The discursive Other

Dynamics in plant scientists' talk on Phytophthora with experts and the public

Karen G. Mogendorff

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During a PhD one learns much, but that does not mean that I started my PhD as a tabula rasa. This thesis is at least in part informed by my life and research experiences prior to the start of my PhD research. Two persons who have had a notable impact on my early formation as a researcher I would like to mention here: Thea van der Geest and Sjaak van der Geest (not related to each other). Thea supervised the very first research I undertook on my own and, after that, my master's thesis in applied communication science at the University of Twente. Several years later, Sjaak supervised my master's thesis in social and cultural anthropology and encouraged me to write my very first research article, helping me to develop as a writer. Moreover, at a distance, Sjaak has been one of the few constants in my semi-nomadic life as a researcher working on temporary contracts at different universities.

One's life experiences may also implicitly affect research, as is certainly the case for me. My understanding of genomics – an important concept in this thesis – partly derives from my lived experience as one half of identical twins and is affected by a decade-long participation in twins research.

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1 Introduction to the Discursive Other

The idea that innovation is a linear process in which scientists invent, businesses apply and consumers buy has been replaced by the notion of innovation as a co-evolutionary product of science, technology and society (Gremmen, 2007; Oudshoorn & Pinch, 2005; Rip, 2001). Funding bodies, government representatives and societal action groups demand that scientific experts pay more attention to 'lay' concerns in different technology development stages (Caron-Flinterman, 2005; Gaskell & Bauer, 2001). Lay concerns may refer to concerns of citizens or people in general, or concerns of prospective users or consumers of new technologies[1]. Involvement of users and people is particularly propagated when technologies are perceived to contribute to high-stakes societal issues – e.g. global food security – or if public resistance to new technologies is anticipated. Both high stakes and public controversy are characteristic of the plant technology science field in Europe and in the Netherlands (Duarte, 2011; Gaskell & Bauer, 2001; Leach et al., 2005; Rowe et al., 2005; Rowe & Frewer, 2005). Dutch plant technology science is the setting in which data were gathered for this thesis.

Scientific experts need to relate to the concerns of a great many others – users, citizens, consumers, representatives of industry or government. Experts may do this in different ways: they may talk with laypeople and prospective users of technology during so-called public or open meetings, and they may talk *about* people and user concerns with the media or during expert or invitational meetings. How experts in technology development choose to relate to people and users very much depends on what relationship they have and aspire to have with people and users.

Central to this thesis is how plant scientists discursively handle their relationships with the public or *people* as plant scientists refer to them, and prospective users of plant technology – crop producers (farmers) and crop creators (crop or plant breeders). Why focus on the relationship between science and society in the plant science field? The relationship between plant scientists on the one hand and laypeople on the other has been strained for a long time. Plant technologies such as genetic modification (GM) of staple crops are persistently met with public controversy in Europe despite, or perhaps because of, public engagement activities (e.g. see Gaskell & Bauer, 2001, 2006; De Krom et al., 2012; Wynne, 2001). In particular, cross-breeding between different species to design food products is met with public resistance. Tinkering with food is framed as violating existing religious and species-based sociocultural classification systems (Douglas, 2002; Douglas & Wildavsky, 1983). For instance, tomatoes modified with pork genes may be unacceptable by some because relevant species' boundaries are crossed. Furthermore, forms of genetic modification are often framed as unnatural and as potential threats to our health and safety (Marris, 2001; Wynne, 2001). The resistance to genetically modified crops occasionally becomes very tangible; sites where genetically modified crops are tested are with some regularity destroyed or damaged by action groups (De Krom et al., 2012; Duarte, 2011).

[1] Laypeople or laymen are a standard way of referring to non-experts. Because the term *lay* has a derogatory connotation in the context of this thesis, it is initially put between inverted commas; layness or ignorance is not a standalone category but tends to be constructed in opposition to expertise and as such tends to be negatively valued. The term *lay* is also inaccurate, that is, expertise or the lack thereof tends to be highly relative and context-dependent; one and the same person may be treated as either an expert or layperson depending on the subject under discussion and the interaction setting. In this thesis, I use the term laypeople unless the analytical focus warrants me to be more specific.

Bio-scientists have variously responded to people's concerns and reactions to technologies such as genetic modification of food crops. Backed by the Dutch government, Dutch plant experts[2] genetically modify staple crops, e.g. to make them disease resistant. However, these experts appear to have accommodated people's concerns with regard to the transgression of species' boundaries; they decided to adopt genetic modification based on intra-species plant breeding – cisgenesis – and to abandon the practice of cross-species plant breeding – transgenesis. Moreover, plant scientists and plant breeders are campaigning in Brussels for cisgenic modified crops to be exempted from stringent EU regulations on field testing and producing GMOs (Holm et al., 2013; Jacobsen & Schouten, 2008).

Lay concerns are widely dismissed as irrational, emotional or irrelevant to science (Burchell, 2007a, 2007b; Cook, 2004; Cook et al., 2004). In contrast, bio-scientists including plant scientists tend to present themselves as rationally acting professionals. This is criticized by Cook (2004); he shows that plant scientists are prone to act emotionally themselves in talk about GMO. The typecasting of people and scientists in oppositional and mutually exclusive categories of irrational versus rational tends to spur some bio-scientists to engage in public education activities.

An underlying assumption of many science education initiatives is that, if people understand science and technology better, then they will respond more rationally when confronted with new technologies (Besley & Nisbet, 2013). For instance, bio-scientists tend to consider people's lack of knowledge of mainstream food production practices problematic because, according to them, this knowledge deficit at least in part explains why people's expectations or preferences with regard to food are unrealistic or irrational (Meyer et al., 2012).

The focus of many bio-scientists on fixing the knowledge deficit of non-scientists has been widely criticized (Hansen et al., 2003; Wynne, 2006). One of the criticisms is that increased knowledge does not necessarily mean that people will come to share someone else's views, attitudes and stances on a subject. A study of the Dutch Advisory Board on Genetic Modification (COGEM) that analyses patterns in arguments for and against genetic modification in agriculture shows that the well-informed – in the technical-scientific sense – do not necessary cease their opposition against GM crops (COGEM, 2007). Another critique is that many science literacy activities treat their audiences implicitly as passive recipients of knowledge, whereas research shows that people integrate new knowledge into what they already know and in alignment with their needs (Bucchi, 2004; Bucchi & Trench, 2008; Dietrich & Schibeci, 2003). Put differently, it is unlikely that education or lecturing alone is enough to bring plant experts and laypeople closer together with regard to the value and desirability of genetic modification (GM).

In the literature, the strained relationship between (plant) experts and laypeople is often attributed to a lack of trust in science (Cunningham-Burley, 2006; Wynne, 2006)[3]. However, research indicates that the public are critical of science *and* use scientific arguments to substantiate their claims and positions vis-à-vis scientists and non-scientists alike (e.g. see Bean, 2011; te Molder, 2012). Non-scientists' use of scientific arguments

[2] The category of plant experts consists of various types of experts: academic plant scientists, experts from the plant breeding industry who do or do not supervise research, field experts and experts who combine relevant content expertise with communication expertise. Genetic modification of plants happens within and outside academia and involves various types of plant experts.

[3] The mistrust hypothesis is not without its contradictions. Scientists want citizens to trust them more, but they also want citizens to act more rationally or objectively; simply relying on the authority of scientists is not very rational or objective.

seems to signal a trust in science as an institution, and the popularity of talk about scientific studies indicates that science has become an integral part of societal discourse (e.g. see te Molder, 2012). However, the latter also implies that individual scientists have fallen from their pedestal; they are increasingly asked to account for their scientific practices – probably because scientists have a less exclusive access to, and understanding of, science than they used to have.

In the Netherlands and the world more broadly, the percentage of more highly educated citizens has grown substantially. Additionally, the advent of the Internet and social media has facilitated lay access to science and its debates. Because of these developments, people have gained a better understanding and, arguably, a better appreciation of science. Despite this, as Wynne (2001, 2005) has repeatedly pointed out, scientists and policymakers have largely failed to acknowledge that there are limits to the predictive knowledge of science and of what (part of) phenomena science can make sense in a meaningful manner – something of which the public are increasingly aware and critical (Epstein, 1995; te Molder, 2012).

Put differently, it appears that bio-experts need to find ways to relate to people who increasingly do not accept their concerns becoming sidelined in science–society debates. Or as Swierstra and te Molder (2012) argue, natural scientists should in particular seriously engage with so-called soft impacts – social, political and cultural impacts of emerging technologies that tend to be treated as soft by experts and policymakers – in order to produce technologies that optimally help to manage high-stake societal issues. Before relevant concerns of non-scientists may be sufficiently addressed in technology development, different steps need to be taken.

A first step would be to investigate how, in real-life situated practices, experts involved in technology development in the life sciences, for better or worse, deploy their professional expertise relative to other forms of expertise: everyday knowledge and user knowledge (Epstein, 2011; Swierstra & te Molder, 2012; Haen et al., 2014, forthcoming). The benefit of focusing on real-life practices is that one may gain a better understanding of how plant experts deal with one another and other stakeholders in everyday interactions than by relying on what study participants say about their practices.

One way of investigating how experts engage with user and lay concerns in technology development in real-life practices is by looking at how they talk *with* and *about* people and users in meetings centring on plant technologies. Talk or language in use is instrumental in achieving things (Austin, 1962). With language – formulations, statements and claims – people may unintendedly persuade or convince others, manage stakes and interests so as to protect the factuality of their descriptions, or, conversely, attribute them to others in order to undermine the objectivity of their talk (Potter, 1996). Plant experts may routinely deploy language or discourse in a way that leads to a serious, partial or no consideration of 'soft' concerns in technology development. Language use is learned and habitual in nature; people may therefore unwittingly reproduce dominant discourses on, for instance, technologies. Analysis may bring to light taken-for-granted or hidden consequences of talk.

After insights are gained into the interactional consequences of plant experts' references to Others, what happens when plant experts are given the tools to appraise the interactional consequences of their own talk in the past and the future can be explored (Haen et al., 2014; Lamerichs et al., 2009).

1.1 Aims and Research Questions

A first aim of the thesis is to further insight into how and to what end plant technology experts – scientific and field experts – make 'significant Others' relevant in talk *about* or talk *with* people and users. In biology texts, it is common to treat non-humans such as plants and animals as actors who have agency and/or human traits (e.g. see Dorst, 2011; Drogosz, 2012). Therefore, in talk, significant Others that are either human or non-human may be made relevant. Plant experts whose talk is analysed for this thesis are working on new and comprehensive ways to combat Phytophthora – a major plant disease that has been pestering potatoes and other crops for ages[4]. Plant experts – in particular plant scientists – appear to have a strained relationship with laypeople, users of plant technology and with Phytophthora. The aim of increasing understanding of how plant scientists make Others relevant in their talk can be translated in the following main research questions:

- How and to what end do plant scientists discursively manage the science–society relationship? This question is addressed in chapter 3 by looking at plant scientists' talk about laypeople.
- What functions do references to users serve in talk focusing on technology development to combat Phytophthora in plant expert board meetings? This question is addressed in chapter 4.
- How do plant scientists discursively represent Phytophthora and genomics to the public? And what may we learn from that? In chapter 5, this question is addressed by looking at the innovative (metaphorical) framing of Phytophthora and plant genomics – plant genomics is the proposed solution to Phytophthora.

After insights are gained into the function of plant experts' discursive constructions in face-to-face interactions, these insights may be deployed to help realize a second aim: to explore whether plant experts can be empowered to appraise the interactional consequences of their own talk alongside the content of talk. Interactional consequences or effects of talk refer to how participants in talk-in-interaction, intentionally or not, construct laypeople or science in their talk and how this affects relationships, claims and decisional rights; who has superior rights or is best equipped to decide how lay, user and scientific concerns are weighed against one another in plant technology development? Put differently:

- What happens when plant experts are given the tools to critically appraise the interactional consequences of their own talk? To what extent, and in what sense, do plant experts become self-reflective about their current communication practices? An attempt to turn plant experts into self-reflective communicators is reported upon in chapter 6.

In the following section, the concept that connects the various studies of plant experts' talk in this thesis – *The discursive Other* – is introduced.

[4] Phytophthora is Greek for plant destroyer. It is the most important pest in potato crops, but other crops and plants are also greatly affected by varieties of Phytophthora. In the research programmes followed for this thesis, the oomycete *Phytophthora Infestans* is the main culprit (Kimmann et al., 2002).

1.2 The Discursive Other as Central Concept

Studying how people relate to others is central to the social sciences: people depend on others for their survival, well-being and sustenance. Anthropologists tend to study the so-called exotic Other in different cultures; economists look at transactions between (groups of) people or how people work together to satisfy their basic needs; psychology looks at how individuals' self-image, intentions and behaviours are affected by others (Buchowski, 2006).There are also studies that focus on processes of othering: classifying certain groups of people as Other to fit them in a hierarchy, to exclude them or to justify bad treatment of groups, people or differences in societal standing (e.g. studies focusing on racism, sexism and marginalization) (e.g. see Colligan, 1994).

This study differs from these kinds of studies in that, in this thesis, the focus is on plant experts' references to the Other in real-life real-time talk-in-interaction. Moreover, the focus is not on how talk about the Other affects this Other personally or socially. Rather, it looks at how experts discursively deploy references to Others who are not given the opportunity, or are not able, to speak for themselves. Insight into what talk about the relevant but physically absent Other accomplishes may help further understanding of how relevant Others matter in technology development.

On a more abstract level, this study may shed light on how scientific plant experts may handle the problem of representation. Experts who develop technologies for society in society – like the plant scientists in this study – need to decide about whom to invite to participate in deliberations about technology, and they have to decide in what form they give invitees the opportunity to voice their own and others' concerns.

The concept of the discursive Other as used in this thesis is grounded in discursive psychology, the study of talk-in-interaction that propagates a non-cognitive view on the relationship between mind and language use (for more on discursive psychology, see section 1.3). People may say things, not because they believe them to be true, but because they consciously or unconsciously feel that it is relevant to do so in a specific interaction setting, e.g. people may talk about Islam, not because they necessarily believe in its precepts or are strongly opposed to Islam, but because displaying knowledge and tolerance of Islam may be a relevant activity to avoid potential accusations of discrimination (Bonilla-Silva, 2002).

In this thesis, the focus is on the interaction effects that people's accounts intentionally or unintentionally project or generate in real-life settings, irrespective of whether people's discursive actions reflect their inner feelings and thoughts. The concept of discursive action means that, with their utterances, participants in talk-in-interaction routinely manage identities, roles, rights and responsibilities relevant to particular real-life settings to effectuate various ends intentionally or otherwise. In expert–lay meetings, for instance, experts perform the discursive action of asserting their expertise in face-to-face meetings, e.g. by voicing or explaining jargon. By doing this, expert speakers may project discursively that they have superior access to a field of expertise. Demonstrated superior access to a knowledge domain may generate the interactional effect that co-participants in talk-in-interaction defer to speakers' discursively displayed expertise and grant them superior decisional rights and responsibilities by default, e.g. by ultimately leaving the right and the responsibility to make decisions to people who act like experts in discourse.

Thus, the aim here is not to discover whether what (scientific) plant experts think to be true about lay views is correct, but to discover what (scientific) plant experts achieve, consciously or otherwise, by saying particular things to, and about, Others in a range of different settings. To stress that in this study the focus is on the interactional achievements

of plant scientists' references to Others and, thus, differs from most studies, the term the *discursive* Other is used rather than the Other (every reference to another, one could argue, is discursive in nature).

As far as I know, the concept of the Other has not been used before as a central concept in discursive psychological studies, although it is used more broadly in the social sciences. The concept as used in this thesis has been inspired by various authors who have researched references to Others: anthropology's concept of the exotic Other (e.g. see Buchowski, 2006), the concept of the generalized Other as developed by Holdsworth and Morgan (2007), Latour's (1996) actants, Maranta et al.'s (2003) distinction between Individual LayPeople (ILPs) and General LayPeople (GLPs). From the perspective of discursive psychology – the main research approach of this thesis – the problem with these studies is that they generally deploy the concept of the Other, intentionally or unintentionally, as a concept that partly reflects people's thoughts. The concept of the discursive Other is explicitly used in a non-cognitive way (as explained previously, see also section 1.3).

The correspondence between the concept of the discursive Other of this thesis and anthropology's exotic Other is that the Other generally has subjugated societal status and less (discursive) power than the one who is doing the othering. The exotic Other tended to be seen as more primitive, less knowledgeable and less cultured than the White Man (Buchowski, 2006). A parallel can be drawn with expert–lay constructions. In the literature discussion in the introduction to this chapter, we have seen that bio-scientists tend to conceptualize laypeople as less rational, less consistent and more emotional than experts. Given that emotionality is valued less than rationality in society, scientists who call laypeople irrational can be understood to be establishing their superiority over laypeople by discursively representing them as less, as Other. Moreover, the process of othering tends to create 'us' and 'them' categories (e.g. see Buchowski, 2006).

The concept of the discursive Other of this thesis is also inspired by Holdsworth and Morgan's (2007) concept of the generalized Other. Holdsworth and Morgan (2007) noticed during ethnographic interviews that informants frequently made references to Others in a generalized way. Their informants tended to refer to categories of people – mothers or the prototypical mother, fathers or the prototypical father, children or the prototypical child. Or they referred to a group of people they knew personally in the plural – e.g. the nephews, neighbours – or in more indeterminable vague references – e.g. they, people. Scientists' references to non-scientists in the lay–expert literature also tend to be indeterminable and in the plural. Like the generalized Other, the discursive Other does not refer to concrete individuals but to categories of people, or the prototypical member of a social category.

There are also differences between the discursive Other and the generalized Other. Holdsworth and Morgan (2007) use and adapt the concept of generalized Other in a cognitive way, that is, the generalized Other refers to people's mental states. With this, they follow in the footsteps of the philosopher and sociologist George Herbert Mead who pioneered symbolic interactionism and introduced the term, the generalized Other (Mead, 1962 [1934]). In this thesis, references to the Other explicitly do not refer to people's thoughts.

Latour (1996), who investigated the practices of natural scientists, was also an inspiration, albeit in a limited sense. He pointed out that agency or even freewill is not exclusively attributed to humans but tends to be ascribed to animals, plants and objects. Drogosz (2012) and Costa da Silva et al. (2009) show that Charles Darwin, the father of modern-day biology, attributed agency to plants and animals by personifying or humanizing

them in his texts. Darwin deployed this discursive strategy of personification to better describe and explain his theory of natural selection to lay or non-scientific audiences. Furthermore, like Holdsworth and Morgan (2007) and Maranta et al. (2003), Latour (1996) observed that references to Others may be generic. From his observations, Latour (1996: 2) extended 'the word actor – or actant – to include non-human, non-individual entities', thereby accommodating the empirical reality that scientists often attribute agency and freewill to plants and animals and refer to humans and non-humans in generic terms.

The concept of the discursive Other follows Latour (1996) in that it acknowledges that experts may project agency and human characteristics onto non-humans such as plants and diseases in their talk. This, however, does not necessarily mean that experts who humanize plants and diseases in their talk actually believe that plants have human characteristics, nor does it necessarily mean that plant experts see plants as veritable interaction partners. Rather, it means that the humanization of plants and animals is apparently interactively relevant in plant experts' text and talk. Latour's principle of symmetry and the material-semiotic approach of actor network theory (ANT) is not followed in this thesis (e.g. see McLean & Hassard, 2004, for more on ANT and symmetry).

Considering all the different takes on the Other as discussed above, I conceptualize the discursive Other in this thesis as follows:

> *The discursive Other consists of references to human and non-human actors; Others are discursively treated as human(oid) agents in their own right and as relevant to the interactive management of a problem or dilemma in an interaction setting.*

The above definition implies that the discursive Other may vary across interaction settings. Moreover, the discursive Other:

1. is treated as human or humanoid in talk-in-interaction. In reality, the discursive Other may be non-human.
2. is not in, or not given, the position to voice concerns for him/her/itself. The Other central to the interactive management of a problem tends to be discursively present but physically absent.
3. is central to (scientific) experts' discursive handling of contradictory requirements or realities but does not necessarily reflect speakers' actual beliefs or thoughts.

The concept of the discursive Other serves to enable discussion and reflection on how laypeople and users matter interactively in plant technology development, either because they are the subject of plant experts' talk or because plant experts talk about Phytophthora research in front of them. In the latter case, it is assumed that plant experts' research accounts are prepared with a lay audience in mind.

1.3 Main Research Approach: Discursive Psychology

There are different ways of studying the Other in real-life, real-time practices. Arguably, the most widely known way of doing this is by engaging in participant observation for an extended time period in the setting of interest, as anthropologists or ethnographers aspire to do in their study of different cultures from an insider or emic point of view[5]. However, a

[5] Total participation in the field of interest is often not feasible. In practice, observation and participation are difficult to handle simultaneously by the researcher. Furthermore, the social status, knowledge and capabilities

less well-known and relatively young methodological approach is deployed in this thesis: discursive psychology (DP)[6].

Discursive psychology is a discourse analytical approach that assumes that language is the main resource people deploy to get things done. People use language in encounters with others to perform different actions such as asserting identities, persuading others of their standpoints and making claims (Potter, 1996). Actions performed by speakers may generate different interactional effects. For instance, asserting one's identity as a consumer may serve to demonstrate that one understands and is sympathetic to consumer plights. Demonstrated understanding of consumer plights may then, in a next step, be deployed to legitimize judgements about these plights and so on. Ultimately, DP seeks to offer insights into how participants in talk-in-interaction (re)produce and handle societally relevant issues.

Discursive psychologists are generally interested in the issues that speakers make relevant in specific interaction settings. They ask themselves: Why does this speaker say this right *now*? What discursive ends do speakers who respond to one another's utterances, (intentionally or unintentionally) further by corroborating or negating claims or descriptions of events, people and processes? These questions are relevant because people may word things in various ways; depending on the timing and wording of events, people and processes, speakers may enable or project various responses to their talk and, thus, generate different interactional effects.

One and the same utterance may be heard or interpreted in different ways by recipients of talk. The rhetorical principle in DP makes use of this feature of talk-in-interaction (e.g. see Edwards, 1997; Hutchby & Wooffitt, 1998). DP analysts deploy knowledge of what could have been said by participants in talk-in-interaction to determine the significance and import of a speaker utterance, or speaker utterance and recipient response. Words, sentences and other units of language are imbued with sociocultural meanings that speakers may deploy for their various interactional purposes. For instance, if one wants to say something about the general population of a country, one could use different nouns to talk about people in a general sense, e.g. citizens and consumers. Although these words share a common ground, they all come with their own set of connotations. Citizens are members of society owing loyalty to a state and are entitled by birth or naturalization to be protected by a state or nation; they are associated with democracy, public life, rights and obligations, e.g. citizens have the right to vote and have to pay taxes. In contrast, consumers are understood to be persons who buy goods such as food and clothes to satisfy their personal needs. They are associated with the economy, individualism, capitalism, consumption, households, purchasing power. These differences in the sociocultural connotations imbued in nouns and other units of language enable different discursive actions and may generate different interactional effects – if one wants to delegate people's concerns to the private sphere, this may be accomplished more easily by using the term consumer than citizen; the term consumer is already associated with the private sphere, whereas the citizen category is associated with the public sphere.

In line with its action orientation, DP treats expertise and social identities as unfixed characteristics of people[7]. Personal characteristics or epistemic status need to be asserted or

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of informants may make participation impossible or very difficult. For instance, to participate in science or top sport, researchers need to have specialized capabilities to be able to engage in participant observation.

[6] Discursive psychology was founded by Jonathan Potter and Derek Edwards at Loughborough University, UK. In 2012, DP's 25th anniversary was celebrated.

[7] This stance on expertise can also be found in studies that focus on the performative function of talk without deploying DP (e.g. see Carr, 2010).

projected in talk-in-interaction in the interaction setting of interest – e.g. public debates – before characteristics or statuses are considered valid in DP analysis (Heritage, 2012). For instance, the question *What do farmers say about the technology?* directed at a crop advisor makes crop advisors' expertise with regard to farmers discursively relevant. Furthermore, the questioner in the example shows himself, perhaps unwittingly, to be less knowledgeable on the subject of farmers than the crop advisor who is asked to share his knowledge. Depending on the uptake of the question by the crop advisor, the projected epistemic status of the crop advisor may be confirmed or not.

Now, I use an example to illustrate how discursive psychological analysis works. The example is taken from a recorded expert board meeting (for a DP analysis of user-references during expert board meetings, see chapter 4) and is transcribed using Jeffersonian transcript notation (Jefferson, 2004). After transcription, the fragment was translated from Dutch to English. It is early in the meeting and the chair is engaged in the interactional business of checking whether participants have followed up on the action points assigned to them at the previous meeting. Details on transcript notation can be found in the appendix at the end of this chapter.

Example 1

1	Chair:	Second action point.
2		That's about the Organic Centre
3	P2:	(0.3) she cancelled yesterday
4	P3:	Well, did that meeting take place or not?
5	Chair:	No
6	P2:	Or heard something?
7	Chair:	Well, <u>now</u> it probably will not happen anymore (.)
8		Action point for P2
9	P2:	That was about research we would do for MP (.)
10		with that we are now one step further
11	Chair:	°Done° (.) ok, thank you (.) report?
12	P3:	We go, I think, very very fast about closing the organic thing
13		((two lines omitted))
14		I think it is really too easy
15		that people join our meetings=
16	Chair:	=yes=
17	P3:	=and then say a lot of things and then not show up
18		yes, that is not the way it works for me
19	Chair:	for me neither (0.3) my proposal is to stop wasting words on the matter
20	P3:	oka:y
21	P4:	I know also that the Ministry is taking it seriously too…
		(Px= participants)

The example shows a lot of interaction between various participants (Px) and the chair. This means that the participants' proof principle, that is,recipient uptake can be applied in analysis alongside the rhetorical principle. The chair of the meeting generally checks action points quickly, after which he moves to the first item on the agenda. However, in this example, the chair is forced to deviate from business as usual to address an issue brought up by P3.

In line 3, P2's response to the chair's statement about action point 2 is a first indication that action point 2 is being differently treated than other action points, namely, P2

does not say anything about the action point – what is the standard course of action – instead, he says something about the person who is responsible for following up on action point 2: *she cancelled yesterday*.

In line 4, P4 says: *well, did that meeting take place or not?* Generally, participants are expected to follow up on action points irrespective of whether or not they are able to attend the meeting. Thus, P3's query can be understood as an attempt to go back to business as usual, namely, checking whether action points are completed.

The chair's answer in line 5 is negative and indicates that he already knew that the action point was not completed; P2's subsequent query in line 6: *or heard something?* indicates that he treats this action point the standard way by inquiring how the action point will be effectuated later on.

In line 7, the chair provides a negative assessment of whether the action point will be completed. In particular, the *now* in the response indicates that something is the matter. Later in the meeting, it will become clear that the Organic Centre participant did not just excuse herself for the current meeting but for all future meetings and that she has no successor who will in future represent the Organic Centre. The chair does not dwell on the matter or expand his assessment in line 7. The action point is checked, so he moves on to the following action point in line 8 that is the responsibility of P2. P2 corroborates the chair's action by responding to the chair's query regarding his action point.

Then, in lines 12–18, P3 opens the Organic Centre issue by providing a negative personal assessment of *people*, that is, relative outsiders who violate meeting norms by claiming a lot of attention during meetings but do not show up when it suits them better (the *I think* in line 14 signals that it is a personal assessment). P3 uses the *generic* people, but it is clear from the foregoing discussion that the representative of the Organic Centre is implicated (the latter is more explicitly stated later on in the discussion not shown here). Subsequently, in line 19 the chair acts in alignment with P3 by agreeing with P2's negative assessment; however, simultaneously he attempts to redirect the discussion to the unfinished business of checking all action points by providing the following statement: *For me neither* (.) *My proposal is to stop wasting words on the matter*. *Stop wasting words* is an extreme case formulation.

Extreme case formulations are descriptions that seek by their design to persuade listeners that what is stated is believable or reasonable (Hutchby & Wooffitt, 1998: 209–210). In this case, the extreme case formulation signals that the chair agrees with P3's concern on a personal basis and in sentiment – what happened is totally not done – and it signals that, different from P3, the chair does not want to talk about the matter, at least not right now, given the interactional business at hand. But exactly the opposite happens after this statement. In line 21, P4 aligns himself with P3 by confirming the legitimacy of P3's concerns. Moreover, P4's action increases the legitimacy of P3's concern further by stating in line 21 *the Ministry is taking it seriously too....* In other words, what started as an action point that an absent participant did not complete turns into a much bigger issue about which the Ministry is reportedly concerned.

After P4's contribution in line 21, a minutes-long discussion ensues devoted to the actual participation of organic plant breeding representatives versus their desired participation in the expert board meetings, before the participants return to the business as usual of checking the remaining action points (not included in *Example 1*).

E*xample 1* shows that DP analysts need to have some knowledge of the participants, context and interaction setting to be able to assess utterance plus recipient uptake (see also

Koole, 1997). In *Example 1*, for my analysis I used knowledge of how action points are discursively handled during meetings in general and how action points tend to be discursively handled in expert board meetings in particular. I also deployed knowledge of general discursive trends in the data corpus of recorded expert board meetings in the analysis of this specific fragment of talk-in-interaction.

The Non-Cognitive Focus of Discursive Psychology

As already mentioned, an important feature of discursive psychology is that DP analysts systematically refrain from attributing underlying cognitive states to speakers' utterances (Potter, 1996; Edwards, 1997; te Molder & Potter, 2005). On the basis of the actions that speakers perform with their talk and the consequences of speakers' discursive actions, one cannot say for sure that: 'the speaker thought this, or the speaker intended that while saying this'.

Moreover, as *Example 1* shows, what talk-in-interaction accomplishes depends on two or more people: a speaker and the recipient(s) of that talk. An individual speaker cannot be held totally responsible for the interactional consequences of his or her talk-in-interaction with others.

Perhaps more importantly, attributing mental states to speakers may thwart an aim of discursive psychology and an aim of this thesis: exploring what happens when speakers are stimulated to be self-reflective about the interactional consequences of their talk with others. DP analyses may empower speakers to improve their talk. They can enable certain interpretations of their talk and discourage others, although speakers cannot totally direct how recipients will interpret their talk. Speakers may affect recipient uptake and with that the interactional effects that talk-in-interaction generatesThus, it may help if speakers are (made) aware of the sociocultural inferences imbued in their utterances.

From an early age, children are taught the meaning of language, what they are allowed to say when, and how they should perform discursive actions such as requesting something of someone. People are also taught how they should respond to talk of others: if a child is asked something, it is taught to answer; if it is reprimanded, it is taught to apologize. The latter aspect of language education has to do with the social organization of talk, also known as sequence organization: different types of utterances such as questions or descriptions are not randomly combined. For instance, questions tend to be followed by answers, not the other way around. Given that people's language use is highly routinized, speakers may not be sufficiently aware of how they may deploy the inference richness of talk and the sequence organization of talk consciously to influence the interaction effects that they project with their talk.

Speakers who initiate speech are free to choose how they do this as long as they orient their responses to social conventions. For instance, speakers may start their talk with a personal anecdote or refer to facts. A personal anecdote is generally reciprocated by a show of empathy and/or a personal anecdote of the recipient, e.g. *I have that too! Last week…*, whereas, if one initiates a topic by referring to facts heard or read about, recipients are likely to orient their responses to the facts rather than to the person who is introducing the facts. Thus, if one seeks to invoke empathy from one's audience, telling a personal anecdote may be a more effective discursive strategy than sticking to the facts is likely to be.

To sum up, discursive psychology is a discourse analytical approach that focuses on people's talk-in-interaction. DP analysts deploy the social organization of talk and the inference richness of language and recipients' uptake of talk to find out how people

discursively manage identities, stakes and interests, problems and dilemmas. Additionally, DP analysts seek to systematically refrain from implicitly or explicitly attributing mental states to people; people's talk can be observed directly, whereas people's thoughts cannot. Moreover, people can, but do not necessarily, act in keeping with their attitudes and beliefs. Discursive psychologists are primarily interested in the interactional ends for which speakers use language, intentionally or not; they are not interested in people's thoughts and beliefs per se, unless they invoke these thoughts and beliefs in their talk to conduct interactional business.

Because discursive psychology is a relatively new and little-known research approach in the social sciences, I explain in the following fairly detailed subsection the practical methodological aspects of discursive psychology.

Requirements that Discursive Psychology Imposes on Data

To be able to conduct a discursive psychological analysis, datasets should meet several requirements. Monologues are more difficult to analyse with DP than dialogues because recipient uptake is absent or delayed, e.g. because people are only allowed to ask questions after lectures.

Furthermore, discursive psychological analysis takes into account non-verbal aspects of talk such as tone of voice, speed of speech, loudness of speech, in-breaths, pauses in talk and so forth. For that purpose, Gail Jefferson developed the so-called Jeffersonian transcript notation (Jefferson, 2004). Jeffersonian notation has become the standard in conversation analysis (CA) and DP. The attention to detail in DP transcription and analysis requires that talk-to-be-analysed should be audio or video-recorded (see also Wiggins & Potter, 2007). Without recordings, one cannot transcribe pauses in tenths of seconds, in-breaths and so on.

Discursive psychology is also characterized by a focus on naturalistic talk-in-interaction; the DP analyst preferably does not take part in the talk-in-interaction under analysis. Potter (1996: 135) explains this with his dead social scientist test: interaction is naturalistic in nature when the interaction takes place irrespective of whether the researcher is alive or not. For this reason, many DP and CA practitioners are reluctant to analyse research interviews (for notable exceptions, see De Kok, 2008; Myers, 1999; Roulston, 2006). However, research interviews *can* be analysed with discursive psychology, as chapter 3 of this thesis demonstrates.

Finally, discursive psychology is very time-consuming. The standard time investment for Jeffersonian data transcription is 20 hours per audio recorded hour of talk-in-interaction, whereas the standard for verbatim transcription in the social sciences is approximately eight hours per recorded hour of talk. Put differently, if one wants to conduct a discursive psychological analysis, one needs to have the time to do so. Moreover, one also needs to consider whether a discursive psychological analysis is necessary to generate the kind of insights one seeks. Discursive psychology may offer unique insights into the interactional dimension of human action. However, some of the insights one may gain from discursive psychological analysis can also be gained by other means, possibly in less time, e.g. by observing the phenomena of interest for an extended period of time. In the latter case, the so-called parsimony principle is worth considering: do not spend more time or effort on arriving at the kind of insights you need than is necessary (e.g. see Braithwaite, 2007). Parsimony is a criterion that funding organizations tend to take seriously.

When and Where to Apply Discursive Psychology

Discursive psychology is particularly useful if talk-in-interaction is the main arena where the action takes place that is of interest to the researcher. There is, furthermore, a requirement for the researcher to get permission to record the talk-in-interaction of interest[8]. Taboo subjects – topics that people are unwilling to discuss or find difficult to talk about in front of a recording device – are generally difficult to analyse with discursive psychology. Also, subjects that people are not free to discuss with outsiders – trade secrets or classified information – are difficult to research with discursive psychology, if only because one is less likely to get permission to record talk-in-interaction. In contrast, discursive psychology thrives on ordinary casual everyday conversations, public discussions and debates.

The usefulness of discursive psychology also depends on the nature of one's primary research interest. If one seeks to understand people's world views or ways of thinking, discursive psychology is not the obvious choice. As already stated, discursive psychologists analyse what mental states, events, descriptions speakers choose to make relevant and what ends these voiced states, events and descriptions serve, intentionally or not. Discursive psychology is also of little use if one's primary research interest is to identify causal relationships between different phenomena. Causal relationships are almost impossible to ascertain with discursive psychology (Arminen, 2000). However, if one wants to investigate how people deal with dilemmas in different social contexts, or if one is interested in how people conduct complex tasks in interaction with others, or what the interactional impact is of what people say when and where, one may consider deploying discursive psychology (e.g. see Potter, 1996). Discursive psychology is also worth considering if one thinks that insight into what facts or descriptions *do* in a particular interaction setting may help resolve complex problems.

1.4 The Research Environment: Disease Management with Plant (Genomics) Technology

This thesis focuses on Dutch plant experts' understanding of non-experts in real-life face-to-face settings. To familiarize myself with this, I observed and recorded meetings that all focused on the plant disease *Phytophthora Infestans* in potato crops in different but closely related Phytophthora research programmes; all these programmes try to reduce Phytophthora to manageable proportions with the help of genomics knowledge, that is, knowledge of the genome. To fight Phytophthora, plant scientists collaborate with different plant experts employed in the plant breeding industry or in non-academic government-funded organizations.

Different Phytophthora programmes use different strategies to make potato crops late blight resistant (late blight is another name for Phytophthora). Some programmes deploy classical breeding techniques; others use forms of genetic modification (GM). The generic justification that plant experts provide for the use of GM in staple crops is that GM can speed up the crop-breeding process. The latter is necessary, experts maintain, because it takes plant breeders longer to develop a new resistant potato variety with classical breeding techniques than it takes Phytophthora to breach disease-resistance of potatoes. Diseased potatoes are considered problematic because potatoes are the third staple crop in the world and a major Dutch export product. Additionally, plant experts followed in this study develop and propagate decision support systems that aim to help crop producers and crop creators

[8] For anthropological analysis, recordings are not necessary per se.

decide what agrochemicals they should spray when and where in order to keep Phytophthora under control. Some experts involved in the study also try to better understand and change Phytophthora's genetic makeup. The research programmes have to deal with action groups and people who destroy test fields on a recurring basis.

The research programmes followed for this thesis work closely together. Plant experts assume that Phytophthora may only be definitively kept under control if crop creators and crop producers use different strategies in tandem, that is, if it is possible at all to create and maintain durable Phytophthora resistant potato crops in large-scale crop production systems typical of developed countries. Exchange of ideas between the different programmes is considered crucial to ensure that different Phytophthora management strategies complement one another seamlessly. Therefore exchange of ideas, knowledge and findings are structurally facilitated in a number of ways across research programmes. For instance, senior scientists are assigned to two or three research programmes that deploy different Phytophthora management strategies. Plant experts may act in one programme as project or programme managers and in another as board members or consultants. Furthermore, different research programmes present their work and findings together at self-organized and other-organized public meetings[9]. And last but not least, many senior scientists participate in an expert board connected to several Phytophthora research programmes.

Disease management in staple crops differs greatly from how illnesses in humans are treated. In biomedicine, the focus is on curing patients and on motivating people to cease behaviour that increases the occurrence of disease. In contrast, in crop agriculture, diseased plants are not cured, nor do plant scientists try to change the behaviour of crops to prevent the incidence of disease. Instead, disease management in crops focuses on changing the genetic makeup of healthy crops, changing the behaviour of crop producers and on other less invasive crop protection strategies in order to create or maintain disease resistance in crops.

Most people who are not professionally involved in plant breeding know little about plant breeding and its societal impact. Therefore, the following subsection focuses on what plant breeding is about and explains some key plant breeding concepts used in expert and public meetings analysed in this thesis. Some basic understanding of plant breeding concepts may further elucidate what is at stake in expert–lay interactions in crop technology science. It may also give an inkling of what may be gained from discursive analyses in this field.

