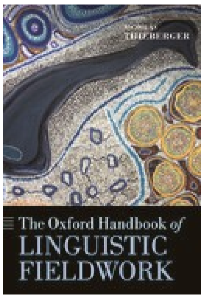

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CHAPTER

1 Audio and Video Recording Techniques for Linguistic Research

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Abstract

This article gives an account of practical issues with audio and video recordings in a fieldwork setting, based on real-life experiences. In addition to some standard recommendations, it includes points learned through mistakes, happy accidents, and trial and error. Comments about specific equipment will be out of date by the time this volume is published. Nevertheless this article gives specifications for at least some items in the hope that this will help to identify types of equipment that have been found to be worthwhile. This article first addresses some general points about what to record in a field situation, outlines the workflow of data processing, and provides notes on managing equipment. It then discusses audio and video recordings and raises the question of energy supply and useful auxiliary equipment. The appendix provides suggestions for a basic field equipment kit. This article also elaborates upon what to record for linguistic analysis followed by the workflow that would allow some of the data to be fully processed during the fieldtrip.

Keywords: audio recording, video recording, linguistic analysis, field equipment kit, workflow, data processing

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1.1 Introduction

This account of practical issues with audio and video recordings in a fieldwork setting is based on our own experience and on that of friends and colleagues.[1] In addition to some standard recommendations, it includes points learned through ↳ mistakes, happy accidents, and trial and error. Comments about specific equipment will be out of date by the time this volume is published. Nevertheless we give specifications for at least some items in the hope that this will help to identify types of equipment we have found worthwhile.

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The chapter first addresses some general points about what to record in a field situation, outlines the workflow of data processing, and provides notes on managing equipment. We then discuss audio and video recordings and touch on the question of energy supply and useful auxiliary equipment. Section 1.7 gives links to more information, and the appendix (§1.8) provides suggestions for a basic field equipment kit.

1.1.1 What to record?

The primary purpose of recordings for linguistic research is to record speech in order to analyse the structure of the language, rather than, say, documenting cultural practices, analysing the content of a story, or creating teaching materials. A good database for linguistic analysis should ideally allow for all of these things and be valuable for other parties than linguists, but it is this primary purpose which determines how the data is treated and processed.

The broader and more varied a text collection is, the more representative it will be of the language in terms of its grammar, the use of different registers, speech styles, and so forth. If possible it is therefore good to aim for recordings with a range of speakers, both men and women, speakers from different generations, with different educational background, with a variety of specialist knowledge and different standings in the community. A good text collection also includes a variety of text types. Besides narratives (stories, legends, etc.) and expository texts (e.g. describing how things are done), ideally the collection will include conversations. Conversations do tend to dry up when the recorder is on, they are difficult to transcribe and messy to 'chunk' for text-audio linkage; nevertheless they are worth the effort: there may be a whole range of grammatical features which only show up in conversation. The main point is that variety in the data is good.

One should therefore record 'everything', i.e. as much as possible, anywhere, anytime. For video recordings, having the camera running frequently can help people become used to being filmed, relax a bit and maybe, eventually, stop insisting on wearing their Sunday best as soon as the machine is on. There are two basic set-ups for doing this. The first one is to position the camera somewhere and let it record whatever happens to be within its frame. This can work quite well when people are sitting and chatting. The fieldworker can reposition the camera from time to time to catch different scenes but does not have to stand behind it all the time. The drawback is that there will always be speakers just outside the frame ↳ or just too far away from the microphone to be clearly audible. The second possibility is for the fieldworker to be behind the camera as much as possible. This may make for better recordings but speakers are less likely to forget about the camera. A second drawback is that extensive filming can be exhausting. The situation for audio-only recordings is similar if simpler. Having an extra person on the team to handle the recording equipment (and perhaps other technical tasks as well) is extremely helpful, particularly for video work. In this case one person can concentrate on the content (negotiating with the speakers) and the other on the context (wrestling with the lighting and acoustics).

While it is good when people relax and forget about the machine, this increases the chance that they will say or do things they may not want to have recorded, transcribed, or played in public. It is the responsibility of the researcher to be sensitive to such situations and, if this is called for, to delete parts of the recording.

Speakers sometimes prefer to plan and discuss what they will say during a recording because they want to deliver a polished performance. If speakers agree, such preparatory discussions should also be recorded. These sessions often constitute the most interesting data, as they can provide naturalistic conversational interaction and also useful supporting information that may be missing in the 'official' version.

Every recording should start with a spoken statement of some basic metadata: an ID for the recording or tape, the date, location, language, and the name of the principal speakers. If the content to be recorded is known, this should be stated too. All of this is vital information and not necessarily easy to reconstruct if omitted at this stage.

1.1.2 Workflow

The workflow, which for linguistic analysis would start with the video or audio recording and end with an annotated text-audio/video-linked database, goes through a number of stages which may involve different people (see also Thieberger and Berez, Chapter 4 below). The steps typically include making the recording, capturing, or copying recordings to a computer,[2] identifying and cutting sessions, transcoding media files to open and common formats, chunking sessions into units (such as intonation units, pause units, or intonational sentences: see e.g. DuBois 1991; Edwards and Lampert 1993; Edwards 2003; Himmelmann
p. 16
2006b), transcribing, ↳ interlinearizing, and translating the text. The less familiar the researchers are with the language, the more of these steps require input from native speakers. An ideal workflow would be efficient in terms of the equipment and the software programs involved, and would avoid double handling of data (such as creating handwritten transcriptions which are later typed). An ideal workflow would also allow for at least some of the data to be fully processed during the fieldtrip (simply because that is where the native speakers' input is available). Such a workflow relies on transcriptions being typed directly on the computer, but where power supply is limited this can be a problem. Moreover, it may not be culturally appropriate, or safe, to even use a computer in the field. In any case it is good practice to plan for an alternative workflow which does not rely on the computer for every step and which includes backup options if major equipment items fail (as they will because of heat, dust, humidity, ants, and that sugary cup of tea spilled into the keyboard). Such a workflow may comprise transcriptions which are handwritten by speakers at the field site and then typed by the researcher during a weekend in the next town with proper power supply.

1.1.3 Keeping equipment working

Keeping equipment working in the field is a challenge. The main enemies are moisture, humidity, dirt, dust, and temperature extremes. Waterproof containers are a basic requirement; if they are insulated, padded, and rigid, so much the better.

Silica gel helps to keep things dry. Equipment items should be kept in individual, airtight bags or containers, or with as little air as possible and each with a small pack of silica gel crystals.[3] The crystals absorb and bind the moisture in the remaining air. The crystals need to be dried regularly, for example in a pot over the fire. Dry crystals are typically blue and turn purple/pink as they become saturated.

Cold as well as heat can be an issue, affecting, for example, battery function. A reliable guide to equipment storage is to avoid locations that would be uncomfortable to humans—consider shade, ventilation, and ambient temperature. In extremely hot conditions, evaporative cooling can be useful. It works by placing a damp cloth over the container or waterproof bag in which the equipment is stored. The evaporating water cools the surface underneath.

If you know that the equipment will be exposed to extreme conditions, then weigh up the specifications carefully. For instance, it is possible to obtain waterproof video cameras quite cheaply; however, you will have to accept compromises in the recording quality.

1.2 Audio recordings

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Audio recordings constitute the core data for linguistic work (other than the study of sign languages) and for many purposes they are sufficient. But equally, in many contexts the addition of video is preferable or even necessary, particularly if the corpus aims to document more than just the language. With audio-only recordings it is especially important to record basic metadata about each session, because there are no visual clues to the identity of the speakers and the recording location or date. The following observations on audio recording techniques, standards, and ancillary equipment (e.g. microphones and headphones) hold for both audio-only and audiovisual recordings. Issues specific to video are discussed further in §1.3.

There are many different equipment settings that can become relevant depending on the circumstances, and we recommend taking equipment manuals to the field, at least as electronic documents.

1.2.1 Things to consider

It is becoming a standard assumption in linguistic research that data analysis involves direct access to the audio data and not just to a transcription. One should be in a position to verify, improve, or correct transcriptions at any time by checking the audio file (see Ochs 1979; Margetts 2009; Thieberger 2009: 402). For this to be possible, a linguistic text database needs to incorporate text–audio linking. This means that the audio (and possibly the video) which corresponds to a text chunk is accessible by a mouse click (the record for each chunk contains start and end time-code data) and this requires digital media files. So, if the master recording is analog it will need to be digitized. If the master recording is on digital tape, the tape needs to be captured to disk. Digitizing and capturing are both very time-consuming processes compared with simply copying a digital file (as is the case with solid-state recorders). These are points which may influence the choice of equipment.

1.2.1.1 Recording resolutions

High-resolution, non-compressed audio recordings are a good and practicable goal. They are a requirement for analysing phonetics, since compressed recordings severely compromise the acoustic quality of the data. In principle the data should be able to support such analysis even if the collector has no personal interest in phonetic research. Recordings should ideally be lasting records of a language, and be available and suitable for all kinds of different analyses and uses for future researchers and community members. This is of particular importance if the language is under threat. For such reasons non-compressed audio is the archiving p. 18 ↳ standard for most language archives. This does not mean that all recordings need to have the same high quality, as long as a good proportion does. Section 1.2.2.1(iii) below provides some comments on the place for lower-resolution recorders.

1.2.1.2 Background noise

One must often choose between a noisier but naturalistic setting and a quieter but maybe less relaxed recording situation. The first might seem richer, but it is easy to underestimate the deleterious effect of background noise. There may also be a choice between recording with background noise or not recording at all. These are not easy decisions to make, but it does not necessarily hold that any recording is better than none. Making a recording in which the speaker is simply inaudible is useless, and may be worse than not recording because the speaker may not be happy to repeat the session.

Sources of problematic background noise include rain (particularly on tin roofs), wind, surf, animals (chickens!), and engines of all kinds. Humming insects right next to the microphone can also be surprisingly noisy.[4] It may be worth waiting for the rain to stop, or looking for a house with a less resonant roof or a place further away from the beach or generator. A good wind gag (or wind screen) for the microphone is essential whenever you record outdoors. Even one made on the spot with foam or fur or other fluffy material can help. Electrical interference can also be a source of noise; we briefly address this in §§1.2.2.2(i) and 1.4.1.

Test how intrusive the background noise is by recording a sample of speech at the beginning of each session and then replaying with headphones to check it. This entails trying to understand or transcribe what is being said without visual clues (such as the speaker's face or gestures which may help one's understanding in the speech situation but which may not be available during transcription).

The type and especially the position of the microphone will make a big difference in noisy recording situations. The closer the microphone is to the speaker's mouth, the better the chance that the speech will be clear and audible. Lapel microphones can be very good in this respect. Highly directional microphones can also be helpful in that they focus on a sound source (but they can be problematic too: see the discussion in §1.2.2.2 below).

