PROLEGOMENA TO A THEORY AND MODEL OF VERBAL PERSUASION

A Subjective-Probabilistic, Interactive Model of Persuasion (SPIMP)

PhD Thesis
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I, Jens Koed Madsen, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

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Es imposible describir lo importante que eres para mí
Tu influencia en mi vida, mi trabajo y hasta en la noción de mí mismo
Juntos, papagina, podremos explorar los caminos menos transitados
Y ésto, es lo que nos hará siempre diferentes, siempre mejores

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Abstract Prolegomena to a theory of spoken persuasion: A Subjective-Probabilistic Interactive Model of Persuasion (SPIMP)

Various disciplines such as rhetoric, marketing, and psychology have explored persuasion as a social and argumentative phenomenon. The present thesis is predominantly based in cognitive psychology and investigates the psychological processes the persuadee undergoes when faced with a persuasive attempt. The exploration concludes with the development of a concrete model for describing persuasion processing, namely The Subjective-Probabilistic Interactive Model of Persuasion (SPIMP). In addition to cognitive psychology, the thesis relies on conceptual developments and empirical data from disciplines such as rhetoric, economics, and philosophy.

The core model of the SPIMP relies on two central persuasive elements: content strength and source credibility. These elements are approached from a subjective perspective in which the persuadee estimates the probabilistic likelihood of how strong the content and how credible the source is. The elements, however, are embedded in a larger psychological framework such that the subjective estimations are contextual and social rather than solipsistic. The psychological framework relies on internal and external influences, the scope of cognition, and the framework for cognition. The SPIMP departs significantly from previous models of persuasion in a number of ways. For instance, the latter are dual-processing models whereas the SPIMP is an integrated single-process approach. Further, the normative stances differ since the previous models seemingly rely on a logicist framework whereas SPIMP relies on a probabilistic.

The development of a new core model of persuasion processing constitutes a novel contribution. Further, the theoretical and psychological framework surrounding the elements of the model provides a novel framework for conceptualising persuasion processing from the perspective of the persuadee. Finally, given the multitude of disciplines connected to persuasion, the thesis provides a definition for use in future studies, which differentiates persuasion from argumentation, communicated information updating, and influence.

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Monograph versus article-based thesis

This thesis is a monograph that deals extensively and theoretically with the topic of persuasion and no peer-reviewed paper is re-printed in the thesis. However, my research has led to several publications during my PhD, which have naturally influenced the ideas in the thesis. These papers are cited on equal footing with papers from other academics. That is, I pay no special interest to these, but cite and quote them simply in the same way as if others had written them. Nonetheless, to provide an overview of the written work completed during the PhD, here is a list of the papers published, submitted, or in preparation that naturally form part of the background and motivation for the thesis. The papers are either available online or upon request if the committee needs them.

Harris, A., Hsu, A. & Madsen, J. K. (2012) Because Hitler did it! Quantitative tests of Bayesian argumentation using *Ad Hominem*, *Thinking and Reasoning* 18 (3), 311-343

Harris, A., Hsu, A., Madsen, J. K. & Hahn, U. (submitted) The Appeal to Expert Opinion: Quantitative support for a Bayesian Network Approach, *Cognitive Science*

Madsen, J. K. (2012) 'Overtalelse' defineret i et retorisk perspektiv, *Rhetorica Scandinavica* 16 (2), 37-57

Madsen, J. K. (2013) A Cognitive Supplement to Rhetorical Theory, in Belle, H. v., Gillaerts, P., Gorp, B. v., Mieroop, D. v. d. & Rutten, K. (Eds.) *Verbal and Visual Rhetoric in a Media World*, Leiden University Press: Mulder van Meurs: Amsterdam, 95-116

Madsen, J. K. (submitted) Approaching Bayesian subjectivity in a temporal perspective, *Cybernetics & Human Knowledge*

Madsen, J. K. (in prep. A) Persuasion: A review of definition, description, and analyses

Madsen, J. K. (in prep. B) General Cluster: A Psychological Exploration and Theoretical Improvement of Cluster Criticism from a SPIMP approach

Madsen, J. K. (in prep. C) Intentionality and attention in persuasion processing, *Phenomenology and the Cognitive Sciences*

Madsen, J. K. & Chamberlain, R. (in prep) A Meta-Analysis of Participant Pools in Psychological Research: A Review of 10 Years

Madsen, J. K. & Chater, N. (in prep.) Persuasion: A puzzle for reasoning theories? *Cognition*

Madsen, J. K., Pezzulo, G. & Chater, N. (in prep.) A mechanistic foundation for human communication: Grounding pragmatic enrichment in interactivity, *Cognition*

Introduction

Not brute force, but only persuasion and faith are the kings of this world

Thomas Carlyle

The object of oratory alone is not truth, but persuasion

Thomas Macaulay

The study of persuasion

Persuasive attempts, understood as a mutually acknowledged act to change the beliefs of the persuadee, permeate and penetrate society. In an obvious manner, politicians vie for our attention and vote, advertisers push and peddle products in a fiercely competitive market, and orators have debated and continue to debate the fundamental ideas of society such as economic policies, ethics, and public health. Central to these discussions is the fact that persuaders attempt to sway the persuadees one way of another by presenting arguments, appearing credible, and cracking jokes to make the audience more comfortable. In this uncertain marketplace of ideas, more or less malevolent and benevolent speakers navigate complex social situations to be as successful in persuading their audience as possible. Given the presence and general importance of the phenomenon, it is not surprising that persuasion has been studied throughout the millennia from the Ancient Greeks and Romans up until modern day psychologists, economist, and rhetoricians (to name a few, see appendix 1 for a brief historical illustration of some main authors and ideas in the history of persuasion).