Societal Relevance of Crop Breeding

Plant or crop breeding is a deliberate human effort to change aspects of plants to perform new roles or to enhance existing functions of plants. The changes made in plants are heritable (Acquaah, 2007: 3). Plant breeders are professionals who manipulate plant attributes, structure and composition to make them more useful to humankind. Usually, breeders specialize in a group of plants. For instance, breeders may develop plants that resist pests so farmers can apply smaller amounts of chemicals to protect their crops against plagues and diseases. Or breeders may develop high-yielding crop varieties so that farmers can produce more for industrial and consumer markets. The latter improves farmers' incomes and accommodates consumer demand for food products.

[9] For instance, the Dutch National Agricultural Organization (LTO) also organizes public meetings at which Phytophthora research is presented. Some of these meetings are included in the dataset.

The term *cultivar* is generally reserved for new crop varieties that breeders purposefully create (Acquaah, 2007: 4). Plant breeders also maintain the characteristics and quality typical of certified varieties. They do this because characteristics of a particular variety may change over time due to changes or mutations in its genome and environmental influences. For commercial purposes, it is important that crop varieties of staple crops such as potatoes remain constant in taste, colour, smell, structure, yield, disease susceptibility.

Plant breeders use different technologies to modify existing plant varieties or to create new cultivars: classical breeding techniques, genomics and genetic modification. For instance, they deploy classical breeding techniques to enhance the flavour of a tomato. Classical breeding involves the selection and nurturing of a specimen of a certain crop variety provided by nature that exhibits the desired trait. The plant breeder selects in every generational cohort for further breeding the offspring that exhibit the desired traits best and throws away the specimens that do not live up to expectations. Consequently, plant breeding is sometimes also called *the art of throwing away* (personal communication from an expert from a breeding company). A problem associated with traditional breeding practices is connected to this continuous throwing away: it decreases the diversity of the crop's gene pool; less genetic variety is associated with higher disease susceptibility in crops.

To develop a new variety that exhibits reliably, the desired traits may take longer than 10 years with classical breeding techniques. The long time span involved in creating or enhancing crop varieties is considered problematic, in particular in large-scale agricultural mono-crop production systems typical in developed countries such as the Netherlands. In these large-scale food production systems, harvests tend to be vulnerable to diseases; this causes crops to succumb to disease before a new, more resistant variety is developed.

To manage problems such as these, plant breeders and scientists have supplemented non-technological disease management strategies with new technologies such as genomics. Barnes and Dupré (2008: 400) define genomics as both knowledge and technology: genomics is knowledge of the genome *and* the application of genomics knowledge – technology – for different purposes such as genetic modification. It is also argued that genomics is technology that requires knowledge about doing: 'technology is more properly interpreted as the codified and abstracted knowing about doing; about practices, about means to ends, and technical systems' (Bond, 2003: 126).

Plant scientists and plant breeders deploy genomics technology for different purposes: to speed up the classical breeding process or to create new varieties that cannot be obtained with the help of classical breeding techniques (Rommens et al., 2007). For instance, breeders may use genomics knowledge and techniques to transfer a desirable gene from a mouse into a tomato in order to create tomatoes that exhibit the desired trait. This transference of genes between different species that cannot sexually reproduce outside the laboratory – the so-called cross-breeding of non-crossable species by sexual hybridization – is called transgenesis. This means that transgenesis cannot be accomplished with classical breeding techniques. Transgenesis and its younger brother cisgenesis are forms of genetic modification.

Cisgenesis differs from transgenesis: in cisgenic plant breeding, genes are used only of species that are crossable in nature. For that reason, this form of genetic modification is said to mimic nature (Holm et al., 2013; Rommens et al., 2007). According to Holm et al. (2013), scientists introduced the cisgenic concept internationally in 2006, and field trials with a variety of crops are on the way or have pending applications for deregulation. Application procedures may take years. As a result, there is a considerable delay between what scientists

come up with in the laboratory, the actual testing of varieties that have been modified in the field and the introduction of modified crops on the market. The delay caused by application procedures is considered by some plant experts as undesirable or unnecessary (Levidow et al., 2000; Schouten et al., 2006).

The scientists whom I followed in my research alternately use classical breeding techniques, forms of genomics technology or cisgenesis. They all deploy complementary non-genomics disease management strategies such as the removal of offshoots of potentially infected crops after harvest. These indirect strategies aimed at decreasing plant susceptibility to disease – e.g. soil management and plant nutrition – are not the main focus of the research programmes on which this thesis draws and therefore are not further discussed here[10].

1.5 Data Gathered in the Setting of Plant Technology Science

I collected, recorded and observed different naturalistic face-to-face encounters to explore experts' talk on Phytophthora research. I also conducted ethnographic interviews with plant experts who at the time of the interviews were or had been connected to the research programmes and projects followed[11]. Furthermore, I spent one day a week for three years at the plant science group. Annual reports of the programmes and materials used during meetings, such as PowerPoint slides and/or hand-outs provided during meetings, were collected to aid transcription and analysis of data[12].

Additionally, I observed and audio-recorded different sets of meetings. The exception is the two workshops that I organized together with, respectively, Prof. Dr te Molder and Prof. Dr Gremmen. The workshops were partly audio-recorded and partly video-recorded. Naturalistic meetings were not videotaped because experts who organized the Phytophthora meetings wanted *participants to feel free to voice their questions and opinions* and expressed the view that videotaping might inhibit meeting participants from doing so.

In the first phase of the project, it was not always clear in what setting sufficient amounts of data could be recorded. During one meeting, I was allowed to be present and make notes but not allowed to use audio-recording equipment; however, I was able to record other, similar meetings. Additionally, during the research period, changes occurred in the Phytophthora research projects that I was following; one research programme ended one year earlier than originally planned because the Ministry of Agriculture, Economics and Innovation discontinued funding it.

In the following pages, I provide short descriptions of the types of meetings and interviews I recorded and/or observed. A distinction is made between the recordings I analysed discursively in-depth and the recordings I used to gain a general broader understanding of the diversity and nature of face-to-face multi-party interactions that take place in plant technology development and what is at stake there. The latter meetings also helped me to place the conducted discursive analyses in a wider context. Together, the subsets provide an overview of the rich diversity of institutional, multi-party face-to-face encounters that take place in actual practice in crop technology development.

[10] For alternative plant breeding strategies, see Lammerts van Bueren et al., 2008.

[11] The research programmes started long before I started my PhD project to analyse their multi-party or non-dyadic face-to-face encounters.

[12] The latter I did not do for all meetings because sometimes PowerPoint presentations tended to be used multiple times. This is in particular true for organized public meetings that tended to vary little content-wise.

Data Discursively Analysed

Expert board meetings: Interaction between scientific experts and field experts

At the beginning of 2010, I found out that there was an expert board formally connected to one of the research programmes whose talk-in-interaction I was following. This expert board assessed all Phytophthora research projects that applied for government funding until the end of 2011. In addition, the expert board with its representatives from university, the plant breeding industry and governmental agencies monitored Phytophthora research projects that had obtained funding from the Ministry. Meetings of this expert board were recorded in 2010 and 2011 (eight meetings); a discursive psychological analysis of these meetings can be found in chapter 4 of this thesis.

Public Phytophthora meetings: Scientist–non-scientist interaction

In the period 2010–2013, I recorded public meetings organized by Phytophthora research programmes and public days organized by advocacy organizations for field experts. Public meetings focusing on Phytophthora took place partly indoors and partly outdoors. Scientists first presented their research with the help of PowerPoint presentations in a lecture hall. Visitors were allowed to ask one or two questions after all the presentations, and then the company moved on to the test field. When public meetings took place depended partly on the lifecycle of potato plants, the lifecycle of Phytophthora, the weather and whether enough people were interested in attending the meeting (one year a public meeting was cancelled due to lack of interest). Public meetings were attended by 15 to 120 people (generally more than 30), and most often took place during the summer months.

During public meetings, there tended to be limited opportunities for scientist–non-scientist exchanges. In the period 2010–2012, most time at public Phytophthora meetings was spent on experts' monologues. From 2012 onwards, the time spent on expert–people interactions increased. The interaction design appeared to reinforce nominal expert and lay roles: visitors asked questions and experts answered them (for a detailed description of the interaction setting, see Box 1.1).

Box 1.1: The organization of asking and answering questions during public Phytophthora meetings

In the recorded public meetings, analysed in chapter 5, plant expert talk generally takes place in a lecture hall and is characterized by little interaction: the chair introduces the meeting programme, explains the interaction rules and introduces each speaker. The expert comes on stage and delivers his or her PowerPoint-assisted talk on Phytophthora, the audience listens and asks, as instructed by the chair, the occasional clarifying question. Then, after the introduction of Phytophthora research, the company leaves the lecture hall and boards wagons behind a tractor that transports them to the test fields where modified and non-modified plants are tested on their disease resistance. On location, the public meeting continues; one or two experts explain what exactly is done on the test field. The visitors can see the test results with their own eyes.

Moreover, after the test field introduction, the chair invites the visitors to ask questions of the experts. Visitors raise their hand, the chair walks or runs to them with the microphone (generally they start with two microphones but usually one breaks down), the visitor ask his or her question. The chair if necessary repeats or summarizes the questions and announces who of the present experts and in what order will answer the question. After that, the chair walks or runs to the various experts named and/or the named experts walk or run to the chair to answer the question. After all named experts have had their say, the chair returns with the microphone to the questioner to check whether his or her question has been answered (this check is not systematically done at all recorded meetings). If the question has been answered satisfactorily, then the chair invites the visitors to ask a new question and a new round of question–answer(s) starts. After the meetings draw to a close (usually after two hours including talks in the lecture hall), last questions are collected, and, if possible, answered. The chair thanks participants and closes the meeting. Subsequently, the tractor transports the visitors back to the lecture hall where the meeting started.

At some recorded public meetings, there is a short discussion staged at the test field site between experts on the one hand and a representative from an action group such as Greenpeace on the other. This discussion takes place in between mediated question–answer(s) sequences of other visitors.

Description based on the author's field notes

Photograph 1.1 Field Visit to a Phytophthora test field with journalists and others

Ethnographic interviews with plant experts and stay at the plant sciences group

In 2009–2010, I conducted 25 topic-based ethnographic interviews with plant scientists, representatives of government and representatives of the plant breeding industry (the Phytophthora research programmes are government funded). The different interviewees have or had a direct interest in plant technology development and participated in recorded meetings or meetings similar to the recorded meetings. Often, interviews were my first face-to-face contact with various key players in the research programmes followed and thus were important in establishing access to the research site. Interviews provided important background information on the research setting and are partly analysed discursively in chapters 3 and 5.

In chapter 3, the 12 ethnographic interviews with the plant scientists are analysed to elucidate how plant scientists discursively manage the science–society relationship. These interviews are analysed with DP in chapter 3 because the naturalistic data gathered for this thesis did not provide sufficiently insight into how the science–society relationship is discursively constructed. In chapter 5, plant experts' use of innovative (metaphorical) framings of the central problem – Phytophthora – and the main technology to fight it – genomics and genetic modification – are analysed qualitatively in the interviews and public meetings.

Additionally, I spent one day a week at the plant science department from the end of 2010 to 2013. This helped me to keep up-to-date on public meetings organized ad hoc, maintain rapport with study participants and gatekeepers, and increase my general knowledge of the societal relevance and stakes in crop-breeding technology.

Workshops with plant experts

In 2012–2013, I organized two workshops with study participants to empower participating plant experts to appraise the interactional consequences of their own talk and use of images during public meetings, expert board meetings and interviews. Workshops participants reflected upon the consequences of talk-in-interaction on scientific expert–lay and expert–user relations and metaphorical framings of Phytophthora. Different from the other subsets of recordings, discursive action method (DAM) workshops were partly audio-recorded and partly videotaped. Chapter 6 provides an analysis of these workshops.

Data Used as Background Information and to Place Analyses in a Broader Perspective

Phytophthora research meetings: Interaction between junior and senior plant scientists

In 2010, I recorded and observed four Phytophthora research meetings in which only plant scientists participated. During a typical research meeting, two researchers present their work with the help of PowerPoint slides to colleagues who also work on the Phytophthora problem. Staff and colleagues give feedback and advice to younger scientists on their work and presentation skills. During meetings, talk focuses on research challenges and technicalities.

The meetings provided scientific technical information on crop technology development, and this helped me to make sense of some of the jargon used during other meetings that I analysed in depth, e.g. the aforementioned expert board meetings.

Interactions between field experts and interactions between plant scientists and members of parliament/policymakers

A communication project linked to the Phytophthora research programmes and funded by crop producers focuses on communication and implementation of research outcomes discussed in the expert board meetings of Phytophthora research programmes. Plant scientists do not partake in these meetings.

Additionally, some meetings in which plant scientists inform and educate members of parliament on stakes and interests in crop technology development were recorded. A particular characteristic of this subset of meetings is that parliamentarians discursively treat scientists as experts on the public understanding of crop technology such as genetic modification, e.g. by quizzing scientists about citizens' stances on GM. Scientists oblige parliamentarians by educating them on crop technology science, in particular with regard to applications of genomics and public stances on crop technology. The recordings are used as background information in the thesis.

The different kinds of meetings recorded are summarized in Table 1.1.

Table 1.1 Subsets of recordings and their interactional particulars

Subsets of recordings	Interaction particulars	Other information
25 ethnographic interviews with experts from science, government and policy, and industry (25 hours)	Provides insight into crop technology science as a field Use of innovative metaphors	All interviews inform analysis of (metaphorical) framings Interviews were held in 2009–2010
	Scientists discursively construct the science–society relationship *People* are the discursive Other	The 12 interviews with scientists were analysed with DP
8 meetings of the expert board connected to several research programmes (20 hours)	Much talk about users and Phytophthora research Users are the Other and alternately depicted as reasonable or as emotional	DP analysed, recorded in 2010–2011
8 public meetings (16 hours)	Phytophthora is explained in detail and treated as the Other Focus lies on accounting for disease management strategies	In later years, more focus on interaction with the public, recorded in 2009–2013
2 DAM workshops with crop experts and scientists (8 hours; 17 participants)	Experts reflect on their own talk based on excerpts from interviews, expert board meetings and public meetings	Audio- and video-recorded material Visual material was used during one workshop
Background data		
2 meetings of the expert board after its official demise (4 hours)	Much talk about how to get funding for continuation of research Discussion of results of various field tests	Not included in DP analysis because of loss of mandate, recorded in 2012
4 internal research meetings (4 hours)	Much technical talk on crop technology development	No analysis is presented of this in this thesis, recorded in 2010
2 meetings of a Phytophthora communication project (5 hours)	Experts from the field discuss Phytophthora research and its usefulness for farmers and talk about absent scientists	These were the only meetings in which plant scientists did not participate, recorded in 2010–2011
Talk-in-interaction with representative of parliament + one day course for new members of parliament (7 hours)	Members of parliament treat scientists as experts on public attitudes towards crop technology development (focus was not exclusively on Phytophthora research)	No discursive analysis provided
		Access restricted, recorded in 2010–2011
2 invitational site visits to test fields (no presentations) for relations, colleagues from university and the media	Focus on inspecting the field site and talking informally to researchers	Recordings were of limited quality and were not discursively analysed, visits in 2011 and 2012

1.6 Structure of the Thesis *The discursive Other*

In chapter 2, I reflect in more depth on what it takes to conduct discursive analyses in specialized interaction environments. I provide a reflective account of how I gained and maintained sufficient rapport and understanding of the specialized interaction environment of plant technology science to successfully conduct discursive (psychological) analysis.

Chapter 3 provides a discursive psychological analysis of ethnographic interviews with plant scientists and has been published in *Science Communication* as 'Everyone may think whatever they like but scientists:' How and to what end plant scientists manage the science–society relationship (Mogendorff et al., 2012). The discursive psychological analysis focuses on the interactional consequences and implications of plant scientists' discursive

constructions of the science–society relationship. The journal's style conventions are maintained in the chapter.

Chapter 4 provides a discursive psychological analysis of recorded expert board meetings connected to different government-funded research programmes in Phytophthora research in 2010 and 2011. Chapter 4 has been published in *Discourse & Communication* as We say:'…' they say: '…': How plant experts use reported dialogue to shelve user concerns (Mogendorff et al., 2014). The journal's style conventions are maintained in the chapter.

Chapter 5 is about plant experts' innovative metaphor use. The focus is on the diversity of (metaphorical) framings deployed. Examples are derived from recorded public Phytophthora meetings and ethnographic interviews.

Chapter 6 is about turning plant experts into self-reflective communicators who are able to appraise the interactional consequences their talk generates, intentionally or not. Materials used during the workshops are discursively analysed in chapters 3, 4 and 5. This means that chapter 6 brings these earlier studies together.

Chapter 7 is the final chapter. The research findings of the different sub-studies and their implications are discussed as well as the limitations and recommendations that follow from the study.

Based on the expectation that most readers will limit themselves to reading the chapters that interest them the most every single chapter has been equipped with a reference list, footnotes and appendix (the latter only when relevant).

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Appendix: Transcription Notations

Based on Jeffersonian transcription (Jefferson, 2004):

(x.x)	Pause of x.x seconds
(.)	Micro pause, less than 0.2 seconds
wo:rd	Colons show that the speaker has stretched the preceding sound
<u>word</u>	Emphasized
° text °	Speaker is talking softer
((text))	Transcriber's remarks
=	No pause between words or turns

2 Discursive Analyses in Specialized Interaction Environments

An Account of How Access and Insights Were Gained to Enable Analysis of Plant Scientists' Talk

The thesis *The discursive Other: Dynamics in plant scientists' talk on Phytophthora with experts and the public* analyses what plant scientists say in face-to-face encounters with laypeople and plant experts. The research is informed by the understanding that when people say something they simultaneously do something (Austin, 1962); by talking to others, people not only exchange meanings and ideas, but also create or reproduce identities and interpersonal relationships. Put differently, talk tends to have interactional consequences (Potter, 1996).

More precisely, this thesis studies plant scientists' talk-in-interaction to elucidate further how plant scientists' portrayal of the discursive Other – in this thesis laypeople, users and the plant disease Phytophthora – impact on the science–society relationship and the science–user relationship (see also chapter 1). Plant scientists discursively treat these Others as human (like) Others that are capable of acting in opposition to scientific or field experts in plant science. The science–society and science–user relationships are considered to be particularly relevant in plant technology science: in part because some plant technologies are persistently met with public controversy (Bauer, 2002; De Krom et al., 2012); in part because funding bodies increasingly require new technologies to be usable in and for society (Leach et al., 2005). It is assumed that public controversy may in part continue because of how plant scientists *word* their arguments and how they respond to lay and user concerns in talk-in-interaction (Potter, 1996). Additionally, *The discursive Other* explores what happens when plant experts involved in Phytophthora research are given the tools to appraise how their own talk affects the science–society relationship and the science–user relationship: How is plant experts' self-reflective capacity affected and in what ways? (see also chapter 6).

The research conducted on plant scientists' talk is data-driven in nature. Analysis is largely based on talk-in-interaction that is going on in real-life real-time encounters between plant scientists and their relevant Others. Real-life encounters are not initiated by the researcher but take place regardless of whether the researcher is present or not (this is called naturalistic interaction). Working with what one finds in one's research setting means that researchers may need to adjust their research plans in line with field site realities. For instance, when I started to research plant scientists' talk, the focus was on expertise and citizenship. Consequently, I started to search for meetings in which experts either talked among themselves about citizens or talked with citizens. I also looked for meetings in which citizens discussed plant technologies, but I did not find meetings or discussions in which citizens discussed plant technologies or meetings in which plant experts spent considerable time discussing citizen concerns. Instead, I found that plant scientists and other plant experts tended to talk about prospective users of plant technology during expert board meetings and infrequently organized public meetings, talked about laypeople during ethnographic interviews and used innovative metaphors to describe and explain Phytophthora and genomics during ethnographic interviews and/or public meetings. In accordance with these research site realities, I changed the research focus from expertise and citizenship in plant experts' and citizens' talk-in-interaction to plant experts' talk about users and laypeople and plant experts' talk in front of laypeople about Phytophthora.

Another challenge that researchers may encounter has to do with getting the kind of access to data that one seeks: one may not get access at all, or one gains access but does not

get permission to record data, or one may record some but not all data. Depending on what type of access one acquires to coveted data, one may need to change rapport-building and data-gathering strategies, e.g. to get access to data that was first denied. If changes are made, one may want to reflect upon the consequences of these changes.

When scientists have acquired the coveted access, it may be that some of the data, although they offer relevant insights, are difficult to analyse with the pre-planned methodology. Discursive psychological analysis with its reliance on detailed transcription of verbal and non-verbal talk-in-interaction requires recordings in which non-verbal nuances of talk-in-interaction are hearable, such as intonation. If nuances are not sufficiently hearable in recordings, the recordings may nevertheless offer relevant information or insights – e.g. on context or language use. In the latter case, it may be worth considering whether these recordings can be analysed by other accepted means.

The study of plant scientists' talk reflected upon in this thesis is understood to be an interdisciplinary endeavour, that is, a main research approach is deployed – discursive psychology (DP) – supplemented with anthropological methodology such as ethnographic interviews and being there at the research site for an extended time period (see also chapter 1). Additionally, *The discursive Other* draws upon insights from plant technology literature to the extent that this is necessary to explicate what is going on and at stake interactionally in Phytophthora management. In this research, I draw upon anthropological methodology because it is designed to gain physical and epistemic access to non-everyday contexts from an emic or participants' point of view (e.g. see Bernard, 2006) whereas discursive psychology traditionally focuses on the study of talk in everyday contexts and has only recently begun to study talk-in-interaction in more specialized interaction settings (e.g. see Antaki, 2011; Hepburn & Wiggins, 2007).

Anthropological methods may be of help in ensuring that researchers acquire sufficient understanding of specialized research settings, and they may be additive in the sense that anthropological methodology enables discursive analyses that offer relevant insights but do not necessarily have all the characteristics desired in discursive psychology, e.g. data are monologues, whereas DP prefers data with a lot of ongoing dialogue (see also chapter 1).

In the rest of the chapter, I explicate how ethnographic interviews, observation during recordings and *being there* at the research site one day a week to talk informally to study participants may support and contribute to, in particular, discursive psychological analyses[13]. I do this by reflecting on my own experiences with building and maintaining rapport to gain access to data, people and insights; and by reminiscing on my own experiences with gathering knowledge and developing insights to pave the way to analysis.

That researchers tend to have an impact on their research is not to suggest that individual researchers necessarily produce unique research outcomes; different researchers may come independently to roughly the same conclusions (e.g. see Veldhuijzen et al., 2013). Rather, some researchers may be better equipped to conduct particular research projects than others. For instance, in societies that are segregated along gender lines, female anthropologists may be better situated to research women's lived experiences than male anthropologists, if only because men in these societies are not allowed to be alone with women who are not family.

Put differently, research is in and of itself a profoundly social endeavour; researchers' societal characteristics such as gender, academic title, age, able-bodiedness and ethnicity

[13] The value of analysing interviews with discursive psychology is addressed in chapter 3.

may, but do not necessarily, impact on the research conducted. Research is also social in the sense that researchers are expected to act in accordance with norms and rules endemic to methodologies and research communities. Furthermore, a characteristic of building and maintaining rapport is balancing involvement with distance. One needs to be involved enough to establish a good working relationship with gatekeepers and study participants, and one needs simultaneously to maintain sufficient distance to be able to conduct independent analyses (e.g. see Mogendorff, 2007, on inter-subjectivity).

The social character of research implies that researchers need to account for how their (social) characteristics affect their access to data and knowledge, and how researchers relate to the norms embedded in methodologies and/or research communities of which researchers claim to be a part (see also May & Perry, 2011, on the researcher belonging to the research community).

Before I present my experiences with building rapport and gathering the knowledge necessary to conduct discursive analyses, I first discuss in more depth the potential added value of providing reflexive accounts of the researcher's rapport-building and data-gathering practices.

2.1 The Added Value of Accounts of Rapport Building and Data Gathering

Reflecting on one's role as a researcher is broadly propagated in the social sciences. Reflexive practices are considered important in determining the extent to which social research represents, and is relevant to, societal realities. Moreover, reflection is supposed to contribute to the quality of the research and the well-being of study participants (see May & Perry, 2011, for an overview of thinking about reflexive praxis in the social sciences). However, not all social science disciplines propagate reflexive practices in equal measure. Discursive psychology (DP) and conversation analysis (CA) do not have a tradition of reflecting on the role of the researcher in his or her research (Wiggins & Potter, 2007). Generally, they strive to minimize researcher impact especially in the data-gathering phase (e.g. see Potter, 1996).

DP and CA analysts are generally also not treated as accountable with regard to their role in data gathering and analysis. Arguably, the reason may be that until recently CA and DP analysts focused on studying talk-in-interaction in mundane or institutional contexts to which most people, including analysts, have physical and epistemic access by default throughout their lives. For instance, DP and CA researchers study mealtime conversations or doctor–patient consultations (e.g. see Heritage, 2004). The consequence of this focus on talk in ordinary mundane settings or common institutional contexts is that analysts need to gather relatively few data on these mundane interaction environments before they can proceed to analysis; one may argue that they already 'gathered' relevant knowledge of these types of conversations while living their everyday lives.

This may change gradually now. DP and CA analysts increasingly analyse talk-in-interaction in applied and/or specialized interaction environments (e.g. see Antaki, 2011; Hepburn & Wiggins, 2007). Everyday physical and epistemic access to specialized interaction environments is not a given. This implies that analysts who do research in specialized environments need to work harder to gain access and relevant knowledge of the interaction environments in which they work; they need to familiarize themselves with the jargon, the main issues, the stakes and interests that potentially could be made relevant in talk-in-interaction.

DP analysts, irrespective of the interaction environment they study, may encounter problems when they seek to record conversations of others. To conduct their analyses, they need to build rapport with potential study participants. However, although discursive psychologists do engage in rapport-building and data-gathering activities, they seldom report and *reflect* on these activities in their writings (see also Arminen, 2000).

In this chapter, I argue that discursive psychologists may benefit from reporting and reflecting upon their rapport-building and data-gathering activities, in particular if rapport building and data gathering are time-consuming and difficult; difficulties that are overcome may be seen as accomplishments in their own right. More importantly, transparency about knowledge acquisition prior and (indirectly) relevant to analysis may contribute to an improved collective understanding of what it takes to pull off interactional analyses in specialized interaction environments such as plant technology development (see also Schwartz-Shea & Yanow, 2013, on transparency). DP and CA analysts know that their analyses are very time-consuming compared to other forms of qualitative or interpretive analysis (see also chapter 1). To non-DP and non-CA analysts it may be less clear why exactly DP and CA require so much time and effort. Therefore, an account of the preparatory work that is undertaken prior to actual analysis may help readers and funding bodies to appraise and appreciate discursive analysts' work and efforts better.

In the foregoing, I have provided several arguments as to why describing and accounting for gaining physical and epistemic access to the research setting may benefit the research. However, *showing* instead of *telling* how reporting and reflecting on research choices may contribute to a better understanding and, arguably, appreciation of the research conducted may be more convincing. In the following section, I expound on my choices with regard to rapport building and data gathering.

2.2 Building and Maintaining Rapport with Plant Experts

At the end of 2009, I started the research project *The discursive Other*. Initially, I knew very little about plant breeding, genomics and genetic modification of crops, so I needed to acquire some basic knowledge on these subjects and to develop a feel for the plant technology field that specializes in Phytophthora management: what are the major issues, dilemmas and themes? Why do people make such a fuss about genetically modified crops? I also needed to establish relations with different Phytophthora research programmes to map when and where relevant face-to-face communication was taking place and build rapport to get permission to record meetings for further analysis (for an overview of collected data, see chapter 1). In this PhD project, relations needed not only to be established with relevant actors, but also to be maintained over an extended time period, both of which are discussed in this chapter.

I had several strategies at my disposal to develop a sufficient understanding of, and feel for, the plant technology field, its key issues and concepts. I began by reading articles and books about societal aspects of plant breeding and genomics, consulted websites and blogs of organizations in the field, watched videos and clips on genetic modification and plant breeding on YouTube, attended seminars and lectures, stayed one day a week at the plant sciences group and interviewed key players.

To start with the latter: these ethnographic or topic-based interviews served different purposes. First of all, the interviews provided information; they helped me to familiarize myself with the views and conceptualizations of representatives of government, plant

breeding industry and the university on the subject of plant technologies such as genomics and genetic modification. The interviews also yielded useful information on how different Phytophthora research programmes relate to one another and on the programmes' policies and practices with regard to communicating to laypeople, users and expert actors. Secondly, the interviews enabled me to gain access to Phytophthora research meetings and to start building rapport with key players and gatekeepers. Thirdly, the interviews provided useful material to analyse; in chapter 3, the 12 ethnographic interviews with plant scientists are analysed interactionally using DP to shed light on how plant scientists construct the science–society relationship. In chapter 5, interviewees' use of innovative metaphorical framing of Phytophthora and genomics is discussed.

The interviews provided insights into key issues and concepts not readily found in textbooks; textbooks generally do not expand on underlying tensions and dilemmas in a research field. The interviews revealed notable differences and commonalities in how various plant experts conceptualized genomics and genetic modification. The differences may in part be attributed to the fact that technologies are still under development and in part reflect the ambiguities felt amongst scientists with regard to the societal significance and necessity of specific plant technologies[14]. What these differences and commonalities entail, and what their functions are, are discussed in chapter 5.

Additionally, the interviews caused me to change my initial research focus. From the interviews I learned that the Phytophthora research programmes organized infrequent and ad hoc public meetings. I also found out that research programmes and individual plant scientists infrequently interact directly with laypeople; some of the experts actually said that it is not a goal of the programme or part of their job to interact directly with laypeople. Some interviewees pointed out that lay–expert communication is not the responsibility of an individual Phytophthora project. In practice, experts involved in various research programmes talked the most to and with the public. Generally, however, research programmes informed the public through the written press. Plant experts also presented their research to farmer clubs and other organizations if invited.

The infrequently organized public meetings and the lack of direct organized interaction with laypeople or citizens prompted me eventually to adapt the research focus. Initially, the focus was on expertise and citizenship. However, plant scientists rarely invoked the citizen category in their talk, and they interacted infrequently with citizens or laypeople. Laypeople were generally talked about during interviews but rarely in meetings. Additionally, I found that plant scientists and field experts in plant science talked a lot *about* prospective users of plant technology – the crop producers or farmers – but were far less inclined to interact with them in person at meetings. So, given these field realities, I changed the research focus from citizenship to the discursive Other – or how and to what end plant scientists talked *about* their relevant Others in different interaction settings (see also chapter 1).

Plant scientists' discursive practices with regard to users of plant technology differed from how laypeople and their concerns were handled; in contrast to people, users were not only informed about Phytophthora research. The Dutch Ministry of Agriculture, Economics and Innovation required Phytophthora research to be user-friendly. To that end, the programmes organized expert board meetings to ensure as much as possible that the plant technologies developed to combat Phytophthora were usable in and by society. This led me

[14] In contrast, during public meetings, different technologies are presented as complementary.

to record and analyse these expert board meetings for as long as they were organized (see chapter 4 for a discursive psychological analysis of these expert board meetings).

A problem with mapping expert–lay communication initiatives was that public meetings tended to be organized ad hoc, often at short notice; in practice, organizers – with whom I was acquainted by then – sometimes forgot to inform me about these meetings. Additionally, there was not an ex-ante overview of invitational lectures available of individual plant scientists talking on a personal title to non-scientific audiences. The instances of forgetfulness were greatly reduced when I came to stay one day a week at the plant sciences group.

My general data-gathering strategy was to record relevant meetings as much as was feasible the first two years. After two years it became apparent that I would end up with enough data to satisfy qualitative research standards. After some time, a concern became that in quite some public Phytophthora meetings content and speakers did not vary much although the visitors per meeting changed. Furthermore, visitors generally were granted little opportunity to respond to what speakers had to say (visits to test fields excluded; in those instances, visitors had more opportunities to ask questions (see also chapter 1, Box 1.1).

Generally, I was granted access to meetings and permitted to make notes whenever I requested this. However, I was not informed of all ongoing meetings in advance; communication reports mentioned lectures to which I was not privy. When I made inquiries, I learned that some lectures were not considered of interest to me; they were considered too technical, too monologic or too similar to recordings I already had. I generally agreed with these assessments. I was allowed to audiotape almost all research programme meetings – there was one exception, but, luckily, I had a recording of a similar meeting. I was not always granted permission to videotape meetings or it was unfeasible for me to do so[15]. I was permitted to audio-record meetings of one research project which developed publicly contested technology, on the condition that I checked with the project leader whether he was agreeable to my using in an article fragments taken from the project recordings dealing with the contested technology[16].

The latter arrangement did not cause many difficulties. In most of my analyses, I focused on patterns in the data. Patterns may be illustrated and explained with the help of different fragments taken from various recordings. Given that the discursive constructs that I analysed tended to be non-specific to one particular project or research programme, I was generally able to use fragments from recordings that I did not need to check first with project leaders before publication.

To sum up, the foregoing account of the multiple functions of interviews and access to meetings illustrates that access to people – either to record meetings or to interview them – shapes what researchers – including discursive psychologists – may do with data. In the following section, the focus is on maintaining rapport – an important prerequisite to gain the ongoing cooperation of study participants.

Maintaining Rapport and the Value of Staying at the Same Place as Study Participants

Building rapport is not a once-off effort. Rapport with gatekeepers and study participants needs to be maintained, particularly if one seeks the goodwill and input of study participants

[15] In some cases, it was unfeasible for me to videotape meetings or audio-record parts of meetings; I am not a professional camerawoman; recordings made in the open air in the rain were not always of great quality.

[16] This requirement was in addition to standard practices to protect study participants, such as anonymization.

over an extended time period or at a later time. Maintaining rapport may pose particular challenges to discursive psychologists.

DP practitioners are advised not to partake in the talk-in-interaction they want to analyse. Wiggins and Potter (2007) recommend that DP researchers ask study participants to record their own talk-in-interaction; after enough recordings of sufficient quality are produced, the researcher can pick up the recordings or have the recordings delivered to him or her without affecting the research.

Wiggins and Potter's (2007) advice makes sense; discursive psychologists tend to be primarily interested in how and to what end participants in talk-in-interaction discursively handle identities, responsibilities, relationships, stakes and interests. For the same reason, DP analysts generally refrain from conducting research interviews – at least not for discursive analysis – because the interviewer obviously has an impact on the ongoing talk-in-interaction. However, De Kok (2008) argues, and Lampropoulous and Myers (2012) show, that analysis of research interviews with CA or DP may offer relevant insights to DP and CA.

One assumption that appears to underlie DP practitioners' reluctance to conduct research interviews is that researchers tend to differ greatly from study participants. This may be true in some instances, but not in others. The focus of my research is on the interactional consequences of dynamics in lay–plant expert interaction. During the project I was practically a layperson on the topic of plant technology. I grew more knowledgeable, but I knew that I would never become an expert on the subject. Moreover, the main difference between lay participants and me in the study – at least from an interactional perspective – was that I had more and better opportunities to ask questions.

A problem with DP practitioners' preference for minimal researcher impact during data gathering may be that potential study participants are reluctant to hand over recordings of talk-in-interaction to an anonymous researcher, particularly if the recorded talk contains sensitive or confidential information. This may pose a problem for discursive psychologists and conversation analysts in that DP and CA analysis may require recordings that are not freely obtainable (see also chapter 1).

Additionally, audio-recordings by themselves generally do not hold much information on interaction context idiosyncrasies that may come with individual recordings. For instance, if one records mealtime conversations, the eaters' seating arrangements may not always be the same, nor is the recording equipment necessarily positioned in the same way at every meal. Seating arrangements may affect who talks to whom, and positioning of recording equipment may affect what is hearable and/or visible in the recordings and what is not. The latter may affect analysis (e.g. see Goodwin, 2000). It also means that notes accompanying the recordings may be of use.

Given the public controversy surrounding some technologies central to the interaction environment of plant technology science, I did not consider it feasible to hand over recording equipment to study participants. Instead, I was present at meetings that I recorded to take notes on seating arrangements, who talked to whom and so on. I also used meetings to maintain rapport with study participants.

During research for my master's degree in communication science, I first noticed that avoidance of interaction with study participants for the sole purpose of minimizing researcher impact may occasionally be counterproductive; one may be perceived as too distant. Moreover, later when I conducted research among young adults with impairments – first as a master's student in anthropology and later as a junior researcher – I experienced first-hand that my personal characteristics as a researcher and a person tended to be a

resource rather than an hindrance in research; that is, my physical impairments increased rapport with disabled study participants (see also Mogendorff, 2007).

On the basis of these early research experiences, I decided to be present during Phytophthora meetings and to answer the occasional question put my way. I did not partake in ongoing discussions on Phytophthora and technology. My presence and note-taking enabled me to monitor the quality of the recordings and take notes to make subsequent transcription easier. Furthermore, I collect hand-outs used in meetings to aid analysis later. Avoiding affecting talk-in-interaction during meetings as required by DP tended to be easy; study participants did not expect much of me – a social scientist – in the way of contributing to the content of Phytophthora research meetings.

Nevertheless, when study participants learned that I was a communication scientist who analysed talk-in-interaction, some of them asked me to give feedback on their communicative performance. I was not happy about these requests because I did not want to give participants the impression that I was there to assess them. After I was asked several times to give feedback, I changed my introduction – I introduced myself no longer as a communication scientist but as an anthropologist who was trying to discover patterns in talk-in-interaction across meetings[17]. The latter resulted in far fewer requests for advice and feedback.

After plant experts became used to my presence, my participation during discussions at Phytophthora research meetings generally were limited to short whispered exchanges with participants seated next to me (mostly initiated by my neighbours). Together with informal conversations with participants during coffee breaks and lunches in between meetings, these exchanges helped me to maintain rapport and to clarify unclear terminology used during meetings, and they enabled me to learn more about the views, interests and backgrounds of individual participants.

Additionally, in the expert board meetings, there was a more or less fixed corpus of study participants. If one follows and sees people for several years, then, at some point one may be asked to contribute to discussions. I was asked to contribute to a meeting by presenting my preliminary findings at the last official meeting of the expert board in 2011. The latter gave me the opportunity to repay some of the hospitality I received and to member-check whether my preliminary findings resonated with study participants (see also Schwartz-Shea & Yanow, 2013, on member-checking).

In addition to observing and recording various types of Phytophthora meetings, I spent one day a week at the plant sciences group for three years when the opportunity presented itself. My presence, limited as it was, enabled me to keep better track of Phytophthora meetings that were organized ad hoc and at short notice. It also made it easier for me to learn more about the different plant breeding practices and how various researchers not directly involved in Phytophthora management research but familiar with Phytophthora viewed practices and technologies found in the Phytophthora management projects.

Being present one day a week at the plant sciences group also helped in the last phase of *The discursive Other* project. After I had conducted various discursive psychological analyses, I planned workshops to explore whether I could turn visitors to Phytophthora meetings and plant experts – scientific and field experts – into self-reflective communicators able to appraise the interactional consequences of their own talk on Phytophthora. Two of

[17] I am entitled to introduce myself as either since I hold an MSc. in social and cultural anthropology and an MSc. in applied communication science.

the three planned workshops actually took place. I had to cancel the workshop with citizens because I fell one participant short. For the two workshops with experts – one with field experts and one with scientific experts – I managed to get enough workshop participants. I believe I was more successful at recruiting participants for the expert workshops because for these workshops I invited people whom I knew through my research.

