcooked so the beans are starting to break down, there's less water, and it becomes too sticky. Thick and all in a mush.

*ledepede*—dal that is suitable for eating with rice; the shape of the beans is almost gone and it's more like a paste. Thin and slick.

*lodopodo*—dal that could have been *ledepede* but too much water was used in the cooking and it was cooked too long. Thin and sticky.

In considering the ideophones in relation to each other, key aspects of their meaning—such as the amount of water, the degree to which the beans are broken

down, and the resulting stickiness— become apparent. It is therefore recommended when conducting an exemplar listing task to list ideophones with similar meanings together. This encourages the use of more informative exemplars that highlight differences between meanings. When items are presented in isolation, participants may simply provide an exemplar like ‘dal’ for *lidapada*, *ladapada*, *ledepede*, and *lodopodo*. By presenting these words together, exemplars are likely to be much more elaborate (e.g. ‘dal for eating with roti’). For this reason, ideophones collected using the free listing method described in Section 5.2.1 make very good items on exemplar-listing tasks.

One limitation of the techniques discussed so far is that the analysis of meaning is largely through categories identified by the researcher. This neglects the emic perspective, which is why these tasks should be seen as supplements to rather than replacements for the core source of information about the meaning of ideophones—speakers themselves. FOLK DEFINITIONS provide perhaps the richest source of data on the meanings of ideophones. These are informal paraphrases explaining the meaning of a targeted word or group of words, collected in the language under study, and video-recorded to capture multimodal features such as gesture, facial expressions, and enactments that contribute to the explication (see Dingemans 2015a for a complete guide). It may also be useful to provide participants with a pen and paper (or other drawing materials) that they can use to assist in their explications, or if discussing ideophones for which you have exemplars, to bring either the exemplars themselves or photographs or videos of these exemplars that the participants can refer to. For example, if the ideophones under study were elicited using stimuli, then it is good to use these stimuli when discussing them.

Many of the techniques speakers use to explain the meanings of ideophones—listing contexts of use, or referring to related ideophones as semantic anchoring points—overlap with the targeted techniques we have already discussed, providing some external validation for the usefulness of these methods. However, through folk definitions we have the opportunity to see the paths speakers take to make these links, which may not overlap with the paths taken by the analyst. The free set-up employed in folk definitions, which contrasts with the highly structured nature of the other tasks, also provides an opportunity for speakers to engage with multiple semiotic resources—e.g. gesture, pictures, drawings, stories, metaphors—to explain the meanings of ideophones. These are often highly effective at communicating ideophone meanings, in ways that are hard to achieve through prosaic language alone.

For example, Nuckolls et al. (2017) provide some striking illustrations of how bodily and vocal performances can lead to better definitions of ideophone meanings. Using the example of the Pastaza Kichwa ideophone *polang*, the authors discuss how examining bodily performances accompanying this ideophone led to a ‘light-bulb’ moment that unified apparently disparate uses of the ideophone to

refer to canoes gliding across the water, and animals floating upwards towards the surface. They noticed that in many of their video recordings participants seemed to ‘become’ the floating objects they were describing, particularly through their eye gaze. If the perspective of *polang* is from the object in the water, they realized, then “there is relatively little difference between gliding and floating upwards and gliding or floating across the surface of the water. Both involve movements that are done with relative ease, a minimum of effort, and an absence of thrashing” (Nuckolls et al. 2017: 166). This led them to propose the revised definition of *polang*: “Simulates a gliding movement *from underwater* to the surface or across water. Repetitions simulate bobbing movements” (Nuckolls et al. 2017: 166; emphasis is our own).

As another example of how multimodal representations can illuminate meaning where words fail, Dingemanse (2015a: 228) describes how the distinction between the Siwu ideophones *giligili* and *minimini*—both of which have to do with roundness—became clear to him only after comparing the types of gestures that speakers used for them in folk definitions. He noticed that people consistently gestured *giligili* by tracing circles in the air with their index finger, while for *minimini* they consistently moulded a sphere with both hands. From this it became clear that the difference between the two was a matter of dimension; *giligili* depicts a flat circular shape, while *minimini* depicts a sphere. Similarly, Badenoch et al. (2021) provide several examples of how gestures accompanying folk definitions of Mundari ideophones were helpful in extracting core features of their meanings.