1.2.1.3 Audio levels

Balancing input levels before starting a recording should be a routine task (assuming the equipment allows for such balancing—and high quality recorders and cameras will). Such 'balancing' entails setting the recording level as high as possible p. 19 ↳ while preventing the loudest passages reaching the upper limit and so introducing distortion or clipping: this is a subjective and challenging task. As well as making an initial check, ideally one would also continue to monitor the input levels and the degree of background noise while recording, since conditions can easily change without it being readily apparent to the naked ear, but this can be hard to manage for one person. It is wise to become familiar with the idiosyncrasies of the equipment settings before going to the field.

1.2.2 Equipment

Recording quality has to be the first criterion for choosing equipment. Other considerations are power consumption, weight/bulk, ruggedness, and expense. One further consideration is the question of who will be using the equipment. If machines will be used by the speech community, it is worth investigating what type of equipment people are already familiar with. It is also helpful to consider how easy it would be for a novice to use a particular machine. For example, some recorders have only two or three buttons to regulate a whole range of functions through various combinations. This can make it much harder to learn to use them because the commands are not linked to individual buttons. It is also good to remember that many common symbols that may appear on buttons or on a display are not particularly iconic and require some background in the history of western material culture (e.g. the camera icon which indicates the recording setting on most cameras looks nothing like modern video cameras).

1.2.2.1 Recording equipment

We recommend using machines which can record non-compressed digital audio in a non-proprietary format,[5] but we also refer to some other options. This standard essentially implies making high-resolution (16 bit/44 kHz or better) uncompressed PCM[6] recordings stored as wav files (Windows) or aiff files (Mac).[7] Countless alternatives exist, all of which have their strengths. Compressed but very high-quality (i.e. 'lossless compression') formats exist both in proprietary (e.g. Apple lossless) and open (e.g. FLAC) forms. Similarly, 'lossy' formats can be proprietary (e.g. the ubiquitous MP3) or open (e.g. AAC, intended as a
p. 20 successor to MP3). ↳ Arguments can be made for all these formats (not least on the grounds of file size, which translates to portability and availability over the internet). Sometimes the proprietary formats are the most efficient (quality vs. size) and/or the most common (at present). However, they can leave your data stranded if at some point the format is no longer supported. We have already discussed why any kind of audio file compression is generally not a good thing. So regardless of the temptations, non-compressed, non-proprietary PCM files remain the safe standard for primary recordings. It is always possible to make alternative versions of these using different codecs[8] for special purposes such as streaming over the web.

(i) Solid-state recorders

Solid-state recorders record directly to flash memory (internal, on removable media, or both) rather than to tape or disk. They comprise a huge range from humble and tiny MP3 devices (perhaps embedded in your phone) to studio quality, not particularly portable, mixing decks. The subset under discussion here are those that are compact enough for the field and also record in uncompressed PCM format. Early models tended to be bulky, heavy, expensive, and power-hungry. Today there are smaller, lighter, energy-efficient models, and a solid-state audio recorder makes a good primary recording device.

There is a plethora of ever-changing options regarding performance and features, but perhaps the most important distinction lies between those models that accept external professional quality microphones (usually via some combination of ¼ in. TRS or XLR jacks)[9] and those that do not. A further distinction can be made between those that support 'phantom powered' microphones and those that do not (see §1.2.2.2(ii) below). Since many good microphones require such power, this ability extends the range of equipment compatible with the machine. Even if microphones do not require phantom power, having suitable TRS and/or XLR jacks is desirable—our marvellously useful wireless microphones, for example, are self-powered but they use XLR connectors.

A machine that does not accept external microphones at all (or which does so poorly—it is worth searching online for user reviews on this topic) cannot be wholeheartedly recommended for linguistic fieldwork, since
p. 21 there are simply too ↳ many situations where the ability to use an external microphone is important, if for no other reason than to control the effect of background noise, as mentioned earlier. While this is less of a problem with solid-state audio recorders than with video cameras (because with audio-only it is generally easier to place the recording apparatus close to the speaker), it is still a major factor. We will discuss this further in §1.2.2.2(i).

Apart from the specifications regarding microphones, the differences between recorder models come down largely to rather subjective matters like ergonomics and perceived durability. A quantitative exception to this is the 'noise floor' characteristic, i.e. the background signal created by the device itself. It is very important to minimize this for quiet recording situations.[10] Handling the equipment during recording (e.g. to change settings) may also create noise which will be recorded (a solution might be a remote control).[11]

In an era of convergence (phones as computers, computers as phones and so forth), it is worth keeping an open mind on what functions a particular device can support. A particularly interesting new development in solid-state audio recorders is the incorporation of a basic video camera (so far only in the 'Zoom Q3'). This rather reverses the balance found in cheaper video cameras (i.e. good-quality optics but scant regard for audio capability—discussed further in §1.3.2.5). Although no substitute for a good quality video/audio setup, such a recorder may provide a satisfactory solution for situations where good quality filming is not possible but where a video record would still be valuable for context.

Perhaps in due course manufacturers will also think of adding GPS logging to audio recorders (as they have for some still and video cameras). Such a capability would be well worth employing, since it would provide location metadata which can be difficult to reconstruct for audio-only recordings.

(ii) Direct to computer

In general we would not recommend recording straight to the computer in the field, for both practical and technical reasons. A computer is more vulnerable than the average recorder and is likely to consume more power. Furthermore a typical PC will not have a built-in sound card of adequate quality. Although it is possible to upgrade this, internally or externally, this represents additional expense that could have been better spent on a dedicated recorder.

Nevertheless there are several situations where such a solution might make sense. Perhaps all recordings will take place in controlled indoor environments with AC power; or perhaps it is only feasible to carry a computer and a microphone. Another scenario where recording directly into the computer can make sense is p. 22 ↳ where simplicity of the workflow is important. For example, when working with community members to produce audio materials (e.g. as teaching materials or talking books), it may be helpful if all processes are done on the same machine because you can edit sections on the spot by recording over them directly. Another reason could be if you wanted an uninterrupted recording whose file size will be too large for the recording device's memory. However, be aware that any long uninterrupted recording runs some risks. Depending on the equipment, the audio file may not be written to disk until you press stop, so if your equipment crashes halfway though you will lose it all.

There are two satisfactory options for direct recording. The better option is to use a USB pre-amplifier to bridge between a professional microphone and the computer. The simpler one is to use a special USB microphone—a type marketed principally for podcasting—which incorporates the necessary circuitry.[12] (Such microphones can only be used for direct input to the computer; they do not work for other recording devices.) Some solid-state recorders can also be used as a USB microphone (the ‘Zoom H2’ is an example), although in this scenario it is hard to see the benefit of making field recordings to a computer rather than to the recorder unit itself.

(iii) Compressed digital and older recording technology

There may still be a place for machines which record compressed digital audio or use older technologies. One legitimate use for such equipment is as a low-energy and/or low-cost backup to the main recorder. The quality will likely be suboptimal but there are some scenarios where they can be useful. Machines for this purpose could be ‘MP3’, ‘dictaphone’, MiniDisc, or analog recorders.

Solid-state models are particularly handy as go-everywhere pieces. Just as one should carry a notebook and pencil everywhere, it makes sense to carry a small, inexpensive recording device, just in case.[13] They are ideal for trips away from the main field site where it may be too difficult or precarious to take the master recording machine. Such trips are often the situations where fantastic data comes one's way, such as animated conversations, impromptu singing, traditional speeches, or additional speakers one did not know about. It is great to be able to record when such opportunities arise.

Another scenario is where researchers already have access to older good-quality technology such as DAT or the Sony 'Walkman Professional' compact cassette recorders. There is an economic rationale for this (good equipment at no cost), but even so we do not recommend using such machines as primary recorders ↳ because the data need to be digitized or transferred to disk. (Likewise, existing data on such tapes will need to be converted while this is still possible, i.e. before the equipment disappears altogether.) The cost of this time-consuming and exacting work rather cancels out the savings on the hardware.

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Another application for lower-quality recording equipment is its use for hand transcription of recorded data in the field. This is not ideal because, as mentioned, the transcription and the text–audio linkage will become two separate steps in the workflow and this means more work (much more). We recommend this scenario only in cases where the basic transcription cannot be made directly into the computer. We have had good experience both with analog players and with an MP3 player/recorder in situations where there was limited power and the speakers who did the transcriptions had no experience with computers. The MP3 machine even allowed the transcribers to select a chunk of text, which was then replayed as a loop until the section was transcribed. To make this work we transferred compressed versions of the original audio files from the PC.

In another situation, because of limited solar power supply during the rainy season, a colleague created analog tape recordings just for the purpose of transcription by using a battery-run analog cassette tape recorder in parallel to her master recording equipment (which was digital video). This meant she did not have to capture or convert the recordings in the field and speakers could transcribe directly from the tape. She chose analog equipment because speakers were familiar with this technology.

MP3 and MiniDisc (MD) recorders are small, relatively inexpensive, and handy but they record in compressed and sometimes proprietary formats. Moreover, the MiniDisc system, despite being digital, only allows analog transfer to computers (unless one uses specialist equipment). The later Hi-MD recorders can record in lossless PCM, but early models were plagued by encryption and transfer policies (imposed by the manufacturer, Sony) that made it hard to transfer digital recordings to the computer. Although these restrictions have since been eased, Hi-MD technology has effectively been superseded by the solid-state machines discussed above.

A further problem with all MiniDisc models is the possibility of including machine noise (from the disk spinning up intermittently) in recordings if the microphone placement is unfortunate. A similar risk exists with all mechanical recorders (digital video, compact cassette, etc.) as opposed to solid-state flash memory devices. The additional danger with MiniDiscs lies in the fact that because the noise is not constant it might not even be registered as an acoustic hazard before it is too late. MiniDisc recorders, although small, cannot be as miniaturized as some MP3 recorders because of the physical dimensions of the disk itself.

Digital Audio Tape (DAT) recorders record non-compressed data in excellent quality but they have essentially been superseded by solid-state recorders. As with ↳ all digital tape formats, DAT recordings need to be transferred to disk in real time before the sessions can be fed into the normal workflow (and note that this is not as straightforward for DAT as for DV tapes).

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While the recording quality of high-end analog machines can be very good, the tapes require digitizing. The problem is that this is not easy to do oneself without sacrificing quality. Archiving bureaus use specialized tape decks and computer interfaces to do the best possible job. It can be tempting to create a 'rough' digital copy (so that analysis can begin) using a regular cassette deck and the line-in jack of a PC, either in the field or while waiting for the high-quality version to be processed by a bureau. If you do this, the two different versions, the home-made and the professional one, will differ in their time code. So there is no point in creating text–audio linkage with your home-digitized data. When using analog recorders it is essential to choose high-quality tapes (rather than no-name products) and to avoid tapes longer than 60 minutes; longer tapes tend to be of lower quality.

