1 TITLE

The art of misunderstanding: how to detect, handle and prevent misunderstandings of regulatory texts on information security.

2 SUMMARY

Speech act theory offers a central insight: utterances do not just convey meaning, they are actions that assert, request, warn, promise, invite, predict, offer, direct. In conversation, we generally recognise speech acts automatically and correctly, and almost as soon as the other starts to speak. But in some situations there is a problem. With regulatory texts on specific subjects, even the experts frequently disagree exactly what responsibility these texts confer onto whom. I propose to show that in these situations, the misidentification of speech acts is a major source of confusion; that the author(s) and audience have different interpretations of what speech acts are contained in these texts, and what the normative dimensions of these speech acts are. These findings will be interpreted in the context of Brandom's normative inferentialism, and against the background of the cognitive theory of predictive processing; both sharing an notion of common ground and score keeping. Together, these theories may be combined to provide a framework for normative agency and interaction, of which speech acts are an instance. From this combination of philosophical insights and experimental findings, I aim to provide recommendations to improve understanding of regulatory texts on information security.

3 DESCRIPTION

3.1 THE PROBLEM AND ITS RELEVANCE

Human society runs on norms. Norms tell us how we are expected to behave and what we may expect from others. From an administrative point of view, authorities may wield norms as instruments of governance, i.e. to direct or constrain behaviour. Such norms are usually set out in writing, in letters, regulations, standards or law.

Some norms exist to protect society at large and hence are of particular importance. This century, information security has become a major concern. Threats range from common theft to a disgruntled employee bent on revenge; from industrial espionage to natural disaster; from human error to terrorist attack. As threats increase, so does the risk of inadequate protection of information and its disruptive effects on society (The Netherlands Scientific Council for Government Policy, 2019). A multitude of (inter)national regulations has

emerged, and more are appearing every day. These regulations guide, direct or compel to institute good information security governance and to be transparent about the level of compliance achieved. Failing to comply may be punished in various ways: a formal warning, a fine, a revoked licence, or public shaming; and may result in the loss of a job, bankruptcy, or even a prison sentence. Governments and businesses generally recognise the importance of information security- if not for society's sake, then for their own.

However, there is a problem. Regulatory texts are often hard to understand and open to different interpretations, resulting in inadequate or inconsistent security measures. I make this observation from over 20 years of experience as an IT and information security professional.

Attempts to remedy this situation have been based on a now classic philosophical notion of language and thinking popular in business environments and particularly within the IT industry, namely that language is representational. Simply put, we assign names to objects, and predicates to sets of objects. Having so created internal representations of our knowledge of the outside world, we can then use these in our mental reasoning (computing) and from there, to language. On this view, a misunderstanding is thought to be caused by either inadequate expression or a lack of proper definition, and it is along these lines that attempts improve the situation have been made. With little success. To illustrate:

- Contrary to popular opinion, authors of regulatory texts are well able and willing to use plain language. Abstract wording usually arises through a group effort which aims for consensus. Not surprisingly, sending policy makers on a writing course has not improved matters (Terlouw et al., 2006, pp. 25–29).
- Re-casting textual interpretation problems in terms of information processing has led IT professionals to try to define concepts through tools of their industry, i.e. through descriptive languages or formal ontologies. This has led to more, not less divergence on what relevant concepts words actually stand for. See Souag et al. (2012) and Alenezi et al. (2020).

On similar lines, a recent report by the Dutch Nationaal Cyber Security Centrum (2020, p. 38) lists the experts' view of possible causes for inadequate security measures. Lack of knowledge and inadequate behaviour features prominently, suggesting that knowing exactly what to do and actually doing it, is problematic, but no further analysis is made of the root cause.

3.2 PROPOSED APPROACH

Since classic representationalism, another way of looking at language has emerged that may be more helpful in understanding how text may be misunderstood: the view that language is a tool for facilitating action, rather than a

passive medium. To use language is to perform an act: a *speech act*, such as asserting, requesting, promising, warning, inviting, apologising. Speech acts are now also called speech action (Sbisà & Turner, 2013, p. 15). On this action-oriented view of language, a misunderstanding arises from a failed interaction between two or more agents rather than from a faulty formula in standardised communication, such as in computer programming.

