REGULATIONS ON USE

Stephen C. Levinson and Asifa Majid

This website and the materials herewith supplied have been developed by members of the Language and Cognition Department of the Max Planck Institute for Psycholinguistics (formerly the Cognitive Anthropology Research Group). In a number of cases materials were designed in collaboration with staff from other MPI departments.

Proper citation and attribution
Any use of the materials should be acknowledged in publications, presentations and other public materials. Entries have been developed by different individuals. Please cite authors as indicated on the webpage and front page of the pdf entry. Use of associated stimuli should also be cited by acknowledging the field manual entry. Intellectual property rights are hereby asserted.

Creative Commons license
This material is provided under a Creative Commons Attribution-NonCommercial-ShareAlike license (CC BY-NC-SA 4.0). This means you are free to share (copy, redistribute) the material in any medium or format, and you are free to adapt (remix, transform, build upon) the material, under the following terms: you must give appropriate credit in the form of a citation to the original material; you may not use the material for commercial purposes; and if you adapt the material, you must distribute your contribution under the same license as the original.

Background
The field manuals were originally intended as working documents for internal use only. They were supplemented by verbal instructions and additional guidelines in many cases. If you have questions about using the materials, or comments on the viability in various field situations, feel free to get in touch with the authors.

Contact
Email us via library@mpi.nl
Max Planck Institute for Psycholinguistics
P.O. Box 310, 6500 AH, Nijmegen, The Netherlands

THE LANGUAGE OF OLFACTION
Asifa Majid, Gunter Senft & Stephen C. Levinson

Project   Categories and concepts across language and cognition
Task   Linguistic elicitation for odour vocabulary using "scratch and sniff" booklets
Goal of task To investigate how languages encode olfactory experiences – specifically (1) whether there is dedicated vocabulary for encoding olfaction and (2) how much consistency there is within a community for describing smell experiences.
Prerequisite You must have completed "Language of perception" (pp. 10-21).
                  To conduct this task you need – (i) The Brief Smell Identification Test[TM], (ii) a pencil, (iii) a pencil sharpener, (iv) The Picture Identification Test

Background

Early research on the sense of smell sought to find a systematic relationship between the physical characteristics of a chemical stimulus and the resulting percept of smell, hoping to identify the basic building blocks out of which other smells could be built. Attempts to classify smells through individual introspection date back to Aristotle through Linnaeus to the Dutch psychologist Zwaardemaker in the late nineteenth century. The first attempt to produce an empirical classification was by Henning (1916), who asked six participants to identify the basic sensory experience of over 400 odorants. Henning proposed that there were six basic odorants, "putrid", "etheral", "resinous", "spicy", "fragrant", and that all other odours could be located in a multidimensional space, with each one of the odorants as points of a prism. But further studies did not support this model. Amoore (1967, 1977) attempted to outline a different approach, where primary odorants were to be identified through specific anosmias. Anosmia is the inability to smell, and specific anosmia is the inability to recognise a discreet aroma. Amoore took specific anosmias as *prima facie* evidence for basic building blocks of odour. However, the range of specific anosmias seems to be very large – around 70 – and other evidence suggests that loss of ability to detect one smell correlates highly with detecting other smells too (Yoshida 1984). Thus approaches attempting to identify primary odorants have failed and current experts in the field assume that odour perception is largely determined by experience (Wilson & Stevenson 2006).

One experiential factor relevant to this project is the role language plays in odour perception. There is evidence that language may play some beneficial role. For example, odour labels can affect the percept of an odour source. When presented with an odour and told that it is cheddar cheese people rate that scent as much more pleasant than when they are presented with the same odour and told it is body odour (de Araujo, Rolls, Velazco et al. 2005). More generally, odour labeling can facilitate odour memory (Lyman & McDaniel 1986), with correctly labeled and familiar odours being identified and remembered better than incorrectly labeled or unfamiliar odours (Rabin & Cain 1984). Also, verbal distractor tasks can interfere with recognition of odours (Murphy, Cain, Gilmore et al. 1991, Perkins & Cook 1990), suggesting a crucial role for language in odour memory.