2.3 Gathering Knowledge and Developing Insights Necessary for Analyses

Researchers who study social interaction deploy different forms of knowledge to make sense of how people engage in face-to-face communication with one another. Firstly, they need to have general knowledge of the language and culture in which they are conducting the research. They need to understand the language that is spoken, idiom, and the sociocultural codes of what may be said when and where (and what may not) in order to be able to recognize what is going on in talk-in-interaction. Native speakers possess and use this kind of knowledge effortlessly. Discursive psychologists may, however, need various other forms of knowledge to successfully conduct discursive psychological analyses.

Schegloff (1987), one of the founders of CA, acknowledges that students of social interaction may need to gather additional information to gain a sufficient understanding of the interaction environment. Discursive psychologists need to have extensive knowledge of the interaction environment in which they are interested (Potter, 1996). Or as Geertz (1973) – a well-known and influential symbolic anthropologist – put it: 'without knowledge of context it is hard to distinguish whether a twitch of an eye is a wink or a blink'. To be able to assess what is going on in talk-in-interaction, analysts need to have a basic understanding of the content being discussed in encounters. The action performed with talk may contradict the literal meaning of talk, but to determine the action and the consequences thereof it is still necessary to have some inkling of the semantic meaning of utterances.

If one studies talk-in-interaction in institutional settings, then an understanding of specialized knowledge or jargon is required (Schegloff, 1997). This kind of knowledge is generally not gained by listening solely to recordings. Participants in talk-in-interaction may, for example, share knowledge of jargon and therefore do not feel the need to explain the meaning of specialized terminology to one another in talk-in-interaction.

For instance, cisgenesis and transgenesis are specialized terms or jargon commonly used in plant breeding – concepts that I learned at the beginning of *The discursive Other* project. These terms caught my attention because they appeared to divide plant scientists. Cisgenic plant breeding is a form of genetic modification that is said to mimic nature (Rommens et al., 2007); the outcome of cisgenic cross-breeding is close to what may be accomplished with classical breeding strategies. However, cisgenic modification of plants takes place in a laboratory and thus is generally understood to be artificial. Transgenic modification is similar to cisgenic breeding in that in the laboratory the same techniques are used to create cisgenic as transgenic crops. However, transgenesis is not similar to classical plant breeding judged by the end result. Transgenesis involves the cross-breeding of different species, resulting in a unique organism. Differences and similarities between transgenesis and cisgenesis tend to be deployed discursively for various purposes in the political arena. Some plant scientists are lobbying to get cisgenesis exempted from EU regulations regarding the testing of genetically modified crops, arguing that cisgenic crops cannot be distinguished from crops that have been created with the help of classical breeding techniques (Levidow et al., 2000). So far, cisgenesis and transgenesis have been

treated in the same manner under EU regulations on the basis that the techniques used for transgenesis are the same as those used to create cisgenic crops (e.g. Jacobsen & Schouten, 2008). A third argument is imaginable: cisgenesis is treated neither as similar to classical breeding strategies nor as similar to transgenic breeding. The latter stance is informed by the understanding that cisgenesis is an in-between category: the process may be 'unnatural' but the outcome is 'natural'. I did not encounter the third conceptualization in the literature, but it is a discursive possibility.

Thus, selective deployments of meanings of complex concepts such as cisgenesis and transgenesis may have very real and far-reaching consequences for crop creators. This makes it relevant for DP analysts who work in an interaction environment in which GM is treated as an important issue to familiarize themselves with how different, sometimes contradictory, meanings of complex key concepts may discursively be deployed and the potential consequences thereof. If one does not know the meanings and implications of these complex concepts, it becomes hard to determine what interactional purposes are intentionally or unintentionally served by discursive 'play' with meanings of complex concepts.

Furthermore, Schegloff (1997) acknowledges that it is relevant to know how what is discussed during meetings relates to issues and concerns on the meso and macro level. For instance, without knowledge of how plant technology development is viewed by relevant actors, stakeholders, the scientific literature and the public at large, it is hard to establish which of the discursive patterns found in expert board meetings merit further analysis because they are relevant to study participants, the scientific literature and societal debates.

For the most part however, DP stresses that only what is made relevant in the immediate interaction context really matters in analysis (e.g. see Waring et al., 2012). A lot of knowledge someone has may not matter discursively because it is not relevant and not invoked in the interaction setting under study. Moreover, according to DP, someone's identity as an expert is not an a priori given but needs to be established in talk-in-interaction again and again. Only if participants make the expert identity relevant in talk, e.g. by treating someone as an expert, does someone's expert status matter in an encounter from a CA or DP perspective (Schegloff, 1987). But do identities and expertise always need to be expressed in talk-in-interaction to be of consequence to the interactional business of an encounter? Yes, but how this is done may partly depend on foreknowledge – e.g. participants may know the other participants' field of expertise before the meeting – often, that is the very reason that they have been invited to partake in the meeting. If participants know prior to the meeting what expertise co-participants bring, participants do not need to go through the process of finding out what someone's nominal status is, although they may still need to establish how participants in talk-in-interaction with their various epistemic statuses relate to one another in a meeting.

What may pose a challenge to the analyst is that some of this shared foreknowledge between participants in talk-in-interaction indirectly or subtly affects talk-in-interaction (see also Stevanovic & Peräkylä, 2014, for a similar argument), and this is hard to discern by analysts who work purely with recordings of meetings. Consequently, some basic background knowledge of participants in talk-in-interaction in addition to recordings may be useful during DP analysis.

Furthermore, what stakes and interests are bound to be relevant? It may be good to know what knowledge participants in talk-in-interaction are supposed to have and what their societal standing is, even if this knowledge is not made explicitly relevant in talk-in-

interaction. Ottinger's (2013) research on refinery expertise shows that the personal experiences of experts tend to be treated differently from the personal experiences of concerned citizens. Experts' individual personal experiences tend to be treated as relevant evidence in relation to gauging the impact of the refinery on the local community, whereas personal experiences of individual citizens are not treated as relevant evidence. However, the expert status or citizen status is often not invoked in the telling of the personal experiences, except that the personal experiences of experts are treated differently in talk-in-interaction than the personal experiences of citizens. The reason that expert and citizen identities are not invoked may be that participants in talk-in-interaction know who-is-who among their co-participants. If, however, analysts have no access to these a priori statuses of participants in talk-in-interaction, then they may well be unable to explain the differential treatment of personal experiences in the discourse – in Ottinger's case about how the refinery affects community living.

Another example: in the expert board meetings analysed in chapter 4, there is a marked difference in the use of user-references between crop advisors and plant experts. Crop advisors deploy factual statements to refer to users – farmers – whereas plant experts tend to invoke reported dialogues between themselves and farmers. The explanation provided for this phenomenon is that crop advisors are known to visit farmers as part of their work on a daily basis to advise on farmstead and crop management, whereas plant scientists need 'to prove' that they have epistemic access to farmers (for the senior plant scientists who partake in the expert board meetings it is not an absolute prerequisite for their research to consult with farmers). Had I as an analyst solely relied on audio-recordings of meetings, I would not always have known who was who during meetings, and, more importantly, I would not have been able to explain the differences in participants' deployment of user-references. I acquired knowledge of expert board meeting participants during interviews, by googling participants and by talking informally to participants during breaks, and before and after meetings.

Koole (1997) raises a similar argument with regard to doctor–patient communication. According to Koole (1997), how patients respond to their doctor depends not only on what is made relevant during a consultation, but also on the fact that the patient and doctor tacitly agree on how they relate to each other at the doctor's surgery: division of institutional roles and tasks is clear and relatively fixed prior to the doctor–patient consultation.

Ottinger's (2013) and Koole's (1997) examples, and my example about crop advisors, imply that analysts must ensure that they know the identities and roles of study participants that may potentially be of consequence in the talk-in-interaction under study; otherwise, it may become difficult to understand differences in treatment of, at face value, similar experiences. Interviewing participants and gathering relevant documents such as agendas, communication plans, minutes, annual reports may be a useful strategy to determine the formal purposes of meetings, the designated role of different participants or participant groups as opposed to actual events and roles during encounters.

The same holds true for the interviews. On the basis of what was discussed at interviews, I could have focused the analysis on different phenomena. Eventually, I decided to analyse how plant scientists tend to construct the science–society relationship. This pattern appeared to be relevant to the research aims, to plant scientists and to the wider scientific literature on lay–expert communication.

After the researcher has decided upon what discursive pattern or recurring discursive device should be investigated further, the interactional consequences of the pattern or

device should be determined. This generally requires knowledge of the DP and CA literature as well as extensive knowledge of the sociocultural inferences that may be incorporated in the concrete utterances, statements and expressions that make up the discursive pattern or devices of interest. Knowledge of stake, interests and dilemmas in plant technology science is also salient here in that it tends to help speakers to manage a dilemma, stake or interest that others may potentially attribute to them. These stakes, interest and dilemmas may be discovered by studying the literature, documents and blogs, and by talking to people involved, e.g. by interviewing them.

If the main tools of discursive psychology – the rhetorical principle and the uptake of an utterance by another – can be deployed to a limited extent, e.g. because the talk in monologic in character, one may consider whether less time-consuming qualitative analysis better fits one's goals, given time constraints. In *The discursive Other* project, most public Phytophthora meetings contain little expert–lay talk-in-interaction. Partly for that reason, I eventually decided to conduct a framing analysis of key concepts in this interaction-poor dataset (see also chapter 5).

The step after identifying the purposes served by a recurring discursive device is to place the analysis in its wider societal context; plant experts' interests, stakes and dilemmas are not necessary relevant to a wider academic audience or society at large, and vice versa. For that, it may be of help if one familiarizes oneself with the societal and academic debates regarding the lay–expert relationship and the technology–user relationship, which are not necessarily directly made relevant in talk-in-interaction but are of relevance to what one hopes to accomplish with DP analysis, e.g. to contribute to academic and societal debates.

A final step may be considered after discursive psychological analysis is completed: member-checking one's findings with study participants. This last step is reported upon in chapter 6 of this thesis. Knowledge required in this step is empowering in nature in that the researcher enables study participants to discursively analyse their own past talk-in-interaction with an eye to improving their future talk-in-interaction.

2.4 Conclusion and Discussion

This chapter has shown that qualitative interpretive methods such as interviews, observation and being present at the research site over a relatively long time period may support and complement discursive psychological analyses in complex interaction settings such as plant technology science. Knowledge gathering and sense-making activities in discursive psychology entail: determining what data need to be gathered, gaining and maintaining required access to data, gleaning the meaning of specialized talk-in-interaction, identifying relevant discursive patterns, analysing the discursive pattern and placing this analysis in a wider societal context. If datasets do not fully meet the requirements that DP transcription poses on data (see also chapter 1), other modes of analysis may be considered.

In this chapter, I have attempted to show with the help of my own experiences with conducting discursive analyses in the specialized context of plant technology development that reflecting upon the impact of the analyst – how he or she gained physical and epistemic access to the research setting – may be a good thing; outcomes of discursive analyses depend largely on the knowledge, skills and competencies of the researcher, in particular if access to data and knowledge of the research site and interaction setting is specialized. Moreover, transparency potentially enables readers and reviewers to better appraise the researcher's claims and the scope and societal relevance of presented analyses (see also

Schwartz-Shea & Yanow, 2013, on the value of transparency). Against this background, discursive psychologists may benefit in their future research activities from reflection upon how they came by the knowledge and insights that enabled their analyses.

Discursive psychologists may gain from reflection, in particular if they see reflection as a normal recurring process. As we have seen, the data-driven nature of discursive psychological research may mean that one has to adapt data-gathering plans to field site realities, e.g. because the desired talk-in-interaction is not taking place or cannot be recorded sufficiently. Every change invites reflection because what data one may analyse potentially affects analysis. It is also good to check whether the actual dataset as opposed to the pre-planned dataset still optimally serves the research purposes, or whether one needs to gather new or additional data or adapt the research focus.

Furthermore, reflection may be particularly successful if DP analysts are able to balance the involvement with gatekeepers and study participants necessary to build and maintain physical and epistemic access to the research setting on the one hand with sufficient distance to ensure the scientific independence of the research on the other.

What interviewees say in interviews may contradict what they do and accomplish with their talk; this means that interviews do not necessarily say much about what is happening in naturalistic talk-in-interaction (e.g. see Austin, 1962). This chapter has demonstrated that this does not render interviews useless in research projects where discursive psychology is the main research approach. Interviews may be useful in different ways. First of all, interviews tend to provide valuable information on stakes, interests and tensions endemic to the interaction environment and that are relevant to the actions performed in talk-in-interaction. This knowledge enables analysts to deploy the inference richness of specialized discourses.

Secondly, ethnographic interviews and being there at the research site may play a pivotal role in gaining access to relevant data and in rapport-building activities that may come in handy especially if, later on, one needs the active participation of study participants. Interviews may also be deployed to determine the viability of discursive psychological analyses against the background of research aims and questions, e.g. can enough hours of recorded naturalistic talk-in-interaction be obtained? Last but not least, interviews may give some inkling of the nature and quality of talk-in-interaction that may be recorded. The latter helps to determine whether there is a good fit between research focus and data *and* between data and choice of methodology. Given the different functions that interviews may play in a discursive psychological research project, one may conclude that interviews may indirectly affect analysis (through their impact on access to data and knowledge of analysts) and therefore are worth considering.

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3 'Everyone May Think Whatever They Like, but Scientists . . .'
Or How and To What End Plant Scientists Manage the Science–Society Relationship

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In this study the authors examine the performative functions of scientists' discursive constructions of the science–society relationship. They use discursive psychology to analyze interviews with Dutch plant scientists and show that interviewees contrast the freedom of people in the private sphere with scientists' responsibilities in the professional sphere to regulate "lay" access to science. To accomplish this, interviewees make claims about the scientific value of lay views only after they have displayed their tolerance of these views. Additionally, many interviewees refer to their own lay status in everyday life. Finally, the relationship between findings and recent science communication approaches is discussed.

3.1 Introduction

Notions about how scientists should or best could communicate with different societal groups have changed. Policymakers and other stakeholders increasingly recognize that so-called laypeople[18] have salient knowledge and critical perspectives that should be taken seriously as inputs into planning, designing, and implementing research (Burchell, Franklin, & Holden, 2009; Caron-Flinterman, 2005; Leach, Scoones, & Wynne, 2005). These changes also apply to the plant (genomics) field.

As a result, the old strategy of agro-biotechnologists to treat "scientists" and "the public" as mutually exclusive categories in which scientists have relevant knowledge and laypeople do not (Cook, Pieri, & Robbins, 2004) may no longer count with scientists and other stakeholders as an effective way to manage communication with non-scientists. This raises the question of how agricultural scientists now construct the science–society relationship and what the possible communicative implications are. Looking at the performative functions of plant scientists' constructions of the science–society relationship may be relevant because such an analysis offers other insights than content-oriented analyses; there is a difference between the semantic meaning of what people say and the communicative actions people perform with what they say (Duranti, 1997; Potter, 1996). For instance, Jingree, Finlay, and Antaki (2006) show with an interactional analysis of residents–service providers meetings that the service providers in the study use empowering words in a way that disempowers residents. Simultaneously, the use of empowering words indicates that service providers discursively respond to changed notions about how society should treat its disabled citizens. The past decades have seen a shift in focus from caring for disabled citizens to empowering citizens to take care of themselves (see, e.g., Barnes, Oliver, & Barton, 2002).

A performative analysis contributes to a better understanding of what conversational partners do by preferring one account over the other at a certain moment in the interaction. Insight into what is accomplished with science–society constructions in plant (genomics)

[18] Where we write about laypeople, one may also read non-scientists. We use the term *laypeople* to be in keeping with the terminology used in the existing lay–expert literature.

science may further insight into why exchanges of arguments pro and against plant genomics have not resulted in a societal consensus about whether and, if so, when the deployment of genomics technology is desirable (Bauer, 2002; Gaskell & Bauer, 2001; Hagendijk, 2004).

In this article, we present an analysis of Dutch plant (genomics) scientists' discursive constructions of the science–society relationship in 12 interviews. With this, we aim to further understanding and raise awareness of how scientists' discursive constructions actively shape communication between science and society and how scientists' constructions are informed by changing notions about how science should relate to society. We employ the approach of discursive psychology to look at:

- How plant scientists discursively construct the science–society relationship in their talk.
- What scientists' discursive constructions achieve with regard to the distribution of rights and responsibilities of both non-scientists and plant scientists in interaction.
- How plant scientists' discursive constructions of the science–society relationship relate to current science communication models; do current models adequately explain how plant scientists construct the science–society relationship, or can these models be refined?

To our knowledge, a detailed discursive analysis of plant scientists' constructions of the science–society relationship has not yet been performed. In the following section, we discuss the literature on scientists' understanding of laypeople, including the public engagement literature, to sketch how scientists have conceptualized laypeople and to explicate in more detail what our research may add to the literature.

3.2 Scientists' Understanding of the Public and Public Engagement

Research on scientists' understanding of the so-called public and public engagement is diverse[19]. Studies vary greatly in the methodologies they employ (Hansen et al., 2003). Some are based on quantitative data analysis (e.g., Crawley, 2007; Gunter, Kinderlerer, & Beyleveld, 1999); others seek to qualitatively interpret observations, individual interviews, focus groups, workshops, or portrayals of science in the media (e.g., Davies, 2008; Yearley, 2000). However, most of these studies agree that scientists still predominantly engage in one-way communication with the public. Furthermore, these studies conclude that there may be a gap between the theory and the practice of public engagement in science (Barnett, Burningham, Walker, & Cass, 2010; Davies, 2008; Wynne, 2001, 2006). Wynne (2001, 2006) goes even further and claims that deficit approaches to public understanding of science are re-created partly because engagement activities are more about getting potentially controversial technologies accepted than ensuring better decision making.

Studies that take into account the inherently interactional and dynamic nature of expertise and language may help us understand the real or imagined gap between theory and practice (Carr, 2010; Duranti, 1997). Expertise can be seen as an interactional

[19] We sometimes talk about the public in this article. We primarily use this term to be in keeping with the literature on scientists' understanding of the public and public engagement. However, whenever one reads public, one may also read non-scientists. Non-scientists we deem a more neutral term because the term public suggests that scientists can totally control with whom they interact. However, in actual practice, non-scientific participants are not a passive partner in science communication activities. Non-scientists are likely to decide for themselves whether and, if so, when they participate in public engagement activities.

accomplishment in that an expert needs to be treated as knowledgeable by participants in talk-in-interaction (Antaki, 1994; Carr, 2010; Kerr, Cunningham-Burley, & Tutton, 2007). The latter implies that research should not limit itself to content analyses of what people say and write. These studies often assume that expertise is primarily something people possess and not something people need to establish in interaction over and over again by talking and acting like an expert (e.g., see Carr, 2010; Duranti, 1997). For instance, a content-oriented analysis of interviews and meetings may reveal the strategies that non-scientists employ to be treated as having relevant contributory expertise (e.g., Epstein, 1995). However, from these studies we do not learn what discursive constructs people employ at what moment in interactions to achieve diverse goals. The latter is important because one discursive construct may engender different effects depending on when and where in the interaction it is employed (Sacks, 1992). Even scholars who conduct a discursive analysis of science and technology debates as part of a study often do not investigate the precise discursive circumstances in which the observed phenomenon occurs (see, e.g., Kerr et al., 2007).

In contrast, the performative analysis we present in this article focuses on how the situated use of discursive constructions affects understandings and relationships between scientists and non-scientists. More awareness of what talk accomplishes at certain moments in interaction may empower stakeholders to better manage relationships (see also Lamerichs, Koelen, & te Molder, 2009). We will now discuss the literature on plant scientists' understanding of laypeople given that epistemic cultures differ substantially across the sciences (e.g., Knorr-Cetina, 1999).

Plant Scientists' Understanding of Laypeople

Empirical studies of plant (genomics) scientists' understanding of laypeople and empirical studies of public engagement are scarce. Burchell (2007a, 2007b), Burchell et al. (2009), and Cook et al. (2004) are notable exceptions.

Based on interviews with 30 senior scientists predominantly working in the medical bio-sciences, Burchell et al. (2009) claim that bio-scientists consider it important to include laypeople in their deliberations. They also report that bio-scientists say that laypeople are generally interested in scientific progress but are easily misled by the media and pressure groups (Burchell et al., 2009). However, several studies claim that scientists portray laypeople as less positive toward agricultural genomics than toward biomedical genomics (Burchell 2007a, 2007b; Burchell et al., 2009; Cook et al., 2004; Hansen et al., 2003). Moreover, Cook et al. (2004) conclude that agro-biotechnology scientists in the United Kingdom treat "scientists" and "laypeople" as mutually exclusive categories because they do not acknowledge their own existence as both scientists and laypeople. However, Cook et al. (2004) remain vague about what their informants discursively achieve with this construction of the expert–lay relationship.

Wynne (2001, 2005) and Young and Matthews (2007) argue that scientists' claim that laypeople oppose genetically modified organisms because they do not understand that science cannot provide certainties is a self-serving construction. According to them, natural scientists try to retain authority and scientific freedom by stating that what laypeople want is unrealistic and irrational. These conclusions, however, are not based on a discursive analysis of what scientists achieve with their claims about laypeople but on opinion research and logical reasoning. In contrast, by analyzing what scientists say in talk-in-interaction, we are able to investigate what plant scientists' discursive constructions of the science–society

relationship accomplish independent of what they themselves report that they achieve with these constructions.

3.3 Participants in Our Study: Data, Method, and Analytical Approach

Twelve Dutch plant (genomics) scientists were interviewed to identify important issues in plant disease management. The interviews are part of a larger study that focuses on how discursive constructions in talk-in-interaction may affect intergroup relationships and choices in three plant research programs that employ different strategies to combat disease in staple crops. Staple crops are a major Dutch export product, which makes plant disease management a serious business in the Netherlands.

The interviewed scientists are or have been involved in at least one of the three aforementioned research programs. Participants were interviewed because of their knowledge of the plant sciences field and because they have experience with dynamics in stakeholder interaction—for example, public resistance to genetically modified crops. The latter we thought was relevant because scientists' past experiences may inform their current constructions of the science–society relationship.

Participants were selected with the snowball method; scientists in multi-stakeholder boards connected to the different research programs were approached for an interview and asked to name other suitable candidates. At 12 interviews data collection stagnated; participants provided names of scientists who had already been interviewed.

To allow interviewees themselves to introduce relevant issues and let the interview resemble an ordinary conversation, a topic list was employed as is the norm in ethnographic interviewing (Duranti, 1997). Plant scientists were invited to talk about their education and professional background, the plant disease management strategies of the research programs, their role(s) in the programs, and the people and groups they interact with. While listening to interview recordings and reading through transcripts, we noticed that participants consistently and extensively talked about laypeople in a way we have not yet encountered in the literature: They did not construct laypeople and scientists as mutually exclusive categories (cf. Cook et al., 2004). Therefore, we decided to further investigate the purpose of this part of the plant scientists' talk.

Analytical Approach: Discursive Psychology

In this study, we employ discursive psychology to analyze science–society constructions of plant scientists. Discursive psychologists analyze discourse as a sociocultural practice (Potter, 1996). The focus is on the situated use and effect of people's narratives, descriptions, and statements (Potter, 1996; Sacks, 1992). Analysis is generally based on a detailed examination of discursive actions in sequence. Analysts use the evolving turn-by-turn development of a conversation or narrative as a resource to make sense of the social activities that are performed with talk. For instance, speakers may render a story about an unexpected experience believable by suggesting that they first exhausted rational explanations for what they experienced before they turned to the paranormal to make sense of what happened (e.g., Wooffitt, 1992). By first narrating how they sought for rational explanations for an unexpected experience, speakers demonstrate that they are capable of rational thought, undermining the possible inference that they are delusional.

Discursive psychologists also employ the rhetorical principle (Potter & Hepburn, 2005; Wooffitt, 1992); analysts ask themselves why a speaker makes a claim in a certain way

to demonstrate how speakers routinely undermine possible alternatives of their representations of events, subjects, and objects (Antaki, 1994; Wooffitt, 1992). For instance, when a mother says that the sports teacher said that her daughter excels at tennis, she undermines the possible inference that she – as a proud mother – exaggerates the accomplishments of her daughter.

Analysts prefer to work with recordings of so-called naturalistic interactions: interactions in which the analyst does not take an active part either by initiating or by participating in the interaction. The advantage of analyzing naturalistic data is that the researcher does not directly affect the turn-by-turn development of the recorded talk-in-interaction. Of course, the presence of the researcher in itself and the act of recording may affect the turn-by-turn development of interactions. However, the potential impact of researchers on the turn-by-turn development of naturalistic interactions is different from researchers' impact on the turn-by-turn development of interactions in which the researcher takes an active part – as in for example, interviews (Duranti, 1997; ten Have, 1990).

If and how discursive psychologists analyze interviews depends on their research questions, the obtainability of recordings of naturalistic interactions, and the kind of interactions that are studied. However, interviews are always analyzed as conversations (Potter & Hepburn, 2005). An advantage of a discursive analysis of interviews is that phenomena may be analyzed that are less likely to be invoked in naturalistic settings but are nevertheless considered important, for instance, because they are mentioned in the empirical literature (cf. Duranti, 1997). For instance, in a researcher–stakeholder meeting lay views may not be discussed because participants already have a shared understanding of the relevance of lay views for the research under discussion. Moreover, experts are unlikely to state that lay views are irrational in meetings with laypeople. How and when speakers make claims and narrate events partly depends on the groups that participate in talk-in-interaction and their personal and collectively shared knowledge about events, subjects, and objects (Antaki, 1994). Moreover, in research interviews, participants may talk more freely than in naturalistic settings in which what they say may have a direct impact on the projects they have a stake in professionally (cf. Duranti, 1997). Interviews may enable us to explore the performative functions of scientists' negative statements about laypeople.

3.4 Analysis: Scientists' Construction of the Science–Society Relationship

A device that scientists in interviews consistently used to make claims about the science–society relationship is what we named displays of tolerance[20]. Displays of tolerance are statements that express some sort of understanding, lenience, or forbearance, such as *I understand that*, *I can imagine something by that*, *it is okay with me* (Participants S2 and S3). Typically, displays of tolerance do not explicate what exactly is understood, imagined, or allowed. In our data, displays of tolerance refer to laypeople's views[21]. The science–society construction we found in our data, however, does not solely consist of a display of tolerance of lay views but is followed by a claim about the scientific value of lay views—for example, *but you cannot take that seriously of course* (Participant S6). Furthermore, this science–

[20] We did not find earlier studies in the literature that discursively analyze displays of tolerance.

[21] Interviewees generally do not employ the terms laypeople or lay views. They speak of *they*, *people*, or *consumers* when they talk about the societal relevance of their work or when they discuss well-known lay arguments. In the empirical part of the article, we use the term laypeople as an umbrella category for interviewees' different references to non-scientists. Likewise, we employ lay views to refer to non-scientific views.

society construction is often supported by membership claims in the lay category, such as: *as a consumer I have that too* (Participant S7).

The displays of tolerance discursively contrast with the claims about the scientific value of lay views that follow it; displays of tolerance are always made in the first person singular, whereas claims about the scientific value of lay views are made by using the generalized pronoun "you." We will demonstrate how the differential use of personal pronouns serves to delegate lay views to the private sphere and scientific concerns to the public sphere (see also Swierstra & te Molder, 2012). We will furthermore show that the latter is instrumental in managing the science–society relationship.

Moreover, claims about the scientific value of lay views are always made after displays of tolerance of lay views. Additionally, some participants claim membership in the lay category between displays of tolerance and claims about the scientific value of lay views. This combination of discursive devices is—as we shall demonstrate—used for one purpose only: to manage lay access to science. However, in our data, displays of tolerance of lay views and claims in the lay category are not always followed by claims about the scientific value of lay views. We also found singular uses of displays of tolerance, singular uses of claims in the lay category, and displays of tolerance combined with claims in the lay category.

In the following subsections, we will first discuss the uses to which displays of tolerance and claims in the lay category are put before we examine participants' displays of tolerance followed by claims about the scientific value of lay views.

Displays of Tolerance of Lay Views and Membership Claims in Lay Categories

The following fragment is one of numerous examples in which Scientist S3 uses the specific display of tolerance *it is okay with me* to explain why lay expectations with regard to our food system are unrealistic. In *Fragment 1*, Scientist S3 talks about a media campaign called "The Pigs Pay the Price." The campaign is organized by an action group. Details on transcript notation can be found in the appendix to this chapter[22].

Fragment 1: Singular use of a display of tolerance

1	S3:	Yes, it is okay with me to let pigs live
2		outside in the fresh air (.)
3		but don't ask how bad it smells=
4	K:	=Yes (.)
5		there are reasons for the way things are done=
6	S3:	=EXACTLY (.)
7		people are not told the whole story

(S3 = interviewed scientist, K = interviewer and first author)

In Lines 1 and 2, Scientist S3 displays his tolerance toward laypeople's views on stock breeding. With this, S3 shows that he has knowledge of lay views. Moreover, he acts as if he is entitled to grant or withhold permission to let pigs live in fresh air. A possible explanation for why S3 states that it is okay with him to let pigs live in fresh air is that he wants to demonstrate that he is not against lay views as such. The display of tolerance is followed by the objection *but don't ask how bad it smells* (Line 3). Interestingly, this is a common

[22] All fragments are analyzed in Dutch and subsequently translated from Dutch to English by the first author. Translations from Dutch are as literal as possible for analytical purposes.

complaint about pig farming in the open air. The objection acts as a disclaimer and undermines the possible inference that S3 as a private person may support *all* lay views. A display of tolerance of lay views followed by an objection that may also be heard as a typical lay view enables S3 both to demonstrate his superior knowledge of lay views and to criticize lay views without inviting the potential inference that he is principally against them. S3 accomplishes superior knowledge of lay views by showing that lay views are not always compatible with each other. The latter also enables S3 to dismiss as unrealistic laypeople's specific desire to let pigs live outside in the fresh air.

The analysis that S3 shows himself not to be against lay views per se, and displays his superior knowledge of lay views, is further supported by S3's statement that *people are not told the whole story* (Line 7). By saying this, S3 claims to know more than laypeople. Moreover, he shows that he does not hold laypeople accountable for their unrealistic views; laypeople are misled by others.

Participants' references to their own layness perform different discursive functions. However, there is no exclusive relationship between membership claims in lay categories and the discursive actions they perform. For instance, some participants refer to their own layness to show that their research is responsive to society; other participants invoke other devices to accomplish the same goal. In the following fragment, Scientist S4 answers Interviewer K's query about how he listens to society. K asks him this after he has claimed that his research is relevant to society.

Fragment 2: Singular use of scientists' membership claims in lay categories

1	S4:	We have contact with breeders and cultivators
2		with farmers we have little contact
3		(0.8)
4		Anyway, you are yourself a consumer (.)
5		So, naturally, I have my own personal opinion (.)
6	K:	yes=
7	S4:	=that are the sources

(S4 = interviewed scientist, K = interviewer)

In this example, Scientist S4 explicitly claims membership in the lay category in Lines 4 and 5 to justify why he and his colleagues have little contact with farmers (Line 2). The use of the personal pronoun *you* in Line 4 is ambiguous in that it could refer to S4 and to Interviewer K. However, by continuing with *I have my own personal opinion* (Line 5), S4 makes the generalized entitlement to the consumer category applicable to himself. In the following fragment, displays of tolerance are followed by a claim in the lay category.

Fragment 3: Displays of tolerance followed by a claim in the lay category

1	S2:	As a scientist you have to say rubbish (.) nonsense
2	K:	(.) And as a citizen↑
3	S2:	I cannot separate them (.) ((both roles))
4		NO OF COURSE NOT
5		(0.6)
6	K:	okay=
7	S2:	=I do understand that people have no knowledge
8		of this field ((genomics))
9		I can imagine they can be made afraid
10		((ten lines omitted in which S2 blames

11 Greenpeace for making people afraid))
12 K: Citizens are not scientists=
13 S2: =Naturally=
14 K: =they have different concerns in everyday life (.)
15 S2: Naturally (.) of many many things I know nothing
16 and then I make decisions in a different way
(S2 = interviewed scientist, K = interviewer)

In this fragment, Scientist S2 not only displays his tolerance of laypeople (Lines 7–9) but also puts limits on his membership in the lay category. In Lines 3 and 4, S2 states that as an expert in genomics, he cannot be a layperson on the subject of plant genomics. In Lines 15 and 16, however, he claims that he often makes decisions like a layperson in everyday life. With this, S2 presents layness as a situated practice that is rooted in everyday life and in partial knowledge. Of some subjects scientists know much, of many subjects they know little. This fragment explicitly shows how by referring to their own experiences as laymen in everyday life, participants claim knowledge of how layness is enacted. Moreover, the claim in the lay category serves to strengthen S2's entitlement to judge lay views: an entitlement S2 first establishes by displaying his tolerance of lay views (Lines 7–9). This fragment also shows that participants do not claim to know exactly the same as laypeople. To the contrary, they claim to know more than laypersons on the subject of plant genomics. Put differently, layness and scientific expertise are presented as resources that may be invoked by one and the same person but as belonging to different spheres of life: Lay views belong to the private sphere; scientific views to the public sphere (see also Swierstra & te Molder, 2012).

Displays of Tolerance Followed by Claims About the Scientific Value of Lay Views
In this section, we examine how and to what ends displays of tolerance followed by claims about the scientific value of lay views are invoked by participants.

Fragment 4: Displays of tolerance, claim in the lay category, and claim about scientific relevance of lay views
7 S8: that is often not true (.)
8 but well, you may <u>think</u> that=
9 =EVERYONE MAY THINK WHATEVER THEY LIKE[23]
10 Isn't it↑(.)
11 K: mmh=
12 S8: =and make their own choices=
13 K: =yes (.)
14 S8: thus that I mean as well
15 there is a little piece of irrationality in that ((the
16 choices people make)) whereof you think=
17 =that is almost impossible to direct <u>I</u> think
18 (0.7)
19 or maybe you can but often it is directed by
20 (0.3)
21 things suddenly become scarce or something like
22 that (.)

[23] The Dutch expression *Iedereen mag alles vinden* is commonly translated in English as *Everyone may think whatever they like*. The literal translation is: *Everyone may think everything*.

23 Or eh popular or modern instantly (.)
24 that are trends people follow
25 and they are usually not scientific
(S8 = interviewed scientist, K = interviewer)

S8 talks in this fragment about the veracity of lay claims. He opens with a rather broad, nonspecific statement: *Everyone may think everything/whatever they like* (Line 9). Everyone may think whatever they like first and foremost invokes a sociocultural norm, namely, that citizens are free to think and do what they want in their private lives as long as they do not harm or hinder others. Also, by stating that *everyone may think everything/*whatever they like, S8 acts as if he has the right to grant or withhold people permission to do whatever they like (see also Sneijder & te Molder, 2005).

Furthermore, the statement everyone may think everything/whatever they like contains two extreme case formulations: everyone and everything. Extreme case formulations are descriptions that seek by their design to persuade listeners that what is stated is believable or reasonable (Hutchby & Wooffitt, 1998: 209–210). The extreme case formulations *everyone* and *everything* in this statement serve here to project the curtailment that follows later. In everyday life, the statement *Everyone may think whatever they like* is known to be an exaggeration in that it states a moral principle and not a fact of life. People cannot always express whatever they like, if only because they need to take into account the interests of the people with whom they live and work. Therefore, listeners are likely to expect that *Everyone may think whatever they like* is followed by a disclaimer or restriction. Because the curtailment is discursively projected, the restriction that follows appears to be reasonable: *that are trends that people follow and they are usually not scientific* (Lines 24–25). This restriction enables S8 first to separate lay views from scientific practices by allocating them to the private sphere and then to restrict laypeople's right to make veracity claims without appearing intolerant or patronizing.

Fragment 4 (continued)

26 S8: thus people have the perception (.) of (.) that is true (.)
27 that I have too (.) as a consumer (.)
28 K: yes
29 S8: <u>but</u> if you look at it scientifically (.)
30 then it is often not true
31 ((13 lines omitted))
32 S8: we as researchers (.) I want to say
33 (0.6)
34 <u>may</u> also be (.) irrational in private life (.)
35 but as a scientist (.) I think (.)
36 You <u>should</u> stick to scientific criteria
(K = interviewer, S8 = interviewed scientist)

Lines 32 to 34 state that scientists may be irrational in their private lives. With this, S8 claims that scientists are laypeople in their private lives. In Line 27, S8 is even more explicit about his layness in everyday life. By doing so, S8 rules out the possible inference that scientists do not understand what motivates laypeople or do not take lay views seriously; on the contrary, S8 shows that he has independent access to lay knowledge as a layman in everyday life. Moreover, by presenting himself as a scientist and a layperson S8 does claim the capacity and the right to determine whether lay views are relevant to science. If S8 claimed

membership in only the lay category, he could only claim the right to assess lay views. If S2 would only invoke his membership in the scientist category, he would put himself in the position of being entitled to evaluate scientific arguments only. Moreover, with the use of the personal pronoun *I* in Line 27, S8 establishes that he is only entitled to judge the way consumers make choices as a private person. By using *I* instead of the impersonal *you* preferred by scientists, S8 separates his consumer role from his scientist role (see Myers, 2006, and Stirling & Manderson, 2012, for more on the uses of impersonal you). Separation of these roles is important because S8 has earlier in the fragment restricted laypeople's right to make veracity claims. If S8 had not discursively separated the lay category from the science category, he would have curtailed scientists' right to make veracity claims. Furthermore, the statement in Lines 32 to 34, that in everyday life scientists are consumers who are entitled to make irrational choices, implies that scientists are able to provide the input from a lay perspective if desirable. Finally, by alternately presenting himself as a consumer and a scientist, S8 not only portrays himself as capable of assessing lay views but also undermines laypeople's right to assess the relevance of lay views for science. After all, laypeople are presented as having access only to lay knowledge whereas scientists present themselves as knowledge hybrids (see also Thomas & Twyman, 2004).

In the following fragment, Interviewer K introduces a well-known lay argument against transgenesis—a specific form of genetic modification that employs genes of different species to enhance a (food) product or organism. K introduces the argument after scientist S2 has extensively discussed two types of genetic modification: cisgenesis and transgenesis. Cisgenesis is a form of genetic modification that only uses genes of crossable species. S2 argues that from a technological perspective, cisgenesis and transgenesis are similar and do not warrant differential treatment. Interviewer K then asks what S2 thinks about vegetarians who refuse to eat tomatoes that have been modified with mouse genes:

Fragment 5: Displays of tolerance followed by claims about scientific relevance of lay views

1	K:	No but can you [by that]
2	S2:	> [I CAN] IMAGINE SOMETHING > by that
3		and therefore it is so beautiful (.) that you with
4		Phytophthora (.) ((a plant disease))
5		use only eh species' own genes (.)
6		isn't it↑ (.)
7	K:	[°yes°]
8	S2:	[so] that is all great (.)
9		↑so I understand all that↑(.)
10		and I can imagine that people can make very beautiful
11		pictures of it ((Phytophthora))
12		(0.6)
13		and eh it sounds nice and eh eh (.)
14		You can easily make beautiful posters and scary photos
15		(0.3)
16		BUT you cannot take that ((cisgenesis))
17		seriously of course=
18	S2:	=As a scientist you have to say rubbish (.) nonsense

(K= interviewer, S2= interviewed scientist)

Twice, scientist S2 states that he can imagine (in Lines 2 and 10), and once he states that he understands everything (Line 9). By doing this, S2 displays his tolerance of lay views.