I propose to view regulatory texts through this lens of speech acts, regarding them as consisting of written utterances that perform acts. Regulatory texts are produced by groups for groups. The author-group acts as a *speaker* in producing a written text on behalf of an authority. Government- and business security professionals fulfil the role of *hearer. Speaker* and *hearer* do not interact directly but indirectly through support, maintenance or auditing procedures, and hence are asynchronous. The absence of direct interaction creates a situation where any misunderstandings cannot be recognised by the speaker and hence cannot be corrected. It is not known to what extent the hearer detects any difficulties in interpretation regulatory texts and, if so, what strategies the hearer uses to resolve such issues.

3.3 THEORETICAL ISSUES
Understanding how misinterpretation of regulatory texts arises, may be remedied or even prevented, requires a coherent framework from which to address the question. If speech acts are actions, then speakers and hearers are agents who interact, so we need to make assumptions about agency and about interaction. If interactions build on previous interactions, we need to make assumptions about how this works, and how agents are cognitively equipped to do this. Currently, no such philosophical framework exists around speech acts, so this needs sketching. Some essential components that need fleshing out are listed below.

3.3.1 Interaction and asynchronous communication
Research on speech acts has mostly been done on conversation, with some notable exceptions (Gísladóttir et al., 2012). There is some other research on specific literary texts, speech and other asynchronous communication, such as on social media, but a systematic overview of the differences between interactive and asynchronous speech acts does not seem to exist. This overview needs extracting, for instance, from a recent paper by Labinaz and Sbisà (2021).

3.3.2 Speech act identification
There are many kinds of speech acts. Levinson (2017, p. 199) lists four approaches which are usually combined in identifying speech acts:

   i.   natural metalanguage, that is identifying such words as promising, offerings, declaring, Austin's project. However, natural language is not an especially reliable pointer;

ii. felicity conditions, i.e. specifying the exact conditions under which a speech act will succeed; There are several families of speech-act theory (Harris et al., 2018, pp. 1–16). Underlying each theory, there are assumptions about how the properties of communicative acts are grounded: in *convention* (Austin), *intention* (Grice), *function* (Millikan), *expression* (Green, Bar-on) or *norm* (Brandom). These approaches differ in how they approach convention, mental states, and normativity. For this reason, there is no theory-neutral way to classify speech acts or their felicity conditions;

iii. using a current response to identify prior speech acts (speech acts tend to come in pairs; the response "thanks' must have been elicited from a previous offer);

iv. sequential position of a response that is part of an exchange (for instance, the use of the word "ok" at the beginning, the middle or the end of a conversation renders a different meaning).

Additionally, writing style of regulatory texts may be modelled on legal texts, and hence the resulting speech acts may differ from more mainstream texts. See Ruth Breeze (2017) for an analysis of phraseology, revealing "how patterning in legal language weaves an intricate web of semantic meanings". Also: van der Kaaij (2019) on how (semi) legal language generates normative consequences where ordinary language does not.

3.3.3   Common ground and the normativity of speech acts

The notion of discursive context or *common ground (*Grice, 1989*;* Stalnaker, 2002*)* applies to all speech-act theories, although interpretations vary between speech-act families (Harris & McKinney, 2021). Allan (2013) lists related notions: common knowledge (Lewis, 1969), mutual knowledge (Schiffer, 1972) and assumed familiarity (Prince, 1981).

Following Geurts (2020), I assume that common ground is essentially though perhaps not exclusively *normative,* supporting the way we commonly keep tabs on each other: claiming, correcting, expecting—the game of giving and asking for reasons. As Brandom puts it: "We are *deontic scorekeepers.* Speech acts, paradigmatically assertions, alter the deontic score; they change what commitments and entitlements it is appropriate to attribute, not only to the one producing the speech act but also to those to whom it is addressed" (Brandom, 1994, p. 142). He goes on to say that it is "the job of pragmatic theory is to explain the significance of various sorts of speech acts in terms of practical proprieties governing the keeping of deontic score-what moves are appropriate given a certain score, and what difference those moves make to that score". Unfortunately Brandom restricts himself to assertions, which calls for further investigation into other types of speech acts; for instance, seeKukla and Lance (Kukla & Lance, 2009) and Kibble (Kibble, 2006).