As well as illuminating fine-grained semantic details, different performance strategies can more generally provide an indication of the kinds of sensory meanings an ideophone encodes. Sound ideophones, for instance, are less likely to be accompanied by gesture (Hatton 2016; Mihas 2013; Nuckolls 2020), but may be performed in qualitatively different voices, or even accompanied by vocal depictions (Akita 2021b; Badenoch, Choksi, et al. 2021). Ideophones relating to movement are most likely to occur with gestures depicting the type of movement, while eye gaze or tracing gestures may be used to indicate the path or direction of the movement (Kita 1997; Mihas 2013; Nuckolls 2020; Reiter 2012). Nuckolls (2020) conducted an in-depth analysis of gestures used with Pastaza Kichwa ideophones. She found that ideophones relating to shape frequently occurred with tracing and moulding gestures, or bounding gestures<sup>2</sup> to indicate an expanse of visual phenomena. Colour ideophones also frequently occurred with bounding gestures. Mihas (2013) found that ideophones depicting internal sensations are less likely to occur with gesture in general, but when they do occur with gesture this often involves deictic (pointing) gestures on the body indicating the origin of

<sup>2</sup> Bounding gestures are gestures involving the use of the fingers or hands to depict figurative distance or spatial extent. For an example, see the gestures with the Pastaza Quechua ideophone *shinki*, available at <https://quechuarealwords.byu.edu/?ideophone=shinki> (Nuckolls 2021).



the feeling. Anecdotally, Japanese ideophones for pain and emotions seem to frequently occur with distinctive facial expressions (some examples can be found in Akita 2019). Taste and smell ideophones are not as well investigated, but it appears that gesture may be rarer with these ideophones (Mihas 2013). A typology of vocal and bodily performances occurring with ideophones of different types is an important area for future research.

A final source of multimodal explications of ideophones which has not yet been explored, but which we believe has some potential, is games of charades.<sup>3</sup> These games are particularly suited to the study of ideophone meanings as they are highly performative, and require participants to home in on specific meanings, while distinguishing related meanings. Not only that, but they provide an excellent opportunity to collect data from a wider variety of participants than one might generally consult within a fieldwork setting. A real-life example involving Japanese ideophones, and available on YouTube, is provided in the online Supplementary Materials (Section S1). It is particularly informative to consider how the pantomimers alter their performances in response to incorrect guesses. For example, after the other participants incorrectly guess *puyopuyo* ‘pudgy’ for a gesture intended to represent the ideophone *boyon* ‘blubbery’, the pantomimer dramatically slows down and widens her gestures, at which point the other participants are then able to guess the ideophone correctly.

#### 5.4 Representing ideophones lexicographically

Having collected all this information, the final challenge researchers of ideophones face is how to represent these words lexicographically. In this section, we discuss how the meanings of ideophones can be conveyed, what information might be included in ideophone entries in a dictionary, and how these dictionaries can be structured. The main conclusion is that ideophones require polysemiotic representations, adapted to their specific sensory properties. That is, different types of media and modes of representation are appropriate for different ideophones (see Akita 2016).

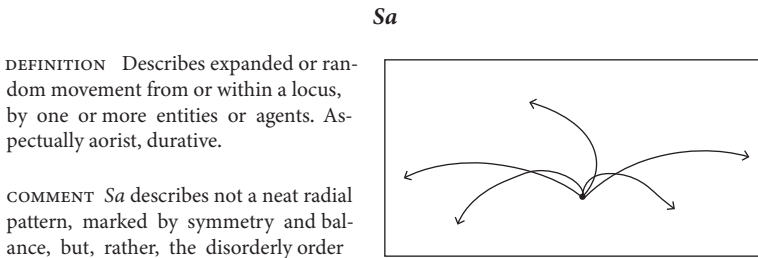
Lexical entries for ideophones can also benefit from a different structure to entries for other words. Some things to include are relevant sensory modalities, notes on cooccurring gestures or expressive pronunciations, phonosemantic mappings, references to related ideophones and the differences between them, and notes on collocational information and background frames.

<sup>3</sup> Pictionary could also be a good game to try if you want to collect visual representations of ideophone meanings, e.g. for use in lexicographic materials (see Section 5.4).