On the other hand, there is evidence suggesting limited interplay between language and olfaction. For instance, some studies have failed to find facilitative effects of language on odour recognition (Engen, Kuisma & Eimas 1973). Furthermore, in a study of aphasics, Goodglass, Barton & Kaplan (1968) found that patients were impaired far worse in naming olfactory stimuli in comparison to visual, tactile, or auditory stimuli – even though olfactory perception in these patients was unimpaired. This suggests that the relationship between language and perception may be much weaker for smell than for the other senses. Consistent with this, there is quite some disagreement in verbal descriptions for olfactory stimuli. Identification of very familiar odours rarely exceeds 50% (Cain 1979), and there can be large numbers of unique descriptions – up to 80% – given to the same stimuli set (Dubois 2000).

Part of the goal of this project, then, is to investigate the relationship between language and olfaction more closely. Specifically, we will focus on the linguistic coding of smell. It appears that there is poor mapping of language to olfaction,[4] as evidenced by the vulnerability to brain damage, and poor inter-speaker agreement in naming. But this evidence is severely limited, since it is founded primarily on study of English speakers, a language with poor vocabulary for the olfactory sense. There is some tantalizing evidence in the ethnographic literature, that this is just a limitation of English (or perhaps Indo-European languages), rather than being an essential feature of language design.

Indo-European languages appear to have limited resources for talking about smell, with the main strategies being to identify the source with a noun – either a specific source (e.g., *rose*) or a generic source (e.g. *floral*). Other strategies include using a prepositional phrase (e.g. *smell of lemon*), denominal adjectives (e.g., *fruity*), deverbal adjectives (e.g., *pleasant*, *unbearable*), or verb phrases (e.g., *seems good to eat*) (Dubois 2000). We wish to investigate whether the same sorts of strategies appear in other languages, and the prevalence of different strategies. Totonac, for example, appears to have a much richer smell vocabulary (Aschmann 1946). According to Aschmann, Totonac has no general word for expressing that something smells – the exact "shade" of the smell must be taken into account.

Totonac has eight major classes of smell terms formed from a basic root. The roots can be used as verbs with the addition of causative, ingressive or abstractive affixes. The causative prefix plus suffix indicates that the subject of the verb causes the object to take on the smell of the original root, the ingressive suffix indicates that the subject of the verb gets or is getting into the state of the root and the abstractive suffix indicates that the smell of the stem is around without any object or subject indicated (an additional suffix can be added to increase the abstraction). To form a noun a suffix can be added to the root, which would indicate the thing itself has such and such smell, and a different suffix would produce a static adjective or noun exaggerating the intensity of the smell.

---

[4] There is some evidence suggesting that this poor mapping is due to the nature of olfaction itself. Herz & Engen (1996) report a study where 140 undergraduates were asked to conjure a sensation in the absence of any stimulation. The study found that ability to imagine an odour was poor, and significantly worse than their ability to imagine a visual, tactile, or auditory experience. Thus cross-linguistic evidence is essential to tease apart whether olfactory experiences in themselves are ineffable, or whether poor coding in language is merely an accident of some languages.

The broad semantic classes of the Totonac roots are (i) vegetation and good smells, (ii) bad smells, (iii) medicinal and aromatic smells, (iv) body and animal smells, (v) sour smells, (vi) smells that leave a taste in the mouth, (vii) artificial smells and (viii) air-permeating smells (this last class cannot take all of the morphology described above). Aschmann notes that these are not entirely adequate definitions, that the range of meaning of the stems overlap, and more importantly that although the stems have a central "smell" meaning, some of the terms also include the idea of taste, desirability, etc.

The general classes can be further specified with the addition of various affixes. For instance, the class one term for vegetation and good smells has the basic root *mu·?–u?n*, which gives rise to *mu·?klu?n* for 'a pleasant smell of flowers, food, etc.', *mu·?ksu?n* 'smell of mint, parsley, tobacco, and other herbs, Sloane's Liniment, incense, etc.', *mu·?qšu?n* 'smell of ground hominy (*masa*) that still smells strongly of the lime with which it is made', *mu·?qu?n/ mu·?ku?n* 'smell of fresh vegetables, unripe fruit'.