Several disciplines have approached persuasion for a variety of reasons (see 1.1. for a more in-depth description of this). Rhetoric, described as the art of persuasion by Aristotle, remains the oldest discipline to deal with persuasion and provides the first attempt to formalise persuasive appeals. Rhetorical theory discusses the interrelation between content (logos), emotional appeals (pathos) and source credibility (ethos)[1]. As evident from the SPIMP approach developed throughout the thesis, content strength and source credibility remain central elements of the core model in the present approach. As such, the theoretical stance is in accordance with overall holistic approach of persuasion described by Aristotle and debated throughout millennia)with notable differences in terms of principles of reasoning, the qualification of source credibility, and other central elements). Economics – and especially behavioural economics – provides one of several fascinating perspectives on the principles of information updating and valuation of arguments and goods. Interestingly, given the fact that the principle of reasoning invoked in the thesis is probabilistic, economic theorists have described a possible Nash equilibrium for persuasion using Bayesian

[1] The translations of Aristotle's terms are approximations to indicate the relation between his terms and the concepts used in the thesis (content strength and source credibility)

probabilities[2]. As such, economic theory provides interesting empirical and theoretical support for developing a theory and model of persuasion processing. Marketing and advertisement provide further empirical support concerning the effectiveness of persuasive attempts. These studies are predominantly concerned with the outcome of persuasion rather than the processes underlying the reception of acts of persuasion from a psychological point of view. However, studying the effect of certain attempts does provide an indicative and indirect leeway into eliciting the psychological processes given the fact that we cannot elicit these empirically in any direct way[3]. Finally, given the fact that the contribution of the thesis is psychological, naturally psychological literature – both social and cognitive – provides interesting findings in a number of ways. One of the central of these contributions is the exploration of previous models of persuasion and comparison with the model developed in the thesis. The two most prevalent psychological accounts of persuasion processing are the Elaboration Likelihood Model (ELM) and the Heuristics-Systematic Model (HSM). These models rely on a dual-process model when describing persuasion processing such that the cues are processed either via a slow, effortful, and rule-based reasoning system ('central' in ELM; 'systematic' in HSM) or a fast, shallow, and heuristics-based system ('peripheral' in ELM; 'heuristic' in HSM). As will be evident throughout the thesis, the present approach differs on a number of issues (see table 1). Furthermore, the dynamic between the persuader and the persuadee may be approached from a mechanistic and psychological point of view, which indicates the complexity of the dynamics of the persuasive incident[4]. Taken together, the various disciplines provide a compelling interdisciplinary view of persuasion processing that may facilitate a strong theoretical foundation for the thesis.

In order to flesh out a holistic theory of persuasion (both theoretically and in terms of modelling), the thesis draws extensively from each of the disciplines. However, the concrete contribution of the thesis remains predominantly within

[2] As will be evident throughout the thesis, however, persuasion cannot be reduced to rational information updating, expressible via Bayes' theorem.
[3] Even neuroscientific evidence is unfeasible to elicit these processes holistically given the complexity of the persuasive attempts in terms of linguistic comprehension, interactive dynamics between persuader and persuadee, and evaluation of the evidence.
[4] Note that throughout the thesis, I label the persuader as male and the persuadee as female. This is done to ease the reader experience and the roles of persuader and persuadee were assigned by chance (rolling of a dice, incidentally).

cognitive psychology by describing the elements of the core model (content strength and source credibility) as well as the psychological framework surrounding these. That is, the theory and model developed in the thesis aims at describing how the persuadee processes acts of persuasion from a cognitive psychological perspective. Despite this, the contribution should nonetheless be extendable to inform other disciplines such as rhetoric, advertising, and critical analyses.

The thesis develops a core model of persuasion as well as a psychological framework based on the theoretical foundation as outlined above. This involves a critical assessment of previous models of persuasion as well as a discussion of important elements of persuasion and the main research questions addressed are thus

1) How do humans process interpersonal, verbal acts of persuasion from a cognitive psychological point of view?
2) How do humans reason from uncertainty?
3) How do humans evaluate the strength of content evidence and source credibility in a persuasive situation?
4) How does persuasion interact with the other interlocutor, the environmental, and the context in general?
5) What are the benefits and limitations of the previous models and the current approach to persuasion?