3.3.4 Agency

Brandom positions normative relations between discursive practitioners prior to content. As he puts it: "semantics must answer to pragmatics" (Brandom, 1994, p. 83). The idea is that a philosophy of semantics must start by acknowledging that contents is conferred to linguistic expression by the practices of those who use them (Turbanti, 2017, p. 40), i.e. semantics is not conceptually autonomous from pragmatics (MacFarlane, 2010, p. 82). This brings the role of discursive practitioners as *normative agents* into focus, which, Brandom says, is a role only sapient, i.e. not merely sentient beings play. There is the further question of how we recognise this agency and know to assign a normative status to them. Brandom's new book, A spirit of trust (2019), further develops a notion of semantic trust that may be helpful in starting to find an answer to this question. Sbisà and Turner (2013, p. 2) also point out the need to connect up speech act theory with a theory of agency and action, as do Gísladóttir et al. (2012).

3.3.5 Cognitive architecture

Despite theoretical difficulties in identifying of *speech acts*, actually recognising them in conversation is "miraculously" fast and accurate as Levinson (2017, p. 208) puts it. He helpfully summarises research on turn-taking in conversation: gaps between turns are 200-300 milliseconds. Given that the fastest response from conception to word takes 600 milliseconds, speakers in a conversation must recognise the type of speech act early on in the turn. Comprehension and production processes must overlap, even if we have no idea how this is managed cognitively. Something similar must be true of our use of *common ground*, whatever the construal of that notion. On Brandom's view, the use of the common ground involves keeping track of not just our own deontic status but also the status of other people, i.e. constant perspective changing. Even with this extra cognitive load, our access to and use of common ground during conversation seems fast and effortless.

What kind of cognitive architecture fits these data? Friston and Friston (2013) suggest it may be the same architecture that underlies birdsong and allows us to enjoy music: *predictive processing*. The brain is not an extractor of knowledge from sensations, but an organ of inference, actively constructing explanations for what is going on out there, beyond its senses (Friston, 2018). The brain minimises surprises by comparing its data on the outside world (downstream prediction) against this outside world (upstream sensory information), to minimise surprise. The notion of *precision weighting* allows for fine tuning of prediction based on prior knowledge (Clark, 2015, p. 5). Such a cognitive architecture allows for pattern recognition through the tracking of status changes (interrupts) and therefore is highly efficient. Pfeffer and Lynn (2019, p. 249) usefully describe how the idea of predictive processing translates into a set of requirements for a cognitive architecture, such as a layered construction that allows prediction of and error detection in the next layer.

3.4 RESEARCH QUESTION

Is misinterpretation of regulatory texts on information security (partly) due to misidentification of speech acts and/or their normative dimensions?

I will work from the idea that:

- language comprehension is done through *predictive processing*, i.e. through a sequence of pattern recognition from coarse to fine.
- loosely in keeping with Brandom's deontic *scorekeeping*: recognition of social agency comes before recognition of speech acts; all of which comes before in-depth processing of semantic content. It is possible that linguistics research exists that supports these assumptions; this needs investigating.

Sub questions:

a) How is *asynchronous* speech different from conversation and what effect might this have on the identification of speech acts in written texts? See section 3.3.1 and section 3.3.4.
b) What kind of speech acts are contained in regulatory texts on information security? See section 3.3.2. Presumably this will yield *assertions (*MacFarlane, 2011*;* Sbisà, 2019*)* but also other types of speech acts, such as *commands (*Portner, 2007*, 2012*), advice (*Al-Aadeli, 2013*), stipulations (*Shields, 2021*)* and *exertions* (McGowan, 2018).
c) What are the *normative* dimensions of these speech acts (other than assertions)? See section 3.3.3.
d) What speech acts are intended by the author (speaker) of the regulatory text? Do security professionals (hearer) correctly identify speech acts in regulatory texts on information security? This will establish the extent to which the hearer recognise speech acts as intended by the speaker.
e) Does the normative status of the author (speaker) or the publication itself influence hearer's identification of speech acts? See section 3.3.4.
f) Do security professionals (hear*er*) notice when they might have incorrectly identified speech acts? If so, what strategies do they employ to remedy his? See section 3.3.5.

I propose to research this both from the philosophical armchair (questions a - c) and in the real world (questions d - f), using the actual authors of regulatory texts on information security as speaker and senior security professionals as hearers. The idea behind using such a select sample is to prevent interference from knowledge or motivation. These are the very people that by profession have to work with these regulatory texts and have a vested interest in avoiding misunderstanding.