Secondly, by declaring that he can imagine and that he understands, S2 not only shows that he has knowledge of lay views, he also claims the right to assess them. Of particular interest here is the use of the personal pronoun *I* in the displays of tolerance. Choosing *I* over the impersonal *you* generally preferred by scientists (Myers, 2006) indicates that S2 does not claim to understand lay views as a scientist. Displaying his understanding and approval of cisgenesis as a private person with the personal pronoun *I* (Lines 2–10) allows S2 later to state that scientists should not take lay fears seriously (Lines 16–17). So what at first appears to be a contradiction turns out to be no contradiction at all. But why does S2 positively assess cisgenesis before he downgrades this practice from a scientific perspective?

The admonishing declarative *but you cannot take that seriously of course* (Lines 16–17) serves to modify the initial positive assessment of cisgenesis (Lines 3–11) and to prioritize scientific knowledge over public concerns. It is okay for scientists to take public concerns into account as long as it does not compromise scientific standards. After this prioritization, the repetitious labeling of lay concerns as *rubbish* and *nonsense* in Line 18 effectively downgrades lay knowledge.

To conclude, the initial positive assessment of cisgenesis and its subsequent downgrading not only enables S2 to ensure that scientific knowledge is prioritized but also grants S2 the freedom to exclude lay knowledge from scientific deliberations. Moreover, downgrading lay knowledge after prioritization of scientific knowledge serves to give S2 total control over lay access to science, if only because prioritization on its own still implies that lay views should be taken into account. Furthermore, S2's positive assessment of cisgenesis before the downgrading of lay knowledge undermines the potential inference that S2 is against lay views per se.

In the next fragment, Scientist S argues that acceptance of genomics technology in crops has little to do with facts but more with the sides people take – this in response to Interviewer K's query as to whether S sees the genetic modification controversy as only a luxury problem.

Fragment 6: Displays of tolerance followed by claims of the scientific relevance of lay views

4	S:	we:ll that in the beginning (.) when
5		the whole movement started (.)
6		to be against it (.) I think that then
7		good questions have been asked eh
8		(0.5)
9		and also relevant questions=
10		=and it is good that there are regulations (.)
11	K:	mmh
12		(0.6)
13	S:	BUT eh what you SEE now in the last years is that (.)
14		whenever we submit a field test >we get always (.)
15		the same arguments from the same opponents
16		who do not seem to have learned or do not want to learn=
17		=that in the meantime we (.) that
18		scientific progress has been made (.)
19		and that several things ↑(.) that they claim (.) yes (.)
20		that already has been [proven] that they are NOT true
21	K:	[mmh]
22	S:	and that you then should reconsider your position<=
23		well you can't do that when you are an opponent (.)

24 I do understand that but ehm=
25 =So (.) there is not really a discussion
26 going on with those groups it is more like a trench eh
27 war (0.2) one against the other↓
(K = interviewer, S = interviewed scientist)

In Lines 14–20, Scientist S is talking in us and them categories, strengthening the opposition between scientific experts and laypeople when he does something remarkable. S says, *Well that you can't do that if you are an opponent* (Line 23), followed by Line 24: *I do understand that but ehm*. Line 24 contrasts strongly with what S says directly before and after it. So why does S display his understanding in Line 24? Lines 13 to 23 clearly indicate that S does not understand why people do not change their views when new scientific evidence warrants it. However, in Lines 23 and 24, S claims to understand that people do not give up their chosen positions easily, thereby presenting the lay–expert divide as primarily a relational problem rather than an epistemic issue. Moreover, in so doing, S acts as if he is entitled to judge whether lay views are relevant in the genetically modified organism debate.

Additionally, the past performance of the lay movement in science–society debates is sharply contrasted with the present performance of the movement from Line 13 onward: *but eh what you see now*. The use of the general personal pronoun *you* serves here to transform Scientist S's statement into a factual formulation (see also Hutchby & Wooffitt, 1998; Myers, 2006). *You* in Line 22 contrasts with the *I think* in Lines 4 to 9, when S positively evaluates the performance of the movement. By using the personal pronoun *I*, S delivers this positive assessment of past performance as an opinion rather than a fact (Myers, 2006). This difference is relevant here because statements presented as facts tend to be more persuasive than statements presented as personal opinions in matters of societal relevance (Myers, 2006).

Because the present performance of lay representatives is formulated as a fact, it is discursively made more important than past performance, which is formulated as an opinion. However, the positive evaluation of the past helps S allocate blame to lay representatives for the current bad relations between science and society and not directly to laymen themselves. This positive assessment also helps invalidate the possible inference that scientists are generally hostile toward lay representatives. In addition, S makes lay representatives look bad by postulating that laypeople's representatives did not learn *or* do not want to learn, in Line 16. In a knowledge society such as the Netherlands, unwillingness to learn is considered a greater offense than a knowledge deficit as such. This notion is reinforced by contrasting lay representatives' unwillingness to learn with science's willingness to listen; science has listened to representatives in the past and adapted its practices, but lay or citizen representatives do not reciprocate this now. Consequently, the behavior of representatives is presented as improper in two ways: as unwilling to learn and as violating the social norm of reciprocity. Plant scientists on the other hand are portrayed as willing to include laypeople's views if laypeople or their representatives provide good arguments. S uses this contrast between laymen and experts at the end of the fragment to explain the current lack of contact between scientists and lay representatives and to claim the right to decide whether lay views should be included in science–society debates. As in the beginning of the fragment, where S acknowledges that laypeople have made a contribution to science in the past, S nevertheless leaves open the possibility that laypeople or their representatives may be actively engaged in science–society deliberations in the future.

3.5 Conclusions and Discussion

Our analysis has shown how and to what ends participants manage the science–society relationship. The interviewed scientists always display their tolerance of lay views as private persons before they make claims about the scientific value of lay views as scientists. In this section, we discuss the implications of our analysis. We look at (a) the discursive functions of displays of tolerance, particularly in combination with claims about the scientific value of lay views; (b) why displays of tolerance always precede claims about the scientific value of lay views; and (c) how plant scientists' constructions of the science–society relationship relate to what recent science communication perspectives claim about these relationships.

The Discursive Function of Scientists' Displays of Tolerance Combined With Dismissive Claims About the Scientific Value of Lay Views

First of all, displays of tolerance do not simply serve to demonstrate scientists' comprehension of lay views; if that was the purpose, the scientists would have been more specific about what exactly they understand or can imagine and would provide proof of their comprehension. Second, the interviewed scientists display their tolerance although it is formally not part of their job to do so. Because they nevertheless do use displays of tolerance, they act as if their capacity to understand, allow, or imagine lay views does matter. Moreover, they act as if they are entitled to evaluate lay views. This analysis, as we have seen, is strengthened by the participants' claims in lay categories. Displays of tolerance in our data seem to indicate here that scientists are concerned about the societal image of their research to some extent; they show with their displays that they do care about lay views but that they do not necessarily need to involve laypeople or their views in their research practices.

In combination with claims about the scientific relevance of lay views, displays of tolerance achieve yet another purpose. Scientists use membership claims in the scientist and lay category to create the freedom to decide for themselves whether they find it necessary to incorporate lay views in their research. To accomplish this, they need independent access to lay knowledge and the competence and the entitlement to assess lay views. The scientists in our data corpus achieve independent access by claiming membership in lay categories; they achieve entitlement to assess lay views with their displays of tolerance of lay views; and they achieve competence to assess lay views with their independent access to lay and expert knowledge in combination with their entitlement to judge lay views.

As this article has demonstrated, scientists consolidate their right to decide whether lay views should be incorporated in science–society deliberations by prioritizing scientific knowledge, downgrading lay knowledge, or restricting laypeople's entitlement to participate in scientific deliberations by allocating lay views to the private sphere (see also Swierstra & te Molder, 2012).

Participants primarily achieve downgrading, prioritizing, and restricting by contrasting claims in the lay category with claims in the expert category. Interviewed scientists achieve contrast by using the following:

- Nouns/adjectives: for example, cisgenesis is beautiful from a lay perspective, but rubbish or nonsense from a scientific perspective.
- Verbs: for example, laypeople may do whatever they like, but scientists should stick to scientific criteria.
- Personal pronouns: for example, I as a private person versus the impersonal you of the scientist.

Why Displays of Tolerance Are Always Followed by Claims About the Scientific Value of Lay Views

In the past, plant scientists' immediate reaction in interviews was that as scientists they could not take lay arguments seriously because they were irrational or not fact based (see, e.g., Cook et al., 2004). Why do plant scientists now display their tolerance of lay views first before they proceed to downgrade lay views and prioritize scientific knowledge? The problem of dismissing lay arguments out of hand is that it leaves experts vulnerable to the critique that they are not capable or willing to consider lay views: a critique one can do without in a context where funding organizations demand that scientists incorporate lay views in their research.

In contrast, scientists who display their tolerance of lay views before they are critical about them are less likely to be accused of lack of knowledge, willingness, or competence to assess lay views. Of course, scientists could also express their tolerance after they have labeled lay views as not relevant to science, but in that case the effect of displays of tolerance such as *I understand that* changes; then these displays primarily serve to soften the harshness of the critique that has been offered.

How Scientists' Constructions of the Science–Society Relationship Relate to Recent Science Communication Approaches

The research presented in this article indicates that the constructions of absent laypeople fulfill an important role in plant scientists' accounts (see also Hacking, 2007; Wynne, 2005). Nevertheless, the role that the interviewed scientists allocate to laypeople in their accounts is rather limited and passive. Interviewed scientists appear to want to contribute to society by giving laypeople the freedom to reject or to use the technologies and knowledge they come up with (cf. Benschop, Horstman, & Vos, 2003).

Our scientists seem to propagate a science for society but not a science in society. Their discursive practice still resembles a top-down model of science communication, although the role that scientists ascribe to themselves has changed. They present themselves no longer primarily as superior knowledge producers for society but more as actors who can best regulate the use of different kinds of knowledge if necessary or desirable.

Scientists' constructions of the science–society relationship appear to be something in between a deficit model on the one hand and a dialogue or participation model on the other (cf. Burchell et al., 2009; Rowe & Frewer, 2005). We propose to tentatively name this phenomenon the "superior capacity model." We have chosen to use the term model because the discursive constructions participants in our study employ indicate that they partly orient toward and draw on deficit and participation models to account for if, how, and when they communicate with laypeople. Our model is similar to classical deficit approaches in that laypeople are conceptualized as lacking relevant knowledge and experience. It is dissimilar from deficit approaches in that informing the public is considered less important; instead, participants claim that laypeople lack the competence and experience to manage different kinds of knowledge needed to solve today's complex, societal problems. This they do by presenting scientists as better equipped to judge different kinds of knowledge than laypeople are. Our model is akin to participation and dialogue models in that it shares their underlying assumption that different stakeholders may have different types of relevant knowledge (Leach et al. 2005).

However, contrary to participation and dialogue models, our model does not see participation as a precondition for the resolution of societal problems (cf. Burningham, Barnett, Carr, Clift, & Wehrmeyer, 2007). The participation of particular groups may offer no added value, partly because of the existence of knowledge hybrids, as our participants present themselves, who simultaneously possess and competently combine lay and expert knowledge (see also Thomas & Twyman (2004) for the uses of knowledge hybrids). Another reason why lay participation may not offer added value is that participants in our study allocate the relevance of their own and others' lay views to the private sphere (see also Swierstra & te Molder, 2012); in everyday life, it is okay for scientists to make decisions as a layperson. However, interviewed scientists claim that, in a scientific context, different rules for decision making apply.

This superior capacity model is a construction that seems to serve interviewed scientists rather well; they retain their scientific autonomy without contradicting the assumption of funding agencies and others that laypeople have salient knowledge. However, our study leaves many questions unanswered. First of all, further research is needed to determine whether scientists in other epistemic communities employ the discursive construction/model we found and whether the function of the construction is the same in different settings. Secondly, it remains to be seen whether plant scientists' science–society constructions will hold when scientists interact with different stakeholder groups and (representatives of) laypeople in the flesh.

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Appendix: Transcription Notations

Based on Jeffersonian transcription (Jefferson, 2004):

[text]	Overlapping speech
(x.x)	Pause of x.x seconds
(.)	Micro pause, less than 0.2 seconds
(text)	Speech unclear
↑word,↓word	Onset of noticeable pitch rise or fall
wo:rd	Colons show that the speaker has stretched the preceding sound
<u>word</u>	Emphasized
WORD	Speaker is talking louder
° text °	Speaker is talking softer
((text))	Transcriber's remarks
=	No pause between words or turns
>text<	Fast speaking

4 We Say: '. . .', They Say: '. . .'

How Plant Science Experts Draw on Reported Dialogue to Shelve User Concerns

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This study aims to increase insight into the uses of experts' references to physically absent technology users in government-funded plant science. A discursive psychological analysis of expert board meetings shows that experts invoke various forms of reported dialogue/thoughts and dispositional statements when problems with technology and with program funding are discussed. Forms of reported dialogue serve to demonstrate that experts engage in dialogue with users, understand and are reasonable about users' concerns, and that the content of user concerns does not agree with expert views. Dispositional statements allow users' feelings rather than users' knowledge to be acknowledged as relevant. By establishing that user concerns contrast with expert concerns in type and content and by not discussing how users' feelings may be incorporated into technology, experts shelve user concerns. This practice may hinder the development of user-friendly technologies.

4.1 Introduction

Increasingly governmental funding bodies expect scientists to develop new technologies that match prospective users' requirements and serve societal goals (e.g. see Leach et al., 2005). This also applies to the specialized field of plant science in which prospective users of technology are farmers and plant breeders.

However, technologies that primarily serve societal goals such as the reduction of agrochemical use may compromise farmers' boundary conditions: if farmers do not apply agrochemicals in sufficient amounts they may lose their harvests to pests and diseases. With our study we seek to provide insight into how plant experts deal with the dilemma of how to treat user concerns face-to-face other – often competing – concerns in technology development.

We investigate to what interactional ends plant experts refer to users in institutional meetings that aim to ensure that new plant technologies are user-friendly. This perspective is relatively new, for, despite it being widely acknowledged that prospective users are central to the enterprise of technology development, it is rarely investigated how experts interactively deal with concerns of users of technology (Mejlgaard and Stares, 2012; Oudshoorn and Pinch, 2005) or how the articulation of user concerns in talk-in-interaction affects technology development.

Studies that do investigate how users matter in technology development tend to offer insights into the content of arguments that key players use to explain existing relationships and dynamics in biotechnology (e.g. see COGEM (The Netherlands Commission on Genetic Modification), 2007; Yamaguchi, 2007) or they provide insights into how conceptions about 'lay' participants affect who gets the opportunity to voice 'lay' concerns during deliberations and who does not (Felt and Fochler, 2010; Michael, 2009; Powell et al., 2011). Studies such as these teach us that engagement activities may not be designed to give *all* relevant actors the opportunity to voice their concerns. Consequently, much depends on how actual participants voice their own and others' concerns.

In the discourse literature there are hardly any studies about technology development in dyadic or multi-party settings. An exception is a two-party study by Veen et al. (2012) that looks at dynamics in interactions between prospective users of medical technology and experts. Moreover, conversation analytic studies that look at how participants voice others' concerns in interaction overwhelmingly favor dyadic interactions over multi-party interactions (Holt and Clift, 2007). The latter is problematic because the interactional dynamics in multi-party settings are more complex than in dyadic settings, and most deliberations in technology development take place in multi-party settings – settings in which three or more actors participate.

The discursive psychological analysis of experts' user-references we present in this article is situated in a setting in which four types of experts participate and therefore may shed some new light on dynamics in multi-party settings. In the following sections we will first discuss relevant literature on user-references and the complex, non-everyday context of interest – plant disease management science – before we present our analysis. Some basic knowledge of the context of plant disease management we deem necessary to be able to appreciate the discursive practices themselves and their social scientific relevance (see also De Kok, 2008; Moerman, 1990; Stokoe, 2012). However, we do not purport to claim that the discursive practices we explore are unique to the study setting, nor that they are universal practices.

User-references may take different forms. We focus on how users are commonly invoked in the context at hand: by invoking the speech or thoughts of absent others (Holdsworth and Morgan, 2007) and by voicing dispositional statements of users (Edwards, 1994, 1995).

4.2 Invoking Users: The Role of Forms of Reported Speech and Dialogue

Reported speech is a real or constructed quote of another (Holt and Clift, 2007) such as '*they say*: "*but then I don't*"'. Not all reported speech is projected by a reporting verb such as *say* in the example. However, recipients easily recognize quoted speech because it tends to be accompanied by a shift in intonation or, as Wooffitt (1992) calls it, active voicing. Generally, the function of active voicing is to animate speech and to objectify accounts in which reported speech/thoughts is used to corroborate claims (Potter, 1996: 161; see for a similar use of reported inner speech, Lamerichs and Te Molder, 2009).

Several authors have criticized the concept of reported speech (Buttny and Cohen, 2007; Tannen, 1989). We agree with Tannen (1989) that much reported speech is dialogical in nature and that it is important to call reported speech dialogue if dialogue is reported or invoked; with reported speech speakers may achieve other ends than with reported dialogue. For instance, reported dialogue may be preferred in institutional contexts in which demonstrated actual engagement with users is greatly valued, as is the case in technology development (Leach et al., 2005; Oudshoorn and Pinch, 2005).

Participants tend to use different forms of reported speech, thoughts or dialogue: direct reported speech (he said '. . .'), indirect reported speech (he said that they say '. . .'), hypothetical reported speech (then he will say '. . .'), reported thoughts of others (he thinks: '. . .') and plural or prototypical speech (they say that: '. . .'). Direct reported speech tends to signal direct epistemic access to the quoted, whereas indirect reported speech generally signals indirect epistemic access (Holt and Clift, 2007). Studies that investigate thoughts tend to focus on speakers' self-quotes or reported thoughts are

treated as reported speech (Holt and Clift, 2007: 150–151). However, one could say that quotes of others' thoughts imply access to the verbalized and non-verbalized thoughts of the other and that, as such, reported thoughts signal greater access to the quoted than reported speech.

According to Buttny (2003: 106) direct reported speech tends to refer to quotes of individual people but not of a social category: 'Direct reported speech purports to quote the words of the individual while prototypical speech purports to capture the words of the group, as articulated through the individual.' Prototypical speech is kindred to what Wooffitt calls plural speech (Wooffitt, 1992, on plural quotes in Potter, 1996: 161) in that the speech of the group rather than the individual gets reported. Plural speech tends to make the inference available that the plural quote relates to 'a general experience of a range of people' (Potter, 1996: 162). The latter may be useful if one wants to present utterances as representative of a group.

According to Myers (1999b) hypothetical reported speech does not refer to something that has been said, but to what may be said or could have been said. Hypothetical speech may be useful if one does not want to reveal the identity of the quoted or one's relationship to the quoted in that it tends to invoke events that may happen or might have happened.

The functions reported dialogue serves partly depend on its specific features. Typically, reported speech and dialogue convey something about the relationship between the quoted and the quoter (e.g. see Buttny and Cohen, 2007; Duranti and Goodwin, 1997). Generally, direct quotes say something about quoters' epistemic access, for example, that the speaker has independent access to a knowledge source. Epistemic access, in turn, may be used for ends such as providing evidence for a particular position or claim (e.g. see Clift, 2006).

Moreover, the purposes reported speech or dialogue serve also depend on the context of use. As Buttny (1998) and Buttny and Cohen (2007) point out, speakers take the quote out of its original context and incorporate it in a new one. This feature of quotes-in-use enables speakers to deploy one and the same quote for different purposes. Functions, to which contextualized reported speech may be put, include but are not limited to blaming others for specific events or lack of results, avoiding responsibility for a controversial statement and probing what participants' stance is on certain issues (see Myers, 1999a, for more on functions of reported speech).

Finally, reported dialogue may be combined with other kinds of user-references such as dispositional statements. Talk about others' disposition to act in a certain way is a device commonly produced to make assertions about others more believable by presenting behaviour of a person or group as prototypical of that person or group (Edwards, 1994, 1995), for example, 'He is a jealous type of person'. Dispositional statements may refer to cognitive or emotional states of people and are generally informed by category-bound inferences. For instance, conservativeness and common sense are inferences that tend to be attributed to farmers. Dispositional statements are not easily challenged; to challenge them is to challenge widely accepted sociocultural inferences (Edwards, 1994; Emmison et al., 2011).

In this study, we explore the functions that experts' active voicing of users' utterances– user-oriented reported dialogue/thoughts – and dispositional statements fulfil in plant technology development.

4.3 The Research Setting: An Expert Board in Plant Science

Eight successive meetings constituting 20 hours of talk of a Dutch expert board connected to several research programs in plant disease management in staple crops were recorded in 2010 and 2011. The formal aim of the expert board was to ensure as far as possible that the technology developed in plant disease management research programs can and will be used by prospective users: crop farmers and/or plant breeders. The research discussed in the fragments of this article are – like almost all research discussed by the board – governmentally funded. All research discussed by the board is linked to the plant disease Phytophthora.

Technologies discussed in the board meetings aim to increase the environmental-friendliness of disease management in staple 'crops' by reducing farmers' dependence on agrochemicals or by decreasing staple 'crops' susceptibility to Phytophthora, either by increasing Phytophthora-resistance of crops or by reducing the virulence of Phytophthora itself. These different disease management strategies are met with various forms of public and user resistance.

Experts who participate in the meetings are government representatives, plant scientists and representatives of the plant breeding industry. In half of the meetings crop advisors who formally represent farmers were invited to partake in the discussions as well. Farmers as a group are excluded from participation on the board[24]. Plant scientists monitor and conduct research and report on research findings, puzzles and problems in board meetings. Representatives of the plant breeding industry contribute by bringing in their own particular expertise with regard to disease management and they provide the technology for field tests. Representatives of government chair meetings explain governmental procedures, report back to the Ministry and utilize their contacts in support of board decisions.

The expert board has formally existed for almost a decade from 2002 to December 2011. According to old plans the research programmes and its expert board would have been dissolved in 2012 and not in 2011. However, the government decided to cut the yearly budget for 2012 in 2011. Consequently, in the meetings from the end of 2010 till the end of 2011, problems with field tests were drawn upon to argue for continued public funding of the research. Because our research project started at the end of 2009 we only recorded the board meetings from the start of 2010 onwards.

The first author was present at the meetings and took notes about ongoing interactions and seating arrangements. To minimize researcher impact on interactions during meetings she did not partake in the discussions. However, she talked informally to participants during breaks and lunches in between and after meetings. Notes on informal talk with board members, PowerPoint presentations and documents used in the meetings were studied to learn more about the context of plant disease management: the stakes and interests, the meaning of key concepts and some basic knowledge of the technical terminology used during meetings (see Duranti, 2003, for more on this mode of data-gathering). These additional data facilitated subsequent transcription and analysis: they helped us to understand what experts were saying, what alternative actions experts do not effectuate when they speak as they do, and it helped us to decide which recurrent

[24] None of the participants interactively present themselves as farmers during board meetings. However, during informal talks and interviews we learned that some of the participants were raised on a farm or are living on a farm. Nonetheless, farming is not the main form of employment or source of income of participants.

discursive practices in talk-in-interaction related to crop disease management in a meaningful way.

We listened several times to the recordings. During listening the variety and prominence of forms of reported dialogue in talk about users caught our attention. And given the importance attributed to user engagement in technology development, we decided to focus on experts' user-references. Sections that had user-references in them were transcribed by the first author following Jeffersonian transcription conventions (Jefferson, 2004) and subsequently translated (from Dutch) into English. Translations are as literal as possible and include non-verbal cues such as pauses, changes in loudness and speed of utterances.

Additionally, key players in the board were interviewed with the help of a topic list. In this article we draw upon these interviews to place participants' user-references in the wider context of plant technology development (for a discursive analysis of a selection of the 25 conducted interviews, see Mogendorff et al., 2012).

4.4 Analytical Perspective: Discursive Psychology

In our study we deploy discursive psychology (DP) to analyse experts' deployment of user-references. DP is a form of discourse analysis and kindred to conversation analysis (CA), the empirical study of the structure and sequence of conversation. In DP and CA talk is seen as action oriented: language is studied as a participants' resource to conduct a wide range of social actions such as 'doing being' an expert (Potter, 1996). Interactionally, expertise is accomplished if participants behave and are treated as experts: typically, experts claim to know more about specific subjects relative to others and are treated by others as an authority (see also Carr, 2010).

Conversation analysts generally look for discursive patterns across datasets to understand the social organization of interaction (Heritage, 2004; Potter, 1996), for example, to investigate how a telephone conversation is typically started or ended. Discursive psychologists investigate the purposes language-in-use serves by paying close attention to how psychological characteristics, events and descriptions are made available, ascribed, and resisted by participants. Discursive psychology shares the conversation analytic focus on the turn-by-turn development of a conversation as a resource to make sense of the social activities that are accomplished. Furthermore, it uses the rhetorical dimension of conversation by comparing actual accounts of speakers with potential alternative versions of these accounts (Potter, 1996).

In this article, we focus on problem talk – partly because experts in the recorded meetings refer to users most often when they discuss problems in technology development, partly because this focus may add to the Science and Technology Studies literature where taking the user perspective into account is primarily presented as a way to prevent causing problems in technology development (Oudshoorn and Pinch, 2005).

However, first we provide a description of how and when experts in multi-party meetings generally employ user-references before we zoom in on fragments that demonstrate how experts deploy variations of reported dialogue/thoughts and/or dispositional statements about users' emotions. This way we somewhat accommodate Jahoda's (2012) critique that discursive psychological analyses do not always pay enough attention to the wider context in which the analysed interactions take place.

4.5 Reasons for User Absence and User-References in Stakeholder Board Meetings

During interviews by the first author about strategies in plant disease management and the role of the expert board in it, board members said that individual farmers are unable to represent collective interests of farmers: 'The risk is that they only further their own individual interests. After all, they only know their own situation.' And: 'Farmers are interested in the practical uses of technology not in technical details of the research.' And finally: 'Crop advisors are better equipped to represent farmers as a collective than individual farmers.' For these reasons, farmers are formally represented by crop advisors during meetings. They supposedly know farmers' concerns because they regularly visit farmers to advise them on agrochemical use, technology and corporate management. Crop advisors' interest in participating in the board is that they can adapt their advice to farmers' needs based on the newest research insights discussed during board meetings.

Generally, scientists are the most talkative participants. This is in large part because they present their research to the board during meetings with the help of PowerPoint. Research reports may take 30–60 minutes (questions asked about the presented material included).

Together experts in the boards devote on average 30 minutes per recorded meeting to talk about users. To refer to users the words *the field*, *farmers* and/or *breeders*, *they* or *people* are deployed. Experts, except crop advisors, primarily use these user-references in the form of direct reported dialogue, for example, *farmers and breeders say that: '. . .', whereas we say that '. . .'*. Experts use forms of reported dialogue most often in discussions about current problems with technology. Additionally, experts invoke future-oriented reported or hypothetical dialogue in talk about the future of Phytophthora research. Overall, they devote more time to discussing problems with technology than discussing future funding of research.

Furthermore, in problem talk experts do not discuss all possible causes of suboptimal functioning of technology: problems with the technology itself are hardly discussed, whereas users' stance on technology, the growing virulence of Phytophthora and crop advisors' inability to entice farmers to use new technologies as intended, are talked about extensively.

Moreover, in talk about current problems and in future oriented talk, experts – except crop advisors – employ forms of reported dialogue/thoughts[25]. However, the form reported dialogue takes, appears in part to be linked to how users get depicted. In talk about current problems, users are constructed as part of the problem with the help of direct reported dialogue in the present tense and with statements about users' emotional dispositions; in future-oriented talk or with the help of hypothetical dialogue, users are depicted as potential allies.

All participants in the meetings use reported dialogue except crop advisors, who tend to employ factual statements such as *farmers still think that . . .* when they talk about prospective users of technology. The following fragment shows how crop advisors tend to talk about farmers in the recorded meetings (see the Appendix for details on transcript notation).

Just before the start of the fragment a policy worker from a plant breeding company B2 asks the crop advisors (CAx) what is essential for the continuation of the disease management research programme:

[25] Reported thought is only used by one participant (not a crop advisor).

Fragment 1 Crop advisors' non-use of reported dialogue

22	CA1:	And I think that we at this moment
23		still underestimate to what extent (.) this is (.)
24		when I see how many spraying schemes are based
25		on the discussion of 0.3 or 0.25 liter Shirlan
26		((Shirlan is an agrochemical))
27 →		and people ((farmers)) as yet do not realize at all
28		what is at stake now (.)
29	B2:	that is naturally also a piece of (.)
30		that is a part of that eh
31		the pathway from research to application.

(CAx = crop advisor; Bx = representative of breeding company)

Crop advisor CA1 just tells, not shows, B2 what the concerns of users are (lines 24–28). B2 in turn accepts CA1's authority in this matter by agreeing to what CA1 says: *that is naturally also a piece of (.) that is a part of that eh the pathway from research to application* (lines 29–31). Moreover, CA1 connects a personal observation of spraying regimes – *when I see how much spraying schemes are based on the discussion of 0.3 or 0.25 liter Shirlan* (lines 24–25) with an 'objective' assessment of users' state of knowledge: *people as yet do not realize at all what is at stake now* (lines 27–28).

This fragment is typical of how crop advisors in our data talk about users: they provide 'objective' assessments of users' technology uptake based on personal observations about user practices[26]. And these statements are accepted. With this, crop advisors' formal role in the board as representatives of farmers is supported by how crop advisors formulate their claims and how recipients treat crop advisors' claims about farmers.

Moreover, the crop advisor in the fragment talks about farmers in the plural. The use of the plural in reported dialogue between farmers and experts and dispositional statements is typical of expert talk in our data. In the one and only instance in our data that a board member initially bases his claim on an experience of an individual farmer, this is not accepted by the others as relevant to the business at hand: evaluating field tests outcomes in Phytophthora management (*Fragment 2*).

Just before the beginning of the fragment, representative of industry B3 uses the experience of his neighbour – a farmer – to argue that the widely applied agrochemical Shirlan is not effective anymore and that therefore the advice module in the decision support technology system may need to be updated.

Fragment 2 Uptake of individual experiences of farmers

1	B1:	Of that you need to be 100 per cent sure
2		[because] perhaps your neighbour too has timely changed chemicals=
3	S8:	[yes]
4	B3:	=>NO NO< he didn't (.) no no I am sure of it (.)
5	B1:	no WELL YES you say↑ I [am sure but]
6	C2:	[no no but]
7 →		but we are not going to communicate results based on
8		experiences of individual farmers with all <u>due</u> RESPECT
9	B3:	the <u>feelings</u> of farmers should be noted here↓ (.)

[26] Objective in the sense of using terms that index qualities of an object rather than suggesting a personal stance (Wiggins and Potter, 2003).

10 C2: that's right.
(Bx = representative of industry, Sx = scientist, C = civil servant or policy worker)

In this fragment, users' collective emotional dispositions are treated as relevant. This civil servant C2 succeeds by forcefully rejecting individual experiences of farmers as relevant for decision-making (lines 7–8). In line 9 B3 corrects his 'mistake' by making farmers' collective emotional dispositions relevant: *the feelings of farmers should be noted here*. In response, C2 endorses B3's correction (line 10).

By acknowledging that farmers' feelings do matter, B3 and C2 display their understanding that farmers-as-a-group need to be taken seriously as an actor in technology development; farmers' emotional dispositions towards technology could affect the adoption of new plant technologies. Moreover, with the exception of this fragment, experts quote users exclusively in the plural or suggest plurality through the words of a prototypical member (see also Wooffitt, 1992, on plural quotes in Potter, 1996: 161 and Buttny, 2003, on prototypical speech).

Future-Oriented Talk: Hypothetical Dialogue

The form reported dialogue takes partly varies with how technology development gets positioned in time. When our experts discuss current problems with technology they always use forms of direct reported dialogue or thoughts in the present tense and dispositional statements about users' emotions. When experts discuss how to prevent possible problems in the near future then they deploy instances of hypothetical reported dialogue such as *they will say: 'but then I will not keep spraying'*.

We will show that experts' use of hypothetical dialogue in future-oriented talk and their deployment of direct reported dialogue in problem talk produces seemingly contradictory depictions of the prototypical user.

Fragment 3 Use of hypothetical dialogue

1 B4: You end something you see? (.)
2 The first question that the farmer asks is (q) ↑WHAT now? (q) (.)
3 S8: Yes=
4 B4: =So you probably need to say (q) ↑all right then, this initiative is finished (0.8) (q)
5 but in the programs eh we continue with Phytophthora (.) cause otherwise
6 it becomes a story like eh (q) ↑ oh the problem has been solved (q) =
7 B5: =yes EXACTLY=
8 B4: =when everyone is flooded with Phytophthora.
(Bx = representative of industry; Sx = scientist)

In this fragment, B4 enacts the possible uptake by the prototypical farmer of the news that a research program in plant disease management ends in the near future whereas Phytophthora is not yet under control (lines 2, 6). The hypothetical status of the reported dialogue is discursively signaled by the modal *need* in line 4. Furthermore, B4's use of the particle *oh* in line 6 signals surprise of farmers (e.g. see Hutchby, 2001, on 'oh'). The hypothetical surprise of farmers indicates that the research program is terminated prematurely. Moreover, surprise is here constructed as a reasonable response from the farmers' perspective. Also the invocation of farmers' common sense goes unchallenged. Possibly, because it is in line with the category-bound inference that farmers are the epitome of common sense.

In the following fragments we will show that in discussions about current problems with technology other inferences about farmers are made available, both with the help of reported dialogue/thoughts in the present tense and with dispositional statements: namely, that farmers are reluctant or scared to use new technology. The latter depiction of users contrasts with the depiction of users as common-sensically acting humans we just saw in *Fragment 3*.

Problem Talk: Dispositional Statements about Users and Plural Speech Attributed to Users

In the following we analyze instances of talk about current problems in technology development. Typically, experts deploy reported thoughts/dialogue in the vicinity of dispositional statements about users. The latter suggests contiguity – dispositional statements and quotes lie side by side in space and time but are not necessarily connected by causality or some other principle.

We start with the first occurrence in our data of a negative emotional disposition attributed to users (the second meeting of 2010 and the first meeting after a major Phytophthora outbreak). Experts are discussing the possible causes of the failure of a multi-sited field test with a newly developed decision support system that advises users about *when* they should spray *what* agrochemicals in order to sufficiently protect their crops against Phytophthora. At the start of the fragment, the discussion focuses on the frequency of spraying intervals of agrochemicals in relation to crop protection.

Fragment 4 Users' dispositions and reported thoughts

1	S11:	But this then could be a system that would give a breeder (.) mo:re (0.4)
2	CA5:	confidence?=
3	S11:	=yes (.) would appeal ((to a breeder)) more↓ it is (.)
4		five sprayings is perhaps too little eh↑
5 →		they find that SCARY (.)
6	CA5:	yes
7	S11:	(.) yes I just say it like it is
8	?:	yess .hh=
9	S11:	=and eight sprayings they may find a little bit less scary, isn't it?
10	CA5:	(.) yes
11	S11:	(.) I think that was also the idea behind these modules
12		to come somewhat closer to (0.9) the (.) well yes (0.4)
13		the risk perception of the breeder eh↑
14		whereas anyhow Phytophthora is fought appropriately
15		and then (.) well yes if it is possible with
16	CA5:	(0.7) yes=
17	S11:	=less agrochemicals (.) or just as much agrochemicals
18		(0.4)
19 →	B2:	It is not so much [that he finds it scary]
20	C4:	((in the background)) [that it goes wrong] ((in the background))
21	B2:	but more like that he thinks ↑ I have to do something
22		because it is not totally zero ((the risk of Phytophthora))

(Sx = scientist, CAx = crop advisor, Bx = representative of industry)

In line 5 scientist S11 attributes to users a negative emotional disposition towards technology: *they find that scary*. This dispositional statement is preceded in lines 1–4 by S11's suggestion that a higher frequency in crop protection spraying intervals would appeal more

to farmers and breeders. Moreover, S11 appears to be searching for the right expression. The latter may indicate that S11 is aware that his suggestion of changing the spraying intervals may be treated as self-interested (see also Potter, 1996: 131–132, on subtlety and managing stake).

After the dispositional statement is confirmed by a crop advisor (line 6), scientist S11 offers a reflexive assessment on his dispositional statement: *yes I just say it like it is*, pre-emptively denying any bias from his side (line 7). In line 9, S11 continues by providing a specification of what farmers and breeders find scary, ending with a tag question that invites support. In line 10, S11 gets a minimal confirmation from a crop advisor. This appears not to satisfy S11, for in lines 11–17 S11 elaborates on his dispositional statement by reporting his thoughts on the rationale behind the decision support systems. By specifying his dispositional claim, scientist S11 seems to seek to objectify his statement about users' stance towards technology (see Tracey and Durfy, 2007: 240, on objectification).

Finally, in lines 19–21, representative of industry B2 challenges S11's statement that *they find it scary* (line 5) by denying the dispositional statement: *it is not so much that he ((the prototypical farmer)) finds it scary* (line 19) and by subsequently reporting thoughts that users may have had: *but more like he thinks I have to do something . . .* (line 21).

It seems that experts – except crop advisors – cannot content themselves with simply stating that users' emotional dispositions affect technology development. B2 sets the example by challenging a claim about farmers' dispositions that is not demonstrably based on interaction with farmers but on factual statements about farmer behaviour and by backing up his counterclaim with reported thoughts of the prototypical farmer.

Fragment 5 Emotional dispositions and reported dialogue

1	S11:	Another issue that keeps coming back
2		is eh the accumulation of agrochemicals eh
3		because last year was of course a dry spring=
4	C2:	=yeah
5	S11:	eh or yes dry first part of the season
6		that the syste:ms advised longer spraying intervals
7		(0.3)
8		eh two (.) three weeks
9	S11:	.hhh and <u>that</u> many people still also consider scary (.) eh
10		eh they say (q) ↑ yes but then <u>I</u> do not keep spraying
11		and then I keep- the protection eh level goes down ((against disease)) (q)
12		(q) and I need to keep spraying those agrochemicals
13		because the level of protection builds up (.) eh
14		and when the weather changes then I have
15		at least a reasonably protected crop eh (q)
16		whereas <u>we</u> always say eh .hh (q) yes (.)
17		you need to spray at the right moment
18		and then your crop is protected just fine
19		what you did before that↑ does not matter (.) (q)
		(Cx = civil servant or policy worker, Sx = scientist)

This fragment is part of a lengthy discussion about the possible role of users' dispositions and behaviour in the underperformance of decision support systems technology. *And <u>that</u> many people still also consider scary* (line 9) is an explicit claim about farmers' and breeders' emotional dispositions towards the decision support system. The utterance suggests that

farmers and breeders are reluctant to adhere to spray intervals that are longer than they are used to (line 8); moreover, attributed to farmers is the belief that longer spraying intervals mean less direct and indirect crop protection against Phytophthora (lines 6–15).