Totonac does not appear to be alone in having dedicated smell vocabulary. The Waanzi of Gabon are said to have a dedicated vocabulary for describing smells, with up to 15 "basic" odour terms (Mouélé 1997). The Kapsiki of Brazil are said to have 14 terms (Tyler 1996) and the Seerer N'dut of Senegal have 5 (Dupire 1987). A systematic cross-linguistic study can help establish whether these examples are rara (Plank & Plank 1995) and whether smell is indeed "ineffable".

Research questions
What resources do languages have for describing smells? Is there dedicated vocabulary for encoding olfaction, and if so what are the types of distinctions that are encoded? And, finally, how much consistency there is within a community for describing smell experiences?

Task
The task is designed to elicit smell vocabulary from speakers using a standardised kit. The primary goal is to establish how people describe de-contexualised scents, and what resources the language provides for doing so.

Consultants
Test 10 participants. Please keep a note of participants age (approximate age is fine), gender, and full linguistic background. It may also be useful to note whether your consultant smokes, and if so how many cigarettes/cigars they consume a day. [5]

Stimuli
The "smell kit" is 10 booklets (one per consultant), entitled "The Brief Smell Identification Test[TM]", a pencil and a pencil sharpener. **You must only use a pencil on the smell booklets – preferably the provided pencil. Any other implement will damage the patches.**

---

[5] There is age-related decline of olfaction which becomes more pronounced from 60 years of age. Women also perform better in smell detection than men, as do non-smokers (Doty, Shaman & Dann 1984). If possible, seek younger female non-smoking consultants. This is not necessary, however. But do be sure to collect full background information about the consultant.

Each booklet has instructions on the front page, which you should familiarise yourself with before proceeding with testing. Note that the original booklet was designed to be a forced-choice task, but we are interested in free naming thus the English descriptors have been covered in the stimulus booklets. Do not remove the covering stickers!

There is also 1 picture booklet for this task. The picture booklet depicts visually the objects from the smell kit. This is to check consultant's familiarity with the objects featured in the smell booklets.

Procedure
Remember to video~audio-tape your session.

(1) The Brief Smell Identification Test
Explain to the consultant that you will have a book that has different smells on each page. You will present them with a smell and they should describe for you what they experience.

The booklet contains 12 pages. At the bottom right-hand corner of each page is a brown label. This contains the scent. The scents should be presented to consultants in a fixed order, beginning with item 1 on page 1 and progressing through the pages consecutively until the booklet is completed.

For each page the researcher will present the scent to the consultant (as outlined below) and ask the consultant in their native language *What smell is this?* or *How does this smell seem?* (check section on "Language of Perception" pp. 10-21 before proceeding with this task).

To release the fragrance from the brown label, the researcher should use the pencil provided to scratch the label. It is very important to use a sharp pencil (a dull pencil, or a different object will not be effective for releasing the fragrance and will damage the stimulus). Tracing the letter M or Z should be enough to release the fragrance. As soon as the fragrance is released present to the consultant so that they can sniff the released scent. Repeat the process with the same stimulus until the consultant is able to smell and name the scent. After each scent ask *What smell is this?* and record the consultant's answer. Proceed till completion.

(2) The Picture Identification Test
In order to test whether consultants are familiar with the objects in the smell booklets, we also have a visual analogue. A single booklet with 12 pages depicts the objects featured in the smell booklet.

After conducting the elicitation with the actual smell booklet, present the pictures one at a time to the consultant and ask them simply to name the object. Note – three of the objects rely on speakers being able to read English to identify the object correctly (these pictures are from a standardised test and apparently the creators did not think about the use of labels!). You can either omit these from testing, or just note what people say to these stimuli. While we are interested in whether people are familiar with these objects (and thus answers to these pictures may not be the most informative) we are also interested in whether responses to smell stimuli are more or less consistent than answers to stimuli in other senses, such as vision. Thus it is also of interest to see whether there is more

consistency across consultants for the visually depicted objects than there is for the olfactory objects – or vice versa.

Analysis
Each consultant's response will be coded for word/phrase/construction used to describe smell. This will then be analysed for (1) consistency across consultants and (2) category of response, i.e., are responses (a) evaluative, (b) descriptive, or (c) source-oriented.