4 KEYWORDS

Philosophy of language, speech acts, normativity, scorekeeping, common ground.

5 TIMETABLE

Work schedule covering 3-4 years

Phase	Main research	Estimated duration (months)	Type	Outcome related to question
0	Theoretical background of speech acts theory and its relation to philosophy of mind and cognitive psychology	6	Desk research	Back-ground
1	Asynchronous (written) language versus conversation: general differences and possible effects on speech act identification	4	Desk research	1a
2	Identification of speech acts in a sample of regulatory texts on information security	4	Empirical	1b
3	Establish normative dimensions for speech acts other than assertions found in phase 2	12	Desk research	1c
4	Set up field experiment	5	Desk research; have design checked	Experimental design
5	Run field experiment and collect results	8	Empirical	1d, 1e and 1f
6	Writing it up the dissertation	9	Desk research	
		48		

6 Summary for non specialists

We humans have many norms: for eating, speaking, dressing, driving, speaking, smelling, playing and every other activity imaginable. Norms guide our social expectations and keep us in check, affording predictability to our lives. Some norms affect all of society and are typically shared in some written form, mostly via regulations, sometimes via laws. Such is the case with norms for information security, because digital information is rapidly becoming one of the most threatened assets of our society. Unfortunately, we can no longer do without digital information, on pain of severely disrupting our way of life.

It seems obvious that implementing and adhering to such norms is in the interest of both the general public and the individual company. Unfortunately, misunderstandings and disagreements on the interpretations of such regulatory texts often arise, even amongst the experts. The question is, why? There is a general tendency to blame the usual suspects: lack of knowledge, unclear definitions or lack of writing skills. Such approaches have not proved productive: the problem is still there.

I propose another approach, namely to examine these regulatory texts from the point of view of what actions and responsibilities they imply, either for the author or for the audience. Under normal circumstances, we are very good at detecting what kind of action is implied by something said to us. We recognise questions (implies giving an answer), assertions (implies stating a belief), directives (implies doing as you are told), promises (implies a commitment) almost from the moment someone starts to talk to us. To give a real life example: the directive 'eat your greens' does not just point out vegetables on your plate that you might eat; you are being told by someone in a position of authority that you are expected to eat them. Regulatory texts are a bit strange in this respect: in these texts is not easy to detect the difference between a directive and an advice, or between an assertion and a stipulation, or between a permission and a suggestion. I mean to establish this as a fact through empirical research involving both the author(s) and the consumers of specific regulations.

Interpreting such findings needs a framework which involves a theory of language (how are sentence actions?), of agency (how are speech actions related to agents, and what exactly is the role of an agent?), of cognition (how do we process language?) and of shared norms (what comes first, norms or meaning?). Such theories exist, but not in any interconnected framework. This framework will be developed; the experimental findings positioned within it; and from there, hopefully some practical guidance will emerge on how to improve regulatory texts on the one hand, and for further research into the art of misunderstanding on the other hand, as it is unlikely that all sources of misunderstanding will be identified in this project.

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8 CURRICULUM VITAE

8.1 EDUCATION

8.1.1 General education
- Stedelijk gymnasium Haarlem, 1974-1979
- Prince Henry's High School, Evesham, UK. 12 O levels, 4 A levels and a multitude of school prizes.
- University of Oxford, Corpus Christi College, BA Philosophy, Psychology and Physiology (PPP), 1984; MA in Philosophy and Psychology in 2005
- University of Amsterdam, 'doctoraal' in organisational psychology (1986-1988), thesis not completed due to financial circumstances.
- Radboud University, Research Master Philosophy of Language, started February 2019.

8.1.2 Work related education
- The Open Group, Master IT architect, 2011, since serving as a certification board member.
- ISACA, Certified Information Security Manager (CISM), 2018

8.2 WORK EXPERIENCE
- ICT Amsterdam bv, 1985-1990. IBM midrange programmer, system engineer; later information analyst;
- 4Ever Solutions bv, 1990-1998. IT consultant and project leader.
- Dutch Tax Office, 1998 – now. First program manager, then domain architect for several domains (data, security, tax compliance, IT factory). Now senior policy advisor for information security. I also represent the Dutch Tax Office in the national governmental "BIO" workgroup as an expert on information security.