In summary, we cannot recommend DAT or analog machines as primary recording devices. If you must use them, you need to be aware of the additional steps this creates in your workflow, and we urgently recommend that you transfer all recordings to hard disk as soon as possible. We do not recommend MiniDisc either unless there is no other option. An exception might be made for the Hi-MD version, since it is capable of high-quality PCM recordings that (at least in theory) can be transferred digitally to computer. However, before using this device in the field it should be checked that the resulting files are in an open, editable format.

MP3 and other low-end solid-state recorders (e.g. 'dictaphones', mobile phones, and PDAs) may well have their place in a field kit as long as they are not the main recording device. If you use them, be aware that the recorder's default compression setting is not necessarily the best of which it is capable, so check the settings and choose best recording quality rather than maximal duration.

1.2.2.2 Microphones

Microphone technology is a large and complex topic. There are innumerable variables in both internal design and external form. What follows is related principally to field recordings of speech events as opposed to, say, music performances or other semi-formal scenarios where aspects other than intelligibility of speech might be important (see Barwick, Chapter 7 below on methods for recording music).

(i) General comments and recommendations

It is best not to rely on built-in microphones. For one thing, there is the risk of recording motor and other
p. 25 internal noise with video tape cameras and other mechanical recorders. This is not a ↳ problem with true solid-state recorders which do not have tape motors or hard drives—but remember that cameras of this kind may still have zoom and focus motors. Also, internal microphones have historically not been of equal quality to dedicated external ones. This is less the case today. Indeed, many recent audio recorders, such as the 'Zoom' range, clearly have very carefully designed internal microphones. Regardless, external microphones simply provide more flexibility and potentially better performance than inbuilt ones, especially if they can be used remotely.

Since we recommend external microphones, we need to introduce the topic of 'balanced audio'.[14] This method of connecting devices provides protection against noise created by electrical interference, for example when using long cables between microphone and recorder (as you do when filming). Professional microphones tend to be of the balanced type. There is nothing inherently wrong with a microphone that is not balanced and therefore connects with conventional cable (typically with TRS mini jacks), but in this case long cable runs greatly increase the likelihood of static crackle. The longer the cable, the more crackle. Balanced microphones (typically with XLR connectors) avoid this, but unfortunately the cables required are rather bulky.

While it might seem obvious to take advantage of stereo or surround sound capabilities in a recording device, it is seldom the case with linguistic recordings that this kind of fidelity is required. Certainly a single speaker usually requires only a mono recording. Making mono recordings can be helpful in situations where it might be difficult to determine an optimum recording level (or where there is no time to make the usual pre-recording checks): it is often possible to feed the input of one microphone into both channels and to set each channel to slightly different levels. This gives one the opportunity later to choose the recording that gave the best result in terms of signal distortion.

As already mentioned, a good wind gag is a vital microphone accessory for most fieldwork. This is not the same thing as the piece of foam surrounding the device itself that was probably supplied with the microphone. Such foam sleeves do help in controlled conditions, but they are not adequate for outdoor use. A suitable wind gag will resemble a piece of fur (one nickname for larger gags is 'dead cat') and is generally intended to be used over the supplied foam cover not instead of it.[15] Commercial wind gags are generally
p. 26 superior to homemade ones because ↳ they employ 'acoustically transparent' materials to avoid an overall loss of sound.[16] Most designs are intended for large stand-alone microphones, but there are also models available for lapel types and even for entire camcorders (to shield their internal microphones). Note that no wind gag can be totally effective against strong wind conditions. However, paying attention to the orientation and placement of the microphone (i.e. so that it is shielded from the wind even if the object of the recording is not) can mitigate the problem.

Recording individual speakers.

Almost any kind of good quality microphone can be effective when recording just one speaker; the choice becomes more critical when recording a group, as discussed in the next section. Nevertheless we have developed a strong preference: our best recording experiences when recording individual speakers have been with lapel (also called tie-clip or lavalier) microphones ('Sony ECM-C115/C10') and in particular with radio lapel microphones ('Sony UWP-C1'). In this arrangement (supplied as a package), a lapel microphone is connected by a short cable to a transmitter, and both components are with the speaker. The transmitter can be clipped to a belt, put into a pocket, or simply placed next to the speaker. The third part of the setup is the receiver which is plugged into the recorder as any other microphone would be. The advantages of radio microphones become obvious whenever there has to be some distance between the recorder and the speaker, for example with video recordings.

For one thing, there is no cable between the speaker and the camera over which people may stumble.[17] Cables are always a problem, but especially for systems without balanced connectors (i.e. many microphones and most MP3 recorders, and consumer and prosumer video cameras) for which long runs constitute acoustic hazards as mentioned earlier. Even more importantly, radio microphones allow the speaker to move around freely. This allows a craftsman, gardener, or performer to go about their business while being filmed. We also have good experience with radio microphones for running commentaries. We come back to this in the section on commentaries below.

Radio microphones are quite likely to have professional type connectors such as XLR. In order to use such a microphone on a more basic recorder, some kind of adaptor might be required. This might be either a simple
p. 27 converter lead or a more sophisticated unit providing signal level control, etc. (e.g. 'BeachTek DXA-2S'). The ↳ latter option is preferred if the recorder lacks such controls, though it is rather expensive.

Radio microphones need not be of the lapel type; they can also be handheld, which can work well for an experienced performer (e.g. a singer or orator). However. for the naïve user (like most of us) a lapel microphone that can be fastened to the clothes near the mouth, and then forgotten, probably works better. (But it requires that people wear some kind of shirt or top to which the microphone can be attached.) We recommend that all lapel microphones—wired or wireless—should be of the omnidirectional type. Unidirectional lapel microphones will, in theory, isolate the speaker's voice from the background better, but if the relation between the mouth and the microphone should change (through slipping or turning of the head) the recording quality will be very poor.

A variation on the lapel microphone is the headset microphone (the 'Voice Technologies VT700' omnidirectional has been highly recommended by a colleague). In this configuration a very small microphone is suspended in front of the mouth by the headset. This arrangement probably gives even better results than the lapel microphone (no rustling shirts!) but is a little more intrusive to wear, and will be more obvious on camera.

Despite our own bias towards radio lapel microphones there are serious drawbacks to both the ‘radio’ and the ‘lapel’ aspects that should be mentioned. Regarding the radio technology, electrical interference can be a disastrous problem, particularly if it occurs during an unmonitored session (although we have never experienced this, probably because we operate in remote rural locations). Also, keeping track of the charge state of both the transmitter and receiver elements of a radio set-up is onerous (they are rather hungry); and having to stop a recording to change batteries is far from ideal.

As for the lapel design, it does entail the risk of recording noise generated by the wearer, either due to accidental microphone movement or caused by gestures involving touching the body close to the microphone (e.g. slapping the chest). The first type of risk can be reduced to some extent by careful attachment and the use of a pad and/or wind gag.

A second objection to the lapel type is simply that the recording process can be inhibited by the fact that someone must wear a piece of equipment. If the speaker is reluctant to wear a microphone or if the logistics of attaching the microphone are a problem, a solution might be found by mounting the lapel microphone on a stick as close to the speaker as possible. We feel this still provides an effective way to concentrate on one speaker (and it remains a reasonably discrete and non-threatening object, as microphones go). But of course there will be situations where it is impractical to place anything near to even a single speaker. In such a case some of the scenarios described in the next section might be appropriate.

If only the radio aspect constitutes a problem, wired lapel microphones may be a solution. The range
p. 28 includes both professional, often XLR models (e.g. ‘Sony ECM-4 ↳ 4B’) and consumer, mini-jack models (e.g. ‘Sony ECM-C115’ or ‘ECM-T6’). The latter type is attractive for secondary or backup devices because they are very small, relatively cheap, and quite modest in their power requirements (though they do still require a battery). However, they are generally best suited to audio-only recordings because of the general requirement with video to place the camera at a distance.[18]

Recording groups of speakers.

Documenting activities involving groups of speakers rather than recording one or two speakers may require mobility and switching between speakers or performers. Using lapel or headset microphones means that one has to commit to recording primarily one speaker (or two, if one has a microphone for each channel). If the recorded event includes a lot of verbal interaction by several people who are moving around, then a different arrangement is required. Options include ‘table top’ microphones (e.g. ‘Sony ECM-F8’) and the external microphones designed specifically for some consumer video cameras. Table top microphones work well for semi-controlled environments (i.e. indoors). Once again, consumer models are best suited for audio-only recording (because of the problems of long cables).

Regarding gear for cameras, one option is the so-called ‘zoom microphone’ (e.g. the ‘Panasonic VW-VMS2’), a hybrid device in which the balance between directional-mono and wide-stereo input is altered as the lens is zoomed (widest lens angle equates to full stereo). While this option does not produce ‘professional’ audio, we found that there were situations where it worked well, allowing the camera operator to make ad hoc decisions where to focus and record, and it was definitely better than relying on the camera's inbuilt microphone.[19]

Quite good results can also be achieved by simply mounting one or two radio lapel microphones (or regular balanced XLR microphones with long cables) onto sticks which are either poked into the ground or held by assistants. We recommend taking a simple microphone splitter jack which allows two mono microphones to record simultaneously into the two channels of a typical stereo jack input. If there is only one principal speaker, the second microphone can be directed towards the audience.[20]

Recording with live commentary.

There are times when the main purpose of a recording is to capture a primarily non-linguistic (e.g. p. 29 ceremonial, musical, ↳ sporting) event. In these situations it is worth considering adding a live commentary. The techniques and pitfalls are somewhat different from normal recording.

In the simplest scenario, the camera operator or a person standing next to them might comment on what is being recorded. This is not ideal for several reasons, but it can be appropriate in certain circumstances. For example, when a member of the community films events independently, any observations they make about what is going on enhance the recording in two ways: by adding linguistic data, and by explaining what is happening for people who were not present. This setup will only work satisfactorily if the microphone used can record an audio source close to the camera (i.e. not a zoom or directional microphone trained on what is being filmed, but rather the camera's internal microphone or a wired lapel microphone).

A drawback with this scenario is that the commentator is tied to the camera. As mentioned earlier, one solution is to use radio microphones which allow the speaker to move around freely. For example, we were able to film a soccer match and record a running commentary, including impromptu interviews with the referees, by a speaker who was on the other side of the playing field (see Margetts 2011). Having the commentary made the record of the match more interesting and worthwhile both for the community and for the project.

In theory one can even have two simultaneous, independent commentaries with this method, one for each audio channel, since with the radio microphones the commentators may be at a distance from each other. This might be useful for some events.