Outcome
Data will contribute to a description of the grammar of perception in the field language, intended for a collected volume. The pooled cross-linguistic data will also contribute to an overview publication on the encoding of the senses across languages.

Optional post-task elicitation
Obviously this small set of smells will not exhaustively tap the olfactory lexicon of the language. After completing the standardised elicitation, take the opportunity to ask your consultant follow-up questions to probe for further vocabulary. One simple method you can use is simple "free-listing". Ask your consultant: *What are all the different smells an object can have*? Or if you have already elicited specific terms you can use them as the basis of the question *Things can smell flowery, musky – how else can things smell?* Also, you may wish to establish form classes of elicited terms and do extra elicitation with one or two consultants on the precise semantics of terms used in this task.

References

Amoore, J. E. (1967). Specific anosmia: A clue to the olfactory code. *Nature*, *214*, 1095-1098.

Amoore, J. E. (1977). Specific anosmia and the concept of primary odors. *Chemical Senses*, *2*, 267-281.

Aschmann, H. P. (1946). Totonac categories of smell. *Tlalocan*, *2*, 187-189.

Cain, W. S. (1979). To know with the nose: Keys to odor identification. *Science*, *203*, 467-470.

de Araujo, I. E., Rolls, E. T., Velazco, M. I., Margot, C. & Cayeux, I. (2005). Cognitive modulation of olfactory processing. *Neuron*, *46*, 671-679.

Doty, R. L., Shaman, P. & Dann, M. (1984). Development of the University of Pennsylvania Smell Identification Test: A standardized microencapsulated test of olfactory function. *Physiology & Behavior*, *32*, 489-502.

Dubois, D. (2000) Categories as acts of meaning: The case of categories in olfaction and audition. *Cognitive Science Quarterly*, *1*, 35-68.

Dupire, M. (1987). Des goûts et des odeurs: Classification et universaux. *L'Homme*, *104*, 5–25.

Engen, T., Kuisma, J. E. & Eimas, P. D. (1973). Short-term memory of odors. *Journal of Experimental Psychology*, *99*, 222-225.

Goodglass, H., Barton, M. I. & Kaplan, E. F. (1968). Sensory modality and object-naming in aphasia. *Journal of Speech and Hearing Research*, *11*, 488-496.

Henning, H. (1916). *Der Geruch*. Leipzig: Barth.

Herz, R. S. & Engen, T. (1996). Odor memory: Review and analysis. *Psychonomic Bulletin and Review*, *3*, 300-313.

Lyman, B. J. & McDaniel, M. A. (1986). Effects of encoding strategy on long-term memory for odors. *Quarterly Journal of Experimental Psychology*, *38* ,753 –765.

Mouélé, M. (1997). L'apprentissage des odeurs chez les Waanzi: Note de recherches. *Enfances*, *1*, 209–222.

Murphy, C., Cain, W. S., Gilmore, M. M. & Skinner, R. B. (1991). Sensory and semantic factors in recognition memory for odors and graphic stimuli: Elderly versus young persons. *The American Journal of Psychology*, *104*, 161-192.

Perkins, J. & Cook, N. M. (1990). Recognition and recall of odors: The effects of suppressing visual and verbal encoding processes. *British Journal of Psychology*, *81*, 221-226.

Plank, S. & Plank, F. (1995). Unsägliche Gerüche: Versuche, trotzdem vom Riechen zu sprechen. In B. Busch & U. Brandes (Eds.), *Das Riechen: Von Nasen, Düften und Gestank* (pp. 59-72). Göttingen: Steidl.

Rabin, M. D. & Cain, W. S. (1984). Odor recognition: Familiarity, identifiability, and encoding consistency. *Journal of Experimental Psychology: Learning, Memory & Cognition*, *10*, 316-325.

Tyler, S. A. (1996). The essence of aroma. *American Anthropologist*, *98*, 617-619.

Wilson, D. A. & Stevenson, R. J. (2006). *Learning to Smell: Olfactory Perception from Neurobiology to Behavior*. Baltimore: John Hopkins University Press.

Yoshida, M. (1984). Correlation analysis of detection threshold data for "standard test" odors. *Bulletin of the Faculty of Science & Engineering of Chuo University*, *27*, 343-353.