Finally, we discuss how ideophone dictionaries can be structured in a way that highlights the connections between different ideophones, the structure of the ideophone lexicon as a whole, and the depictive conventions operating in the wider ideophone system. This can be achieved through extensive use of tagging, and dynamic network visualizations that provide holistic representations of relations and structure in the ideophone lexicon.

### 5.4.1 Polysemiotic representations

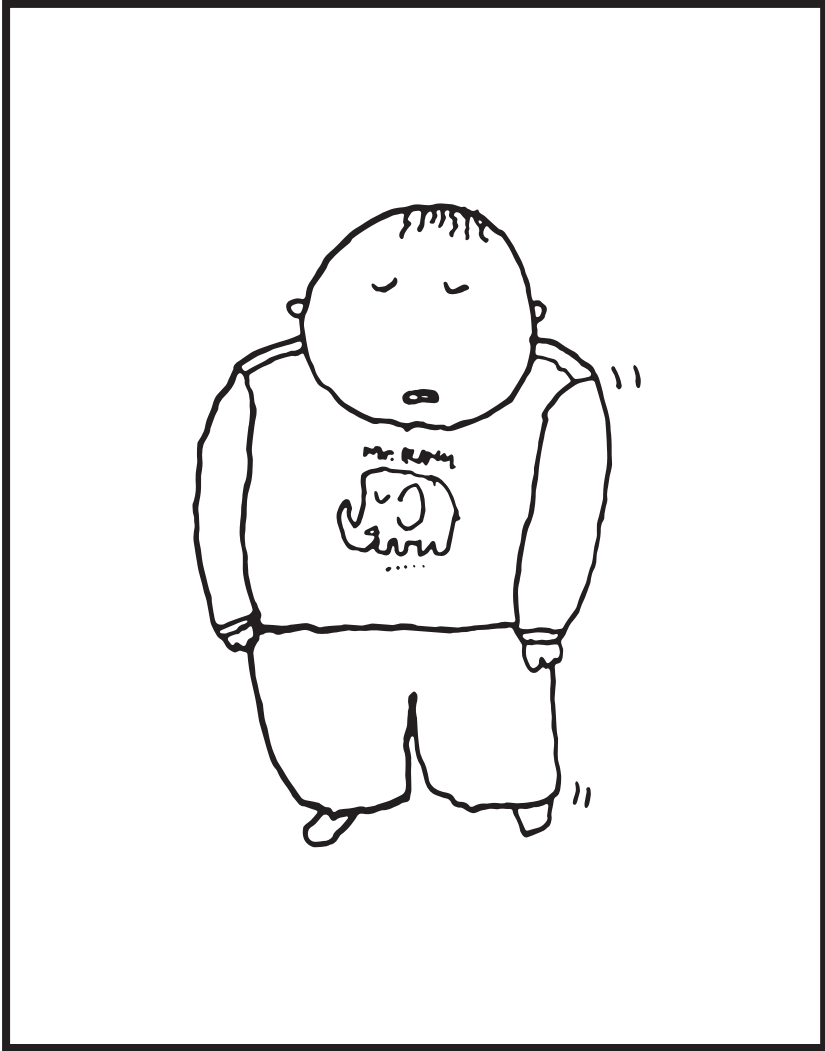
Some of the most pioneering examples of ideophone dictionaries have exploited multiple modalities to represent ideophone meanings. Paper dictionaries, for example, have made heavy use of the visual modality; some examples are given in Figures 5.5, 5.6, and 5.7. Figure 5.5 is taken from Janis Nuckolls’s seminal monograph *Sounds Like Life* (Nuckolls 1996), a third of which is devoted to a series of appendices describing, exemplifying, and illustrating the meanings of Pastaza Kichwa ideophones, often using elegant diagrams of hypothesized underlying sensory schemes. Depictive prosody is also captured through innovative typography in example sentences, shown in Figure 5.6. Here, the relative typographical height of ideophone tokens stands in analogical relation to the pitch at which it is pronounced.



**Figure 5.5** Lexical entry for *sa*  
 Source: Nuckolls (1996: 145). Reproduced with permission.

16. Ña apari-sha, waska-ndi ña sa<sup>sa</sup> sa<sup>sa</sup> ichari-shka  
 then carry-COR rope-both now sprinkle-PERF  
 “Then, carrying (the basket) with the rope, she sprinkled it sa<sup>sa</sup> sa<sup>sa</sup> .”