A potential problem with commentaries is that in many cases (e.g. a musical performance) the recording of the main event should not be contaminated by the commentary, i.e. it should be possible to turn the commentary off when playing back the recording. Again, a radio microphone can solve this problem by placing the commentator well away from the second microphone which is recording the main event. A drawback with this arrangement is that the audio for the event itself will only be mono, since the other channel is in use for the commentary.[21]

There are other setups apart from radio microphones that will work for recording commentaries without interfering with the primary performance, such as using long XLR cables with a wired microphone (commentator at a distance from camera and performance) and/or using highly directional microphones (camera and commentator at a distance from performance). In any case, commentaries are a good method to acquire additional linguistic data.

p. 30 (ii) Microphone design

There are a number of microphone designs, but the two that concern us most here are the dynamic and the condenser microphone. Most dynamic microphones operate in a similar fashion to a loudspeaker, only in reverse. Generally they do not require external power (although some modern designs do) and are resistant to water, as well as being tough and relatively inexpensive. However, they tend to be bulky and basically come in the design that you need to poke in someone's face. They work well for stage performers.

Condenser microphones (also known as capacitor or electrostatic) are more commonly found in a linguistic field kit, because they tend to be more compact and more varied in design. For example, they come as lapel and table-top microphones and as a miniature type—the electret microphone—which is often found in things like headsets, mobile phones, and computers. Condenser microphones always require a power source of some kind. This can be from batteries or via ‘phantom power’, where the microphone draws electricity from an external source, generally the recorder itself. In this system, 48 volts DC is supplied through the balanced audio connection itself. One problem is that some microphones which do not use phantom power, and which can actually be damaged by it, also use balanced audio connections (typically XLR). So in general phantom power should be switched off unless you are using a microphone which requires it. Another type of in-line power supply is found in some microphones for computers and portable recorders. These employ a stereo TRS mini-jack, even though the microphone itself is mono: the redundant channel is used to supply power to the microphone.

Battery-powered microphones may have some power-saving mechanisms, but unfortunately they do not turn themselves on or off, adding to the fieldworker's margin for catastrophe. As mentioned, this is especially the case with radio microphones, which require considerable power for both the transmitter and receiver packs.

(iii) Directivity

Many different degrees of directivity exist in microphones. To some extent, different patterns of sensitivity tend to be associated with particular designs and configurations (e.g. small table-top microphones are commonly electret and omnidirectional), but there is a large degree of cross-over. Choosing an unsuitable combination is therefore quite easy.

The omnidirectional pattern has been recommended in this chapter, but there are situations where it is not appropriate, particularly where the microphone cannot always be close to the intended speaker. In situations like this, where the speaker may be drowned out by other voices and noises, uni- and semi-directional microphones are more suitable. At the extreme is the ‘shotgun’ pattern. Microphones of this type are very directional and are used for example in wildlife recordings, where they can be used at a great

distance to capture discrete events. ↳ The very narrowness of their scope makes them tricky to use—the relationship to the speaker must be constantly monitored. Should the speaker or the microphone move during recording, then you risk recording even more rain or surf. Having such a microphone mounted to a video camera in line with the lens (common on professional models) provides a relatively low-maintenance solution, assuming that someone is monitoring the recording through the camera most of the time. Shotgun microphones seem to perform better outdoors than inside, where they can cause phase problems and odd echoes.

Less extreme, semi-directional microphones are the so-called ‘cardioid’ types. Three distinctions are often made: cardioid, super-cardioid, and hyper-cardioid, in increasing degrees of directivity. These patterns favour sound from the front, without being too narrow. While placement is less critical than for shotgun models, such microphones do still place an onus on the sound engineer (i.e. you) and/or the speaker to maintain a good spatial arrangement. Again, such microphones can be mounted on a camera (and are likely to be the type of microphone supplied with a professional camera). These are the primary microphones used by documentary film-makers, presumably because of the useful degree of directivity (especially when mounted on the camera and therefore automatically aligned with the subject). Our experience with this technique was that, for reliable results, the camera had to be closer to the speaker than we generally felt comfortable with, and rather than using a cable to get the microphone closer (and then continually monitoring this arrangement) we preferred to use the radio microphones.

(iv) Mono vs. stereo microphones

We already mentioned that stereo recording is not particularly relevant for many linguistic field recordings. However, there are clearly applications, such as musical events, where it is desirable. A good solution would be to use the inbuilt microphones of a modern solid-state recorder on such occasions. These often have paired microphone sets crossing over in a so-called 'X/Y' arrangement such that both are on the same axis, avoiding time lag between channels. In some cases there are two sets (i.e. four microphones) with forward- and rear-facing configurations. It is the post-processing of all four channels which can achieve a kind of surround sound. Sometimes the angle between the paired phones can be altered to suit different conditions (e.g. narrower angle for smaller music ensembles). Such microphones provide a point-and-shoot option for producing accurate stereo.

Another workable scenario is to string up a couple of omnidirectional radio microphones in a rough 'stereo' configuration (or, for video, to employ one 'local' radio microphone plus a camera-mounted microphone feeding into separate channels). The result will be more stereo than mono, and might be sufficient to p. 32 ↳ capture the ambience of an event, as well as giving some insurance against disaster in case one of the microphones fails to provide an adequate record.[22]

1.2.2.3 Headphones

Headphones are an essential part of a field equipment kit. They are necessary for checking the audio levels before, during, and after recording and for transcription of the data. Earphones, i.e. phones which are plugged into the ear (rather than covering it), are handy because they are small, light, and discreet. They can however be very uncomfortable if they are used for any length of time, and this can become a problem for transcribing. We have good experience with foldable headphones which are quite small, compact, and inexpensive, and more comfortable than earphones in the long run. A kit could contain both: headphones for transcription and earphones for checking audio quality during recording. If you are recording in situations where there is a lot of background noise, consider high-quality headphones which cut out much of the external sound and enable you to focus on what is actually being recorded.

A splitter plug which connects two pairs of headphones and therefore allows two people to listen to a recording is essential when working on a transcription together with a speaker. The alternative is to use loudspeakers, but they consume more power and create a more public work situation. Such a splitter plug may look the same as the microphone splitter but they are not interchangeable.[23]

1.3 Video recordings

We advocate video recordings as the basic recording method for a number of reasons. Video provides information which is important for certain kinds of linguistic analyses such as gestures and facial expressions but also information about who is speaking, who else is present, orientation and seating arrangement of speakers, recording location, and time of day. In short, video helps greatly to establish the context of a speech event. Only some of this context can be captured by metadata, and that only if such metadata is meticulously recorded and p. 33 ↳ preserved. Also, remembering that in the long run linguists are not the only group interested in the data, it is clear that audio/video is generally superior to audio-only recordings for the documentation of cultural setting and interaction.

The choice of video over audio as the basic recording technique should not, however, be at the expense of the audio quality, and so a good-quality camera is essential.[24] Cameras in the professional range have professional audio inputs, circuits, and controls; cameras in the consumer and prosumer ranges do not. Whatever other bells and whistles they provide (inbuilt GPS, YouTube upload feature, 5.1 surround sound, ‘Automatic Smile Shutter’, etc.) they do not give serious consideration to audio quality. Even so, a non-professional camera can be a satisfactory backup device provided it can take some kind of external microphone (this may be via a ‘hot-shoe’ for a dedicated camcorder microphone and/or a TRS mini-jack; but remember that the latter can result in problems with static crackle from longer microphone cables as mentioned in §1.2.2.2(i)). We have had good experiences with a bottom-of-the-range professional camera which had XLR audio (the ‘Sony DSR-PDX10P’) and which was only marginally more expensive than the top-end consumer model at the time.

Choosing a camera as the master recording device does not mean everything has to be recorded as video. It may not always be possible or appropriate to film, for example because of low light or community/individual sensitivities about what should be filmed. In such cases the camera can simply be used with the lens cap on as a high-quality audio recorder.

Even more than with audio equipment, video cameras have many different settings that can be relevant for recordings and they are capable of a bewildering range of error messages: do take the manuals to the field.

1.3.1 Things to consider

Unlike with current audio recorders, it is still common for good-quality video cameras to record to digital tape rather than to hard disk or flash memory (i.e. solid state). Although this is changing, DV and HDV[25] tape
p. 34 will be around for some ↳ time as a common, affordable recording medium. This raises two important considerations. First, it requires a time-consuming (i.e. real-time) capturing process to transfer the data to disk. Second, one may therefore be tempted to put this task off. But at some point suitable cameras and tape decks will become obsolete and then un-transferred material risks being left unconvertible, so tapes should be captured to disk as soon as practicable.[26]

Hard-drive and solid-state cameras might seem a better option in this respect, but they provide their own hazards in terms of file format, quality, and specification. The problem is that in order to save disk space they typically transcode on the fly to some more compressed format than that used by the standard tape formats, for example to a version of MPEG2 or AVCHD.[27] There is nothing inherently wrong with this (except that these formats often need transcoding again before they can be handled in mainstream non-linear editors, or in other player applications, e.g. ELAN[28]). But, particularly for consumer-range machines, it increases the risk that the data is being recorded in what turns out to be a non-standard, non-popular format/version which will need to be expertly transcoded at some stage to prevent loss of quality and maintain long-term playability. The topic of data conversion and preservation is discussed further in the next section.

1.3.1.1 Recording resolutions

Unlike with audio files, the goal of creating uncompressed video is not currently feasible—the quantity of data required is simply too great for standard data storage mechanisms. This is particularly the case with high-definition video which is gradually superseding standard definition. Even compressed video can be a problem: an hour of recording in standard MiniDV format consumes about 13 Gb—too large to be archived on a standard DVD. With newer technology (e.g. single sided Blu-Ray disks can accommodate 25 Gb data) and the increasing affordability of large hard drives, this problem is to some extent diminishing, and there is a case to be made for backup copies being made in the original format. Nevertheless, at present compression is often necessary, at least for delivery of the content, and the aim is to find a format and standard that entails minimum loss of data while remaining open and well supported. We suggest referring
p. 35 to large linguistic archives such as DoBeS or PARADISEC for recommendations.[29] In our project ↳ we follow DoBeS specifications (and software guidelines) for creating MPEG2 and MPEG1 versions from DV tapes.

It is important to realize that, although the typical standard-definition video cameras (i.e. MiniDV) create uncompressed linear PCM audio, current high-definition (HD) cameras typically do not. Instead, they record audio in compressed forms (e.g. MPEG1 layer 2, AAC/MPEG4 or Dolby Digital/AC3). This rather speaks against most HD cameras for our purposes if they are intended to also be the main audio recording device.

1.3.1.2 Filming techniques

Filming introduces a whole new range of things to get wrong. It is not usually possible, on your own or as a two-person team, to attend to everything, and audio settings should always take priority. But even if the camera has to be on auto-everything, there are a few things one can try to always remember that will improve the results. Ideally no one would go into the field without some basic training in the use of video equipment, preferably given by a film-maker rather than a shop assistant. At the very least you should experiment vigorously before you go.