In lines 10–19, scientist S11's dispositional statement is directly followed by reported dialogue. The *they* in line 10, and the *I* in lines 10–12 and line 14, refer to the prospective users of the technology, and the *we* in line 16 to the technology developers. The start of reported dialogue is signaled by the reporting verb *say* in line 10 followed by a change in intonation; the *they* in line 10 signals that scientist S11 first enacts the speech of farmers and breeders and the *I* after *they say* indicates that the *I* is a prototypical farmer.

One may ask why S11 uses an assessment of a past event – a major outbreak of Phytophthora in 2010 – to claim that users' judgement is clouded by emotions. He could also have used the event to question the efficacy of the decision support technology but he does not do that. Instead, by invoking users' dispositions and users' speech S11 focuses the attention on the user. The use of reported dialogue also backs up S11's claim that user logic does not agree with scientific logic.

Interestingly, S11 neither provides nor is asked to provide an account of what he has done to reconcile user logic with expert logic. The latter suggests that experts such as S11 are free to decide how to combine user logic with expert logic after they have demonstrated that they have considered users' views.

In the following fragment a policy worker from a breeding company, B2, distinguishes between theoretical and pragmatic feasibility of crop protection spraying schemes.

Fragment 6 Emotional dispositions and reported dialogue

1	B2:	We always say at first communication wise↑
2		(q) spray only when there is a critical period (q)
3		Then it becomes apparent in practice that that is not feasible (.)
4		and <u>people</u> do not dare to do it (.)
5		then at some point you go back to say well (q)
6		oka:y what do <u>you</u> want then↑ (q)
7		(q) we want a kind of week scheme together with (q)
8		then you take (.)
9		it makes little sense to have a fantastic management strategy
10		that is 100 per cent effective=
11	C2:	=yes=
12	B2:	=that in practice will not be used (.)
13		then you come a day after the fair=
14	C2/S8:	=yes (.)
15	B2:	then you have to meet each other halfway
16		I think we have done that quite well.
		(Bx = representative of industry, Cx = civil servant)

In this fragment, industry representative B2 provides an emotional dispositional statement: *people do not dare to do it* (line 4) with regard to limiting spraying to critical periods: intervals in which a Phytophthora outbreak may occur. The statement presents the lack of daring of users as prototypical of farmers by making available the sociocultural inference that farmers are conservative and reluctant to change their behavior with regard to agrochemical spraying. Furthermore, *do not dare* implies that farmers tend to be too scared to reduce their agrochemical use in line with expert advice.

In *Fragment 4* we saw that B2 did provide evidence to counter scientist S11's claim about users' stance toward technology. However, the primary function of dispositional statements and reported dialogue here is to demonstrate that the expert board has taken users' feelings and user engagement seriously by engaging in dialogue with users, and by respecting user concerns irrespective of whether users' dispositions are compatible with scientific logic. Furthermore, users' dispositions towards technology are presented as constructive: they are not invoked to provide a possible explanation of the underperformance of technology, but as a starting point for dialogue between users and experts.

This fragment also differs from *Fragment 5* in that B2 here adds something about how differences between user and expert logic should be handled: *then you have to meet each other halfway* (line 15). Notwithstanding this addition, B2 remains vague about how users' concerns should be handled exactly and he is not asked to be more specific. Put differently, the practicalities of combining user logic with scientific logic are not treated as relevant. With that, it is left to technology developers to decide how to combine these two.

4.6 Conclusions and Discussion

We have seen that experts treat user engagement as relevant in technology development by enacting dialogues with prototypical users. However, different from the formal goal of the expert board, user-references do not primarily serve to elucidate the implications of users' concerns for new technologies. Instead our data suggest that users are of strategic importance in technology development. Experts produce assertions about users' negative emotional dispositions towards technology and reported dialogue/thoughts when the underperformance of new technologies is discussed. In these instances users tend to be depicted as possible threats to the success of plant technologies (*Fragments 4*, *5* and *6*). In contrast, users are portrayed as allies when the continuation of research programs is discussed with the help of hypothetical reported dialogue (*Fragment 3*). However, these two seemingly contradictory user depictions both show that for better or for worse users matter in technology development. This is all the more apparent, given the amount of time experts devote to talking about users' stances relative to other potential causes of suboptimal functioning of technologies.

Furthermore, our analysis indicates that users' concerns do matter in a different way from experts' concerns. Users' collective feelings are treated as relevant to technology development (fragments 2, 4, 5, 6) whereas experts' feelings are never treated as relevant. Different from Cook et al. (2004), we found that experts acknowledge that users' concerns – that is, feelings – make sense from their own life world and are therefore legitimate from that perspective. This finding is in agreement with a study of plant scientists' discursive practices we conducted earlier (Mogendorff et al., 2012). In the latter study we found that scientists acknowledged that non-scientists' concerns have legitimacy in everyday life but not in science.

The analysis presented in this article also demonstrates that experts' displays of understanding of the user perspective do not necessarily mean that users' concerns are incorporated in technology. With plural reported dialogue in the form of *they say '. . .', whereas we say '. . .'*, experts demonstrate that the content of expert and user logic tends to be incompatible. And by treating expert *knowledge* and users' *feelings* as relevant, with the help of dispositional statements participants accomplish two things. First, they establish that user concerns and scientific concerns are not of equal value;

emotions tend to be treated as less valuable than knowledge in technology development and science. Simultaneously, experts make it hard, if not impossible, to compare experts' and users' concerns; feelings and knowledge relate to one another as apples to grapes.

To conclude, by establishing that user and expert logic are of two worlds that are both to be respected but as such incompatible, experts in our study effectively retain the freedom to choose if, how and when to follow up user logic in technology development. Or to paraphrase Gieryn (1982: 792), experts maintain their autonomy over professional activities by enacting dialogue between experts and absent users, by producing dispositional statements about users, and by saying nothing about how they incorporate users' concerns in technology.

This conclusion is quite remarkable. Because the central aim of the board we studied is to ensure that new plant technologies are user-friendly, one would expect that scientific experts are asked to account for how they plan to incorporate users' concerns in technology. As we have seen, our experts were only required to demonstrate that their claims are rooted in direct interaction with users and that they seriously consider user concerns. A possible explanation for this may be that if board members were to demand that experts account for how they have inscribed users' concerns in technology, then experts could easily treat this as a contestation of their expertise.

Moreover, reported dialogue is ideally suited to acknowledge others' concerns or emotions without necessarily endorsing their content. The production of reported dialogue/thoughts enables experts in our data to suggest that their claims about users' emotional dispositions are the outcome of their reflection on interactions with a range of users. With the latter, speakers may project an image of themselves as reasonable and consistent beings who understand and are sympathetic to users' concerns but do not necessarily agree with them. In addition, by acting reflectively experts also project the suggestion that users are less reasonable than they are (see Locke and Edwards, 2003, for more on speakers' reflexivity). In doing so, experts create the possibility to not take into account, that is, to shelve, user concerns.

Now we can also try to interpret crop advisors non-use of reported dialogue: advisors' tell, not show, what user concerns are and they get away with it. By not inviting crop advisors to elaborate on their epistemic access to users, their epistemic access to farmers is treated as self-evident. This interactional treatment of crop advisors is commensurate with their formal role as representatives of farmers.

Finally, this study raises the question what functions we would prefer experts' knowledge of and experience with users to perform in publicly funded research. Is it is always wise to leave unquestioned how experts apply their expertise? Or is it justifiable to sometimes investigate this at the risk of triggering a hostile response because one ventures into the professional domain of another? The first step lies in making expert participants aware of how they currently deal with user concerns, as many of these practices are persistent but often have little, if nothing, to do with conscious motives or intentions (see Lamerichs et al., 2009, for a discourse-based reflection method for practitioners).

If one wants to ensure that technologies are user-friendly, our explorative study indicates that it is not enough that experts account for their engagement with users. They also need to account for how users' concerns in practice affect new technologies under development. It may also be a good thing to invite users to partake in expert board

meetings; they have a vested interest in demanding that experts account for how they inscribe users' concerns into technology.

4.7 References

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Appendix: Transcription Notations

Based on Jeffersonian transcription (Jefferson, 2004):

[text]	Overlapping speech
.hhh	A hearable in breath, the number of h's signals the length
(x.x)	Pause of x.x seconds
(.)	Micro pause, less than 0.2 seconds
↑word,↓word	Onset of noticeable pitch rises or fall
Wo:rd	Colons show that the speaker has stretched the preceding sound
<u>Word</u>	Emphasized
WORD	Speaker is talking louder
° text °	Speaker is talking softer
((text))	Transcriber's remarks
=	No pause between words or turns
>text<	Fast speaking
(q) text (q)	Constructed speech or reported dialogue

5 'He [Phytophthora] Is Exceptionally Clever'
(Metaphorical) Framings at Work in Conditions of Controversy

This chapter examines the type of innovative framings that Dutch plant experts deploy to explain key concepts in plant technology science: genomics, genetic modification and the plant disease Phytophthora. Awareness and insight of how these framings, including visual and verbal metaphors, are used in plant technology and plant disease management may stimulate a more reflective, deliberate use of such framings.

Plant experts' framings are largely but not always metaphorical in nature. The various verbal and visual framings used by plant experts in interviews and public meetings purport to explain the necessity of controversial GM crops, to separate genomics from controversial GM and to project the image that plant experts are well-equipped to fight the long-standing problem of Phytophthora. Implications of plant experts' framings and avoidance of addressing the GM controversy are discussed.

5.1 Introduction

Plant technology science is a highly specialized and rapidly evolving field, upsetting previously taken-for-granted collective understandings of life processes and how humankind may manipulate nature (Hocquette, 2005; Keller, 2000). The unfinished or evolving status of many new plant technologies and techniques makes communicating new technologies to non-scientific audiences a challenge. This is especially true when these evolving technologies are met with public controversy, as is the case for genetically modified (GM) staple crops (Hagendijk, 2004; Moore, 2001; Prakash, 2001; Wynne, 2001, 2006). In this context, plant scientists may frame problem-technological solutions in different ways to, for example, account for their involvement in publicly controversial research or to explain novel technologies; how plant experts frame publicly contested Phytophthora research may help shape decisions about the continuation of research funding, what technologies are developed, and used or rejected. Therefore, it may be worthwhile to examine plant experts' framing of key concepts in talks prepared for lay audiences.

In this chapter, the focus is on framings of genomics, genetic modification and Phytophthora in plant experts' talk (Phytophthora is a major plant disease). Framing is considered to be 'an action accomplished through language use' (Dewulf et al., 2009: 164). It is a situated practice that is accomplished in talk-in-interaction between two or more people and/or achieved by deploying the rhetorical dimension of talk, that is, speakers routinely make use of sociocultural inferences imbued in talk by comparing the actual framing of events, descriptions or concepts with their alternatives (Hutchby &Wooffitt, 1998), thereby following the interactional framing paradigm in the framing literature (Dewulf et al., 2009).

Studies differ in what gets framed – issues, identities, relationships (Dewulf et al., 2009). The discursive resources that people deploy to frame issues may also vary. Plant experts may, for example, draw upon various co-existing conceptualizations of the role and function of science in society to frame key concepts, or they may deploy more generally applicable framing resources such as metaphors. Metaphors like framing enable action through language use (or through use of visuals). In this chapter, metaphors are understood to be a specific form of framing (see also Hellsten & Nerlich, 2008, on metaphorical framing).

Metaphorical framings may be seen as a strategy for dealing with a situation (Van der Geest & Whyte, 1989: 353). A common way in which metaphors enable people to deal with a

situation is by making the inchoate concrete or more specific; the new and difficult to grasp is described in terms of the familiar and the already known (Chandler, 2007; Lakoff & Johnson, 1980; Van der Geest & Whyte, 1989)[27]. Metaphors may, e.g. through concretization, make elusive or difficult to grasp concepts or experiences more accessible and therefore ready for action. Van der Geest and Whyte (1989) argue how the largely elusive experience of pain can be made more accessible by likening pain to a vice. Through metaphor, others can more easily relate to one's pain. Moreover, therapeutic action can be designed because the doctor knows now how the pain affects the patient. More generally, through concretization, metaphorical framings tend to enable action.

Framing is not always accomplished by likening one entity to another based on similarity as tends to be the case in metaphorical framing; it may also be that one entity is used to refer to another based on some other sort of connection. Lakoff and Johnson (1980: 38–39) mention part–whole, producer–product, object–user as potential other connections that may be used in framing. Lakoff and Johnson (1980: 38–39) call this metonymic framing which, like metaphorical framing, helps to concretize and structure people's actions by grounding them in everyday experiences and the natural world. Framing thus constructs the meaning of the situations it addresses (Edwards, 1997).

Study Questions

In this chapter, the focus is on what meanings and actions plant experts' framing of the key concepts genomics, GM and the plant disease Phytophthora enable and suppress in talk-in-interaction. And given that in the life sciences issues are often metaphorically framed in discourse aimed at the public: what do the purposes that the (metaphorical) framings enable tell about the science–society relationship?

Genomics and GM are supposed to help plant experts to keep Phytophthora once and for all definitively under control. The focus in this chapter is on plant experts' use of verbal metaphorical framings in Phytophthora research talk in recorded interviews and public Phytophthora meetings. Additionally, the visual metaphor that plant experts most commonly deploy in public meetings to explain the necessity of GM is analysed.

Little is published about the verbal and visual (metaphorical) framing of plant diseases that affect major staple crops, and, to my knowledge, nothing about the plant disease *Phytophthora Infestans* which has been a veritable pest since the Irish famine in the 19th century.

5.2 Framing Resources: Conceptualizations of Science and Metaphors

Speakers may draw upon various framing resources. Plant experts may, for instance, draw upon different conceptualizations of science in their talk. May and Perry (2011) distinguish between excellence and relevance in science. According to them, funding bodies increasingly require scientific research to be excellent according to academic criteria and relevant according to societal norms. May and Perry (2011) argue that this conceptualization of science is problematic in the sense that excellent science is often not considered directly relevant – e.g. research on black holes – and relevant research is often not considered excellent – e.g. action research. This is not to say that excellent relevant or relevant excellent research does not exist but that it is difficult to conduct research that optimally satisfies both scientific and societal criteria.

[27] In this chapter, the terms metaphor and metaphorical framing are used interchangeably.

In talk-in-interaction, plant experts may selectively draw upon the excellence and/or relevance discourse in science, e.g. to frame their research in such a way that choices in research may be viewed as theory driven or driven by societal problems. Depending on how research is exactly framed, plant experts may project that they do or do not take responsibility for the societal relevance of their research.

Metaphors are also a common framing resource in the life sciences. Many metaphorical framings are common expressions, e.g. 'life is a journey' and may be used habitually without conscious thought (e.g. see Hellsten & Nerlich, 2008). In this chapter, the focus is on Dutch plant experts' use of so-called innovative metaphors, that is, metaphorical framings that are not used by default but stand out either because they describe and explain (relatively) new concepts or they contrast starkly with the standard way of explaining concepts or processes. Innovative metaphorical framings may increase insight into how plant experts attempt to manage dilemmas or tensions in Phytophthora research and the science–society relationship.

Framings may be studied in different types of settings. The focus in this chapter is on talk; analysis of experts' metaphorical framings in face-to-face encounters in the bio-sciences is relatively new. Most discourse (metaphor) studies in the life sciences are on (mass) media coverage or how metaphorical framing connects different discourses (e.g. see Carver & Pikalo, 2008). Moreover, they are generally not based on real-life talk-in-interaction but on content analyses and/or interviews (e.g. see Hellsten & Nerlich, 2008).

Studies on (metaphorical) framing differ in their focus. Differences in foci have to do with differences in underlying ideas about the nature of (metaphorical) framings. As Dewulf et al. (2009: 163) in their overview article state: there are roughly two framing paradigms. The cognitive paradigm focuses on information representation and processing; in this paradigm, frames represent what people believe about the external world. The interaction paradigm, in contrast, focuses mostly on interaction processes and sees framing as perspective-based co-constructions of the meaning of the external word. In the latter case, framings 'embody seeds for subsequent future action' (Yanow in Carver & Pikalo, 2008: 227). Studies that focus on the performative function of talk explore what actions metaphors allow or enable to be accomplished in concrete practices. As already stated, in this chapter the emphasis is on what purposes (metaphorical) framings of technology in plant technology science allow or project, given that (metaphorical) framings tend to enable or project different interpretations and uses.

Framings may also vary in modality: most (metaphorical) framing studies focus on verbal utterances. Visuals are rarely the object of study in their own right, although they are often used to communicate ideas or support verbal communication in public science talks (Beers & Veldkamp, 2011; Van den Broek et al., 2010). Given their importance in science communication, visuals deserve more scientific attention. This study seeks to contribute to a greater awareness of the relevance of performative visual metaphor analysis. A visual metaphor used by plant experts to explain the necessity of GM in Phytophthora management is analysed for this purpose.

This chapter focuses on the actions that metaphorical framings of key concepts in plant technology science enable and, implicitly, suppress. The following section therefore focuses on metaphor use in the life sciences, with specific attention on technology and disease metaphors.

A Specific Type of Framing: Metaphors in the Life Sciences

In the life sciences, metaphorical framings such as the 'book of life' and the 'blue-print' became popular in the media during the years prior to, during and after the launch of the human genome project in 1990 to communicate and promote the research on human and non-human genomes (Hellsten & Nerlich, 2008; Nerlich & Hellsten, 2004, 2009) [28]. Despite their popularity, their use is not unproblematic. According to Brown (2003), life science researchers and non-scientists tend to be insufficiently aware that the language and images that they hear and use are in large part metaphorical in nature and therefore do not depict reality one-to-one.

For example, bio-scientists hypothesized the blue-print metaphor commonly used in popular science programmes to be true when they first set out to map the genome (Brown, 2003; Hellsten & Nerlich, 2008; Keller, 2000). However, life-scientists' understandings of genomes have evolved since then; nowadays, scientists are well aware that genes are not blue prints; genes do not translate into phenotypical traits one-to-one. For instance, when one has a 'disease gene', one does not necessarily develop that disease later in life. Whether one develops a disease depends on a great many factors of which genetics is only one. Thus, the imagery of science tends to represent phenomena in keeping with scientists' incomplete knowledge at a particular moment in time.

However, this is not a disqualification of metaphors as framing devices. Metaphors may be very useful to frame concepts and issues; after all, people often learn about the unknown in terms of the already known (Lakoff & Johnson, 1980). Still, metaphors may easily generate misunderstandings. Many people are not aware that popular scientific concepts are metaphorical in nature (Chandler, 2007; Dorst, 2011; Lakoff & Johnson, 1980). Analysis of metaphorical framings may help raise metaphor and framing literacy: the ability to appraise what meanings and courses of action (metaphorical) framings project and suppress.

Awareness of what interpretations specific metaphors enable may shed light on how the use of metaphors may potentially (unintentionally) affect people's actions and decisions. For instance, women with a breast cancer gene are known to have amputated their healthy breasts to avoid cancer. Amputation may actually be the best option available to these women individually. However, a choice of amputation should preferably not be based on the false premise that a breast cancer gene will *always* result in cancer later in life without mastectomy.

In science and technology studies (STS) of laboratory life, several metaphors are described that scientists tend to use in their work practices. Interesting studies on metaphors include Pulaczewska's work on aspects of metaphors in physics (Pulaczewska, 1999) and Knorr-Cetina's (1999) work on epistemic cultures. According to Pulaczewska (1999), physicists use a hunting metaphor in their science discourse. This metaphor implies a quest and a prey that is hunted on purpose.

Scientists may make different aspects of the hunting metaphor relevant (Knorr-Cetina, 1999). When scientists talk about their quest, then they usually refer to the knowledge that they desire and therefore seek. However, the knowledge sought after is not killed and destroyed; but as Knorr-Cetina (1999: 125) shows, scientists in the laboratory may seek to *hunt* and *kill background* in order to arrive at the sought after insights and knowledge. The power of the hunting metaphor as expressed in the expression *killing background* lies in the fact that people who do not have a clue as to what killing background

[28] See Drogosz (2012) on Darwin and metaphors; see Keller (2000) on evolvement of the gene and genome concept.

entails still tend to understand that the background is apparently so undesirable that it needs to be eliminated to generate useful insights.

The hunting metaphor may also generate confusion. Recipients may assume implicitly that the research described with the hunting metaphor may involve doing harm to someone or something when caught. Crucial is here that people have sufficient understanding of science *and* the metaphors-in-use to discern what aspects of the metaphor apply to science and what aspects do not. The process of finding out how the familiar relates to the new and unknown may result in faulty assumptions and, ultimately, faulty actions. Raising awareness of the metaphorical nature of talk about new technologies may help prevent actions informed by misattributions.

Disease metaphor studies focus on how people make sense of human illness and suffering with the help of metaphors. Metaphors help to resolve what the illness causes, who is to blame and what needs to be done to cure the disease (Van der Geest & Whyte, 1989). Plant diseases tend to be under-represented in metaphor studies. In what follows, I discuss studies of human disease metaphors insofar as they appear to be relevant in the context of plant technology disease management.

Arguably, the best known studies of disease metaphors are Susan Sontag's classic (2002) *Illness and its metaphors & AIDS and its metaphors.* Sontag shows that, in discourse on disease, metaphorical framings abound. One metaphor commonly found in disease discourse, including that relating to cancer and AIDS, is the militaristic or war metaphor. Diseases are said to *invade* the human body and need to be *eradicated, destroyed* or *fought*. According to Sontag, these metaphors imply that people may be held morally responsible for keeping their bodily defences up; whoever falls ill or sick may not have taken proper care of his or her body – the body's defences – he/she lacks moral character. Via this route, militaristic metaphors tend to blame patients for their state, e.g. think of smokers who fail to quit smoking although they know that smoking is bad for their health. Put differently, the war metaphor stresses counteraction: one can do something to fight the disease, one is not helpless. Sontag's war or militaristic metaphors when applied to plant diseases are likely to function somewhat differently, if only because it is easier to blame people for their behaviour than plants and crops for theirs. However, with the help of the militaristic metaphor, farmers may be accused of not properly protecting their crops against disease.

The militaristic metaphor makes it also difficult to decline to fight the enemy, whether this is an aggressive neighbouring country or a disease. For instance, if one objects to the spending of money or proposes budget cuts, one may be accused of being a traitor who does not want the best for one's country. An ill person may be accused of not trying hard enough to regain health, burdening society unnecessarily.

Finally, a special type of metaphorical framing found in the biological sciences is personification: a figure of speech in which agency and human traits are given to a plant, animal, object or concept (see Dorst, 2011; Drogosz, 2012; MacKay, 1986). Personification generally makes it easier for people to relate to what is personified.

In this section, I have shown that metaphors may enable specific meanings and may inspire particular, sometimes far-reaching, actions and decisions, e.g. for people who are seriously ill or have the 'wrong' genes. In the latter sense, metaphorical framings may greatly affect people's lives. In the following section, I introduce the context in which Dutch plant experts deploy metaphorical (framings) to describe and explain genomics and Phytophthora to laypeople and users.

5.3 Analytical Approach and Data

In this chapter, the focus is on plant experts' innovative metaphor use in real-life PowerPoint presentations about Phytophthora research to laypeople and users (public meetings recorded tended also to be visited by crop producers). I am primarily interested in how plant experts explain key concepts in Phytophthora research projects: genomics, genetic modification and the plant disease, Phytophthora. At public meetings, plant experts provided explanations to laypeople and users. During ethnographic interviews, they explained key concepts to a social scientist – me – who knew very little about genetic modification and next to nothing about Phytophthora and plant genomics before the interviews.

This chapter provides a performative analysis of plant experts' use of innovative (metaphorical) framings drawing on the inference richness of language relating to three important concepts in Phytophthora management. The analysis presented is not principally at odds with the main research approach of this thesis: discursive psychology; actually, the procedure is inspired by it, but it is somewhat different (see also chapter 1 on discursive psychology).

In keeping with discursive psychology (DP) and interactional framing (see Dewulf et al., 2009), I assume that the content of plant experts' metaphorical framings does not necessarily reflect reality one-to-one or that framings represent people's thoughts for that matter. For instance, as we shall see, plant experts tend to personify the plant disease Phytophthora – an oomycete[29] and not a humanoid – in their talk. However, this does not necessarily mean that plant experts believe that Phytophthora has human traits.

Like discursive psychology, I deploy the inference richness of language in analysis (see Potter's, (1996) chapter on semiotics). More concretely, during analysis, analysts compare alternative ways of wording a message with the rhetorical principle. For instance, people may say no to an invitation in different ways: they may say: 'we cannot come'; 'we do not accept the invitation'; 'we would like to come/accept but, unfortunately, are unable to make it'. All these different ways of in essence saying no to an invitation project slightly different interpretations. The last alternative 'we would like to come but, unfortunately, we are unable to make it' projects regret on the part of the invitees and signals that declining invitations is a delicate matter. In contrast, 'we do not accept the invitation' is a direct factual decline of the invitation which projects that saying no is not so difficult; this may indicate that the event to which the invitee is invited is not that important to the inviter and invitee or that the invitee does not need to take into account the feelings of the inviter (e.g. because they hardly know each other).

Thus, every meaningful utterance including plant experts' framing of key concepts projects something and thus is analysable with the rhetorical principle. Additionally, DP analysts may look at what discursive actions performed through talk may be achieved, intentionally or not, in talk-in-interaction. For instance, they may examine what acting like an expert, e.g. by using jargon and objective assessments, accomplishes. The latter depends on how co-participants in talk-in-interaction respond to the discursive action of acting like an

[29] Oomycetes, also known as water moulds, are a large group of terrestrial and aquatic eukaryotic organisms. Although they superficially resemble fungi in mycelial growth and mode of nutrition, molecular studies and distinct morphological characteristics place them in the kingdom *Chromalveolata* (phylum Heterokontophyta, the 'stramenopiles') with brown and golden algae and diatoms (Heffer Link et al., 2002).

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expert, e.g. co-participants may endorse the speaker's expertise by treating his or her arguments as more valid than non-expert arguments. Given that recipient uptake is largely missing – during analysed talks people can hardly ask questions directly after talks – in the data analysed in this chapter, only what is projected and enabled by metaphorical framings can be analysed, not how it is taken up by the public.

In keeping with qualitative performative analysis, the analysis provided is broader and more diverse in its scope than most discursive psychological analyses. Plant experts' framings of three different concepts are explored and various verbal and visual (metaphorical) framings, whereas a typical discursive psychological analysis entails the detailed analysis of one recurring discursive pattern or device that manages a problem or participant dilemma in a specific interaction settings.

I first looked at the range of genomics definitions that plant experts voiced in interview recordings and transcribed them verbatim. Genomics is a central concept in plant breeding for resistance against diseases such as Phytophthora. I noticed that plant experts' defined genomics in three different ways that all differed from a common definition of genomics found in the literature (Barnes & Dupré, 2008: 400). The latter intrigued me and lead me to examine what interpretations these definitions of genomics project or what discursive work they actually appear to enable and suppress. For instance, what purposes do definitions of genomics as data project in the context of partly controversial Phytophthora research?

I also looked at plant experts' use of visuals in talks at public Phytophthora meetings. I noticed that during PowerPoint presentations a visual was repeatedly used to explain the benefits of GM compared to classical plant breeding as a Phytophthora management strategy. This visual was metaphorical in nature and central to PowerPoint-assisted accounts of Phytophthora research. Given my limited knowledge of GM as a social scientist, I decided to ask plant experts involved in Phytophthora research what interpretations these visual metaphors project and suppress during a workshop in which plant experts were taught to deploy the discursive psychological perspective themselves (see chapter 6 for more on the workshops).

Thirdly, I examined how plant experts explained Phytophthora in short introductory lectures with PowerPoint presentations during Phytophthora meetings open to the public (meetings were recorded, PowerPoints gathered). I noticed that plant experts deploy personification – a metaphorical framing – to explain and account for their Phytophthora research and that this was generally received with friendly laughter from the audience (usually 30 or more people). Consequently, I decided to examine what interpretations of Phytophthora management plant experts' actual use of the personification metaphor projects and suppresses: personification may greatly affect whether genetic modification is accepted by so-called laypeople as a strategy to fight Phytophthora. Finally, I looked at benefits and disadvantages of (metaphorical) framings.

Data: Ethnographic Interviews, Public Meetings about Phytophthora Research and a Workshop

Plant experts' talk was examined in settings in which plant experts explained and accounted for Phytophthora research to non-expert audiences. Eight public meetings and 25 topic-based ethnographic interviews with plant experts (plant scientists, representatives of the plant breeding industry and civil servants working at the Ministry of Economics, Agriculture and Innovation) were recorded and analysed. The aim of the interviews was to familiarize

myself with the research of plant experts who are or have been connected to Phytophthora research projects. I wanted to know what the rationale was behind their research, what motivated them, and what they hoped and expected to accomplish with their research.

The public Phytophthora meetings were recorded to gain insight into how plant experts explain their research to laypeople and users (in turned out that full and part-time farmers tended to attend public meetings alongside other visitors). A limited number of experienced speakers tend to give Phytophthora talks – these talks vary relatively little in content, but who attends the meetings may differ. Plant experts' talks in lecture halls tend to display little talk-in-interaction.

Additionally, a workshop was organized and recorded to discover what plant experts themselves would make of their own image use aimed at explaining the necessity of controversial genetic modification to the public. In this workshop held in 2013, 11 plant experts participated. Most workshop participants also participated in the aforementioned interviews and public meetings (for more on the workshops, see chapter 6). An underlying idea of the workshop was that, if plant experts are able to appraise and appreciate the interactional consequences of their talk, then their future talks might be less plagued by tensions in the relationship between people/users on the one hand and plant experts on the other.

I was present during the recording of public meetings to make notes and to converse with visitors to these meetings during breaks; I was also the interviewer who conducted and analysed the ethnographic interviews. The meetings and interviews were audio-recorded. Public meetings varied in length but generally lasted 2–2.5 hours. Additionally, public meetings in part took place indoors in lecture halls, and partly in the open air (see also Box 1.1 in chapter 1). Interviews also varied in length but on average took one hour. As I was listening to the recordings, plant experts' flexible and innovative use of metaphors caught my attention, in particular because plant experts' (metaphorical) framings of Phytophthora and genomics/GM appeared to do important discursive work. Relevant fragments were transcribed verbatim following general accepted transcription norms in the social sciences.

5.4 The Research Context: Plant Technology Science

Plant experts engage in crop breeding: the science of crossing offspring of different crop varieties with the aim of maintaining an existing crop variety or creating a new one (the latter is called a *cultivar*) that meets the needs and wishes of crop producers and consumers (Acquaah, 2007). Plant experts claim that crop breeding techniques or technologies create profit, benefit people and are good for our planet (Haverkort et al., 2008).

Plant breeders create cultivars and improve existing crop varieties to ensure that they and crop producers (farmers) make a profit. To accomplish this goal, they work to create high yielding and disease-resistant cultivars. A boundary condition for profit is that consumers want to buy the crops that are produced (see also chapter 4). Additionally, people and society are expected to benefit from high-yielding disease-resistant crops; if farmers can sell more they will earn more, and fewer people will die of hunger[30]. Plant experts also argue that the planet may benefit from applications of genomics knowledge; genetically enhanced disease-resistant crops are expected to require less use of agrochemicals (Haverkort et al., 2008).

[30] See Haverkort et al. (2008) on societal costs of late blight; see Zerbe (2004) for a critical analysis of the GMO eradication of hunger discourse.

The economic stakes and societal value or usefulness of plant breeding is generally *not* called into question. Classical breeding tends to be a tacitly accepted practice; tacitly, because ordinary citizens generally do not know what classical breeding entails. Since 1866, when Gregory Mendel (Mendel, 1866) – the so-called father of plant breeding – published a paper about plant hybridization in peas, classical breeding techniques have been systematically applied (e.g. see Levidow et al., 2000).

In contrast, more recently developed technologies, such as genetic modification, for the definitive management of plant disease are conceived as controversial by politicians, farmers and breeders, action groups and the public at large (Jacobsen & Schouten, 2008). This is believed to be true of transgenesis in particular: genetic modification that involves the cross-breeding of different species (Holm et al., 2013).

Public controversy may have concrete and far-reaching consequences: in the Netherlands and other European countries, field sites where genetically modified crops are tested are with some regularity damaged or destroyed by action groups such as the Field Liberation Movement (e.g. see De Krom et al., 2012; Duarte, 2011). In the 1990s and early 2000s, there were several societal debates about the genetic modification of food crops (e.g. see Hagendijk, 2004; Marris, 2001; Moore, 2001; Prakash, 2001; Tijdelijke Commissie Biotechnologie en Voedsel, 2002; Wynne, 2001). Despite this, to date, blogs, sites and newspaper articles continue to pay much attention to genetically modified crops. Scholars have sought to explain the continuing public controversy surrounding some plant technologies (Gaskell & Bauer, 2001, 2006) (for explanations of public GM controversy found in the literature, see chapter 1).

The persistence of the public controversy surrounding plant technologies such as GM crops raises the question of how plant experts communicate their partly contested research to non-expert audiences: plant technologies such as GM are instrumental in fighting the plant disease Phytophthora. Therefore, an analysis of which metaphors are used, how and to what end in conditions of publicly controversial Phytophthora research may prove useful; it may help to appraise the actions that plant experts' innovative metaphor use discursively enable, and how plant experts' metaphor use may help reduce or reproduce public controversy with regard to GM.

5.5 Results I: Plant Experts' Framings of Genomics

The 25 plant experts interviewed claim that genomics is either technology or knowledge, or they draw analogies between genomics and widely accepted forms of technology such as information and communication technology. In contrast, Barnes and Dupré (2008: 400) maintain that genomics tends to be defined as both knowledge and technology at once or as technology and knowledge about doing and knowledge of technical systems (Bond, 2003).

I now discuss three examples that represent the range of innovative genomics framings deployed by interviewed plant experts and government representatives (during public meetings, plant experts talk about GM or cisgenesis and not about genomics). The fragments are transcribed verbatim. Fragments were translated by the author from Dutch to English. An interviewee P1 explains what genomics is:

Example 1

I: *Can you tell me what according to you genomics is?*

P1: Genomics is knowledge of genomes. This knowledge can be used for different purposes. One needs to separate the production of knowledge from its applications.

I: Such as genetic modification?
P1: Yes.
(…)
I: But (genomics) knowledge is produced for a purpose. Knowledge is here not produced for its own sake.
P1: Well yes, but they are still not the same. Genomics can be used for different purposes. So you need to separate genomics from its applications. That is what we say.
(Px = study participant; I = interviewer and author)

Study participant P1, like many interviewed plant experts, separates the production of knowledge from applications based on the knowledge produced. The interviewer first asks for clarification: *such as genetic modification?* P1's response indicates that he indeed means that genomics should be seen as separate from GM. This separation of knowledge production and potential practical applications of that knowledge projects the interpretation that plant experts do not want to be held responsible for what is done with the genomics knowledge they produce.

Different from plant experts, laypeople often equate genomics with genetic modification, which has a negative public image, and this is also why the interviewer objects that *knowledge is not produced for its own sake* (I know this because I conducted the interviews myself). Against the background of publicly controversial GM crops, separating knowledge from its applications signals that interviewees specifically seek to avoid the transference of negative connotations associated with GM to genomics – knowledge produced in the lab.

In contrast, other interviewees focus on the technological dimension of plant genomics. In the following example, interviewee P2 – a plant scientist – is talking about transgenesis – interspecies breeding – and cisgenesis – intra-species breeding. Transgenesis is met with public controversy. Cisgenesis is presented as less controversial (e.g. see Holm et al., 2013). For that reason, the plant scientists I followed have opted to use cisgenesis to create a Phytophthora-resistant potato crop and to stop producing transgenic crops to manage Phytophthora. However, according to P2, transgenesis and cisgenesis are not very different, at least not from a technological perspective, and to suggest otherwise is immoral because it is not an honest depiction of how things are:

Example 2
P2: You could say we are fooling the public. From a scientific perspective, the distinction between transgenesis and cisgenesis is nonsense; with cisgenesis and transgenesis you use the same techniques.

By stating that the distinction between cisgenesis and transgenesis is nonsense and by focusing on the similarities between transgenesis and cisgenesis – a purportedly less publicly controversial application of genomics than transgenesis – the public controversy with regard to transgenesis is being dismissed as irrelevant from a technological perspective; the techniques used for cisgenesis and transgenesis are presented as similar or the same. However, the knowledge required to conduct cisgenesis is different from the knowledge required to conduct transgenesis, e.g. transgenesis requires knowledge of what genes – relevant to one's purposes – may be found in what species.

According to Jacobsen and Schouten (2008) and Levidow et al. (2000), the concept of

cisgenesis was invented in response to public resistance to transgenesis. At EU level, experts are lobbying to get cisgenesis exempted from stringent EU regulations with regard to GM.

Against this background, *Example 2* may be read as a critique of scientists who engage in cisgenesis. The complaint is that these scientists have succumbed to irrational public concerns. Moreover, implicitly P2 projects the image that one's research strategy should only be informed by scientific considerations. By doing this, P2 fails to take into account the context in which the decision is made to limit oneself to creating disease-resistant crops with cisgenesis, and he does not visibly take into consideration knowledge that is a prerequisite for conducting various forms of GM (the knowledge required may not always be exactly the same).

When I asked P2 during the interview why he considers societal concerns irrational, he maintained that transgenesis does not threaten the diversity of the gene pool. From a biotechnological perspective, it is not problematic that species disappear or change as long as the diversity of the gene pool is guaranteed. From a societal perspective however, it may be argued that the disappearance and creation of species is problematic; in society, species tend to be a more relevant social category than gene pools. This may indicate that public controversy surrounding transgenesis vis-à-vis cisgenesis is largely ontological in nature (see also De Krom et al., 2012).

In a less commonly deployed metaphorical framing, a government representative (P3) likens genomics to information and communication technology:

Example 3

P3: Genomics is data. In ICT you work essentially with data.
So, it is very similar to that. And people are happy to use ICT applications...
I: Yes, but that is different for biotechnology.
P3: True enough. I just want to say, personally, I have no problem with genomics.
(P3 = interviewed government representative; I = interviewer and author)

In *Example 3*, genomics is likened to data in information communication technology (ICT) by interviewee P3. This is only done by interviewed government representatives. ICT is widely accepted; it tends to be an uncontroversial technology. Therefore, by likening plant genomics to ICT, it is suggested that plant genomics may eventually be as essential to people's everyday lives and as uncontroversial as ICT. This particular metaphorical framing seems to discourage discussion of the public controversy surrounding plant genomics: one does not have to discuss things that will become uncontroversial by themselves, in particular if it is not one's explicit responsibility to address these kinds of issues.