**Figure 5.6** Example sentence for *sa*  
 Source: Nuckolls (1996: 147). Reproduced with permission.



**noso noso** [A][B]

Describes moving slowly, clumsily. Often used to describe the movement of large people and animals. Lumbering

のそのそ

動きが鈍いさま。体が大きい人や動物の動きを表すことが多い。

**Figure 5.7** Lexical entry for *nosonoso*

Source: taken from Gomi (1989) as below.

Figure 5.7 comes from another classic, Taro Gomi's (1989) *Illustrated Dictionary of Japanese Onomatopoeic Expressions*. Comparing the visual representations of ideophone meaning in Figure 5.5 and Figure 5.7 is itself a lesson in semantic typology. The illustrations for Pastaza Kichwa ideophones are very simple and

underspecified compared to the illustrations for Japanese ideophones, which contain much more information—reflecting their highly specific frames (Akita 2012). For example, *nosonoso* does not refer to just any kind of slow, clumsy movement, but specifically evokes the lumbering of large people and animals. Pastaza Kichwa movement ideophones, on the other hand, take a much wider variety of referents (tokens of *sa*, for instance, find it referring to salt, logs, clothes, sea turtles, or even entire tribes of people; see Nuckolls 1996: 146). Pastaza Kichwa ideophones evoke very purely the type of movement, as Nuckolls’s illustrations capture. Drawings of ideophone meanings are thus not only a tool to represent those meanings, but also a means of analysing them, especially when collected in large numbers from speakers themselves (e.g. through folk definitions, or games of pictorial).

The latest iteration in Nuckolls’s documentation of Pastaza Kichwa ideophones is an online dictionary, called *Kichwa Realwords* (see Nuckolls et al. 2017; links to *Kichwa Realwords* and the other online dictionaries mentioned in this section are provided in the online Supplementary Material). Nuckolls actually refers to it as an ‘anti-dictionary’, because it defines Pastaza Kichwa ideophones not in terms of other words, but through video clips containing expressive gestures and vocalizations.

The effectiveness of multimedia representations of ideophone meanings (in comparison to verbal paraphrases) has been quantitatively investigated by Akita (2016), who found Japanese speakers were much better able to identify the intended ideophone when its dictionary definition was accompanied by an image or a video. Akita highlights the importance of adapting the choice of media to the sensory semantics of the ideophone. For example, photographs were better at representing ideophone meanings relating to texture, videos were best for movement, and cartoon (*manga*) drawings were best at representing emotions and inner sensations. Even then, the meanings of some ideophones were very challenging. For example, neither the dictionary definition nor the cartoon illustration used for the ideophone *gangan* ‘(e.g. one’s head) pounding’ provided the level of referential specificity needed to distinguish this ideophone from the related ideophone *zukizuki* ‘(e.g. one’s head) throbbing’. Akita suggests that the addition of a metaphor referring to the clanging sound that *gangan* originally imitates may have helped participants to single out the intended ideophone in this instance.

*A Multimedia Encyclopedia of Mundari Expressives* (McLean and Purti 2018) is another resource that makes use of polysemiotic representations to convey the meanings of ideophones. It uses images, videos, stories, and songs. The stories and songs were particularly helpful in conveying the meanings of ideophones encoding emotion, by stimulating those emotions in the same way that the ideophones stimulate them for speakers of Mundari. For example, to explain the meaning of the ideophone *akul-bakul* ‘so angry one cannot speak’ Madhu Purti, masterful Mundari speaker and co-author of the *Dictionary of Mundari Expressives* (Osada,

Purti, and Badenoch 2019a), described a night when she was staying in a student dorm for women only, and one of the other women in the dorm brought a boy back to their (shared) room. She said the boy was her brother but everyone knew he was really her boyfriend; that night Madhu was really feeling *akul-bakul*. Recorded folk definitions (Section 5.3) are a useful source of these kinds of polysemiotic representations of ideophone meanings.

Table 5.1 summarizes strategies for representing ideophone meanings that make use of multiple semiotic resources, organized according to the relevant sensory domain. For smell and taste ideophones, as well as photographs of things exhibiting these smells and tastes, photographs of people's facial expressions when they experience these smells/tastes were also included. Further examples of ideophone dictionaries that make use of these different techniques are provided in Section S2 of the online Supplementary Materials.