As with still photography, a flat horizon such as the sea should be a level line. It is easy to overlook this in the heat of the moment and record with the horizon at an angle. Unlike with still photography, it is a major hassle to rotate and crop the result; normally one has to live with the shame.

Even with perfect exposure it is very easy to mar a shot by omitting to use a lens hood of some kind. (Maybe it was not a problem at the start of the session, but then the sun came out…) Amazingly, consumer/prosumer models rarely include a dedicated hood. Perhaps the smaller lenses they use need less shading, or perhaps the manufacturers calculate that most people would rather have a sleeker machine than a clearer image. Professional models always seem to include a hood. If you have one, do use it to keep lens flare[30] and the consequent loss of detail and contrast at bay. If necessary, consider making one out of cardboard; at the very least be aware of the problem.

Lens filters are also invaluable. They are inexpensive and protect against damage to the lens besides filtering out problematic light. The basic type is the UV filter which screens out ultraviolet rays, thus reducing haze effects. Also useful is the polarizing filter. This is adjustable and functions to darken the sky and also to reduce reflections, for example from a water or glass surface (meaning that objects behind the surface can be seen).

 Most video cameras have an external indication that they are recording, typically a red light near the lens. This can be helpful when one is using the remote control to operate the camera, for example, if the researcher has to be in the picture together with the speaker for an elicitation task. However, the red light can also have the drawback of alerting people that the camera is recording and may cause them to modify their behaviour. The camera is likely to have the option of turning the red light off.

(i) Tripods vs. handheld filming

We believe that in most fieldwork settings it should be standard practice to use a tripod for filming. There are several good reasons for this. A handheld camera invariably moves and shakes and this makes for bad recordings. Holding the camera for any length of time is exhausting. Speakers are more likely to relax and forget about the camera if there is not someone constantly behind it.

There is a different school of thought which advocates filming without a tripod. The idea is that people actually relax more with a handheld camera than with a tripod, because after a while they are more aware of the person than of the camera to the extent of not even noticing it any more. From this point of view, one is therefore better off learning to hold a camera steady and level rather than fussing with a tripod.

We think that this approach is probably more appropriate for documentary film-making than for the type of linguistic data collection generally under discussion here. Films are composed of a number of small scenes arranged to tell a story—irregular camera movement can be either edited out or is simply overlooked because of the composite nature of the final production. But for many, if not most, linguistic data samples, long unedited recordings with video matched to audio are the norm, since the point is primarily to capture a speech event. For such recordings, the inevitable camera shake from a handheld recording of an essentially static scene is likely to be very noticeable and distracting. Either way, it is good practice (often suggested by documentary film-makers) that the camera should appear to run as much as possible, particularly at the beginning of a shoot, simply to help people accept the camera as normal.

Typical fieldwork may encompass a range of filming scenarios: some recordings will be static set pieces, others on-the-fly recordings of things that just happen (it may simply be impractical to lug a tripod around while following a speaker who has agreed to demonstrate e.g. traditional gardening or fishing methods). In other words, a decent tripod and good handheld technique can both be recommended.

If you do succeed—by whichever method, fixed camera or handheld—in putting your subjects at ease, do remember that the more likely speakers are to forget that they are being recorded, the more important it is that they can later veto parts of the recording they do not want to have made public.

 If one opts for a fixed camera, even a very small, lightweight tripod or propping the camera up on a table is better than nothing. But if the budget allows, a professional camera should be complemented by a sturdy tripod. Such a tripod need not be heavy (though it will be relatively bulky); carbon-fibre models are comparatively light. Apart from the fact that a professional camera tends to be bigger and needs more support than a consumer one, a good tripod with a good head will allow much smoother camera movements. Before filming, the tripod should be leveled (most tripod heads include a bubble level).

If the camera is to be handheld, one should choose the steady-shot option, which compensates to some extent for jerky movements. A hand-grip (of the sort sold for still cameras, e.g. ‘Hama’ brand) can be very effective for steadying a video camera. The grip can also be used for mounting a microphone away from the camera itself, so reducing its susceptibility to mechanical noise. If most of the recording will be done on the hoof, a small sized ‘stabilizer’ might be justified: these devices assist a walking camera operator to create smooth footage (e.g. ‘Steadicam’, ‘Glidecam’, and ‘Blackbird’ brands).

(ii) Zooming, panning, and composition

Elaborate camera work is rarely necessary or desirable for decent language recordings. If speakers are stationary, there is little reason to use zooming and panning at all. As tempting as they are, it is good to avoid these manoeuvres; they make recordings look chaotic and unprofessional. Overly active camera work can also cause loss of visual data, such as gestures. When zooming in on the speaker's face or panning to capture other aspects of the recording situation, there is no record of the speaker's hand gestures for that segment (see Seyfeddinipur, Chapter 6 below).

The zoom function should therefore generally be used merely as a tool for composition: frame the speakers intelligently and then stop. Likewise for the camera direction and position: if you do choose to use so called ‘developing shots’ (i.e. when you zoom or pan during a shot), a good rule of thumb is to keep the image still for at least ten seconds before and after the movement. Also, make all such adjustments slowly (‘slow’ here means about three times slower than you might think during filming). Zooming and panning typically appears too fast and hectic when reviewing the recording. Remember that most camera movement should be motivated by the subject, not the camera operator, and so in general camera movement should only be required to follow someone and keep them in frame.

Recordings that take place in confined spaces can be very hard to frame—one simply cannot zoom out far enough. The solution is a wide-angle lens. Such a lens is often available for professional cameras, and simply fits over the standard lens. We found this a very worthwhile accessory.

p. 38 It is nice to get a close-up of the speakers who participated in a recording (which can be used for stills too) and a record of who else was present.[31] But ideally this would be separate from the filming of the linguistic data. To do this one can add a segment at the end of a recording that includes a slow zoom onto the speaker and a slow pan across all the people present.

Active zooming and panning may have a place in the documentation of events and activities where people are moving around and it is hard to capture everything. But even here less is more. A better option is proper editing post recording to create good cuts between scenes. If the budget allows it, a second (possibly lower-grade) camera is useful on such occasions. If two cameras are filming aspects of the same event, the first can do a continuous overview of the scene while the second does close-ups. The two can later be edited together. This is no small undertaking, however.

(iii) Lighting and positioning

This topic is related to composition, but here the emphasis is on achieving optimal exposure and therefore clarity of all the data that the video contains. It is helpful to understand some of the characteristics of camera systems in dealing with the variability of light intensity across an image, and therefore how exposure settings are arrived at and what their limitations are. Knowing this one can then make intelligent choices both with the setup of the scene (discussed here) and with the exposure controls on the camera (discussed below in §1.3.1.3(ii)). We will discuss three points of interest here.

First, it is easier to compensate for too much light in a scene (by using a smaller iris setting and/or a faster shutter speed) than for too little, which can only be done at the cost of a 'noisy' image. So, if possible provide plenty of light.

Second, it is important to realize that any automatic exposure mechanism makes assumptions about the quantity of light in an image. The default setting is to assume that the sum of all the lights and darks makes a neutral grey. For many images this is a reasonable approximation, but it is also commonly inappropriate for typical fieldwork setups. If, for example, there is a large area of bright sky/sand/snow in the scene, the net effect may be considerably brighter than a neutral grey. The camera's auto-exposure assumption would then be wrong, with the result that all tones will be rendered darker than they should be, and this may well mean a loss of detail in the human face. Most cameras offer various pre-programmed modes ('backlight', 'portraiture', 'beach', etc.) which attempt to do better than the default setting in certain conditions, but their success depends on the operator understanding and remembering to use them. It is safer to learn how to set the exposure manually such that the main point of interest is correctly exposed, and then to always do this.

p. 39 Third, the problem of incorrect exposure would not be so serious if it were not for the limitations in exposure range of the camera sensor, i.e. the fact that tonal detail is not well captured at the extremes—light and dark—of an image. This means that without efforts to limit the overall tonal range (i.e. contrast) in a scene—usually by brightening the darker areas with artificial lights or reflectors, and perhaps darkening the light areas with screens—some visual information will be lost, and it is not possible to recover this information in post processing.[32]

Since the use of auxiliary lights and other props is probably neither a possible nor desirable option for most fieldworkers, attaining the control of professional film-makers is not a realistic goal: unintentional lens flare, burnt-out highlights, and featureless shadows can all be expected from time to time. But it is possible to minimize, or avoid altogether, such defects impinging on the essential features of a video document by paying attention to the orientation of the scene, as well as to the exposure setting on the camera.

Filming against the light or a bright background—for example the speaker sitting indoors in front of a window—should, but often cannot, be avoided. In this situation, manual exposure on the face or using a pre-programmed backlight option are essential to avoid filming a mere silhouette. This problem is amplified if the person has dark skin. Although an acceptable result regarding the face can be achieved using this method, this is the least satisfactory orientation.

Shooting ‘with the light’, i.e. having the light source behind the camera, is generally better but does not necessarily solve this problem. If the speaker is sitting in the sun in front of a light-coloured background, such as the wall of a house, the background will reflect the light and still be brighter than the person being filmed; finding a darker background will make a big difference. Also, if the speaker is facing strong light they may squint, be uneasy, and display unflattering facial shadows.

Filming in the shade helps, but can still be problematic. We once filmed a group of speakers sitting comfortably under a tree, but all around there was coral gravel reflecting the sun such that there was no angle where the camera could have avoided a bright background. Again, in such situations the backlight option or manual exposure helps.

An ideal arrangement would be for the speakers to sit at a 45 degree angle to the light, outdoors (where there is generally more light), and positioned in such a way that bright objects, such as walls, reflect light onto the face but are not directly in the background. However, best positioning for image may not be the same as best positioning for audio. Factors such as wind and other sources of noise are arguably more important (discussed in §§1.2.1.2 and 1.2.2.2(i) above).

1.3.1.3 Adjusting settings

As with audio recordings, adjusting the available settings of video cameras can make a major difference to the quality of the recording. The auto settings are not necessarily suitable. A camera should allow controlling for focus, exposure/iris, shutter speed, white balance, and audio input levels. Unfortunately this is not always the case, particularly regarding audio control.

(i) Focus

The ubiquitous auto focus function is very convenient but has a drawback: if something passes through the picture in front of the speaker, the focus will automatically switch to the entity in the foreground; when it has disappeared, the focus will switch back to the speaker, causing moments of blur while the camera refocuses. This can be avoided by only using auto focus to choose the right focus and, once that is set (i.e. on the speaker), by locking the focus in that setting. Alternatively, one can simply operate the camera in manual focus. Auto focus can also be unreliable at low light levels with the camera going in and out of focus, ‘hunting’ for the right target, so again it is better to make a decision and lock the focus.