Discussion of Framings of Genomics

In their framings, plant experts tend not to acknowledge the dual nature of genomics as at once a technology and a body of knowledge, as propagated by Barnes and Dupré (2008: 400); acknowledging the dual nature of genomics would imply that there is no sharp distinction between genomics on the one hand, and publicly controversial applications of genomics such as GM on the other. One may conclude from this that plant experts with their framings of genomics try to avoid any hint of public or societal controversy about their research. Moreover, they have an interest in avoiding associations between controversial GM crops and genomics: publicly controversial crops are hard to sell.

The technology paradoxes of the technology philosopher Andrew Feenberg (2010) may help to deepen understanding of why the use of metaphorical framings of genomics

technology is not necessarily an effective discursive strategy. One paradox that appears to be relevant here is the paradox of the part of the whole (Feenberg, 2010: 4):

> The apparent origin of complex wholes lies in their parts but, paradoxical though it seems, in reality the parts find their origin in the whole to which they belong.

People tend to realize implicitly or explicitly that *in reality* – that is, in everyday life – the parts that constitute the whole, in this case knowledge and technology, are linked or, as Feenberg (2010: 4) puts it: 'find their origin in the whole'. This is not to say that distinguishing between genomics and GM is without merit; as an analytical distinction it may have its purposes.

Additionally, criticism of cisgenesis from colleagues in plant science as demonstrated in *Example 2* may in part also be informed by the understanding that plant experts in general and plant scientists in particular have a vested interest in distinguishing cisgenesis from transgenesis. As already stated, as Jacobsen and Schouten (2008) show, plant experts are lobbying in Brussels to get cisgenesis exempted from the stringent EU regulations that apply to transgenesis. This suggests that the choice of cisgenesis over transgenesis is partly informed by politics. In *Example 3*, genomics is equated to data and likened to ICT. The problem here is not so much that the context in which cisgenic crops are developed is ignored but that it is changed from biotechnology to ICT. Changing the context is potentially problematic because technologies tend to be developed in particular contexts for specific purposes. Transferring it to another context may generate specific problems.

To sum up, we have seen that plant experts deploy various framings to disassociate genomics from the public controversy surrounding GM. Genomics is likened either to technology or to knowledge or data in ICT, although genomics, as Barnes and Dupré (2008: 400) argue, is understood to be both at once, technology *and* knowledge. Examined framings are not without their problems: they may oversimplify complex matters such as technology and its development, and in the context of technology development they may generate problems if only because technologies are increasingly required to be usable in and by society (e.g. see Leach et al., 2005)[31]. The latter raises the question of whether plant experts are well-advised to put much effort into avoiding associations between genomics and genetic modification, and thereby avoid addressing the underlying non-scientific concerns that inform public controversy.

5.6 Results II: Visual Metaphorical Framing of Genomics/GM

During public meetings, different images are used to tell the story of Phytophthora. Plant experts tend to narrate first how this immigrant disease travelled and ultimately came to plague potato farmers in Europe and the Netherlands. Then they continue with how plant scientists and breeders with classical breeding strategies have attempted to keep Phytophthora under control. These strategies were moderately successful; with classical breeding strategies it may have taken more than 10 years to create a disease-resistant potato, but they worked reasonably well. However, plant scientists claim that over the last decades Phytophthora has become more aggressive (Kimmann et al., 2002) and nowadays breaches potato resistance in three or four years (see also Haverkort et al., 2008). After plant

[31] In the interviews, plant scientists also say that they want to help resolve societal problems with their research.

experts have painted this stark reality, they present their solution: speeding up the crop-breeding process with the help of genetic modification, that is, cisgenesis.

How GM in the cisgenic variety may be *the* solution to Phytophthora, plant scientists explain with the so-named chain picture [*Kettingplaatje* in Dutch] (Figure 5.1) at public meetings about Phytophthora or about potato research when Phytophthora research is discussed[32].

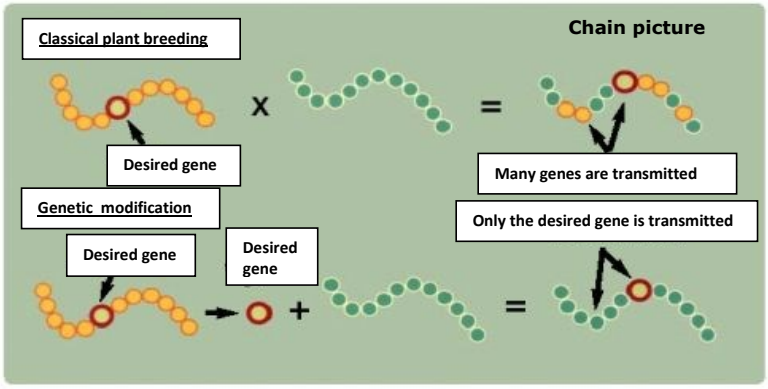

Figure 5.1 Chain picture showing the classical plant breeding and genetic modification processes

This schematic depiction explains how genetic modification saves time compared to classical crop breeding strategies. Plant scientists point out that genetic modification in the laboratory entails the selection of the desired gene in the donor potato and the subsequent transmission of the desired gene to the host potato that scientists seek to make Phytophthora resistant. In contrast, classical breeding techniques are depicted as not that precise. Classical breeding entails the selection and subsequent transmission of a great many genes – desired and undesired ones – from the donor to the host.

Audience Responses to Scientists' Chain Image-Assisted Framing of Genetic Modification

Non-scientists in the audience do not comment or ask questions about this chain picture during or after plant experts' PowerPoint presentations. However, plant experts – colleagues of the presenters – who attend public meetings alongside non-scientists tend to be critical of the depiction of genetic modification. They do not challenge presenters directly, but their critiques can be heard as background mutterings during meetings if one sits close to them (as I did in some cases). Critics find the picture too neat, 'it misleads more than it explains' and 'the chain image suggests that genetic modification is fool proof'.

Critics argue that, although it is true that the transmission of genes is more precise in genetic modification than in classical breeding, it is still difficult to insert the desired gene at the exact spot on the host genome where it is believed to be most effective. The spot where the genetic material ends up is important: location may affect the expression of genes in the cultivar's phenotype. In response to this critique, presenters mention in later meetings that the chain picture is an idealization of genetic modification, in that, in actual practice, it is still difficult to insert the desired gene at exactly the right spot on the genome of the host.

[32] Originally, the chain picture was in Dutch, so I covered the Dutch text with English text boxes. The chain picture was developed by Timon van den Heuvel: a former PhD candidate at Wageningen University who graduated in 2008 and who gave his permission to use the picture.

Plant Experts' Appraisals of the Chain Image during a Workshop
What interpretations does the chain image enable and what interpretations does it suppress? To shed more light on this, the chain image was presented to 11 plant experts during a workshop (see also chapter 6). The following statements show how workshop participants (Px) appraised the framing effects of the chain image:

P5: I see beads… That says next to nothing [about genetic modification], it is like fiddling.

P9: Beads on a chain that is something little girls may fiddle with.

P6: This image is value free but not very powerful. You would like to see a diseased potato next to it. Or add an image of healthy wild potato plants.
You could actually do both.

P7: The actual problem is not in the picture here. In that sense it accomplishes very little.
(P5, P6, P7 and P9 are plant experts who participated in meetings and a workshop).

From the workshop participants' responses, one may conclude that the chain image does explain cisgenesis in an abstract manner but does not convey what the technology of cisgenesis may contribute to Phytophthora management. Participants did not think the image very useful in its own right, but in combination with other images they thought the image potentially very powerful. Interestingly, the responses of P5, P6, P7 and P9 suggest that a so-called neutral, impartial and abstract image may not be very powerful when it comes to communicating the relevance and urgency of resolving problems as efficiently as possible, as the chain picture is designed to do.

5.7 Results III: Personification or Metaphorical Framing of Phytophthora

In ethnographic interviews and during public Phytophthora meetings, plant experts who are also experienced speakers personify Phytophthora – they attribute agency and human characteristics to Phytophthora. In *Example 4*, derived from an ethnographic interview with senior plant scientist P4, P4 points out that Phytophthora was long regarded as a fungus or mould but is nowadays considered to be an oomycete. He proceeds to explain with the help of personification how Phytophthora infects a potato plant.

Example 4

P4: Well the idea that Phytophthora will disappear, that is not going to happen
it is an extraordinarily smart fungus or oomycete if you heard [name of another plant expert].
You are not allowed to say mould, so, it is an oomycete

I: [smiles] that acts like a fungus

P4: that acts like a fungus
enneh he is exceptionally clever,
has an enormous amount of genes to, you know,
to cause infections. Different genes…

I: Yes

P4: that is *very* smart to, at some point, through mutation or recombination with other...
to create a different, another pallet of genes to outwit resistance. Just like that.
Enneh he [Phytophthora] has so many of them [other genes]

if you let him [Phytophthora] be then all resistance genes would be – fast I will not say –
but resistance would be breached [by Phytophthora]

In this example, P4 communicates that Phytophthora is an extremely sharp-witted opponent who cannot totally and utterly be eradicated. However, he also suggests that with much effort and vigilance Phytophthora may be kept under control. The personification or humanization of Phytophthora by attributing human traits such as cleverness to the oomycete seems here to underline the unpredictable, difficult nature of Phytophthora. Like humans, Phytophthora can quickly adapt himself to new situations (apparently oomycetes are of the male gender as the *he* of P4 suggests). The latter appears to serve the purpose of persuading others that Phytophthora needs to be monitored constantly. If plant experts do not stay alert, then Phytophthora may run unchecked, destroying food crops in its wake. The personification metaphor also serves to justify why considerable resources have been spent and need to be spent on Phytophthora research.

Not only during ethnographic interviews but also during recorded public meetings, Phytophthora is personified as *Example 5* demonstrates (this fragment is also used during workshops analysed in chapter 6). The extent to which speakers attribute human traits to Phytophthora varies; it is not done by all speakers who present their work at a meeting – many speakers limit themselves to agentification in keeping with handbook texts on crop breeding (e.g. see Acquaah, 2007; Drogosz, 2012) – but some recurring experienced speakers at public meetings may personify Phytophthora.

Example 5

Prof 2: And ehm if if ehehm a Phytophthora thinks
yes this doesn't work this is a potato then he may mutate,
so produce a somewhat different Phytophthora protein
that this potato does not recognize and then…
he [Phytophthora] fools the potato and eh then he dies.

Here, Phytophthora is presented as a fickle, devious enemy who can reflect on his or her own actions and those of others and adapt his or her strategy accordingly. The implication is that there is no shame or embarrassment in being tricked over and over again by a smart, worthy enemy such as Phytophthora. Reflexively it is suggested that, in order to combat Phytophthora, a strong capable opponent is required, in this case, plant experts.

Example 6 shows how personification is or, better yet, is not taken up by a non-scientist or layperson (L1) in the audience (L1 asks his question after all experts have delivered their talks):

Example 6

L1: How does Phytophthora spread itself?
Prof1: I did show that eh a leaf like that looks murky and fungal flakes land…
(L1 = layperson in audience, Prof1= professor)

L1's response indicates that the story of how Phytophthora thinks and acts does not provide laypeople with enough insight into how Phytophthora may rapidly spread and destroy potatoes on a large scale. Moreover, in his answer to L1's query, Prof1 uses agentification of Phytophthora – ascribing agency without humanization (Drogosz, 2012). Unlike

personification of Phytophthora, agentification does not invite any questions (but that may be in part because visitors have little opportunity to ask questions after talks).

To sum up, personification of Phytophthora turns a plant disease into a worthy opponent that plant experts may fight successfully. By talking about Phytophthora in this way, they show not only that Phytophthora is very clever and versatile, but also that they know how Phytophthora thinks and acts. The latter reflexively implies that plant experts know Phytophthora sufficiently well to come up with a viable strategy to fight the disease. However, *Example 6* indicates that personification of Phytophthora perhaps does not sufficiently answer all farmers' or laypeople's questions.

5.8 Concluding Remarks

Central to this chapter was the following question: what interpretations do plant experts' framings of genomics, genetic modification and Phytophthora project in plant experts' talk on Phytophthora research? And what are the implications with regard to the science–society relationship?

The various framings of genomics suggest that genomics is either knowledge or technology, but not both at once as Barnes and Dupré (2008: 400) maintain. The purpose of individual genomics framings appear to be: avoiding association with controversial genetic modification by invoking older conceptualizations of science as largely separate from society; but discursively avoiding association with the publicly controversial GM does not change the fact that the reality of technology development is complex (e.g. see Gremmen, 2007). Nowadays, technologies or knowledge are not developed for their own sake but are meant to contribute to high-stake societal issues such as eradication of hunger (e.g. see Zerbe, 2004). Avoidance of engagement with public controversy may also be understood as a denial of laypeople's concerns – something that is unlikely to further lay–expert dialogue.

Plant experts' depiction of GM in the chain picture looks neutral and harmless: *beads on a chain that is something little girls may fiddle with*. Again one may ask whether this depiction serves Phytophthora research in the long run. And what about depicting a contested technology – GM – as something abstract and harmless? Would that under conditions of controversy persuade people that GM is truly harmless and able to contain something as versatile and fickle as Phytophthora?

This chapter has shown that the personification of Phytophthora plays an important role in managing tensions that plant experts experience in their quest for a durable solution to the age-old problem of Phytophthora. Plant scientists only succeeded in keeping Phytophthora under control for several years before Phytophthora breached crops' disease resistance yet again. This implies that Phytophthora requires a worthy and versatile opponent, in a conflict that may only be mastered – as the framing with the personification metaphor suggests – by smart plant experts who have developed a controversial but potentially effective technology: genetic modification (cisgenesis). With that, the designated purpose that personification of Phytophthora serves appears to be clear. Furthermore, personification is a common strategy used in biological education for children (Byrne et al. 2009; MacKay, 1986), suggesting that personification may be taken up as a form of amusement or belittlement.

If we look at plant experts' overall framing of concepts as discussed in this chapter, then we see that public controversy surrounding plant technologies such as GM crops is avoided, not addressed. This is not a constructive stance that invites dialogue. Moreover,

one may ask whether avoidance does anything to improve the plant science–society relationship. Laypeople may not question GM's efficacy, but they may question whether GM is compatible with their health and values, that is, it may be more relevant to them how GM may affect their own lives (see also Burchell, 2007). Framings of genomics, furthermore, indicate that plant experts do not claim responsibility for the societal relevance of their science (in interviews they claim that they practice societally relevant science; see also chapter 3).

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6 Turning Plant Experts into Self-Reflexive Speakers
An Exploratory Study of the Discursive Action Method at Work

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Plant experts tend to focus on the scientific relevance of content in public science talks, thereby running the risk of alienating their publics in the process. This chapter explores whether and in what ways plant experts can be empowered to appraise the interactional consequences of their own talk about others. In two discursive action method (DAM) workshops, 17 plant experts analysed the interactional effects that their own talk projected.

Participants confirmed a number of the interactional effects that were distinguished by the authors in earlier studies, e.g. they indicated that displays of tolerance of lay views projected the image that plant scientists have sufficient access to lay concerns to assess the relevance of lay views for science. Participants' appraisals generated new insights with regard to the double duty or ambiguity of utterances, e.g. user-references help to uphold scientific norms but do not enable the user-friendliness of technologies.

6.1 Introduction

In science and technology studies (STS), bio-scientists focus on the scientific relevance and correctness of talk-in-interaction, and the dismissal of lay concerns as irrational is considered problematic (Bubela et al., 2009; Burchell, 2007; Wynne, 2001, 2006). For instance, Wynne (2005) criticizes life scientists' focus on 'the facts'; he points out that publics are well aware that complex societal issues cannot be reduced to mere technical-scientific facts. In keeping with this, Cook (2004) and Cook et al. (2004) found that plant scientists may explicitly label lay concerns irrational or unscientific in opposition to rational science.

Another concern of scientists has to do with how research can be best explained to the public. Burchell (2007) and Myers (2003) demonstrate that (plant) scientists are concerned about how media allegedly explain to laypeople publicly controversial research such as genetic modification (GM). They show that plant experts often believe that journalists 'dumb down', oversimplify or misrepresent scientific facts (see also Bubela et al., 2009). Moreover, scientists in Davies' study (2008: 422) believe that they need to be careful about how they communicate their research to laypeople, whom they conceptualize as persons lacking in the ability to handle science correctly. Davies (2008) also found that scientists prefer one-way communication over dialogue.

Regardless of whether life scientists' treatment of lay concerns and public communication is justified, how experts talk *about* non-scientists – laypeople and users – may affect how experts explain their research to publics and what they do with non-scientific concerns in science and technology development (see also Davies, 2008).

Moreover, given how life scientists talk *about* laypeople and their concerns and to a lesser extent tend to talk *with* them at public meetings, it may be fruitful to investigate whether (scientific) experts can be made aware of what they project and accomplish interactionally with how they discursively treat non-scientists' concerns in their talk *about* them and what they project while presenting their research *in front of* them. Turning plant experts into self-reflective communicators may potentially change how experts talk *about* and *with* non-scientific Others.

The exploratory study reported upon in this chapter focuses on plant experts who use genomics knowledge and GM to help manage the problem of Phytophthora – a major plant disease – in staple crops. We investigate whether and in what ways we can turn plant experts involved in partly publicly controversial Phytophthora research into more self-reflexive communicators who can appraise the interactional effects of their own talk about their 'significant' Others in different interaction settings: laypeople, users and personified Phytophthora. Phytophthora is included because plant experts tend to discursively treat Phytophthora as a veritable humanoid Other, that is, an opponent with human characteristics. We do this by letting plant experts examine their own talk from an interactional perspective. Are plant experts, for example, able to distinguish that a focus on 'the facts' in talk may signal a monopolization of expertise and/or a disregard of lay and user concerns? As far as we know, this has not been done before in the green life sciences.

To realize our aim, we organized two workshops in which in total 17 plant experts participated. In the workshops, these experts appraised the interactional effects of their own talk-in-interaction in fragments that represent different discursive patterns that we found them to deploy in their talk *about* laypeople, users and the plant disease Phytophthora. Discursive analysis of plant experts talk prior to the workshops yielded various insights about how (scientific) plant experts discursively manage the science–society and the science–user relationship in talk-in-interaction, including how plant experts attempt to manage public controversy surrounding GM crops (see also Mogendorff et al., 2012, 2014). If plant experts can appraise the interactional effects of their own talk about Others, they may reconsider how and to what effect they communicate with users and laypeople about Phytophthora research, and this may increase insight into how (plant) experts' science communication may be influenced.

6.2 Published Interactional Analyses of (Plant) Experts' Talk

It is rarely investigated how plant experts try to ensure that the focus during deliberations stays on, or shifts towards, 'correct' arguments (i.e. correct from a scientific perspective). Ottinger's (2013) research on refinery expertise suggests that one way experts try to ensure that only objective or 'valid' concerns are put on the agenda is by dismissing individual non-experts' experiences with technology as personally motivated and therefore irrelevant to science and policy (e.g. see Ottinger, 2013; Mogendorff et al., 2014). In contrast, Ottinger (2013) found that the individual everyday experiences of experts are more likely to be treated as valid input (see also Padmos et al., 2006). This indicates that the societal status of speakers may indirectly be made relevant in conducting interactional business.

Mogendorff et al. (2014) offer other insights; they found that plant experts treat users' emotions rather than users' knowledge as relevant to technology development. Emotions and knowledge are generally not considered of equal value in technology development; thus, by focusing on user emotions, plant experts indirectly present user concerns as of less value than scientific concerns, and they portray themselves reflexively as reasonable and rational (see Locke & Edwards, 2003; Mogendorff et al., 2014). Framing user concerns as emotional dispositions rather than knowledge makes it difficult to incorporate user concerns in technology development; emotions and knowledge are difficult to weigh against each other (Mogendorff et al., 2014).

However, this does not mean that nothing has changed in how experts handle lay concerns in their talk. Mogendorff et al. (2012: 743–746) found that experts are responsive

to the critique that they disregard lay concerns. They largely avoid these kinds of instigations by invoking displays of tolerance of lay views, e.g. *I understand that*…. With these displays of tolerance, they project the image that they are entitled to assess the relevance of lay views for plant technology development. They do this by demonstrating that they have knowledge of lay and scientific concerns (Mogendorff et al., 2012). However, these displays of tolerance do not guarantee that lay views are in fact considered in technology development.

On the contrary, Mogendorff et al. (2012: 734 and 739) show that displays of tolerance and claims of lay membership, such as *that I have too as a consumer*, may help plant scientists to claim lay views as legitimate in everyday life but not in science. This interpretation is strengthened by statements about the value of science that follow displays of tolerance of lay views, which tend to implicitly downgrade lay views. However, plant scientists do not totally banish people's concerns to the private sphere; some of them acknowledge that non-scientists came up with good arguments in the past (Mogendorff et al., 2012: 743; see also chapter 3). By displaying their tolerance, caring and knowledge of lay views before subjugating lay concerns, plant experts establish that they are the best equipped to assess when and where lay views may be relevant to science.

Communication Training Literature

The literature on communication education mentions various tools or methods to improve professionals' interaction skills. Interventions vary from general, decontextualized communication guidelines to video-reflexive methods to stimulate recall and reflection on what went on and wrong in face-to-face encounters (Iedema et al., 2009; Veldhuijzen et al., 2013). These tools differ in their efficacy.

DeNeve and Heppner (1997) show that role-play and simulation techniques yield better results than lectures in terms of communicative performance. However, recently Stokoe (2013) criticized the use of traditional simulations or role-play; skills learned in role-play – generally based on hypothetical scenarios or past encounters – are found to be of limited use in real-life communicative encounters (see also Alexander & Le Baron, 2009).

To overcome these weaknesses, Stokoe (2013) developed the conversation analytical role-play method (CARM). This method draws upon real-time encounters and conversation analytical insights to enable participants in training to apply directly what they have learned in their everyday professional practices.

Another relatively new method is the discursive action method (DAM). This method differs from other training methods in that it does not try to improve participants' interactive skills directly, e.g. by letting participants practice their interaction skills or pointing out what has gone on in their past interactions. DAM focuses on stimulating participants to develop their analytical capabilities to appraise the interactional consequences of their own talk, e.g. participants learn to discern how the use of different discursive devices such as quotes or factual statements may affect the speaker's designated epistemic status. After workshop participants (WPs) have become aware of the interactional effects projected by their talk, they have the tools to appraise all their future talk and make choices therein (see also Lamerichs et al., 2009). Given that we want to achieve the latter with plant experts, we chose to deploy DAM.

6.3 The Discursive Action Method

Sneijder et al. (2007) first described the DAM for health practitioners; Lamerichs et al. (2009) first published about DAM in an academic journal, where they explain DAM's purpose and procedure. Haen et al. (2014, forthcoming) use DAM and scenarios to foster mutual responsiveness in food innovation.

DAM entails teaching workshop participants to analyse their own talk using discursive psychology (DP) – a discourse analytical approach. Like DP, DAM makes use of the fact that the interactional effects that talk-in-interaction unintentionally generates partly depend on the 'it could have been otherwise' quality of descriptions (e.g. see Edwards, 1997; Potter, 1996). For instance, speakers may strive to be treated as an expert in different ways, e.g. they may state that they are an expert or they may talk like an expert, e.g. by using jargon. Speakers tend to produce versions of reality to resist potential versions of what is being said. This is known in DP as the rhetorical principle. Inspecting stretches of discourse for these alternative versions helps the analyst to make sense of actions performed. Additionally, the uptake of pre-designed messages by co-participants tells the DP analyst what the interactional effect of talk is, e.g. whether a speaker's utterance is treated as disrespectful or accepted at face value (see also Veen et al., 2011).

Typical of the fragments deployed to turn WPs into self-reflective communicators is that they display little dialogue between plant experts and other speakers. Therefore, the principle of recipient uptake can only be sparingly applied in the workshops; the focus lies on applications of the rhetorical principle.

The aims of DAM differ from those of DP. Discursive psychology seeks to analyse what (un)intended purposes talk-in-interaction accomplishes in real-life real-time practices to gain a better understanding of complex societal problems, whereas DAM deploys discursive psychology to empower participants to appraise the interactional consequences of their own talk for their own future benefit.

Participants in DAM workshops need to go through various steps to achieve an interactional perspective on talk (adapted from Lamerichs et al., 2009: 1166–1170). The first steps entail adopting a non-cognitive view by focusing on the management of interactional dilemmas or problems. People tend to routinely link what people say to what they think. According to DAM, people's words do not need to correspond with reality, or with people's thoughts or beliefs.

In DAM workshops, participants are invited to shift their focus from the correctness and relevance of the content of utterances to the functions that different versions of the same utterance may serve in managing interactional dilemmas. For instance, different parties' concerns may be presented in opposition to one another by deploying 'they' (users) and 'we' (experts) constructions (e.g. see Mogendorff et al., 2014). This framing of concerns in dual terms tends to pave the way to treat concerns of the Other party differently than one's own concerns.

After workshop participants have shifted their focus, they are ready to explore the discursive functions of their talk. This entails determining how an interactional problem is handled discursively and what the intended and unintended interactional effects of the discursive strategies deployed may be. Lastly, WPs jointly discuss the significance of identified functions and effects for their communication practices.

Aims and Setup of DAM Workshops

Two DAM workshops with 17 plant experts were conducted, recorded and analysed to explore whether plant experts are capable of identifying and reflecting upon how talk – intentionally or not – manages central interactional dilemmas in plant technology science. The participating experts were involved with research projects focusing on Phytophthora management in staple crops in the Netherlands and tended to be linked to previously analysed meetings or interviews focusing on the analysis of plant expert talk (Mogendorff et al., 2012, 2014).

WPs' involvement with Phytophthora research varied. They did one or more of the following: conducted, supervised or managed Phytophthora research; communicated findings to users and the public; and/or designed and facilitated communication activities relating to crop breeding. All participants had knowledge of Phytophthora and crop breeding in general; two of them were also communication professionals with a background in the life sciences. Workshop participants were interested in optimizing their communication in face-to-face encounters.

A workshop entailed an introduction to DAM, discussion of fragments in small groups and a plenary discussion in which implications of the small groups' findings were discussed. Given that fragments were discussed in five small groups for approximately one hour, the workshops yielded eight hours of recorded talk-in-interaction (an individual workshop lasted 2.5 hours). During small-group discussions, the workshop leader (first author) and her assistants (second and third author) circulated to observe how participants were doing and to answer questions.

After the group discussions, findings and their implications for communication practices were discussed in a plenary session. The first author translated the fragments and quotes cited in this paper from Dutch to English. The quotes represent how participants made sense of the fragments with the help of DAM.

Fragments Deployed during DAM Workshops and Instructions to Participants

In the workshops, the focus was on what designated purposes plant experts' talk about relevant Others served, irrespective of plant experts' intentions or thoughts about these Others. The Others were in this context human or non-human actors whom plant experts discursively treated as human(oid) agents central to the interactive management of a problem: laypeople, users and the plant disease Phytophthora. Phytophthora is considered an Other because plant experts tend to treat Phytophthora in public talks as an agent that, like people, can think and deceive. Moreover, personification of plants and animals in biology education is not uncommon (Dorst, 2011; Drogosz, 2012). WPs were given one fragment on plant experts' typical talk about users, one fragment on how plant experts typically talk about laypeople and two small fragments on how they talk about Phytophthora in front of laypeople and users.

To apply DAM, several auxiliary questions accompanied every single fragment provided to small groups of workshop participants such as 'What is the speaker's dilemma here?' If WPs know what the speakers' problems are, they can more easily identify and appraise the interaction effects. Another auxiliary question was: 'Of what could the speaker be accused here?' We also asked the participants to consider possible alternative formulations to what was being said in the provided fragments. In doing so, the workshop participants worked with the aforementioned rhetorical principle, which proposes that descriptions are typically organized to argue against a possible contrasting version (see also

Lamerichs et al., 2009).

Non-verbal aspects of talk-in-interaction were transcribed with Jeffersonian transcription notation (Jefferson, 2004). WPs were given a copy of the appendix of transcript symbols when they split up into small groups to appraise the interactional effects of the fragments (see appendix at the end of this chapter).

DAM Criteria

The first step is to help WPs to adopt an interactional perspective on talk and serves to ensure that they feel secure enough to critically assess their own talk-in-interaction. Only then can participants freely discuss the intended, unintended and potentially negative purposes achieved or projected by utterances in the fragments. In addition to a sense of security, familiarity is an important criterion.

Does the discursive pattern look familiar, is it representative? Familiarity is important to establish the relevance of the interaction pattern analysed for workshop participants and says something about the representativeness of fragments. Utterances such as 'I could have said that' or 'that is typical of how plant experts talk to the public' imply familiarity with the discursive pattern.

DAM participants should also be able to identify the main functions that talk-in-interaction serves and to reflect upon the interaction effects this generates, e.g. how plant experts draw boundaries between science and society and how this affects the science–society relationship discursively.

6.4 Results: Turning Plant Experts into Analysts of Their Own Talk

During workshops, plant experts examined excerpts of their own talk about non-scientific Others: one fragment focused on plant experts' references to users, one focused on plant scientists' depictions of laypeople and one fragment showed how plant scientists humanize Phytophthora in front, and for the benefit, of laypeople and users. The anonymized fragments represented a recurring discursive pattern analysed prior to the workshops (for these analyses, see chapter 5 and Mogendorff et al., 2012, 2014). The discursive pattern is central to handling a participant dilemma.

The discursive patterns and the dilemmas they handle looked familiar to WPs, as utterances such as 'I could have said that' and 'that is indeed a problem' indicate. During workshops, participants made jokes and were critical of their own and others' talk; they appeared to feel secure enough to appraise their own or others' talk-in-interaction.

Workshop appraisals of interactional effects are presented per fragment: the fragment that workshop participants were asked to appraise is introduced, followed by the WPs' appraisals and findings in plenary discussions. Workshops participants' statements were transcribed verbatim in keeping with social scientific transcription conventions. The fragments that workshops participants appraised were transcribed in keeping with Jeffersonian conventions, as is the standard in discursive psychology (Jefferson, 2004).

Fragment 1: Use of Reported Dialogue

Mogendorff et al. (2014) analysed plant experts' references to users in expert board meetings that aim to increase the user-friendliness of plant technologies. The talk analysed covers eight meetings in two years (20 hours of talk). Mogendorff et al. (2014) show that user-references mainly serve to shelve user concerns by contrasting the emotional

dispositions of users with the knowledge of plant experts. Workshop participants examined a fragment that demonstrates how plant experts in expert board meetings typically deal with user concerns.

Fragment 1

1 Researcher: Another point that keeps coming back
2 is eh the accumulation of agrochemicals eh
3 because last year was of course a dry spring=
4 Policymaker: =yeah
5 Researcher: eh or yes dry first part of the season
6 that the syste:ms advised longer spraying intervals
7 (0.3)
8 two (.) three weeks
9 Researcher: .hhh and that many people still also consider scary (.) eh
10 eh they say (q) ↑ yes but then I do not keep spraying
11 and then I keep- the protection level goes down (q)
12 (q) and I need to keep spraying those agrochemicals
13 because the level of protection builds up (.) eh
14 and when the weather changes then I have
15 at least a reasonably protected crop eh (q)
16 whereas we always say eh .hhh (q) yes (.)
17 you need to spray at the right moment
18 and then your crop is protected just fine
19 what you did before that↑ does not matter (.) (q)
(Mogendorff et al., 2014: *Fragment 5*)

Decision support systems are designed to advise farmers and breeders on what agrochemicals to spray when in order to prevent their crops being affected by Phytophthora. When farmers spray agrochemicals partly depends on the weather, partly on the lifecycle of potatoes and Phytophthora and partly on farmstead characteristics. *People* in this fragment are users of the decision support systems.

In this fragment, users' emotions rather than their knowledge are made relevant by a researcher (Line 9). And after that, in Lines 10–19, the researcher enacts a dialogue between *we* – scientists – and users of the technology – *they*. This dialogue allows researchers to demonstrate that their claims are based on actual dialogue with users. The contrast made between the researchers' perspective and the users' perspective serves to show that user concerns are hard to reconcile with scientific concerns. The latter is reinforced by the fact that feelings are less valued than knowledge in technology development. Overall, the enacted dialogue in *Fragment 1* enables plant experts to shelve user concerns (see also Mogendorff et al., 2014).

Workshop participants' appraisal of Fragment 1

All workshop participants (Px) note that a contrast is made between scientists and laypeople:

> P5: Scientists are presented as rational, self-assured. Users are presented as conservative and hesitant.

Workshop participants do not really consider the dialogue in the fragment to be a dialogue:

P7: It is not a dialogue, it is a quoted dialogue.

Also, study participants think that the dialogue is *well-structured*, *attractive*, *life-like* and *ensures that the speaker keeps the attention of his audience*. Moreover, they agree that the contrast made in the dialogue between experts and users produces distance between experts and users:

P2: Directive as in: you need to do it...

P4: A quote that is not your own words. You are not responsible for its content. The quote could have been more neutral. Now as it is, [the quote] plays more on the person.

Workshop participants also express their thoughts on what the function is of the reported dialogue (RD) in *Fragment 1*:

P2: With it [the quote] you come closer to people, you make things more concrete. And with it [the quote] you say: 'if we work together, I understand what the sensitive issues are'. And that the problem is not with the DST [decision support technology discussed in *Fragment 1*].

P8: The researcher shows with the dialogue that he has had contact with farmers; that he has stood in the clay with his feet. He derives authority from that. And [he shows] that he knows best.

What if the researcher had not 'quoted' a dialogue? Participants agree that the reported dialogue demonstrates that plant scientists have knowledge of user concerns:

P9: If there was not a dialogue [in the fragment] between scientists and users, he [the scientist] may have been accused of being pig-headed.

P5: Then the expert [in the fragment] may be accused of lack of knowledge of the user perspective on things.

P12: Without the quoted dialogue, he [the scientist] would appear to be nagging, obstinate.

Furthermore, workshop participants provided alternatives to talking about user concerns in dual terms and could voice disadvantages of the use of RD:

P8: It would be better NOT to talk about science versus farmers. In the actual DSTs [decision support technology], differences between farmers and scientists are respected. You could also do that [respect differences] in dialogue. There is no talk about differences between farmers and differences between potatoes, although they are respected in the DST.

P11: Now [with the dialogue], he [the scientist] does not explain why it does not matter whether it [agrochemicals] built up. He could have done that instead, stick to the facts.

And according to workshop participants, the researcher in the fragment shows himself not to be very empathetic:

> P2: The researcher could have said: 'farmers need to make choices as well. So, I can understand it'. That would have been more empathic [than what he actually says].

To sum up, workshop participants recognized what discursive actions plant experts performed with RD and were critical of its use. WPs indicated that RD helps plant scientists to project the image that they have sufficient access to user concerns, so as to generate the interactional effect that they are best equipped to determine what should be done in technology development without appearing to be pig-headed. However, the talk about users in oppositional 'we' (scientists) and 'they' (users) terms was seen as not conducive of a discursive exploration of the merit of actual user concerns. As a negative interactional effect, WPs mentioned that RD appeared to disrespect important differences between various users and diverted attention away from potential problems with the DST.

Fragment 2: The Discursive Construction of the Science–Society Relationship
We found in an earlier study (Mogendorff et al. 2012) and in the literature (e.g. see Leach et al., 2005) that plant experts struggle with the dilemma of how best to account for public concerns with regard to plant technology development – e.g. think of publicly controversial GMOs – without implicitly renouncing their scientific independence.

Fragment 2, analysed with DP in Mogendorff et al. (2012: 737–739), demonstrates in an exemplary way how plant scientists discursively manage the science–society relationship in the face of publicly controversial GM crops.

Fragment 2

1 Scientist:	EVERYONE MAY THINK WHATEVER THEY LIKE isn't it? (.)
2 Interviewer:	mmh=
3 Scientist:	=and make their own choices=
4 Interviewer:	=yes (.)
5 Scientist:	thus that I mean as well
6	there is a piece of irrationality in that whereof you think=
7	=that is almost impossible to direct I think
8	(0.7)
9	or maybe you can but often it is directed by
10	(0.3)
11	things suddenly become scarce or something like that (.)
12	or eh popular or modern instantly (.)
13	that are trends people follow
14	and they are usually not scientific.
15 Scientist:	thus people have the perception (.) of (.) that is true (.)
16	I have that too (.) as a consumer (.)
17 Interviewer:	yes=
18 Scientist:	=but if you look at it scientifically (.)
19	that is often not true
20	((13 lines omitted))
21 Scientist:	we as researchers (.) I want to say
22	(0.6)
23	may also be (.) irrational in private life (.)
24	but as a scientist (.) I think (.)

25 You should stick to scientific criteria
(See also Mogendorff et al., 2012: 737–739)

Mogendorff et al. (2012) found in *Fragment 2* that the scientist displays his tolerance of lay views (Lines 1–3) and shows that he has access to lay views and purports to know how lay views are produced, namely, in an unscientific manner (Lines 6–14). Moreover, the scientist acknowledges that scientists may also be irrational in private life (Line 16 and Lines 21–23).

However, in lines 18-25, the scientist proceeds to contrast lay concerns (Lines 1–16) with scientific facts. The import of this is that scientists cannot simply incorporate non-scientific concerns that are produced in the private sphere in technology development that is ruled by scientific standards. Scientists are also presented as having knowledge of both lay and scientific concerns and therefore as best equipped to decide when and where non-scientific concerns may be included in technology development.

Workshop participants' appraisal of Fragment 2

WPs almost all considered the utterance *everyone may think whatever they like isn't it?* to be potentially disrespectful of the views of laypeople because of the *isn't it* at the end of the utterance. Workshop participants (Px) agreed unanimously that the scientist in the fragment clearly indicates that people are ill-advised to *think whatever they like*; that is, if they want their concerns to be taken seriously in science and technology development:

P3: More like, everyone may think whatever they like as long as it is scientific. Then it is good.

P5: He says this [everyone may think whatever they like] but he actually means the opposite[33].

All participants agreed that the expression *Everyone may think whatever they like isn't it?* projects the subsequent discussion of the downside of this 'live and let live' stance: *You feel there is a but coming….*

In *Fragment 2*, the scientist presents himself as a researcher and a consumer. WPs saw that presenting oneself as both a consumer and scientist may not be a good thing for non-scientists, in that non-scientists may end up not talked to and not listened to:

P4: It [the scientist claiming membership in the lay category] shows that scientists can see things, in a different, broader perspective.

P2: He [the scientist] knows it all. That is a stereotype of course; he doesn't really know it all.

P3: It [claiming membership in the lay category] means that he doesn't really need the input of consumers.

[33] *Fragment 2* is the first fragment that workshop participants analysed. As some of the quotes indicate, workshop participants occasionally used cognitive language. Given the duration of the workshop, we did not expect them to master all aspects of DP perfectly.

Moreover, a participant said that claiming membership in the lay category may weaken the scientific standing of the scientist. An admission of irrationality in everyday life may suggest that one has the ability to act irrationally as a researcher also:

> P4: It [claiming membership in the lay category] may harm his scientific reputation. It means that he may be irrational sometimes as a researcher.

Furthermore, WPs considered the contrast made between the lay and the scientific perspective in *Fragment 2* functional for the scientist:

> P7: It [the contrast] is clearly functional in that it projects an image of the scientist as reasonable and knowledgeable about scientific and lay issues. Lay issues are also portrayed as less. So, he establishes the superiority of scientists about how things should be done.

> P4: I would, as a researcher, not talk in that way about society, I would keep to myself. I think that the researcher creates space for differences between science and society.