**Table 5.1** Strategies for representing ideophone meanings

Ideophone type	Techniques for representation
SOUND	<ul style="list-style-type: none"> <li>• Expressive recordings of the ideophone (e.g. with distinctive voice qualities)</li> <li>• Expressive vocal renditions of the depicted sound</li> <li>• Videos of objects, people, or animals producing the depicted sounds</li> <li>• Sound effects</li> </ul>
MOVEMENT	<ul style="list-style-type: none"> <li>• Videos of things illustrating the movement (include the sounds produced)</li> <li>• Videos of gestures depicting the movement</li> </ul>
SHAPE	<ul style="list-style-type: none"> <li>• Videos of gestures depicting the shape</li> <li>• Photographs of things exhibiting the shape</li> </ul>
COLOUR	<ul style="list-style-type: none"> <li>• Photographs or videos of things exhibiting the colour (videos will be necessary for changing colours)</li> </ul>
TEXTURE	<ul style="list-style-type: none"> <li>• Photographs of things exhibiting the texture</li> <li>• Videos of things exhibiting the texture. The relevant tactile properties can be illustrated by manipulating the object, e.g. through poking, shaking, stretching, scratching, biting, or chewing (include the sounds produced)</li> <li>• Videos of gestures depicting the texture</li> </ul>
TASTE	<ul style="list-style-type: none"> <li>• Photographs of things possessing the taste</li> <li>• Photographs of facial expressions associated with the taste</li> </ul>
SMELL	<ul style="list-style-type: none"> <li>• Photographs of things possessing the smell</li> <li>• Photographs of facial expressions associated with the smell</li> </ul>

Ideophone type	Techniques for representation
INTEROCEPTION	<ul style="list-style-type: none"> <li>• Videos of gestures depicting the sensation and/or indicating the location of the sensation</li> <li>• Stories or short cartoons illustrating the sensation (including the situations which produce it)</li> <li>• Metaphors illustrating the sensation through something more tangible</li> </ul>
EMOTION	<ul style="list-style-type: none"> <li>• Stories or short cartoons illustrating the emotion (including the situations which produce it)</li> <li>• Songs conveying the same emotion</li> <li>• Metaphors illustrating the emotion through something more tangible</li> </ul>

#### 5.4.2 Detailed lexical entries

The same things that make the lexical entries of prosaic words informative—e.g. collocational information, semantic relations, and usage examples—also enrich the lexical entries of ideophones. In addition, there are certain features of ideophones that lexicographers may want to keep track of through lexical entries that are not necessarily as relevant to other word classes. For example, as the meanings of ideophones are so strongly tied to the senses, many ideophone dictionaries include information about sensory modalities in their lexical entries (Van Hoey and Thompson 2020). An example is shown in Figure 5.8, taken from *Kichwa Real-words*. Notice that the sensory domains are also hyperlinked. Linking to sensory domains supports the definitions in ideophone dictionaries by providing users with a point of access to these meanings through relevant senses. Sensory rating tasks, as discussed in Section 5.3, are an excellent source for this information.

The lexical entry in Figure 5.8 also has a section for paralinguistic information. In this case, it includes notes on how the initial bilabial in the ideophone *bhux* is strongly aspirated “to imitate an idea of a forceful burst out of water.” Highlighting the connections between form and meaning in the lexical entries for ideophones can be very helpful, not only for understanding the meanings of individual ideophones, but also to provide a sense of depictive conventions operating across the wider lexicon as a whole, which can assist in the understanding of other ideophones as well. Stimulus-based elicitation, as discussed in Section 5.2.1, is a good technique for exploring these depictive conventions.

Phonosemantic mappings can even be cross-referenced across different entries. The online dictionary of Japanese ideophones, *Onomatopedia* (Imaginary Sound Creations 2018), achieves something similar to this through the use of semantic

## BHUX

**Pronunciation** [bux]

**Related Ideophones** polan, sunī, tsupu, tupu

**Definition** An energetic bursting out of water by a freshwater dolphin

**Sensory Modality** MOVEMENT > Configurational  
MOVEMENT > Haptic  
MOVEMENT  
SOUND  
VISUAL

**Paralinguistic Description** Initial bilabial is strongly aspirated to imitate an idea of a forceful burst out of water. Final velar fricative is often expressively drawn out to imitate the duration of the movement of what is bursting out of water.