(ii) Exposure/iris

Setting the exposure correctly is a subjective and to some extent impossible task. Sometimes the amount of light available, and/or the contrast in the scene, will push the camera's sensor to its limits, resulting in areas that are over- or underexposed. The best that can then be done is to ensure that the speaker's face is adequately exposed. Normally one would want to capture facial expressions and movements of the mouth (which can help, e.g. with phonetic transcriptions).

Setting the exposure manually (by adjusting the iris) is again the preferred option. A reliable technique is to zoom in on the face of a speaker so that it fills the screen, adjust and then lock the exposure, and zoom back out to the appropriate frame for recording the scene. This can be done with the camera on standby; there is no need to record it. If the light changes considerably during filming (e.g. because the sun comes out), the locked exposure can become a problem and will need to be redone.

As mentioned above, cameras generally have preset options for low-light and back-light settings (often employing a ‘gain’ control which boosts the electronic signal, giving you lighter but more noisy or grainy pictures). These can be used as quick alternatives to manually setting the exposure. Be especially aware that a low-light option sets up the camera to make the most of the available light, but does so at the expense of sensor resolution and/or shutter speed. The result can be very grainy images and/or images with disjointed motion. This might still be better than no image. (The audio recording is unaffected, of course.)

p. 41 **(iii) Shutter speed**

Unlike exposure, shutter speed rarely has to be adjusted manually for linguistic recordings. An exception could be the filming of some rapid gestures or other significant activity where high shutter speeds would be beneficial. (The difference may not be so apparent in the video itself, but will manifest itself as sharper still frames.) As with all photography, higher shutter speeds require wider exposures (resulting in shallower depth of field, which demands greater focussing accuracy) and/or more light. The optimal shutter speed for normal recording is 50, to maximize light but avoid blurred images.

(iv) White balance

Setting the white balance means essentially giving the camera a reference point of what white is, which makes all the other colours correct (and therefore avoids pink or green faces). This has to be redone for every recording session that takes place under different lighting conditions (e.g. moving from indoors to outdoors). Cameras usually have an auto white balance function as well as some preset modes (e.g. for artificial light or a sunny day), but manual calibration, if available, is the most reliable method. It is also a simple and quick process, requiring only a white surface, such as a sheet of paper or a white T-shirt, as a reference which should fill the entire screen during balancing.

(v) Audio levels

As mentioned, not all cameras provide adequate audio input controls. All professional models do, but even high-end prosumer ones may be somewhat deficient. A camera may accept external microphone input but still lack manual control for it.

Something to especially watch out for is ‘auto-gain’, a function on cheaper cameras which continually adjusts audio levels depending on the input at the time. We had this problem with such a camera: when the speaker was talking background noise was low, but whenever they paused the level would reset to the new ambient conditions, amplifying the background noise. The result was normal speech punctuated with crashing surf sounds. Make sure your camera does not have an auto-gain function, or that it can be switched off.

1.3.2 Equipment

The same criteria apply to video equipment as to audio regarding quality vs. other constraints such as budget, weight, and complexity of use. The situation with video is more extreme because of the extra paraphernalia associated with cameras (lenses, tripods, etc.). The reality is that professional film-making is less attainable than professional audio recording. The purpose of using professional equipment and techniques, as far as is reasonable, is simply to create the best possible record.

p. 42 As for audio recorders, we recommend using cameras that can record audio in uncompressed linear PCM. That rules out solid-state cameras of most grades and formats. We also do not necessarily recommend high-definition tape cameras, even those of professional or semi-professional grade. At present, most high-definition cameras actually offer inferior audio to their standard definition counterparts. The problem is that high definition equates to recording many more pixels per frame, but the storage medium remains essentially the same (HD is recorded on normal MiniDV cassettes). In the competition for data space, the audio quality has been compromised. This will probably improve in the future as data storage technology continues to develop, but in the meantime it cannot be taken for granted that hi-def video means hi-fi audio.

It is also arguable that many so-called high-definition cameras, particularly in the consumer/prosumer range, do not really deliver better video than their standard-definition counterparts. Certainly they will produce the required quantity of pixels, but there are very many other factors that also determine the final image: lens quality, sensor type and size, in-camera signal processing and compression capabilities. In addition, HD playback can be less than smooth on the average laptop, and so, for the time being, we recommend standard-definition over high-definition video cameras.

Regarding camera technology there is debate about whether a CCD or CMOS light sensor is better.[33] In many situations CMOS has begun to displace CCD technology for reasons such as cost of manufacture and power consumption. Our conclusion is that there are so many variables in design and implementation, as well as in other camera components, that an easy comparison is impossible. Different high-end cameras follow different paths to achieving quality. However, clearly 3CCD systems—where three separate CCDs are employed for each of the red, green, and blue light components—are superior to a single CCD system.

The following sections consider camera types in rough order of preference for linguistic fieldwork.

1.3.2.1 Tape cameras (MiniDV, HDV)

The MiniDV camera type has a good track record and that is what we recommend. It produces the required audio formats and quality by default. Eventually both the format and the recording mechanism (i.e. tape) might become obsolete, but that time has not yet come. However, it is becoming hard to buy this type new as HDV becomes the norm. It is worth noting that HDV tape cameras typically offer standard DV as a recording option, in which case non-compressed linear PCM audio is available. A modern tape-based, HD, low-end
 professional machine, such ↳ as the 'Sony HVR-A1P', would therefore be a fine main recorder when used with the standard DV rather than the HD setting.[34]

1.3.2.2 Solid-state/hard-drive cameras

Tape as a recording medium is steadily losing ground to disk and flash memory for two good reasons: the time-consuming capturing process is no longer required, and there are fewer moving parts and less weight in the camera. Some models replace the tape with a conventional hard disk, but as the capacities of memory cards have increased (and the prices dropped) the solid-state model is becoming prevalent. This trend is stronger in the consumer range, but also apparent in professional cameras.

The problem with this technology shift is that, at present, there is an unfortunate lack of uniformity regarding recording file formats (compared to MiniDV, which is well established). Therefore extra care should be taken that recordings are created in, or converted to, archivable formats.

(i) High-definition cameras

There is no doubt that high-definition video is tempting—the higher screen resolution is hard to dislike. But as mentioned, there are problems, particularly with models which do not offer a recording option with uncompressed audio. Generally, then, this camera type cannot be recommended. This situation will probably change, however: there is already at least one current semi-professional model, the 'JVC GY-HM100', which seriously addresses the audio question by recording uncompressed linear PCM audio alongside the MPEG2-based HD video. This would appear to be a fine camera for the field in every respect, though it is more expensive than the 'Sony HVR-A1P' mentioned above.

(ii) Standard-definition cameras

Given the typical problems of solid-state/hard-drive cameras (unconventional formats, lack of uncompressed audio), it is hard to recommend them on the grounds of convenience alone (i.e. not requiring the capturing process) since they provide no better video resolution than a standard tape-based machine. Since they are light, compact, and relatively inexpensive, however, a case can be made for such cameras as auxiliary or backup machines. As noted before, not every recording need be of top technical quality: sometimes having a camera/recorder to hand is the main thing.

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1.3.2.3 All-weather cameras

There is also a place for all-weather cameras which are water- and dust-proof and sometimes quite resistant to impact and extremes of temperature. We are not dealing with professional-quality models here but rather with consumer machines (solid-state type) packaged for use at the beach, in the snow, and so forth. They are a safer option for filming in wet conditions such as boat trips. We provided such a camera to speakers to do their own recordings when we were not present and could not help with the maintenance of the equipment in a tropical climate. Some of the community-made recordings we have received from this camera would have been unattainable by an outside researcher.

Such cameras are not particularly expensive, but there is a price to pay in reduced audio/video quality. Critically, they do not allow for external microphones and have rather weak internal ones. This makes them decidedly second-rate as audio recorders. To get the best possible sound the camera must be positioned as close to the speaker as possible (rather than being positioned at a distance and capturing the right frame by zooming in).

For even more challenging conditions, such as filming fishing or hunting activities, there are specialist cameras designed for extreme sports. An example is the 'GoPro HD HERO' range. These small and quite inexpensive cameras are waterproof to 60m and highly shockproof (they can be mounted to surfboards or crash helmets), yet shoot HD video with 48 kHz mono audio.

1.3.2.4 Still cameras

Many cameras designed to take still images can also function as video cameras. There are two broad categories: SLR cameras offering very good HD video in some format, and compact cameras with a lower quality (even if marketed as HD) video mode. For many reasons, only the SLR type can be recommended for primary recordings (e.g. SLRs tend to have better built-in microphones than compact cameras and some models even allow external microphones), but even then only with qualifications.

The main issues with video on SLR cameras are the limited duration of recording and the sound quality. Nevertheless there are some cameras with useful specifications. As an example, the 'Pentax K-7' apparently records up to 25 minutes (or 4 Gb file size) of HD video (720p variety, i.e. 1280 × 720 pixels) with sound. This

camera also has a stereo jack for an external microphone (though not XLR). Benefits of such cameras include the compact size of the apparatus (good for cramped indoor situations) and the control over depth
p. 45 of field afforded by the lenses available (which e.g. allow speakers' faces to stand out clearly). So this kind ↳ of equipment may work well for many fieldwork settings, especially if complemented by a decent solid-state audio recorder.[35]

1.3.2.5 Incidental cameras

We mentioned earlier (§1.2.2.1(i)) the 'Zoom Q3' recorder which includes a video camera for basic QuickTime movies of 640 × 480 pixel resolution at 30fps. Such a device seems almost a gimmick, but could actually provide just the right balance of good audio plus reference video in a small package for on-the-run fieldwork.

The 'Flip' range of pocket sized camcorders are also worth considering as backup or go-everywhere devices. Although these cameras are not optimized for sound, they offer good video in a very compact format. Other devices that could be used to capture really basic audio/video in emergencies include some mobile phones, iPods, PDAs, and webcams.

1.4 Energy supply

1.4.1 Things to consider

Different field sites have very different power constraints. In an urban setting, mains electricity may be regularly available but perhaps likely to suffer power outages or voltage spikes without warning. In this case a good UPS[36]—or just a surge/spike protector—might be the only essential energy supply item to pack. A rural field site may well lack any regular source of electricity, in which case solar- and/or fuel-powered generators will be required along with regulators and storage batteries.

Which of these often heavy and bulky items need to be brought to the field and which can be bought locally will also vary. At our field site we had to bring in solar panels and auxiliary electronics but were able to buy a large truck battery in the nearest town. We needed a big battery because we had several computers, cameras,
p. 46 ↳ and other equipment to run. If one only needs to recharge the recording equipment periodically, one may get away with just a solar panel plus a regulator—so a storage battery is not always required.

Some recording equipment can be run from mains power. Even if the circumstances permit it, we avoid doing this, both to retain flexibility (i.e. so that the machine is not tethered to an outlet) and because with such a power source one may need to look into shielding to prevent interference in the audio.