According to the WPs, the overall effect of the interactive pattern in *Fragment 2* appears to be that scientists ascertain that, in the end, they know best; they alone have access to both scientific and lay knowledge. This interpretation is reinforced by the fact that the scientific perspective is also presented as superior to the lay perspective:

> P8: Scientists follow rules; lay people do just what they like.

To sum up, in keeping with the authors' analysis (Mogendorff et al., 2012), WPs discern that displays of tolerance and contrastive statements about science do not so much project empathy and tolerance as help plant scientists to interactively effectuate the image that they are ultimately best equipped to judge when and where lay concerns should be taken into account in technology development; and that in that sense it helps plant scientists to discursively uphold their scientific independence, or rather, superiority.

Fragments 3a and 3b: Personification of Phytophthora

Plant experts have been trying to defeat Phytophthora for decades. So far, they have managed to produce crops that temporarily withstand Phytophthora. This raises the question of whether plant scientists may eventually control Phytophthora definitively. If the answer is no, funding bodies may conclude that financing Phytophthora research is a waste of money.

Thus, plant scientists may have an interest in presenting Phytophthora, and the technologies with which to fight it, in a way that logically explains why science may *now* succeed in controlling Phytophthora. The 17 WPs appraised two short fragments on how plant scientists manage this participant dilemma during public Phytophthora meetings.

Phytophthora research programmes organize public meetings to present research findings and to give visitors the opportunity to ask questions after plant scientists have delivered their talks. *Fragment 3a* represents the standard way in which Phytophthora is presented; the portrayal in *Fragment 3b* is specific to public Phytophthora meetings.

Fragment 3a

1 Prof1: And in fact you could say that ehm ehm you (.)
2 Phytophthora's potential to create new isolates
3 that are much more aggressive
4 than the existing isolates has increased enormously

Fragment 3b

In this fragment Prof2 explains how Phytophthora makes a potato ill.

1 Prof2: and eh when when a ehehm Phytophthora thinks↑
2 (q) yes this does not work this is a potato↑ (q)
3 then he can mutate (.)
4 thus make a somewhat different little Phytophthora protein[34]
5 that is not recognized by the potato (.)
6 and then he cons it ((the potato)) and then eh he dies
7 well yeah where there is a need there is a way (.)
8 ((line omitted))
9 that is looking for resistance genes of the potato
10 and several mechanism (.) these little proteins Phytophthora makes
11 that fight eh that is eh at the heart of the matter

The authors found that in particular the use of the personification metaphor in *Fragment 3b* helped to project the image that the fight against Phytophthora is not totally helpless, whereas the use of agentification – attributing agency to Phytophthora – in *Fragment 3a* does not. The personification metaphor implies that the strong and cunning Phytophthora needs strong capable opponents in the form of plant scientists.

Workshop participants' appraisal of Fragments 3a and 3b

WPs consider the agentified and personified portrayal of Phytophthora as correct and familiar (Px):

> P10: Both [representations] are correct. It is vague talk, typical of how professors talk.

However, *Fragment 3a* offers little hope, whereas *Fragment 3b* offers much hope:

> P8: Of *Fragment 3a* you could say that Prof1 propagates: 'We should stop eating potatoes'. It is hopeless. Prof 2 says: 'There are possibilities, there is hope. You cannot eradicate it [Phytophthora] but you can manage it'.
>
> P2: In *Fragment 3a*, Phytophthora is portrayed as a pathogen that becomes more aggressive as if it is out of control. The impression you get from this is that nothing can be done to contain Phytophthora except perhaps spray till Phytophthora is truly dead.

In *Fragment 3b*, Phytophthora is personified – Phytophthora thinks, it cons, it decides what it wants to do (see also Dorst, 2011, on personification). Furthermore, the fight against

[34] The Dutch diminutive *eiwitje* is used, here translated as little protein.

Phytophthora is depicted as a war between plant scientists and Phytophthora – a war that may go on indefinitely but is worth fighting:

> P6: Prof2 personifies Phytophthora. Phytophthora thinks, Phytophthora is a challenging opponent.
>
> P3: It is almost as if a war is going on between Phytophthora and scientists [referring to *Fragment 3b*]. That may be a smart move to get money for research. He [Prof2] is talking about tackling underlying mechanisms [of Phytophthora], fundamental research. *Fragment 3a* is more about applied research.

Moreover, participants say that Prof2's portrayal would probably generate more funding than the description provided by Prof1 in *Fragment 3a*; fundamental research requires more investment than applied research:

> P5: Prof2's image of Phytophthora implies that money is always needed [to fight it]. And: Prof1 needs money temporarily.

Furthermore, according to the participants, the two fragments differ in how much they are designed with the lay audience in mind:

> P7: Prof2 attempts to talk in ordinary language so that people who are not familiar with scientific language may understand it as well.
>
> P10: In part, the language is patronizing; the use of diminutives such as *little protein* [in *Fragment 3b*] may implicate that people, citizens are not taken seriously.
>
> P1: *Fragment 3b* is also more interesting and entertaining. With Prof2, Phytophthora is a little bit like a funny animal.
>
> P3: Prof2 is telling a story; Prof1 is factual/paints the depressing reality.

One participant jokes that Prof2's portrayal of Phytophthora implies that Phytophthora may be intelligent and able to talk:

> P2: In the fragment with Prof2 it is like: we are going to talk [with Phytophthora]; it is like the United Nations [laughs].

To summarize, WPs were able to discern that the personification of Phytophthora in *Fragment 3b* generates other effects than the agentification of Phytophthora in *Fragment 3a*. *Fragment 3b* invited some good-natured fun-making, but WPs were also critical of the use of personification. In particular, the use of diminutives in *Fragment 3b* was considered to potentially project the image that plant scientists patronize the public or that plant scientists may risk not being taken seriously because personification is presented as a joke.

Plenary Sessions

In the plenary session of the workshop, WPs reflected on what they discovered in the small group discussions. They marvelled at what could be learnt from looking at the alternative wording of utterances, what (unintended) interactional effects they project. Participants

differed in how they related to fragments: some identified functions as neutral analysts; others mentioned what they would do (differently). WPs also identified what they assumed to be disadvantageous effects of the discursive constructions used.

They agreed that the fragments investigated displayed too little actual dialogue and that the framing of lay and user concerns in dual terms in *Fragments 1* and *2* does not really invite dialogue between scientists and non-scientists; in particular, the RD in *Fragment 1* was considered too polarizing for that. However, WPs recognized that RD has its uses. According to them, plant scientists project an image of themselves as know-it-alls with RD; they do not really need laypeople – be it citizens or users. The same is projected with *Fragment 2* when the scientists contrast unruly lay concerns with rule-based science. Furthermore, WPs were concerned that displays of tolerance of lay views did not project real tolerance or empathy with laypeople. They were charmed by the personification metaphor, in the sense that it was considered effective in projecting the image that investing in Phytophthora research may be worthwhile. However, personification is also risky in that it may generate the effect that members find that they are patronized – everyone knows that plant diseases cannot think and act like people. The use of diminutives in the personified Phytophthora narrative was believed to strengthen this latter projection.

Finally, WPs agreed that the talk about users and laypeople partly projected undesirable effects and that something should be done about this. They concluded that they should talk more *with* than about users and laypeople and that they should avoid language that could be interpreted as childlike, patronizing or inauthentic. More concretely, they thought that the use of diminutives and too much talk in dual or oppositional terms should be avoided.

WPs found it hard to directly translate gained insights into concrete communication activities. There was also relatively little time during workshops to discuss implications for communicative practice in depth. A difficulty mentioned during the workshops was that utterances often projected positive and undesirable effects at once (e.g. see Heritage, 1984, on double duty). Further research may shed more light on how best to translate discursive appraisals of talk about laypeople and users into communication activities that truly propagate scientific engagement with non-scientific concerns.

6.5 Conclusions and Discussion

Can plant experts be made aware of how their talk about laypeople and users, and talk about Phytophthora in front of a lay audience, not only transmit a particular content but also project or generate intended and unintended interactional effects? It appears that this is possible.

WPs clearly enjoyed analysing the fragments; the small group discussions were animated and occasionally accompanied with joking and laughter. Participants' critical remarks on discursive patterns show that they felt secure enough to appraise their own talk-in-interaction in the presence of others. Apparently, the DAM criteria of security and familiarity were met, and discursive patterns were recognized from real-life. Workshop participants also showed that they were able to critically appraise the main interactional effects that the fragments intentionally and unintentionally projected, in line with Mogendorff et al. (2012, 2014). Therefore, the DAM criterion of being able to assess functions of talk appears to have been met.

WPs noted that RD in dual 'we' and 'they' terms in *Fragment 1* helped plant experts to shelve user concerns; additionally, they recognized how the contrast between lay concerns and scientific concerns in *Fragment 2* enabled plant scientists to maintain control of how and when non-scientific concerns are weighted in plant technology development. And they noted that different portrayals of Phytophthora may discursively project different assessments about the usefulness and feasibility of Phytophthora research.

To conclude, WPs can discern that it matters what discursive devices are used, consciously or unconsciously, to communicate with and about Others. For instance, in the discussion in *Fragment 1*, they demonstrated awareness that speakers are responsible for the content of their factual statements but not for the content of quotes and that, therefore, quotes may elicit other responses than factual statements. WPs also saw that how Phytophthora is presented to the public matters greatly; depending on the kind of metaphor used, the interpretation that funding of Phytophthora research may produce durable results is projected, or the opposite. Participants also clearly recognized that what people say does not necessarily reflect people's thoughts or reality, e.g. that the use of RD does not necessarily mean that a dialogue has taken place between scientists and users. WPs also concluded that scientists' displays of tolerance as exemplified by *Fragment 2* clearly did not necessarily signal true tolerance of lay views.

Moreover, WPs saw more sharply than the authors that utterances may simultaneously enhance and undermine plant scientists' positions; With regard to *Fragment 1*, WPs agreed that the RD in dual 'we' (scientists) and 'they' (users) terms came at the cost of paying attention to relevant in-group differences between users and diverted attention away from potential problems with technology. They concluded that shelving user concerns has its uses but may not contribute to user-friendly technologies. In *Fragment 2*, a participant noted that claiming membership in the lay category may project the image that plant scientists are sufficiently knowledgeable about lay views in order to retain control over when lay concerns are considered in technology development but may simultaneously diminish plant scientists' professional identities as rational beings (e.g. see also Heritage, 1984: 182, on double duty of talk).

With regard to *Fragments 3a* and *3b*, WPs concluded that plant scientists' use of the personification metaphor is risky. On the one hand, the metaphor projects the image that funding Phytophthora research is useful. On the other hand, the use of personification in combination with the use of diminutives may be interpreted as child's talk and project belittlement. WPs found that the latter projection should be avoided. However, they generally found it hard to translate insights that they gained into concrete communication actions.

To summarize, this chapter indicates that plant experts can be made to consider interactional consequences of their talk with the help of DAM, and that WPs' appraisals may offer interesting insights in their own right. On the basis of the research presented here, we cannot say that WPs deployed the insights that they gained during the workshop in their talk about or with laypeople or users later on. However, after the workshops, WPs ceased using diminutives and the personification metaphor in public talk about Phytophthora and tended to devote more time to talking to laypeople at public meetings. This suggests that there is hope; in particular if we gain more insight into how, from an interactional perspective, communication activities can be improved.

6.6 References

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Appendix: Transcription notation

Based on Jeffersonian transcription (Jefferson, 2004):

.hhh	A hearable in breath, the number of h's signals the length
(x.x)	Pause of x.x seconds
(.)	Micro-pause, less than 0.2 seconds
↑word,↓word	Onset of noticeable pitch rises or fall
<u>Word</u>	Emphasized
WORD	Speaker is talking louder
((text))	Transcriber's remarks
=	No hearable pause between words or turns
(q) text (q)	Constructed speech or reported dialogue

7 Conclusions and Discussion
Implications, Limitations and Recommendations

7.1 Introduction

This thesis sought to explore how Dutch plant scientists who work on the problem of Phytophthora – a major plant disease – make use of relevant non-scientific knowledge of, and non-scientific takes on, the Phytophthora problem in society. This was explored by looking at plant experts' actual talk *about* users and laypeople and how they talked *in front* of laypeople and users (plant experts followed for this study do not frequently engage in dialogue with laypeople and users). How plant scientists talk *about* their research and how they refer to the role of laypeople and users in it may affect how they talk with laypeople and users and may, ultimately, affect the science–society relationship, the science–user relationship and, indirectly, public controversy surrounding genetically modified crops.

The decision to start studying plant scientists' talk-in-interaction about laypeople and prospective users of plant technology was partly motivated by the fact that the usability of technologies depends at least in part on how concerns of different relevant actors are accounted for and/or incorporated in technologies (Veen et al., 2011) and that some plant technologies – such as genetically modified crops – are persistently met with public controversy in Europe (e.g. see Gaskell & Bauer, 2001, 2006).

It is interesting to study talk in conditions of controversy. Controversy generally brings to light what is important to people and why. It evolves around high-stakes issues on which various parties have different takes and stances – stances about which they tend to be passionate. Public controversy in plant technology science as studied in this thesis is about genetic modification (GM) of potato crops – the third staple food in the world. Technologies that purportedly put our sustenance on the line – as genetically modified staple crops are framed to do, e.g. by the media – may be met with opposition or hotly debated. It may also be societally relevant to study technology development in conditions of controversy; policymakers and others may be interested in how the energy and passion that proponents and opponents put into (re)producing public controversy unintendedly with their talk may be constructively redirected to explore what people consider essential with regard to food and food production systems.

In the context of technology development, controversy may pose a problem to those who develop plant technologies: it may undermine user adoption of technologies (e.g. see Leach et al., 2005). People consume what plant technology users – farmers – produce: food crops; if a substantial number of members of the public are unwilling to buy GM crops, then users may be hesitant to use GM technology (see also chapter 4). Public controversy may also be costly; fields where GM crops are tested are destroyed with some regularity (e.g. see Duarte, 2011). Thus, public controversy in plant technology development is about how science relates to society and users; how research excellence relates to the relevance of science (see also May & Perry, 2011).

Discursive psychology (DP) was chosen as the main research approach; by design, DP examines talk-in-interaction in real-life real-time settings. It focuses on what interpretations co-participants in talk-in-interaction enable with their talk, how talk is heard by recipients and what interactional achievements are accomplished with talk (Potter, 1996). The general aim of discursive psychological analyses is to provide insights into how discursive phenomena help to reproduce or resolve societally relevant dilemmas.

DP is well-suited to examine sensitive or controversial issues because of its separation of mind and word: what people say and accomplish with their talk does not necessarily reflect their underlying intentions or thoughts (Potter, 1996; chapter 1 this thesis); Talk does not need to represent reality as speakers see it to have very real consequences (cf. Merton, 1995, on the Thomas theorem). Discursive psychologists tend to point out the intended and unintended interactional consequences of participants' talk, e.g. how speakers manage participant dilemmas with their talk. This thesis has taken discursive psychological analysis a step further by first analysing plant experts' talk and then teaching plant experts to adopt a discursive psychological outlook on talk-in-interaction in order to enable them to critically reflect on the interactional consequences of their own talk (see also chapter 6).

7.2 Main Findings and Their Implications

Plant experts in the study tend to talk more *about* laypeople and prospective users of technology than *with* people and users about plant science; and, if they talk to publics, they tend to largely favour one-way public communication (see also Davies, 2008). With their talk about laypeople, plant experts carefully avoid projecting the image that they are ignorant of lay views and user concerns. Chapter 3 shows that plant scientists' references to laypeople appear to be vague but empathetic; they say that *they understand* or *can imagine* people's concerns; and some scientific experts claim membership in the lay category by saying things such as: *I have that too as a consumer*. The primary function of displays of tolerance of lay views and membership claims in the lay category is that they signal access to laypeople's knowledge and experience.

That these statements about lay views or people are not (primarily) designed to display empathy becomes clear if one examines in what discursive context these displays of tolerance are deployed: displays of tolerance of lay views tend to be followed by contrastive declarative statements about science, e.g. *I understand that people may think that but scientists*…. In these discursive constructions with expansions such as membership claims in the lay category, lay views tend to be presented as without order: *Everyone may think whatever they like*, whereas statements about science are presented as rule-bound: in science *standards are followed*. The displays of tolerance in their immediate discursive context serve mainly to demonstrate that plant scientists sufficiently understand lay concerns to appraise their relevance for plant technology development and thereby retain their control over if, when and where lay concerns may be incorporated in technology development (see chapter 3). With this, plant scientists reflexively take full responsibility for plant technology development, including the usability and relevance of plant technologies in and to society. Whether this indeed leads to technologies that are usable in and by society is another question and cannot be determined with discursive psychological analysis. However, by claiming full responsibility for technology development, plant scientists unintentionally make themselves potentially very vulnerable to critique in the event that technologies turn out not to be usable in and by society.

In chapter 4, the focus is on plant experts' user-references in expert board meetings. These meetings are organized with the aim of ensuring as much as possible that government-funded Phytophthora research results in plant technologies that are usable in and by society. Plant experts' references to users are less univocal in tone than plant scientists' constructions of laypeople in chapter 3. However, user-references appear to serve

similar purposes as references to laypeople. They imply that plant experts have sufficient access to, and understanding of, user concerns to assess when and where user concerns are relevant to plant technology development. Plant experts accomplish this mainly by using reported dialogue: *we say: '…', they say: '…'* (the pronoun *we* refers to the experts, *they* to the users; see also chapter 4).

Furthermore, user concerns are presented as difficult to reconcile with scientific concerns. This is done by framing the dialogue in 'we' and 'they' terms and by exclusively making user *feelings* and expert *knowledge* relevant in meetings. Feelings and knowledge are hard to compare with each other. Feelings also tend to be less valued in science and professional practices than knowledge. Thus, framing user concerns in terms of feelings implies that scientific concerns should be prioritized over user concerns. Plant experts' demonstrated access to user and scientific concerns and their implicit prioritizing of scientific concerns help scientific plant experts to present themselves as the group best equipped to assess the relevance of user concerns for plant technology development and to shelve user concerns (see also chapter 4). The risk here is again that implicitly plant experts claim full responsibility for plant technology development although they do not control how plant technologies are taken up by users and society.

Chapter 5 focuses on how plant experts frame key concepts in Phytophthora research: Phytophthora and the technology to fight this versatile oomycete. We have seen that plant experts attribute agency and human traits to Phytophthora (see also Dorst, 2011, on personification). For instance, they say: *Phytophthora produces proteins*… or *Phytophthora cons the potato*. Reflexively, a clever versatile enemy such as Phytophthora requires a smart opponent in the form of intelligent and creative plant experts.

Additionally, plant experts present GM as *the* way to speed up the crop breeding process so much that they can produce new Phytophthora-resistant potato crops before Phytophthora has figured out how to breach crops' disease resistance. To support their story, plant experts deploy the so-called chain picture: a visual metaphor to compare classical breeding with genetic modification (see chapter 5). As we have seen, this chain picture is too neat to be true according to colleagues of plant experts in the audience. Moreover, alternative approaches to fight Phytophthora are not, or sparingly, discussed during expert board meetings (for an alternative approach to Phytophthora management, see Govers, 2009).

Chapter 5 also demonstrates that plant experts use framing to weaken associations between genomics and the publicly controversial genetic modification. Technology is understood to be technology and knowledge at once (Barnes & Dupré, 2008: 400). In contrast, plant experts tend to portray genomics as either solely knowledge/data or solely technology. The function of framing here is to explicitly separate genomics from potentially publicly controversial technologies such as GM crops. This seems at odds with the assertion made by many plant experts in interviews that their research differs from biologists who, for instance, study the structure and inner workings of a plant primarily to understand plant structure better. Moreover, plant experts in the study maintain that they seek to address societal problems[35].

A consequence of casting genomics technology as necessary is that it may foreclose

[35] This was said during ethnographic interviews. The ethnographic interviews focused on the work of plant experts and on how different actors such as the public and users related to their research. I generally started interviews by asking plant experts about their background and how they became involved in Phytophthora research.

discussion of potential alternatives to manage the Phytophthora problem. One does not argue about what is inevitable or inescapable. The latter appears to be the case and can be problematic given that plant experts only explored a limited number of strategies to manage Phytophthora (see chapter 5).

Implications of Discursive Analyses

As summarized in the foregoing section, references to laypeople and to users have in common that they are compared to scientific concerns. Lay and user concerns are found wanting, given that they do not conform to scientific standards. A problem with this scientism (Ninnes, 2000) – a network of beliefs, processes and practices that produces a knowledge standard that is projected as perfect and therefore essential – is that people's and users' concerns tend to be discredited implicitly because they differ in type from the scientific standard.

Plant experts' dichotomous pitching of lay/user as rule-free/emotional on the one hand, and science as governed by rules/rationality on the other, appears to be functional in that it helps scientific plant experts to uphold the professional norm of scientific independence: scientists are not supposed to let their research be affected by the stakes and interests of third parties. However, given that lay and user concerns are relegated to the private sphere or shelved in plant experts' talk, laypeople and users may find that their concerns are not represented fairly; or they may claim that talk about lay and user concerns primarily serves to further scientists' category-bound interests. Talk about laypeople and users without truly engaging with underlying lay and user concerns may unintentionally help maintain or create public and user alienation from science and technology development (cf. Wynne, 2001), in particular because, in this study, plant scientists demonstrate that they know and care enough about user concerns to be able to claim sufficient access to lay and user concerns for the sole purpose of shelving them until further notice. What they do or do not do with public and user concerns is simply not questioned by colleagues (see also chapters 3 and 4).

Phytophthora and genomics framings in chapter 5 also indicate a defensive stance on the part of plant experts: genomics and genomics applications such as GM are presented as the only viable solution that may keep Phytophthora definitively at bay. Defensive stances do not really invite talk about alternative ways of fighting Phytophthora. An alternative portrayal, a well-known science metaphor, not put forward by the plant experts I followed, is that a oomycete like Phytophthora is an interesting puzzle whose inner workings need to be deciphered in order to be able to master or control the disease (e.g. see Gibbon, 2012).

In plant experts' portrayal, Phytophthora management is depicted as a heroic undertaking, a fight or war, whereas in the puzzle depiction Phytophthora is presented as an intellectual endeavour. In the fight portrayal, the focus is on destroying or containing Phytophthora, and, in the portrayal of Phytophthora as a puzzle, the focus is on understanding Phytophthora better. Moreover, in the opponent–war portrayal, plant scientists' reputations are put on the line far more than in the intellectual puzzle depiction. Losing a fight, after all, sounds far more dramatic than failing to solve a puzzle. Framing Phytophthora as an opponent instead of as a micro-organism raises the stakes: funding becomes a question not only of relevance and allocation but also of morality. Refusing to finance a war or battle may be hard to defend, if only because discursively one risks losing the war (see also Sontag, 2002, on militaristic metaphors).

To summarize, the discursive (psychological) analyses presented in this thesis show that plant experts use talk *about* Phytophthora, genomics, laypeople and users to ascertain and maintain their identities as experts who are still capable of fighting Phytophthora and who uphold the standard of scientific independence; they do independent research in conditions of controversy. How plant experts achieve this discursively is not without its contradictions and tensions, in particular because maintaining one's scientific independence may come at the cost of really engaging with users' concerns.

7.3 Plant Experts' Discursive Other

The discursive Other is the central concept introduced in chapter 1 and was defined as follows[36]:

> *The discursive Other consists of references to human and non-human actors; Others are discursively treated as human(oid) agents in their own right and as relevant to the interactive management of a problem or dilemma in an interaction setting.*

The Other tends to be discursively present but physically absent. The Others encountered in plant experts' talk throughout this thesis are: laypeople (chapter 3), users (chapter 4) and humanized Phytophthora (chapter 5). These Others have in common that plant experts use them to manage the science–society and the user–science relationship: to position themselves as independently acting and capable professionals.

In chapter 3, plant scientists discursively position laypeople in a way that enables them to balance two requirements. Plant scientists need to conduct research that is *excellent* according to scientific standards and *relevant* according to societal norms (see May & Perry, 2011).

According to May and Perry (2011), relevant research is often not considered to be excellent, and vice versa. Plant scientists attempt to manage the potentially conflicting requirements of excellence and relevance in research by presenting themselves as knowledge hybrids, that is, people who have knowledge of both lay concerns *and* scientific concerns (see also chapter 3). It is implied in this discursive construction that plant experts' knowledge of lay concerns alongside scientific knowledge enables them to (potentially) develop technologies that are excellent and relevant to society, without giving non-scientists a substantial role in their research. A problem with this may be that relevant concerns are left unaddressed; even knowledge hybrids do not know everything.

In chapter 4, plant experts manage again the conflicting requirements of relevance and excellence in research, but with another discursive Other: users. Plant technologies need to be usable to be relevant to society (Leach et al., 2005); but, if experts listen too much to users, they run the risk, potentially at least, of their technologies being very practical but not excellent according to scientific criteria. We have seen in chapter 4 that plant experts deploy reported dialogue and emotional dispositional statements to discursively manage potential conflicts between scientific concerns and user concerns: scientists are responsible for 'the facts' and users for 'emotions'. The latter enables plant experts to shelve user concerns when convenient and retrieve them if and when, according to them, the situation warrants it.

[36] *Discursive* is placed before Other to stress that plant experts' constructions of others do not necessarily reflect the speakers' actual beliefs, or reality.

The problem with the activity of shelving user concerns is that it is unlikely to contribute to user-friendly technologies, at least as long as it is unclear what the criteria are for putting user concerns on the shelf and taking them off. Moreover, by projecting the image that user and scientific concerns are hard to reconcile with each other, plant experts reflexively create the image that they do not know user concerns well enough to be able to incorporate user concerns in technology development (if desirable).

In chapter 5, plant experts personify Phytophthora in public meetings to communicate that their research is relevant and worthwhile. The discursive strategy employed here is to create the image of a powerful and cunning Phytophthora. The cleverness and cunning of Phytophthora explains discursively why for so long plant experts have not been able to bring Phytophthora definitively under control and why plant experts are reflexively capable and worthy opponents of Phytophthora.

What these three discursive Others have in common is that they present the Other as an opponent who cannot be totally understood from a purely scientific perspective; Others do not conform to scientific norms by discursively acting emotionally, unruly or unfair (*Phytophthora cons* etc.), that is, if compared to the scientific norm, Others tend to be subjugated to science and scientists: they are less rational or less moral, e.g. Phytophthora does not outwit but cons the potato.

The question here is whether plant experts' actual othering of Phytophthora, laypeople and users vis-à-vis science is a discursive strategy that contributes to plant technologies that are usable in and by society. Talk in oppositional terms generally contributes to subjugation and the disregard of some concerns. This may not be conductive of the open dialogue necessary to work together jointly on societal problems (e.g. see Edelman, 1993; Verkuyten et al., 1995). And *that* does not support discursively the creation of user-friendly or less controversial technologies.

Despite this, there is hope. The fact that plant experts nowadays make their knowledge of laypeople and users relevant in talk at all signals that plant experts at least reflexively acknowledge that plant technology development is not a purely scientific affair. This may be a starting point from which experts, laypeople and users can work together to create an interactional space in which various types of concerns get the attention they need to reach the overarching shared goal of creating plant technologies that are usable in and by society.

7.4 Conclusions

Discursive constructions of Phytophthora, genomics, laypeople and users seem primarily to help plant experts to expand the authority of science with regard to societal issues. Plant experts project the image that they – the scientists – are veritable knowledge hybrids, able to conduct concurrently both *excellent* research according to scientific norms and *relevant* research according to socioeconomic norms; they know about science as researchers and they know about society as consumers and citizens.

One problem with this may be that scientists do not always claim full responsibility for their research. They avoid, as discussed earlier, the issue of publicly controversial GM crops by discursively severing the link between genomics and controversial GM crops and by visually portraying GM crops as inevitable when compared to the slower but widely accepted practice of classical crop breeding. It is inconsistent for scientists to claim full responsibility in one interaction setting for developing technologies that are relevant in and to society and,

when faced with controversy in other interaction settings, to reject responsibility for what is done with the knowledge and technologies that they have developed.

Put differently, plant experts' accounts draw upon different conceptualizations of science. When plant experts need to discursively handle controversial GM crops, they draw upon the 'ivory tower' conceptualization of science in which a sharp distinction is made between the development of knowledge and knowledge applications in society. However, when faced with the requirement to account for the usability of technologies, plant experts draw upon their hybrid identities as scientist-citizens to claim control of, and implicitly responsibility for, the relevance of technologies. This inconsistency across interaction settings with regard to claiming responsibility may prove problematic in that it may potentially harm scientists' authority.

Another observation is that users and laypeople are generally not depicted as potential or natural allies of plant scientists in technology development but as actors who are a potential nuisance to science[37]. We saw a notable exception in chapter 4 in plant experts' future-oriented talk. In that particular case, it served plant experts' interests to depict users as commonsensically acting people who need or want Phytophthora research to continue. Plant experts manage the public and users as a nuisance in science by projecting the image that lay and user participation in technology development is more or less superfluous. Plant experts accomplish lay and user redundancy by claiming membership in the lay category and by showing that they have access to lay/user knowledge on the one hand and scientific knowledge on the other (see chapters 3 and 4).

Moreover, in this thesis, plant experts implicitly show with their talk on Phytophthora, genomics, laypeople and users that they do not know how to act with regard to lay and user concerns on their own terms. Lay and users concerns are always set off against scientific standards. There is a hint in plant experts' talk that in everyday life plant experts deploy other standards than they do in the laboratory and the field. However, they do not demonstrate how they use their everyday knowledge and experience to come up with standards and solutions that do not favour science over lay and user concerns (cf. Felt et al., 2009).

Is this a problem? Are plant scientists not the best equipped to judge what is relevant in technology development and what is not? They might be if technology development was only be about science and knowledge; if having access to and understanding all kinds of relevant knowledge were enough – and if scientists indeed possessed sufficient knowledge of lay and user concerns as the plant scientists appear to claim in this study. However, knowledge alone does not make the world go round. Knowledge is important, certainly, but it is not enough (Dijstelbloem & Hagendijk, 2011; Genus & Coles, 2005; Swierstra & te Molder, 2012).

In modern-day Dutch society, people have easy access to social media to share their opinions on a great number of things, get things done with crowd funding or become famous with enough hits or likes. We live in a society that emphasizes participation, personal responsibility, deregulation and the development of localized policies. In this context people – citizens and consumers – are increasingly used to having choices, to being able to make choices on their own, to letting their voices be heard when they feel like it, to starting or participating in ongoing debates. These consumers and citizens may leave technology development in the technical-scientific sense to the scientists, but they are unlikely to let

[37] This impression is strengthened by that lay/user concerns are pitted against each other in *we*: '…' and *they*: '…' terms.

scientists tell them what technologies they should adopt and how they should use them. Or as te Molder (2012) states: society is *already* talking. Thus, it is not only about whether all relevant views – and what that means is subject to debate – are sufficiently accounted for – it is also about whether people are given sufficient say on issues that are relevant to society and themselves.

If one looks at the purposes served by talk about Phytophthora, laypeople and users, then little appears to have changed. When and where non-scientific concerns are made relevant in technology development is – at least discursively – controlled by plant experts. Ironically enough, plant experts deploy references to laypeople and users to achieve this end. Moreover, framings of genomics indicate that plant experts claim to produce primarily knowledge or data; or they claim that genomics is only technology (see chapter 5). Reflexively, this implies that knowledge or technology is sufficient to fight Phytophthora and that therefore plant experts do not need other non-scientific measures to support them in their fight against it (except funding). This stance may be defendable and understandable from a purely technical-scientific perspective but not from a perspective on technology development in and for society (Leach et al., 2005).

However, not all is lost. In chapter 6, we have seen that plant experts who appraised the interactional effects of their own talk are also critical of said talk. They are not necessarily opposed to what they actually discursively accomplish or project with their talk; scientific independence remains an important value to plant scientists. Rather, plant experts in this study concluded at the workshops that their talk about laypeople and user concerns does not enable the inclusion of other, potentially relevant, views in technology development. This raises the question of how plant experts could constructively relate to non-scientific Others.

However, before I address this, I briefly reflect on the limitations of the study.

7.5 Limitations of the Study

Every research project has its limitations, and this thesis is no exception to this rule. Most limitations of *The discursive Other* are methodological in nature. Given that discursive psychological analysis is time-consuming, in particular in the transcription and analysis phase, a limited number of hours of talk-in-interaction can be studied.

For instance, I would have liked to analyse plant scientists' interactions with parliamentarians. Plant scientists are regularly asked to inform (new) parliamentarians on research that pertains to regulations and policies in agriculture at both national and EU level. Parliamentarians relate differently to plant scientists than, for instance, users of technologies. In a meeting between plant experts and a parliamentarian that I recorded (see also the data section of chapter 1), it caught my interest that the parliamentarian treated plant scientists discursively not only as experts in their respective fields of scientific expertise, but also as authorities on lay views on, among other things, GM crops. However, I was not able to gather enough naturalistic meetings of this sort to create potentially publishable articles (see also chapter 1). Thus, DP's time-consuming nature and focus on naturalistic talk-in-interaction puts limits on the number and range of interactions that may be studied. Study of a fuller range of interactions may provide more useful insights in terms of what discursive work relevant to study participants' situated practices is accomplished and what work is left undone.

A potential limitation specific to a focus on naturalistic interaction – talk-in-interaction is not organized and co-produced by the researcher – is linked to the actual design of other-organized meetings in the interaction context. One has to make do with what one finds. For instance, the lecture format commonly found in science education is not ideally suited for discursive psychological analysis; there is relatively little interaction going on between speakers and their audiences.

From a DP methodological perspective, absent or limited dialogue between experts and laypeople is problematic. Absence of recipient uptake makes it difficult to determine whether the discursive effects that are projected or enabled by plant experts are in actual practice achieved.

Moreover, in naturalistic institutional interactions, not all participants have equal interactional rights – that is, the right to decide how interaction is organized. Typically, the organizer and chair of a meeting decides on the design of the meeting, that is, who is allowed to talk when, to whom, about what, in what manner (see also chapter 4). And as we have seen in Box 1.1, visitors to public meetings are granted limited discursive room to initiate topics themselves and make their own expertise relevant: their role is to listen and ask question; the organizer decides on the topics and who answers the questions.

This design of (public) meetings may limit what can be said how and when in talk-in-interaction, and, ultimately, the interactive accomplishments. This may in particular be problematic from a scientific technology studies (STS) or technology development perspective; that is, the dominant interaction design of public meetings in this study limits the mutual exchange of views necessary or desired to achieve technologies that are usable in society.

If for DP desired naturalistic talk-in-interaction is largely absent, then one may deploy other strategies to generate desired insights. In this thesis, I used DP to analyse ethnographic interviews with plant scientists to gain insight into their lack of interactions with laypeople and users and their discursive constructions of the science–society relationship. To put it more generally, by analysing different types of data – naturalistic and non-naturalistic – one may compensate the weaknesses of one data source with the strengths of another data source, and vice versa.

Another potential limitation of data-driven discursive analysis is the general focus on the here and now. This temporal focus means that discursive analyses tend to provide insight into talk-in-interaction in the recent *past*. This may prove very useful – as this thesis has attempted to show. Despite this, people generally expect studies in human communication to provide recommendations to improve communication in the *future*. Providing interested parties with general guidelines to improve their future communication is easy enough. However, the problem is generally not so much that people do not know how they should communicate in theory and need guidelines for that. It is more common for people to encounter problems when they try to put theory into future practice. After all, it is generally easier to look back than to look forward.

A strength and limitation of the study is that the focus tended to be on recurring dominant discursive patterns (except chapter 5, which focused on plant experts' use of innovative framings). On the upside, an analytical focus on dominant discursive patterns greatly affects discursive work done in an interaction setting. Studying these patterns is therefore relevant. On the downside, dominant discursive patterns provide relatively little insight into the diversity of discursive constructions deployed at the research site. This also implies that the study of dominant discursive patterns does not necessarily yield insight into

plant experts' best discursive practices; insight into the latter is particularly useful if one wants to improve existing practices.

So far, I have focused on study limitations linked to the main research approach. A study, however, may also be limited (and enabled) by the research setting or the research subject. This is certainly true for the research conducted for this thesis. Plant technology development focused on disease management in staple crops in conditions of controversy is a highly specialized field. The consequence of this may be that the discursive phenomena studied are specific to the plant technology field.

From interaction studies we know that talk-in-interaction is highly context sensitive but rarely specific to a particular interaction context (e.g. see Arminen, 2000). This also appears to be true of plant experts' talk studied in this thesis. Many, if not most, sociocultural inferences upon which study participants draw, e.g. the inferences about farmers and science, are not specific to plant technology science but available to a wide range of people within and outside plant technology science. Moreover, the discursive work that plant experts conduct with their talk – maintaining control over if, when and how lay concerns are considered in plant technology development – is not specific to plant technology science but something that other professions and their practitioners may also pursue. However, this is not to claim that what plant experts do accomplish or project with their talk in this study is generalizable across different research settings. The latter cannot be claimed based on situated discursive (psychological) analyses. Likewise, it cannot be claimed that results presented in this thesis are unique to plant experts' talk on Phytophthora.

That said, it stands to reason that what plant experts accomplish in talk-in-interaction and how they do that is partly informed by the conditions of public controversy in which technologies are developed. Possibly, plant experts' presentation of the science–user relationship in *we: '…'and they: '…'* terms is informed by the controversy surrounding GM crops. After all, plant scientists have to cope with action groups that destroy or damage their test field (e.g. see Duarte, 2011). In a way, plant scientists literally need to defend their research. This defensiveness may have sparked defensive stance-taking in 'we' (scientists) and 'they' (laypeople/users) terms. If the latter is true, then the discursive analyses presented in this thesis may be of use to researchers and practitioners who study or are involved in communication in conditions of controversy.

7.6 Recommendations

A problem previously identified in plant experts' talk-in-interaction, as studied in this thesis, is that plant experts tend to talk in *we say: '…', they say: '…'* dual terms. The discursive Other in the form of laypeople, users and personified Phytophthora are discursively treated as opponents who need to be fought or controlled. This appears to be unhelpful in plant technology science in which the usability of plant technologies is considered important (Leach et al., 2005) by the field and by study participants (see chapter 6). Polarization is generally not conducive of collaboration. Thus, it appears that the Other discursively presented as distant and subjugated should be discursively turned into Others who are familiar and equal; someone with whom one may arrive at a shared understanding.

From an interactional perspective, it may be fruitful to occasionally reverse interaction roles of laypeople and plant experts. Othering is generally enabled by the physical absence of the Other. So the first recommendation would be to bring together relevant Others, laypeople and experts. Normally, plant experts tend to *tell* and explain 'the

facts', whereas laypeople tend to listen and may ask the occasional question. This division of interactional labour tends to reinforce the low epistemic status of laypeople relative to experts. So the second recommendation would be to start change traditional interaction patterns, experts may be invited to think of questions to ask of laypeople and to attend meetings at which laypeople may be invited to give a talk about their concerns or specific expertise. The latter exercise would project that non-scientists have relevant expertise of their own.