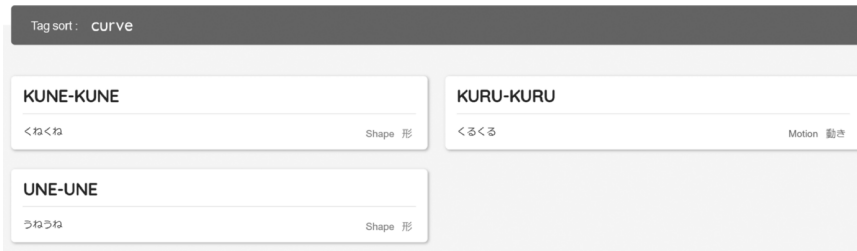
**Figure 5.8** Lexical entry for *bhux*

Source: Nuckolls (2021). Reproduced with permission.

tags. All entries in the dictionary are tagged for semantic components, and users can click on a tag to see all the other entries in the dictionary sharing that tag. An example is shown in Figure 5.9. Being able to view ideophones with similar meanings together, and compare their formal features, allows users to gain intuitions about phonosemantic associations that lead to a deeper understanding of ideophone meanings. The reverse kind of searching would also be useful to implement, so that users could, for example, click on a tag to see all other ideophones with initial /k/, or all ideophones with medial /r/, along the lines of Hamano (1998). One of the hallmarks of true proficiency with ideophones is the ability to invent and interpret novel ideophones. Creating a dictionary of ideophones is therefore not only about creating a record of existing forms and meanings (which in iconic lexicons can go out of fashion relatively quickly, see e.g. Flaksman 2017), but perhaps even more importantly it is about conveying an understanding of *possible* forms and meanings, based on depictive conventions that are much longer-lasting.

Finally, many ideophones exhibit a kind of symbiotic relationship with paralinguistic features such as voice quality and gesture, which tap into and support core elements of the ideophone's meaning. As an illustration, in his survey of Bantu ideophones, William Samarin revealed that "some of the meanings I isolated were based almost exclusively on gestures," and that it was impossible to get speakers to use some of these ideophones without gesturing (Samarin 1971: 153). Ideophones depicting emotion often have a similar relationship with voice quality. While perhaps not impossible, it would at least involve a great deal of cognitive dissonance to produce the Japanese ideophone *wakuwaku* 'excited' using a deadpan intonation. In these cases, paralinguistic features like gesture and intonation can be considered as part and parcel of an ideophone's usage, in which case there should be a

place for these in the lexical entry—just as there is a place for things like part of speech, or grammatical gender. Again, folk definitions (Section 5.3) are a useful source for this kind of information.