Equipment, including battery chargers, will be designed to run on regular mains AC power[37] and/or 12 volt DC power. For many field setups the latter will be the only electricity source available. Adaptors for using such a source almost invariably come with a cigarette lighter-type plug (so that they can be used in a car, as with common mobile phone chargers). The most convenient way to connect these to a home-rigged power source is therefore to use the corresponding cigarette lighter sockets (available at any electrical supplies). For wiring these, the centre point is positive (+ve) and the cylindrical sleeve is negative (−ve).

Assuming that some kind of electrical competence, beyond simply attaching a plug to a socket, will be required, it is worth learning a bit about 12/24 volt DC circuits (e.g. from a boat maintenance book). If some ad hoc wiring will be needed (quite likely in the case of solar equipment), make and test the system before going to the field. A basic toolkit, including a multi-meter and soldering iron, will be helpful. Otherwise the power regeneration scheme can easily become the Achilles heel of the operation. Be aware that low-voltage systems can be every bit as deadly as mains AC in certain circumstances (risk of fire due to high currents in small cables, battery explosions from short circuits, etc.).

1.4.2 Equipment

1.4.2.1 Generators

Some field sites may provide an irregular power supply via an existing fixed generator. This is characteristic of some mission or trade stations which usually require some kind of power infrastructure. If such power is available, then the main concern is to make sure that the supply does not damage the equipment. Simple precautions include disconnecting equipment before shut-down and only re-establishing connections once the generator has stabilized after startup. A UPS provides further protection both against variability in line quality and inadvertent power outages.

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It is worth considering connecting a large battery to the generator and charging this as well. This provides some capacity for either running or charging the equipment when the main generator is off. The best arrangement perhaps would be to only use this battery, i.e. never to run equipment directly from a generator. This would obviate the need for a UPS (which, like a battery, is heavy) and provide the best protection for the equipment. Some generators will offer a direct 12V DC outlet; otherwise a transformer type car battery charger would also be needed.

If no fixed generator exists and solar power is not an option, a portable generator running on diesel or petrol will most likely be the next best option. The same precautions should be taken regarding protecting the equipment.

1.4.2.2 Solar power

Solar panels are a good option in many situations—they certainly cannot be beaten for quiet operation. However, there are a number of complications.

The first is where to mount them. Obviously sun orientation needs to be considered, but also factors like accessibility, and protection from animals and missiles. We were allowed to mount panels on an iron roof, which was in many ways ideal. Connecting the panels to our battery was tricky, however: long wires are a problem with low-voltage systems because of resistance losses, so we had to find the shortest route and the thickest electrical cable for the job. This is where a multi-meter is invaluable, as it allows one to check whether one's non-optimal solution is actually functional or completely useless.

Another complication is the wiring itself. Solar panel generators need voltage regulation and blocking diodes—the former to protect against overcharging, the latter to prevent current running in reverse and draining the battery at night. Some designs have this circuitry built in, but otherwise you must wire-in dedicated components, which should be sized according to panel area (which equates to output current). Getting the balance right between panels, regulators, battery, and equipment takes a bit of calculation. Some of the panel suppliers give rule-of-thumb guides—at least for matching regulators to panels.

Solar panels can be rigid, flexible, or foldable. The rigid type is the most reliable and durable but also the heaviest and most awkward to transport. We have had quite good experience with a flexible model, which could be rolled into a large cylinder that just fitted in a suitcase. It was vulnerable, in that crushing or folding would have ruined it: careful packing and padding was necessary. Foldable types are light, compact, and very tempting but apparently less reliable: several people have reported that the cells failed despite good maintenance.

There are different technologies for creating solar panels. The three best-known types are monocrystalline, polycrystalline, and 'thin film', in descending order of both cost and efficiency. In other words, the monocrystalline type is ideal for on-the-move fieldwork in that a smaller panel can be used but it is also
p. 48 more ↳ expensive. There are a few other factors to consider, however. The monocrystalline type is the most fragile, the thin film type the most robust. Also, the thin film type can be found in a flexible laminate form which can be more easily attached to difficult surfaces, and it works better in very hot conditions. Probably the best application for this type would be where a permanent or semi-permanent field station was to be established (e.g. an entire roof could be covered with such panels).

1.4.2.3 Other power sources

In some ways a solar power generator is a fairly extreme setup given the unit costs and the fragility and bulk of the components. We have already mentioned the portable petrol/diesel generator as an easy option, but this has obvious drawbacks as well, not least in terms of noise pollution. Two other potential electricity sources should be considered: the opportunistic use of motor vehicle power, and wind generators.

It is not efficient to run a motor vehicle just in order to charge a battery, but should the field trips involve regular long journeys by car, bus, or truck anyway, then there may be a case for using the cigar lighter socket during the journey, to charge either individual equipment pieces or a small 12V battery that can be used as a charging source later (in which case it would be best if this battery is of the 'deep cycle' type that is designed to be completely discharged without harm).[38]

The same technique can, in principle, also be used on a boat (but in this case it is unlikely that a suitable socket will be available, so you may need to add the necessary wiring). Never attach anything directly to the starter battery of a boat unless you want a shipwreck. Instead, charge your equipment or dedicated battery through the running engine.

Depending on the prevailing weather at your field site, small wind generators (e.g. as found on sailing boats) could be more useful than a solar panel and no more expensive, bulky, or complex to set up.

1.4.2.4 Batteries

Normally, equipment will be run on batteries for most of the time. These may be internally or externally mounted. If they are internal, then non-removable arrangements should be avoided (i.e. not removable by the user—such as found in iPods): it is essential that batteries can be replaced in the field.

p. 49 Make sure to consider all your equipment needs before setting off. For example, because laptop computers have internal charging circuits and external chargers are not readily available, we needed a special adaptor to power (and therefore recharge) our laptops directly from the truck battery.

Most equipment will allow batteries to be charged by the machine itself, but we recommend not relying on this if possible. It is better to take dedicated chargers for two reasons: it allows equipment to be used with one set of batteries while another set is being charged, and it avoids using the precious machine for such a mundane task. Fortunately, there are universal-type chargers which are readily available from camera shops (e.g. 'Inca' brand), and which are cheap, light, and versatile (one only needs to swap the charging plate to adapt them for different battery types, and they run on both household AC and 12V DC systems).

For video cameras particularly, one should take several high-capacity batteries—and then add another one or two. It is bad enough having to replace tapes or memory cards in the middle of a session without having to swap batteries as well. In our experience, batteries need not be manufacturer-brand items (despite the warnings in the manuals)—we have had no problems using generic units which were about half the price. For such 'clip-on' batteries it is always best to physically remove them when not in use to minimize power drainage. For internal batteries this may not be practical, so remember to always turn the device off after use.

Some equipment will be designed to run on standard batteries, e.g. AA or AAA size. Do not assume that it will run on rechargeable versions—it may or it may not, so check the specs and test. Our radio microphone transmitters and receivers use AA batteries (lots of them!) but refuse to run on rechargeables because the voltage is actually a bit lower than for disposable ones. The discovery of this in the field meant that we suddenly had to source large quantities of good-quality alkaline batteries.

1.5 Other equipment

A number of electrical devices other than recording and power equipment are likely to find their way into a field kit. The most obvious one is a portable computer. This may be complemented by accessories such as external hard drives, and perhaps a GPS device and digital still camera.

If it will be necessary to capture digital video tape in the field, then a reasonably powerful Notebook/Laptop computer (which includes a Firewire port) will be required. If this is not the case, then a 'Netbook' type computer may be quite adequate and more convenient. This relatively new type of miniature laptop is
p. 50 cheaper, smaller, lighter, and less power-hungry than a conventional machine. ↳ Most models will easily be able to run programs typically used in the field, such as word processors, linguistic databases, and audio/video applications.

All portable computers can benefit from a dedicated laptop stand (or just an external keyboard plus a cardboard box to raise the screen height). This helps prevent strain on the wrists and neck and can make a big difference to your well-being. Foldable, flexible, or laser projection keyboards are available which save space and weight.

Regardless of primary disk capacity, some external storage—hard drive or flash—is required for data transfer and backups. One can pay a considerable premium for 'rugged' USB sticks which are resistant to various calamities, but simply taking the same precautions as with other equipment is probably sufficient. External hard disk drives should be of the (more expensive) portable variety since, as well as being small, they generally do not require their own power source but run off the computer.

If a laptop computer is not available (perhaps it is not advisable to take one to the field at all), another solution for audio-video data backup is a device which combines a card reader with a hard drive (e.g. 'Nexto' or 'HyperDrive' brands).

For reading electronic documents (such as PDF versions of equipment manuals), a better option than the laptop would be an eBook reader. Although this might seem like superfluous expense and baggage, it is much easier to read for any length of time (especially in strong daylight) from these devices than from conventional screens. They are light and compact and are low on energy requirements. Currently not all e-readers are good at dealing with PDF documents however (e.g. they may reduce the font size to something illegible in order to fit a document to the page rather than 'reflowing' the line breaks).

It is becoming commonplace to add precise location information to metadata of language recordings. A GPS[39] device is required for collecting this information. Some cameras now contain built-in GPS capabilities for 'geo-tagging'. Small units that connect directly to the computer via a card slot or USB port are also available. Some of these devices are designed as 'track loggers', i.e. they can continuously monitor and store location against date and time over long periods using very little power. This data can then be downloaded to a computer in various formats (e.g. Google Earth KML). Such a track might help, for example, to define a poorly charted coastline or river, a footpath between settlements, or a property boundary. The best option, however, may be a simple but weatherproof handheld device, as these allow greater flexibility for recording both specific points (e.g. a field recording site) and track information. For transferring data to the computer, models that connect via USB rather than the older serial port are much more convenient.

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1.6 Summary

The topic of recording techniques and related equipment is complex. The disadvantage of the tremendous technological advances that are being made is that it is seemingly impossible to assess all the available choices between different devices. When it comes to buying equipment, our general advice is to ask fellow researchers (in person or via email lists like RNLD) for their suggestions on specific items. We advocate the use of video recorders as the basic recording device because it makes for a richer documentation. Where this is not appropriate or possible, a high-quality solid-state audio recorder should be the standard. Smaller recorders are also good as go-everywhere pieces, as are small devices with at least limited video capability. In general, external microphones should be the first choice for recordings.

Buy the best equipment you can afford and learn how to use and maintain it at a basic level. At the very least you should know how to adjust audio levels and, for video, to make manual adjustments to exposure and focus. You must also be able to keep the power supply going. Beyond that, you should be able to assess the nature of a recording situation and identify potential problems with noise and lighting so that you can then make the best of it by adjusting settings and arranging the recording setup with a minimum of fuss.