Additionally, one could organize (mixed) discursive action method (DAM) workshops with various groups of experts, laypeople or users; workshop participants examine expert and lay discursive patterns in participants' own talk-in-interaction and in talk-in-interaction in which interaction roles are reversed or mixed.

In order to organize this type of meeting, criteria need to be met, such as security (Lamerichs et al., 2009) and equality. Participants need to feel free and secure enough to be critical and to be inclined to express their concerns. In chapter 4 we have seen that prospective users of plant technology are allowed and expected to show their emotions, but their knowledge is not treated as relevant. This indicates that relevant concerns and knowledge may be disregarded in expert board meetings and an effort needs to be made to ensure that non-expert knowledge is considered in technology development.

It may also prove fruitful to try conducting discursive psychological analyses of best practices in talk-in-interaction – e.g. by studying the practices of speakers that are allegedly good at talk-in-interaction. Even if it turns out later on that they are not great, one may nevertheless still learn much from them.

Finally, it may be interesting to discursively analyse visuals-in-use. As the saying goes: a picture says more than a thousand words and, consequently, may impact heavily on what participants achieve in talk-in-interaction, in particular in the science and technology field. The study of the use of visuals in talk-in-interaction may complement the multimodal analyses of talk-in-interaction currently popular in conversation analysis.

7.7 References

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Appendices

Summary

Technologies have far-reaching socioeconomic and political consequences, and technology development, adoption and use are far from straightforward; new technologies may be put to different uses than scientists and engineers envisioned originally, or users or publics may reject them. This is particularly true for technologies developed in plant genomics science. In Europe, plant technologies such as genetic modification (GM) continue to be met with resistance by the well-informed and the ignorant alike (e.g. see Gaskell & Bauer, 2001; Duarte, 2011). Moreover, a comprehensive content-analysis by the Dutch Advisory Board on Genetic Modification (COGEM, 2007) that investigates recurrent patterns in arguments for and against GM in the Netherlands shows that knowledge of all arguments does not necessarily result in public acceptance and adoption of GM.

The latter may be because arguments not only convey information and standpoints, they also serve to manage social relations and human activities: language is routinely deployed to manage stakes and interests in face-to-face encounters with others (e.g. see Potter, 1996). For instance, plant scientists' invocations of 'lay' arguments are not simply demonstrations of scientists' knowledge, but may also help experts to inoculate potential charges that they are ignorant of, or indifferent to, public concerns.

To date, science and technology studies (STS) scholars have scarcely begun to systematically explore the performative dimension of language (Veen et al. 2011). In particular, scientists' talk in real-life real-time face-to-face encounters on specialized subjects in non-everyday settings such as (plant) technology science is understudied.

The research project *The discursive Other* seeks to reduce this gap in the scientific literature; it investigates the interactional effects of Dutch plant science experts' talk in different interaction settings: public meetings, expert board meetings and ethnographic interviews. The main research approach deployed is discursive psychology (DP): a methodology that focuses not on what is said but on what is accomplished with talk.

Discursive psychological analyses provide insights into how people (re)produce relationships, identities and claims in talk-in-interaction and how speakers (routinely) manage interactional dilemmas. How participants manage interactional dilemmas is particularly relevant to plant technology science given that the relationship between science on the one hand, and the public or users on the other, appears to be strained for quite some time now (e.g. see Leach et al., 2005; Wynne, 2001).

The central topic of all the talk analysed in this thesis is *Phytophthora Infestans:* a major plant disease in staple crops that helped bring about the Irish famine in the 19th century. Phytophthora is still a large problem. To fight Phytophthora, plant experts have been developing different technologies, some of which, such as genetic modification (GM), are met with public controversy.

Research Aims

The thesis *The discursive Other* addresses the following aims:

- Furthering insight into how and to what end plant (genomics) experts discursively manage the science–society relationship and the science–user relationship in real-life, real-time encounters.
- Increasing insight into whether and in what ways plant experts may be empowered to adopt a self-reflective stance with regard to the interactional effects of their talk *about* laypeople, users, genomics and Phytophthora in different interaction settings.

The *discursive Other* as Central Concept

The *discursive Other* is the concept used to connect the various discursive (psychological) analyses presented in chapters 3, 4 and 5 of the thesis. The concept is inspired by, but not equal to, the anthropological concepts of the exotic Other (Buchowski, 2006), Mead's concept of the generalized other (e.g. see Maranta et al., 2003; Holdsworth & Morgan, 2007) and Latour's notion of actants (Latour, 1996). *Discursive* is placed before Other to stress that this thesis looks at how plant experts discursively manage their imagined or real 'significant' Others in different interaction settings (e.g. see Buchowski, 2006).

What *Other* experts make discursively relevant in their talk varies across interaction settings: laypeople, prospective users of plant technology (farmers and breeders) and the plant disease Phytophthora. In this study, all discursive Others to a greater or lesser degree: (1) have a stake or interest in encounters analysed; (2) are literally not able or are not given the opportunity to voice their concerns by themselves; (3) tend to be talked *about* extensively in a general way; and (4) tend to be discursively treated as actors in their own right (regardless of whether they have this kind of agency in reality).

The following data were gathered:

(1) Twelve ethnographic interviews with plant scientists. These were discursively analysed to explore how and to what end plant scientists discursively construct the science–society relationship; the discursive Other in this setting are laypeople.

(2) Eight plant expert board meetings connected to Phytophthora research programmes. In these board meetings, plant scientists consult with field experts and account for their research to increase prospective user adoption of new technologies and/or acquire permission to conduct research. The discursive Other in this setting are users.

(3) Plant experts' innovative use of (metaphorical) framings of genomics and Phytophthora. These were analysed in eight public Phytophthora meetings and in 25 ethnographic interviews (the 12 aforementioned interviews are part of 25 interviews). The discursive Other in this setting is Phytophthora.

(4) Two workshops with in total 17 participants. These participants examine their own talk-in-interaction patterns found in ethnographic interviews (1), plant expert board meetings (2) and ethnographic interviews and public meetings (3).

Research Approach: Discursive Psychology Complemented with Anthropological Methodology

The main research approach deployed in the thesis is discursive psychology (DP). DP is a relatively young and little-known methodology that focuses on how talk-in-interaction is socially organized and occasioned (Potter, 1996). Analysts are interested in how talk-in-interaction helps to manage interactional dilemmas relevant in specific interaction environments. The focus tends to be on recurring discursive patterns in the data.

Basically, DP analysis is governed by two principles: the participant proof principle and the rhetorical principle. The participant proof principle entails that, in analysis, the responses of recipients of talk are leading and not what the speaker aimed for with an utterance. For instance, an invitation posed by someone may be accepted, declined or ignored. The actual response determines for the analyst what discursive work is

accomplished by the invitation, e.g. declining an invitation may harm the relationship of the inviter and invitee, especially if the invitee is rude in his/her rejection. However, people do not respond randomly to one another: participants in talk-in-interaction routinely make use of their tacit knowledge of language and sociocultural conventions to further their claims and arguments, e.g. questions are supposed to be followed up by answers not by counter-questions. For instance, the statement: *farmers are afraid to use new technology* may be endorsed by recipients because it draws upon the stereotype that farmers tend to be conservative by nature.

The rhetorical principle means in practice that the DP analyst compares what is actually made relevant in talk-in-interaction with alternative wordings of the same utterance in order to determine what is accomplished with actual talk-in-interaction.

DP analysis requires the detailed transcription of talk-in-interaction: pauses in tenths of seconds, changes in speed and loudness of speech are transcribed in so-called Jeffersonian transcription notation (Jefferson, 2004). In DP, data are preferably naturalistic in form, that is, recorded talk-in-interaction is not affected by the researcher. The latter, however, does not mean that non-naturalistic data – such as interviews – cannot be analysed with discursive psychology (see chapter 3 for an example).

Anthropological methodology was deployed in the research project *the discursive Other* to gain and maintain sufficient physical and epistemic access to the plant science field and to successfully conduct discursive analyses. The use of anthropology methodology entailed: staying at the plant sciences group for one day a week for three years to talk informally to plant experts; 25 ethnographic interviews with key players in plant technology science; observation and note-taking during recording of meetings and the use of concepts partly inspired by anthropology.

From the author's research experiences, it is argued that physical and epistemic access to the research setting cannot be taken for granted; and, furthermore, that the extent to which the analyst gains physical and epistemic access to the research setting may affect analysis. The implication of this is that it would be good if more researchers who conduct discursive (psychological) analyses in specialized settings are transparent about how they physically and epistemically accessed their research settings.

Results of Discursive Analyses of Plant Experts' Talk

In chapters 3 and 4, plant experts' talk on laypeople and users is analysed using discursive psychology. The focus is on the discursive functions of dominant recurring patterns of references to laypeople and users. Chapter 5 deals with innovative and interactional (metaphorical) framings of Phytophthora and genomics.

In chapter 3, the focus is on how plant scientists discursively manage the science–society relationship. When in interviews plant scientists talk about how they view the science–society relationship, they consistently display first their tolerance of 'lay' concerns before they go on to contrast rule-free lay concerns with statements about rule-based science. Thus, plant experts tend to discursively subjugate lay concerns to science without appearing to be ignorant or uncaring about lay concerns. Moreover, by discursively demonstrating that they have access to lay knowledge in everyday life and techno-scientific knowledge in science, plant experts invoke the image that they are best equipped to decide if, when and how lay concerns are considered in plant technology development.

In chapter 4, the focus is on how and to what end plant experts deploy user-references in expert board meetings on plant science. Users are physically absent during these meetings. Plant experts actively voice user concerns by reporting dialogues between themselves and users. These reported dialogues show that experts have access to users *and* that user concerns are hard to combine with scientific concerns. Plant experts accomplish the latter by contrasting user feelings with expert knowledge. Ultimately, the use of reported dialogue between users and experts enables plant experts to shelve user concerns.

In chapter 5, plant experts' framing of key concepts is explored. With framings of genomics, plant experts attempt to discursively separate genomics from the publicly controversial GM. This framing of genomics contrasts with plant experts' framing of the science–society and science–user relationship in chapters 3 and 4: with their genomics' framings, plant experts do not take full responsibility for the societal relevance of plant technology development, whereas they do so implicitly with their science–society and science–user constructions.

By personifying Phytophthora in interviews and public meetings, plant experts project the image that it is still worthwhile to fund Phytophthora research; personification also helps to discursively establish that plant experts are best equipped to fight Phytophthora (personification is ascription of human traits to non-humans). With a visual metaphor, plant experts discursively project why GM crops are necessary to definitively manage Phytophthora.

Chapter 6 reports on an exploratory study to turn plant experts into self-reflective speakers who are able to appraise the interactional consequences of their own talk. Two workshops were conducted in which in total 17 plant experts participated. Workshop participants were given representative fragments analysed by the author in chapters 3, 4 and 5. The fragments show in an exemplary way how plant experts talk about their discursive Others: laypeople, users and personified Phytophthora. Plant experts confirmed in their own words the main discursive constructions and their functions as found in the discursive analyses reported in chapters 3, 4 and 5. Workshop participants appear able to reflect on the interactional effects of their own talk. Additionally, the workshops generated some insights that complement the discursive analyses presented in chapter 3, 4 and 5.

The discursive Other across Interaction Settings

The Other that plant experts make relevant in talk enables the handling of participant dilemmas. As the analyses show, the othering of laypeople, users and Phytophthora does not necessarily create discursive pathways that may help bring about less publicly controversial and more user-friendly technologies. Plant experts' discursive constructions of the science–society relationship, for instance, acknowledge differences in views between scientists and people; but acknowledgement of differences between lay and expert concerns is not primarily used to assert the relevance of lay concerns in technology development or to accommodate the incorporation of these concerns in technology development. Instead, plant scientists show that they have epistemic access to lay views, and they acknowledge the differences between lay and expert knowledge to subjugate 'free' lay knowledge to rule-based scientific knowledge. The latter helps plant scientists to present themselves as knowledge hybrids that possess a superior capacity to assess the relevance of lay concerns to plant technology science. With the latter, they take full responsibility for the excellence and relevance of Phytophthora research. User concerns face a similar fate in expert board

meetings, albeit brought about with other discursive constructions: reported dialogue and emotional dispositional statements about users.

The root of the problem may be that the non-scientific Other tends to be treated as an opponent. For instance, Phytophthora is treated as a smart, fickle enemy by plant experts in this thesis; and experts' talk about users in *we say: '…', they say: '…'* terminology suggests an opposition between experts and users. Similarly, the use of *I understand that but science…* constructions – typical of plant scientists' science–society constructions – suggests an opposition between experts on the one hand and laypeople on the other. Casting different concerns and knowledge in dual terms is an effective way to help establish (decisional) hierarchies or chains of command. However, it may not enable a balanced treatment of public, user and scientific concerns in technology development in and for society. One may wonder what would happen if the discursive playing field between experts and non-experts was levelled. What if experts and non-experts shared the privilege and responsibility of deciding when and where non-expert concerns were incorporated in technology?

To stimulate dialogue and exchange of views, it may be fruitful to occasionally reverse interaction patterns of how laypeople and plant experts typically communicate with one another. Normally, plant experts tend to *tell* and explain 'the facts', whereas laypeople are there to *listen* and to ask questions. This division of interactional labour tends to reinforce the low epistemic status of laypeople relative to experts. To change this state of affairs, experts may be invited to ask questions of laypeople, and laypeople may be invited to give a talk about their concerns or expertise alongside experts. Changing the traditional division of interactional labour between laypeople and experts may help redistribute responsibility for technology development in and for society, and ultimately, technologies that are optimal usable in society.

Samenvatting

Nieuwe technologieën worden geacht nuttig te zijn voor en in de samenleving. Als zodanig kunnen technologieën verstrekkende politieke en sociaaleconomische consequenties hebben; ze kunnen voor andere doelen ingezet worden dan waarvoor onderzoekers en ingenieurs ze oorspronkelijk ontwikkeld hadden. Of, een andere mogelijkheid, potentiële gebruikers of het bredere publiek verwerpen nieuwe technologieën. Het laatste geldt deels voor technologieën ontwikkeld in plantonderzoek; in Europa liggen plant technologieën zoals genetische modificatie (GM) al decennialang gevoelig bij een deel van het bredere publiek (zie bijvoorbeeld Gaskell & Bauer, 2001; Duarte, 2011). De hardnekkigheid van dit verschijnsel roept de vraag op hoe dit kan.

Een uitgebreide inhoudsanalyse van terugkerende argumenten voor en tegen GM in debatten laat zien dat zelfs als zogenoemde leken beschikken over kennis van alle argumenten voor GM dit niet perse leidt tot acceptatie of adoptie van GM (zie COGEM (2007)). Een verklaring voor het laatste is dat argumenten niet alleen informatie en standpunten communiceren; ze verrichten daarnaast ook discursief werk in gesprekken in de zin dat ze vaak onbewust en soms bewust verhoudingen tussen en handelingen van mensen managen (Potter, 1996). Gebruik van zogenaamde lekenargumenten door plantonderzoekers zijn bijvoorbeeld niet alleen manifestaties van kennis maar helpen plantonderzoekers ook om potentiële verwijten te pareren dat ze onvoldoende kennis hebben van of geen rekening houden met de zorgen en bezwaren die leven in de samenleving bij de ontwikkeling van nieuwe technologieën.

Tot nu toe is nog nauwelijks systematisch onderzocht hoe de performatieve functie van spraak-in-interactie tijdens bijeenkomsten van invloed is op hoe burgers en experts zich verhouden tot sociaal-maatschappelijke vraagstukken in de levenswetenschappen (zie bijvoorbeeld Veen et al., 2011). Het taalgebruik van wetenschappers in real-life real-time bijeenkomsten over gespecialiseerde onderwerpen zoals plantonderzoek is in het bijzonder nog nauwelijks bestudeerd.

Het onderzoeksproject *de discursieve Ander* beoogt hierin verandering te brengen door te exploreren wat de interactieve effecten zijn het taalgebruik van plantonderzoekers in uiteenlopende setttings: publieksmeetings, expert meetings en etnografische interviews. De hoofdmethodologie die gehanteerd wordt in het onderzoeksproject en in dit proefschrift is discursieve psychologie (DP). Deze methodologie wordt aangevuld met antropologische methoden zoals etnografische interviews.

DP focust op wat mensen bereiken in gesprekken met elkaar. Een discursief psychologische vraag is bijvoorbeeld: Hoe en met welk interactioneel resultaat brengen experts lekenargumenten in tijdens bijeenkomsten die focussen op technologieontwikkeling? Discursief psychologische analyses bieden doorgaans inzicht in hoe mensen in face-to-face ontmoetingen met elkaar onderlinge verhoudingen, identiteiten en claims (re)produceren en hoe sprekers routinematig interactionele dilemma's managen. Hoe interactionele dilemma's hanteerbaar gemaakt worden zou het inzicht kunnen vergroten in hoe de enigszins gespannen relatie tussen plant wetenschap aan de ene kant en gebruikers en burgers aan de andere kant in stand gehouden wordt.

Onderwerp van alle spraak-in-interactie die geanalyseerd wordt in het proefschrift *de discursieve Ander* is *Phytophthora Infestans* – een tot op de dag van vandaag veelvoorkomende plantziekte in voedselgewassen. Om Phytophthora te bestrijden doen

plantonderzoekers een beroep op voor een deel publiek omstreden technologieën als genetische modificatie (GM).

Onderzoeksdoelen
Het proefschrift de discursieve Ander beoogt:

- het inzicht te vergroten in hoe en met welk resultaat plant (genomics) experts de relatie tussen wetenschap en samenleving en de relatie tussen wetenschap en gebruikers managen in real-life, real-time gesprekken.
- het inzicht te vergroten in of en op welke manieren plant experts empowered kunnen worden om een reflexieve houding aan te nemen ten opzichte van hun praat *over* 'leken', gebruikers, genomics en Phytophthora.

De *discursieve* Ander als Centraal Concept
De discursieve Ander is het centrale concept dat discursieve analyses gepresenteerd in de hoofdstukken 3, 4 en 5 van deze thesis beoogt te verbinden. Dit concept als gebruikt in het proefschrift, is geïnspireerd op maar valt niet samen met het antropologische concept van de exotische Ander (Buchowski, 2006), Mead's concept van de gegeneraliseerde Ander (zie bijvoorbeeld Maranta et al., 2003; Holdsworth & Morgan, 2007) en Latour's begrip van actants (Latour, 1996). *Discursief* staat voor de Ander om te benadrukken dat er in dit proefschrift – anders dan bij de meeste andere studies die focussen op de Ander - de nadruk ligt op hoe plant experts discursief hun 'significante' Anderen managen.

Welke discursieve Ander experts relevant maken in bijeenkomsten varieert per interactiesetting: 'leken', prospectieve gebruikers van nieuwe plant technologieën en de plantziekte Phytophthora. Al deze discursieve Anderen hebben met elkaar gemeen da ze: (1) een belang hebben in Phytophthora onderzoek; (2) niet in staat zijn of niet de gelegenheid krijgen om zelf hun zorgen en bezwaren te uiten; (3) dat er over hen in generieke termen gepraat wordt; en dat ze (4) discursief behandeld worden als actoren die over handelingsmacht beschikken (onafhankelijk van of ze deze agency in het echt bezitten).

De volgende data zijn verzameld om inzicht te verkrijgen hoe en met welk resultaat plant experts hun discursieve Anderen relevant maken in spraak-in-interactie:

1. Twaalf etnografische interviews met plantonderzoekers zijn discursief geanalyseerd om te verkennen hoe en met welk resultaat plantonderzoekers de relatie tussen wetenschap en samenleving discursief construeren. De discursieve Ander in deze setting zijn 'leken'.
2. Acht expert overleggen verbonden aan Phytophthora onderzoeksprogramma's. In expert overleggen consulteren plantonderzoekers veld experts en leggen plantonderzoekers verantwoording af over de potentiële bruikbaarheid van hun onderzoeksresultaten. De discursieve Ander in deze setting zijn gebruikers.
3. Acht publieksbijeenkomsten en 25 etnografische interviews (de eerder genoemde twaalf interviews maken deel uit van deze set) zijn verzameld om plant experts' innovatief gebruik van (metaforische) framing van genomics en Phytophthora te exploreren. De discursieve Ander in deze setting is de plantziekte Phytophthora.
4. Twee workshops met in totaal 17 deelnemers. Deelnemers exploreren patronen in hun eigen spraak-in-interactie in etnografische interviews (1), plant expert bijeenkomsten (2) en etnografische interviews en publieksmeetings (3).

Onderzoeksbenadering: Discursieve Psychologie Aangevuld met Antropologische Methoden

De relatief jonge en onbekende discursieve psychologie (DP) is de hoofdmethodologie in dit proefschrift. DP focust op hoe spraak-in-interactie sociaal georganiseerd wordt en sociale doelen dient (Potter, 1996). Analisten zijn geïnteresseerd in hoe spraak-in-interactie bijdraagt aan het hanteren van interactionele dilemma's in specifieke interactie settings. Ze focussen daarbij in de praktijk op terugkerende interactiepatronen.

In de kern leunt discursieve psychologie in de analysefase op de toepassing van het participant proof principe en het retorische principe. Het participant proof principe houdt in dat de reacties van participanten in spraak-in-interactie op een uiting leidend zijn voor de analyse en niet wat sprekers beoogden te bereiken met een uiting. Een uitnodiging kan bijvoorbeeld uiteenlopende reacties uitlokken bij geadresseerden: de uitnodiging kan worden geaccepteerd, genegeerd of verworpen. De feitelijke respons op de uitnodiging bepaalt in hoge mate wat voor werk wordt gerealiseerd door de uitnodiging; acceptatie van een uitnodiging kan de band versterken tussen degene die de uitnodiging doet en degene die hem accepteert maar wordt een uitnodiging verworpen dan dat schaadt potentieel de relatie tussen gespreksdeelnemers. Het gegeven dat deelnemers aan spraak-in-interactie uiteenlopend kunnen reageren op elkaars uitingen betekent niet dat ze volstrekt willekeurig reageren op uitingen. Participanten in spraak-in-interactie doen vaak onbewust een beroep op sociaal-culture normen en betekenissen die ingebed zijn in uitingen. Bijvoorbeeld, de mededeling '*boeren zijn bang om nieuwe technologieën te gebruiken'* is relatief moeilijk te weerleggen omdat ze aansluit bij de welkbekende stereotype dat boeren van nature conservatief zijn. Gespreksdeelnemers houden zich daarnaast grotendeels aan in de vroege jeugd geleerde conversatieregels: een vraag dient bijvoorbeeld beantwoord te worden en niet gepareerd te worden met een tegenvraag.

Het retorisch principe houdt in dat de analist kijkt naar hoe gespreksdeelnemers zaken daadwerkelijk relevant maken in spraak-in-interactie en dit vervolgens vergelijkt met potentiële alternatieve verwoordingen van een uiting en de respons daarop.

Kenmerkend voor DP is verder de gedetailleerde transcriptie van spraak-in-interactie: pauzes in tienden van seconden en verandering in spreektempo en spreekvolume en andere non-verbale aspecten van spraak-in-interactie worden getranscribeerd. DP heeft daarnaast een voorkeur voor naturalistische gesprekken die veel beurtwisselingen tussen gesprekspartners bevatten. Met naturalistisch wordt bedoeld: gesprekken vinden onafhankelijk van de aanwezigheid en participatie van de onderzoeker plaats. Het laatste wil echter niet zeggen dat niet-naturalistische spraak-in-interactie niet geanalyseerd kan worden met discursieve psychologie.

Antropologische methoden zijn in het onderzoeksproject *de discursieve Ander* primair ingezet om de noodzakelijke fysieke en epistemologische toegang te verkrijgen en te behouden tot het veld van de plantwetenschappen en voor het succesvol verrichten van discursieve analyses. Concreet hield dat in dat ik een dag in de week gedurende drie jaar mijn werkplek bij plantwetenschappen gesitueerd was hetgeen me in staat stelde informeel plant experts te raadplegen. Daarnaast heb ik 25 etnografische interviews afgenomen, geobserveerd en aantekeningen gemaakt gedurende de opname van Phytophthora meetings en is het gebruik van concepten in het proefschrift gedeeltelijk geïnspireerd op antropologische inzichten.

Gebaseerd op mijn onderzoekservaringen beargumenteer ik in hoofdstuk 2 van het proefschrift dat fysieke en epistemologische toegang tot het onderzoeksveld niet

vanzelfsprekend is en dat de mate waarin de onderzoeker toegang verkrijgt tot het onderzoeksveld uitkomsten van discursieve analyses kunnen beïnvloeden. De implicatie hiervan is dat het goed zou zijn als meer onderzoekers die discursieve analyses verrichten verslag doen van hoe ze fysieke en epistemologische toegang tot het onderzoeksveld hebben verkregen en behouden.

Resultaten Discursieve Analyses

In hoofdstuk 3 en 4 is geanalyseerd met discursieve psychologie hoe plant experts praten over zogenaamde leken en gebruikers van nieuwe technologieën. De focus van de analyses ligt op de functies die dominante patronen in verwijzingen naar leken en gebruikers vervullen in spraak-in-interactie. Hoofdstuk 5 richt zich op de interpretaties die innovatieve en interactieve (metaforische) framing van probleem-oplossing constructies uitloken. In de onderzochte probleem-oplossing constructies wordt Phytophthora als het probleem gepresenteerd en toepassingen van genomics als de oplossing.

In hoofdstuk 3 ligt de focus op hoe plantonderzoekers de relatie tussen wetenschap en samenleving discursief construeren. Wanneer plantonderzoekers praten over hoe ze de relatie tussen wetenschap en samenleving zien uiten ze consequent eerst hun tolerantie voor lekenargumenten om vervolgens deze lekenargumenten te contrasteren met wetenschappelijke argumenten. Plant experts neigen ertoe om lekenargumenten discursief ondergeschikt te maken aan wetenschappelijke argumenten zonder het beeld op te roepen dat ze geen weet hebben van of niet geven om lekenargumenten. Door expliciet discursief te tonen dat ze toegang hebben tot lekenkennis in het dagelijkse leven en beschikken over technologisch-wetenschappelijke kennis in het werkleven wekken plant experts de suggestie dat zij het beste in staat zijn om te beoordelen waar en wanneer lekenkennis relevant is en meegenomen dient te worden in technologieontwikkeling.

Hoofdstuk 4 focust op hoe en met welk resultaat plant experts praten over toekomstige gebruikers van technologie – boeren en plantveredelaars – in bijeenkomsten over Phytophthora onderzoek. Plant experts citeren dialogen tussen hen en gebruikers. Deze zogenoemde *reported dialogues* tonen aan dat plant experts toegang hebben tot gebruikersargumenten met betrekking tot technologie en dat argumenten van gebruikers voor een belangrijk deel niet compatibel zijn met wetenschappelijke inzichten. Het laatste bereiken plant experts door gevoelens van gebruikers af te zetten tegen de kennis van experts. Uiteindelijk stellen gequote dialogen plant experts in staat argumenten van gebruikers te parkeren.

Hoofdstuk 5 exploreert de innovatieve interactionele framing van kernconcepten in Phytophthora onderzoek. Met framings van het genomics concept scheiden plant experts genomics discursief af van publiek omstreden GM. De framing van genomics contrasteert met plant experts' framing van de relatie tussen wetenschap en samenleving en met de framing van de relatie tussen wetenschap en gebruikers in hoofdstuk 3 en 4. Plant experts claimen met hun genomics framings dat ze niet verantwoordelijk zijn voor de maatschappelijke relevantie van nieuwe plant technologieën terwijl ze dit wel impliciet claimen met hun andere discursieve constructies.

Verder neigen plant experts ertoe Phytophthora te personificeren in interviews en publieksmeetings; personificatie is het toeschrijven van menselijke eigenschappen aan dieren, planten of objecten. De personificatie van Phytophthora stelt plant experts in staat aannemelijk te maken dat het nog steeds de moeite waard is om Phytophthora onderzoek te

financieren en dat plantonderzoekers het beste toegerust zijn om Phytophthora duurzaam te bestrijden. Ten slotte, projecteren plant experts met een visuele metafoor - een specifieke vorm van framing - dat genetische modificatie noodzakelijk is voor de duurzame bestrijding van Phytophthora.

Hoofdstuk 6 doet verslag van een exploratieve studie waarin gepoogd is plant experts te empoweren om zelf met een discursief psychologische bril naar gesprekken over Phytophthora onderzoek te kijken. Achterliggende gedachte bij deze deelstudie is dat als plant experts in staat zijn om naast inhoud naar interactie-effecten van hun voordrachten en interacties te kijken dit een positief effect kan hebben op hoe plant experts discursief omgaan met het brede publiek en gebruikers van technologieën omdat ze bewuster omgaan met de performatieve dimensie van taal. Twee workshops met in totaal 17 deelnemers zijn gehouden om dit te onderzoeken. Workshop deelnemers kregen één fragment uit hoofdstuk 3, 4 en 5 voorgelegd om zelf te analyseren aan de hand van discursief psychologische principes. Plant experts bevestigden in hun eigen woorden de belangrijkste discursieve functies die in hoofdstuk 3, 4 en 5 aan de orde komen. Daarnaast leveren de workshops ook een aantal nieuwe inzichten op.

De Discursieve Ander in Verschillende Interactieomgevingen

De Ander centraal stellen in spraak-in-interactie stelt plant experts in staat verschillende participantendilemma's te managen. De analyses in de verschillende hoofdstukken tonen aan dat het construeren van leken, gebruikers en Phytophthora als een Ander die een potentiële bedreiging vormt niet per se discursieve paden creëert die bijdragen aan nieuwe technologieën die minder gevoelig liggen of gebruiksvriendelijker zijn. Plant experts' discursieve constructies van de relatie tussen wetenschap en samenleving, bijvoorbeeld, laten zien dat er verschillen zijn tussen visies van leken en experts op technologie (zonder al te diep in te gaan op de inhoud). De erkenning van verschil wordt echter niet primair ingezet om de relevantie van lekenargumenten voor technologieontwikkeling te beamen laat staan dat de erke nning van verschil ingezet wordt om de incorporatie van lekenargumenten in nieuwe technologieën te bevorderen.

In plaats daarvan zetten plantonderzoekers de verschillen tussen leken en experts aan om lekenargumenten als ondergeschikt aan wetenschappelijke inzichten neer te zetten. De erkenning van lekenargumenten in de privésfeer helpt plantonderzoekers om zichzelf te presenteren als *knowledge hybrids* die in een optimale positie verkeren om de relevantie van lekenargumenten voor technologieontwikkeling te beoordelen. Door dat te doen claimen ze impliciet de volledige verantwoordelijkheid voor de kwaliteit en relevantie van onderzoek gericht op de ontwikkeling van nieuwe technologieën. Bezwaren van gebruikers ondergaan een vergelijkbaar lot in expert meetings zij het met behulp van andersoortige discursieve middelen.

Kern van het probleem lijkt te zijn dat de niet-wetenschappelijke Ander behandeld wordt als een potentiële opponent. Phytophthora wordt bijvoorbeeld gepresenteerd als een slimme en onvoorspelbare tegenstander. En plant experts' praat in wij-zij terminologie in hoofdstuk 4 suggereert een tegenstelling tussen gebruikers enerzijds en experts anderzijds. Het verwoorden van bezwaren en argumenten van verschillende groepen in duale termen is een manier om beslishiërarchieën te helpen creëren. Het spreken in duale termen lijkt echter niet bij te dragen aan een gelijkwaardige behandeling van publieks-, gebruikers en wetenschappelijke argumenten in technologieontwikkeling in en voor de samenleving. Men kan zich afvragen wat er zou gebeuren als het discursieve speelveld tussen experts en leken

gelijk getrokken zou worden. Wat zou er gebeuren als experts en leken het privilege en de verantwoordelijkheid zouden delen voor hoe rekening gehouden wordt met niet-wetenschappelijke argumenten in technologieontwikkeling?

Het met enige regelmaat omkeren van dominante patronen in hoe experts en leken met elkaar communiceren zou de gelijkwaardige dialoog en de uitwisseling van ideeën en argumenten kunnen stimuleren. Traditioneel vertellen experts hoe het zit, leken luisteren en stellen vragen. Deze verdeling van interactionele arbeid bevestigt de relatief lage epistemologische status van leken in technologieontwikkeling in de plantwetenschappen. Het met enige regelmaat omgooien van dominante interactieve patronen zou kunnen bijdragen aan reflectie op bestaande praktijken en mogelijk een redistributie van verantwoordelijkheden in technologieontwikkeling helpen bewerkstelligen die bijdraagt aan technologieën die beter aansluiten bij de samenleving.

Karen Gabriëlla Mogendorff
Wageningen School of Social Sciences (WASS)
Completed Training and Supervision Plan (TSP)

Name of the learning activity	Department/Institute	Year	ECTS 1=28hrs
A) Project related competences			
Masterclass Interpretive analysis	WUR	2011	1.5
Investigating technology	WASS	2011	4.0
Conversatie-analyse	VU/T&C	2009	2.5
Communication Strategies in Everyday Life (COM 32806)	WUR	2009	3.0
Summerschool LOT	UU	2010	1.5
Assessing Technology Assessment	WTMC	2012	3.0
Ethographic Writing	WASS	2012	3
B) General research related competences			
Scientific Writing	Language Services	2010	1.8
Procesbegeleider ACT	WUR	2010	1.5
Mansholt Introduction	MG3S	2009	1.0
Scientific Publishing	WGS	2012	0.3
Last Stretch of a PhD	WGS	2012	
Teaching Assistent Social Psychology	WUR	2011	2.0
C) Career related competences/personal development			
PhD Assessment	WGS	2010	0.3
Stem en presentatietraining	WGS	2010	0.4
Atlas ti	UvH	2010	0.6
Grant proposal writing	Language Services	2013	2.0
Presentations at International conferences		2010-2014	10.0
Total			**38.4**

Paper and Poster Presentations and Guest Lectures Period 2010-2014
Attachment of Completed TSP

2010

Mogendorff, K.G. (2010). *Interactional Dynamics of Expert–Stakeholder Communication in Crop Genomics,*
Poster presented at CBSG2012, March 2010, Wageningen, The Netherlands

Mogendorff, K.G. (2010). *Unknown, Unloved,*
Short presentation at CSG Research Days, 22–23 September 2010, Nijmegen, The Netherlands

2011

Mogendorff, K.G. (2011). *De Rol van Expert-Leek Constructies in Communicatie* [The Role of Expert–Lay Constructions in Communication],
Paper Presented at Etmaal van de Communicatiewetenschap 2011, 24 January 2011, University of Twente, Enschede, The Netherlands (paper also appeared in the conference proceedings)

Mogendorff, K.G.(2011). *Managing the Expert–Lay Relationship: The Uses of Membership Categorization,*
Poster presented at the CBSG2012, 31 January 2011, Wageningen University, Wageningen, The Netherlands

Mogendorff, K.G. (2011). *Scientists' Discursive Constructions of the Science–Society Relationship,* Paper presentation 23 May 2011, CSG Research Days, Nijmegen, The Netherlands

Mogendorff, K.G. (2011). *Unknown, Unloved: Strategies to Get Permission to Record Meetings of Plant Scientists,*
Poster Presented at the Symposium *Engaging with Genomics*, 20 June 2011, Graz, Austria

Mogendorff, K.G. (2011). *Dynamiek in Expert-Stakeholder Interacties: Discursieve Strategieën om te Waarborgen dat Ontwikkelde Technologieën Aansluiten bij de Praktijk en in de Samenleving*, [Dynamics in Expert–Stakeholder Interactions: Discursive Strategies to Ensure that New Technologies are Usable in and by Society],
Invitational presentation for the Societal Interface Group of the Centre for BioSystems and Genomics (CBSG), 8 September 2011, Wageningen University, Wageningen, The Netherlands

Mogendorff, K.G. (2011). *Gebruik van Discursieve Constructies in Deskundigenoverleggen: Eerste Resultaten [The Uses of Discursive Constructions in Stakeholder Board Meetings: Preliminary Results],*
Invitational talk for study participants, October, Nijkerk, The Netherlands

Mogendorff, K.G. (2011). *Consequences of Plant Scientists' Constructions of the Expert–Lay Divide,*

Paper presentation at the annual meeting of the Society for the Social Study of Science, 2–4 November 2011, Cleveland, Ohio, USA

Boersma, R., J. Jacobs, K. Mogendorff (2011). *What Can Stakeholders Involved with Genetic Manipulation Learn from the Recent Nuclear Power Debacles?*
Paper presentation by Reginald Boersma at EFFoST 2011, 9 November 2011, Technical University Berlin, Berlin, Germany

2012

Mogendorff, K.G. (2012). *The Uses of Variations in Reported Speech about Users in Stakeholder Board Meetings in Plant Science*,
Paper presented at the Discourse, Communication Conversation conference, 22 March 2012, Loughborough University, Loughborough, UK

Mogendorff, K.G. (2012). *The Uses of Variations in Reported Speech about Users in Stakeholder Board Meetings in Plant Science*,
Paper presented at the PCST2012 Conference, theme: Beauty, Honesty, Quality, 20 April 2012, Florence, Italy (short version of the paper is published in the conference proceedings)

Mogendorff, K.G. (2012). *Scientists' Constructions of Plant Disease and their Fight Against it: Are Personification, Contextualization and Gerrymandering as Strategies Effective in Building Public Trust in Plant Disease Science and Technology?*,
Paper presentation at AWIA symposium *Applied Conversation Analysis*, 4 October 2012, Groningen University, Groningen, The Netherlands

2013

Mogendorff, K.G. (2013). *Holding up a Mirror to Scientists: Participants in Workshops Reflect on the Impact of Their Own talk about Phytophthora and Users,*
Poster presented at CBSG2012, 11–12 February 2013, Wageningen, The Netherlands

Mogendorff, K.G. (2013). *De plaats van Ziekte in het Leven van Mensen met Chronische Beperkingen: Over Zelfbeeld, Stigmatisering en Disability Management* [The Place of Illness in the Life of Disabled People: About Self-Image, Stigmatisation and Disability Management], Guest lecture, 12 June 2013, Course: Anthropology and Sociology of Health, Wageningen University, Wageningen, The Netherlands

Mogendorff, K.G. (2013). *Experts' Talk-in-Interaction in Plant Technology Science: Choices in Research*,
Guest lecture, Course: Advanced Communication Science, Strategic Communication, 3 October 2013, Wageningen University, Wageningen, The Netherlands

2014

Mogendorff, K.G. (2014). *Turning Experts in Self-Reflective Communicators: The Discursive Action Method at Work,*

Paper presentation at Etmaal v/d Communicatiewetenschap 2014, 3 February 2014, Wageningen University, Wageningen, The Netherlands

Mogendorff, K.G. (2014). *De Plaats van Ziekte in het Leven van Mensen met Chronische Beperkingen: Over Zelfbeeld, Stigmatisering en Disability Management* [The Place of Illness in the Life of Disabled People: About Self-Image, Stigmatisation and Disability Management], Guest lecture, 19 June 2014, Course: Anthropology and Sociology of Health, Wageningen University, Wageningen, The Netherlands

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After her studies, Karen worked within and outside academia on various (interdisciplinary) research projects before she started her PhD research in the fall of 2009. She has a particular interest in solving methodological puzzles, and with her research she likes to challenge implicit dominant norms built into the physical and sociocultural environments in which people live and work.

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