**Figure 5.9** Searching for the tag ‘curve’  
*Onomatopedia* (Imaginary Sound Creations 2018)

### 5.4.3 Meaningfully structured interfaces

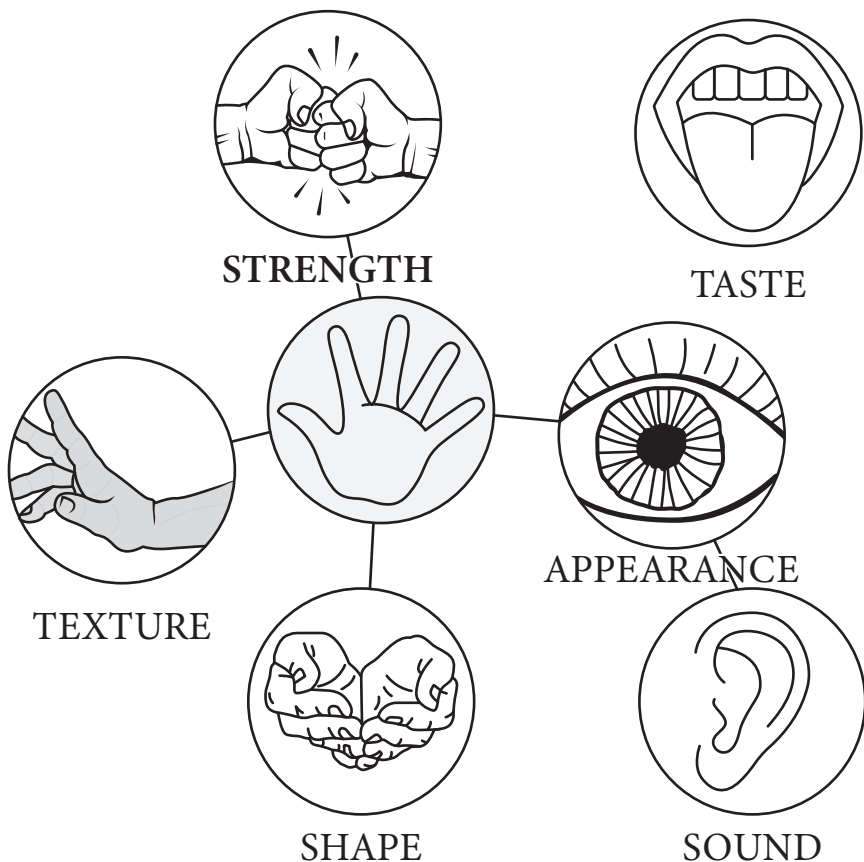
The final decision lexicographers make is how they want users to interact with their dictionary—ideally in ways that say something meaningful about the *operation* of the ideophone lexicon as a whole. We have already seen from *Onomatopedia* how tagging can be an effective way to uncover depictive conventions, and reveal connections between sets of related ideophones. But what if we want to zoom out to get a sense of relations in the wider lexicon as a whole?

SIMILARITY JUDGEMENT TASKS are one principled way to investigate the semantic structure of ideophone lexicons. They can be conducted in different ways. One approach—called pile sorting—is to present participants with ideophones on cards, and ask them to arrange the ideophones they feel belong together into groups (Dingemanse and Majid 2012). This is the fastest way, but it requires participants to be literate in the language under study. Another way is to present participants with triads of ideophones, and ask them to choose the odd one out each time (see Wnuk and Majid 2014 for an example). This does not require literacy, but it can take a lot longer as every possible combination of triads needs to be tested. To the best of our knowledge, these procedures have only been tested with ideophones in one language, Siwu (in Dingemanse and Majid 2012). The results revealed a lexicon structured primarily around fine-grained aspects of sensory perception, which is also how many lexicographers have independently chosen to structure ideophone dictionaries (*Onomatopedia* and *Kichwa Realwords*, for example, are both structured in this way). However, some interesting information which came out of this analysis was that ideophones relating to sound, sight, and touch, for example, were more closely connected than ideophones relating to taste, which formed an outgroup. Furthermore, shape ideophones were more closely grouped with ideophones for textures than they were with ideophones



relating to aspects of surface appearance (particularly colour). This is also in line with how we think about relationships between the senses in ideophone lexicons cross-linguistically (McLean 2021).

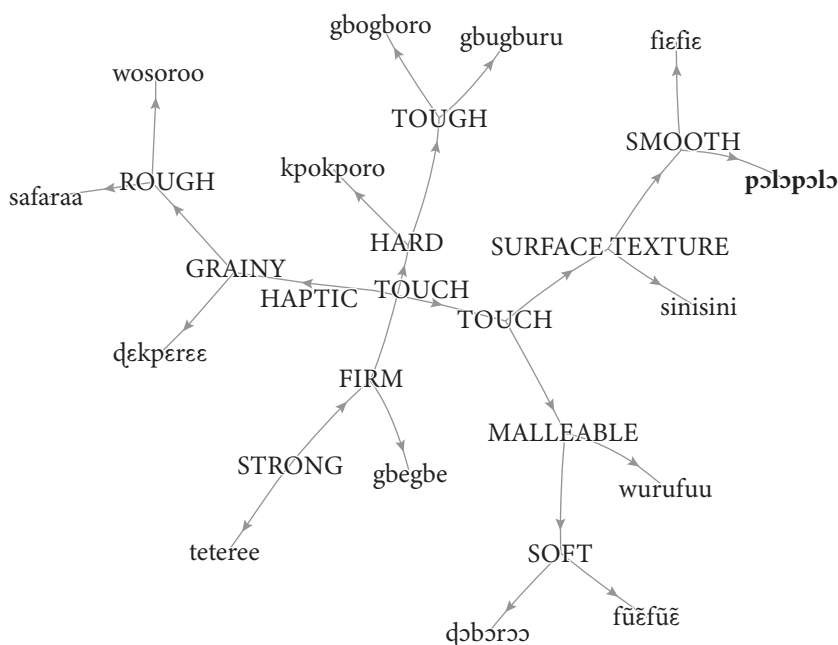
Networks can be an effective way to visualize relationships between ideophones, and offer users a dynamic way to interact with ideophone lexicons and become familiar with their structure. We used the programming language R (R Core Team, 2022) together with the R packages *shiny* (Chang et al. 2020) and *visNetwork* (Almende, Thieurmel, and Robert 2019) to create some toy examples, the code for which is provided in the online Supplementary Materials. Figure 5.10 shows some of the top-level structure in the Siwu ideophone lexicon, based on the analysis in Dingemanse and Majid (2012).