The goal of good-quality recordings is complicated by the many environmental and human variables one must consider. The aim is simply to achieve the best recording quality under the circumstances, not to emulate broadcast standards, and naturally considerations of content (what you record) should take precedence over those of technique (how you record it) as long as you obtain a decent audio quality. In terms of what to record, variety is good—the broader the range of recordings, the richer will be the documentation of the language and culture.

1.7 Where to Find More Information

We do not supply links here to individual technical equipment. What follows is an eclectic list of sites that people have found useful.

http://www.i.nl/DOBES/audio-video

Dokumentation Bedrohter Sprachen/Documentation of Endangered Languages: audio and video-related information.

p. 52 http://www.rnld.org

Resource Network for Linguistic Diversity: the email list includes field recording topics which are summarized in the FAQ pages on the website.

http://bartus.org/akustyk

Bartek Plichta's audio resource which includes his vowel analysis software, equipment reviews, and field recording advice.

http://transom.org

Includes postings about audio recording techniques and tools.

http://www.camcorderinfo.com

Reviews of consumer camcorders.

http://www.video101course.com

http://multimedia.journalism.berkeley.edu/tutorials/video

http://www.film.queensu.ca/250/250HOME.html

Various tutorials and overviews of film making techniques and use of equipment.

1.8 Appendix: A Basic Field Equipment Kit

We provide a list here with some basic requirements for a field kit. The different parts should all be tested and checked for compatibility. This list is not necessarily complete, nor are all items on it mandatory but it provides a starting point.

- solid-state audio recorder
- 4–6 battery packs
- 1 or 2 battery chargers
- 2 microphones
- microphone splitter (to allow for simultaneous use of two microphones)
- 2 headphones (more if several people transcribe in the field)
- headphone splitter
- professional-range video camera
- 4–6 battery packs
- 1 or 2 battery chargers
- tripod, hand grip, and/or camera stabilizer
- portable computer
- 2 battery packs
- 12 Volt power cord
- USB sticks and/or portable external drive and/or card reader with hard drive
- p. 53 ↳ cables (e.g. XLR for microphone to recorder/camera, USB, and/or Firewire for transferring/capturing to computer)
- consumer-range video camera (as backup and for two-camera documentation of events)
- MP3 type small solid-state recorder
- GPS device

- digital still camera
- laptop stand or external keyboard
- eBook reader
- solar panels (or wind generator), plus regulators/blocking diodes to suit type
- car/truck battery, fuses, cable
- multi-meter, soldering iron, other basic electrician's tools
- waterproof bags (at least one for each equipment item)
- silica gel
- bubble-wrap (for padding inside bags)

Notes

1 The authors thank Nick Thieberger and two anonymous reviewers for valuable feedback on earlier drafts of this chapter. We also thank the people and communities in Milne Bay Province who have welcomed and supported our work. We would like to acknowledge past financial fieldwork support from the Max Planck Institute for Psycholinguistics in Nijmegen, the Feodor Lynen Program of the Alexander von Humboldt Foundation, and the DoBeS program of the Volkswagen Foundation. We also thank Rick van Viersen, Gerd Klaas, and Paul Trilsbeek at the MPI for past technical advice on field equipment and recording techniques.

2 If the source audio/video is in analog format the first step of the workflow will have to be digitizing the analog data. The website of the DoBeS Program (http://www.mpi.nl/DOBES/audio-video) provides some useful practical information on digitizing and capturing.

3 Simple waterproof sacks with fold-over openings, as sold in camping shops, are a good solution.

4 Insects can be attracted to microphones if they are sticky or smelly, so keep them clean.

5 Proprietary format specifications are typically not publically available and may be subject to patents and other measures designed to limit access to their design. They may also require usage fees or licence payments, and their future support is not guaranteed.

6 PCM: pulse-code modulation. A digital representation of an analog signal.

7 wav: Waveform Audio File Format; aiff: Audio Interchange File Format. They are very similar container formats for raw PCM audio and both are compatible with Windows, Macintosh, and Linux operating systems.

8 Codec: originally coder-decoder, now more often compressor-decompressor. A hardware or software device now commonly associated with the conversion of one digital signal format to another, often involving a change in compression characteristics.

9 TRS: Tip, Ring, Sleeve. The most common form of audio jack, cylindrical and compact, found in various diameters and configurations (e.g. mono, stereo, and balanced mono). The ¼in. (6.3mm) size is the original and largest and tends to be found in more professional applications.

XLR: Cannon X, Latch, Rubber. A relatively bulky but reliable plug/socket system used mainly in professional audio/video equipment. Typically but not necessarily comprising three pins/holes within a larger cylinder. (Although XLR refers only to the connection type, it is often used as a synonym for the professional, balanced audio system, e.g. ‘XLR microphone’ implying a balanced microphone. This is unfortunate, since TRS and other connectors can also be part of a balanced system. See §1.2.2.2(i) for discussion of balanced audio.)

10 This might be relevant if e.g. a project includes recordings of faint naturalistic sounds like bird calls.

11 E.g. some ‘Zoom’ models reportedly are sensitive even to touching the body of the recorder.

12 E.g. the ‘RODE Podcaster’ or the ‘Samson G-Track’.

13 Note, however, that there are now such small, inexpensive machines capable of recording to good-quality uncompressed PCM format, e.g. the ‘Zoom H1’.

14 Balanced audio is where the connecting cables (e.g. between external microphone and recorder) form a ‘balanced signal pair’ with equal electrical impedances to each other, to ground and to other components.

15 Although there is also the opinion that it is better to omit the foam sleeve, the idea being that this creates a better 'still air space' around the microphone proper and so a lower degree of wind noise transmission.

16 If you choose to make your own wind gag, reasonably acoustically transparent materials are apparently 'gardening fleece' (as used to protect plants from frost) and cloth intended for loudspeaker covers.

17 When working with a long microphone cable on the ground between camera and speaker, tying the cable to the very bottom of one of the tripod legs reduces the leverage and the risk of making the camera topple if someone pulls on the cable.

18 Such microphones are not balanced and therefore should not be used with long cables. So for video, a professional wired model would be required.

19 A recent development in consumer/prosumer video cameras is the provision of inbuilt zoom microphones offering, in theory, some kind of surround sound. We suspect that this trend has more to do with marketing than with providing useful audio capability. It is worth noting that the more expensive camera models do not offer this, so it is probably a gimmick.

20 This splitter will not be required on a machine with professional audio or with an XLR to mini jack adaptor as there should then already be provision for independent input to each channel. But the splitter can be used effectively with lesser equipment, e.g. an MP3 recorder with a couple of basic wired lapel microphones.

21 If it is important to achieve a stereo recording of the event then two recorders could be used. It should be relatively easy to subsequently synchronize the separate recordings, since the audio for the commentary will include the main event in the background.

22 The traditional professional approach to stereo recording is to use two or more mono microphones in strategic locations—something of a black art. Professional stereo microphones also exist, but some are professional enough to consume an entire field budget.

23 The microphone splitter combines two mono channels (one from each microphone) into one stereo channel. In the case of the headphone splitter, the same stereo signal is delivered to two sets of headphones.

24 This section assumes that the camera is required to fulfill both audio and video functions acceptably. Another scenario is to continue to record audio independently with a dedicated recorder, and to synchronize audio and video tracks in the editing software afterwards. In this case, the observations about camera audio quality do not apply. Audio purists may argue that even professional cameras cannot match professional audio equipment. This is technically true, since the maximum setting for DV recordings is 16bit/48kHz (audio sample size/rate) PCM whereas current solid-state recorders can achieve 24bit/96kHz. However, it is still better than standard CD quality (16bit/44.1kHz) and sufficient for most phonetic analyses.

25 Most HD tape cameras that will be within budget use the same tape format as conventional Mini-DV/DVCAM. Moreover most are backwards compatible, i.e. they can record in DV as well as HDV quality.

26 Keep the originals, though: at present tapes are still widely used for archiving because they are in some respects safer and more durable than digital files on e.g. a hard drive or DVD, so it makes sense to preserve the tapes until and unless a more reliable backup technology becomes widely available.

27 This applies to HDV tape cameras as well, i.e. they too use a version of MPEG2 compression.

28 ELAN: EUDICO Linguistic Annotator. A powerful and widely used, XML-based, audio/video annotation tool, http://www.lat-mpi.eu/tools/elan/.

29 DoBeS: Dokumentation Bedrohter Sprachen/Documentation of Endangered Languages, http://www.mpi.nl/DOBES/. PARADISEC: Pacific And Regional Archive for Digital Sources in Endangered Cultures, http://paradisec.org.au/.

30 Where light from a strong source (either in the image itself or just outside it) 'bleeds' into other areas or causes a haze.

31 We are not discussing still images here, but it is appropriate and also helpful to have a portrait photo of each speaker who has contributed to the text collection. The photos can help to remember who is who, they make good gifts for speakers, and they can be included in a speaker database or in a publication of recorded texts. Video cameras generally have a setting to take stills.

32 The fact that 'High Dynamic Range' imaging, where an image preserves detail across all tones, requires the merging of several photographs which are identical except for their exposure levels, demonstrates clearly the limitations of the standard image.

33 CCD: charge-coupled device; CMOS: complementary metal-oxide semiconductor. Both refer here to the chips which take the place of the film in a digital camera.

34 Secondhand professional cameras such as the 'Sony Z1' or 'PD150' models are also worth considering. Such cameras are designed to be maintained and serviced, and hold up better than the consumer/prosumer types.

35 When choosing a camera, note that the typical LCD screens are all but useless in strong sunlight, so models with no optical viewfinder should be avoided. Manufacturers are beginning to promote digital SLRs as video recorders—e.g. Zoom

suggest that their H1 model can be used as an external microphone on such a machine—but it should be remembered that the camera audio quality and controls are likely to be less than ideal: check the specifications.

36 UPS: Uninterruptible Power Supply. A battery-like device for providing back-up power for a limited period after a power failure; it also protects against spikes and surges. Note, however, that no such equipment protects completely against all electrical hazards, and that the surge protection can wear out if subjected to too large or frequent demands.

37 Which however may be of the ~ 230 v (e.g. Europe, Australia) or ~ 120 v (e.g. USA, Japan) varieties: check carefully that the equipment will run happily on either (as with most laptop computer power leads), otherwise obtain a suitable step-up or step-down transformer before plugging into an AC source.

38 Unfortunately, this variety is heavier, dearer, and rarer than the common starter motor battery. Deep-cycle batteries are also recommended for solar generators. However, since they are so much harder to source and since in a well-managed solar setup the battery need not be discharged to damaging levels, we do not think that this type is essential. (Our solution was to buy the biggest truck starter battery we could find locally, make sure it was fully charged before first use, and then monitor its condition regularly.)

39 GPS: Global Positioning System. This uses a network of satellites to provide position and time information. GPS receivers vary widely in accuracy, speed of acquiring data, and reliability, i.e. how well they keep track. Typically they are of limited use in overhung situations, e.g. thick forest.