**Figure 5.10** Top-level structure in the Siwu ideophone lexicon  
Based on analysis in Dingemanse and Majid (2012)

Choosing a node leads to an expanded network of ideophones in each domain, as shown in Figure 5.11. The internal nodes in Figure 5.11 have been given abstract semantic labels following the analysis in Dingemanse and Majid (2012). Another possibility would be to use collocates of the daughter nodes from the prosaic lexicon. For example, the Japanese ideophones in Figure 5.9 could be grouped together under the verbal collocate *magaru* ‘curve’, which they all share. Double-clicking on a node allows users to expand or contract clusters of ideophones as they explore the lexicon. The visualization is available to explore at <https://doi.org/10.5281/zenodo.14598830>.

We created a second toy example of an interactive dictionary, this time using Japanese ideophones. In this example, users can hover over an ideophone to find a link to the lexical entry for that ideophone. We also show how multimedia (e.g. images and short videos) can be incorporated into the network visualization. The example with Japanese ideophones is available online at <https://doi.org/10.5281/zenodo.14598876>, and in the online supplementary material. The visualizations are derived from a file containing a list of nodes, and another file containing a list of connections between different nodes (or edges). These files are available in the online Supplementary Materials.



**Figure 5.11** Network representation of Siwu ideophones

Based on analysis in Dingemanse and Majid (2012)

## 5.5 Conclusions, future directions

We began this chapter with the observation that traditional dictionaries frequently fall short of capturing the meanings of ideophones, and by now we hope to have covered some ways in which we can do better—starting from the very first stages of the investigation of ideophones in the language. While the focus of the chapter has been on documentation, in concluding we would like to highlight the theoretical insights that richer documentation can provide along the way.

We began by talking about multimodal corpora, tagged for markers of depictions. This was presented as a means of identifying and collecting ideophones, but such corpora are much more than simply a means to an end. They pave the way for a broader typology of depiction in language, including ideophones but also related phenomena, such as demonstrations, reported speech, iconic gestures, and the interactions between these, offering insights into the interplay between language-specificity and possible universality in depictive modes of communication (Ferrara and Hodge 2018).

We have emphasized the value of polysemiotic representations as an effective way to convey the meanings of ideophones. However, such representations can also be an object of study in themselves (Zlatev et al. 2023). We saw a glimpse of this when comparing the representation of Japanese versus Pastaza Kichwa ideophones through the medium of drawings, which led to insights into the encoding of meaning in the ideophone systems of each language. In analysing how meaning is transferred from one semiotic system to another, we have an opportunity to better understand the nature of these systems themselves.

Finally, we explored creative ways of presenting and interacting with ideophone dictionaries that better capture relational structure in the ideophone lexicon, and make visible underlying depictive conventions. The ephemeral nature of ideophones and the immense flexibility with which new forms and meanings are dynamically constructed in ideophone lexicons necessitated this. However, through this experience we have also seen how these dictionaries can be transformed from records of the ideophone system of a language, into tools for understanding it.

This raises the question: What other insights might we be missing not only in relation to ideophones, but also in other word classes, simply because existing tools were ‘good enough’? Ideophones, by requiring the kind of multi-methods approach presented here, also teach us how we can do better at documentary linguistics in general, and we encourage readers to use these approaches not only where they must, but also wherever they can.

## Supplementary Material

The supplementary material can be found online at <https://osf.io/q8a6n/>

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