Previous models of persuasion: ELM and HSM

Given the prevalence of persuasion in the everyday life, several psychological models of persuasion naturally already exist in the literature as mentioned in the above. The most influential model in cognitive psychology is the Elaboration Likelihood Model (ELM) and secondly the Heuristic-Systematic Model (HSM)[5]. The ELM, developed by Petty and colleagues, has been cited in numerous papers and remains the most prevalent model of persuasion analyses from psychological frameworks. Given the empirical success of the ELM, it is natural to consider the contribution of the SPIMP model, and this will be evident when presenting some limitations of the present models. Indeed, the SPIMP model and its theoretical background concerning persuasion further develops

[5] Intentionally, I keep the introduction clean and circumvent redundancy by avoiding references in the text as these are spread throughout the thesis as they become argumentatively relevant.

some of the notions presented in the ELM such as the importance of source credibility, heuristics, and reasoning, but in addition it presents a more precise definition of these in a integrated model rather than in a dual-processing framework. Despite some differences in assignments of heuristics, the ELM and the HSM are somewhat similar in their underpinning assumptions. Therefore, for the sake of brevity, I present some of the key features of the models here before presenting some limiting considerations that warrant the theoretical exploration of the thesis.

ELM and HSM Both models rely on a dual-processing framework such that persuasion processing may occur via a central (ELM) or systematic (HSM) route or via a peripheral (ELM) or heuristic (HSM) route. The central route is characterised by being cognitively effortful, slow, and stemming from systematic reasoning (such as logical enquiries). Conclusions derived via the effortful central route yield long-lasting effects such that the persuasive attempts processed through this route are regarded to be more firmly accepted and thus take more effort to subsequently change again. The main component processed via the central route is the evidence presented by the persuader. Conversely, the peripheral route is characterised by shallow thinking, which may be influenced by a host of non-relevant cues such as attractiveness of the persuader, the mood of the persuadee, and so on. The conclusions reached via this route are more volatile than from the central or systematic. That is, cues may function either via the central or via the peripheral during the persuasive attempt such that the content is processed in the central whilst attractiveness or other non-content cues are processed in the peripheral. Effortful thinking may diminish the influence of the peripheral cues such that the persuadee should be increasingly rational and reasonable given additional effort. Indeed, this has been supported by a range of studies conducted by proponents of the ELM and HSM such as Petty and colleagues as well as Chaiken and colleagues. Very positively, then, the ELM and the HSM provide tantalising findings and as such function as important steps toward a psychological appreciation of the cognitive process, which the persuadee undergoes when faced with an act of persuasion. However, as evident from the following, there are some limitations to consider.

Limitations of the ELM and HSM Telling of the persuasion process as they may be, both the ELM and the HSM are faced with inherent limitations. These mainly cluster around the principle of reasoning invoked in the models, the potential interaction

between systems, and the assignment of cues as either central or peripheral. Firstly, despite describing the central route of persuasion as based on reasoning and rationality, the ELM does not develop this stance very clearly. However, from the analyses conducted with the model, it seems that the model of reasoning invoked in the model is derived from formal logic relying on mental modelling from logical connectors. That is, the normative stance seems to be connected with formal logic (this stance will be questioned in chapter 2). Secondly, proponents of the ELM seem undecided whether or not the two systems may interact and if so, how this process happens. Indeed, given the complexity of persuasive attempts, the model has to deal with multiple cues happening simultaneously concerning content strength of the argument, likeability, the relationship between the persuader and the persuadee, the attractiveness of the persuader and so forth. In other words, the plethora of cues stem from phenomena both thought of as central *as well as* peripheral. This begs the question of interactivity between systems. Furthermore, it may be questioned whether these dual-process accounts of persuasion are *really* dual if these systems influence one another in integration, but this depends on the definition of interaction, which proponents of the ELM have not fully specified in detail. Furthermore, it seems contextually ambiguous whether a cue is considered a central of a peripheral cue, which further blurs the distinction between the two systems even more. For example, if a person tries to persuade an agent that he should be a model, his beauty may very well be considered a central cue as this gains contextual and thematic salience. However, if a person tries to persuade an academic committee that she should pass the viva and become a doctor, her beauty matters less and becomes a peripheral cue. In other words, whether or not something is central or peripheral seems contextual and potentially ad hoc. This further calls into question the ELM and HSM dual distinction, as they need a mechanism to decide when a cure is central and when it is peripheral (which entails that something more fundamental than the two systems must be afoot).

In sum, much can be learned from the ELM and the HSM in terms of persuasion processing and the influences on these processes from central and peripheral cues. However, the models are faced with potential limitations, which warrant the exploration of the thesis.

The SPIMP approach

The current approach is labelled The Subjective-Probabilistic Interactive Model of Persuasion (SPIMP). As evident from the 'findings' section below, this proposes a theoretically different model of persuasion compared with the ELM and the HSM. In particular, the underlying assumptions of SPIMP depart significantly from the ones underlying the previous models. The model does, however, make use of the insight of the ELM and HSM concerning the importance of peripheral cues such as qualities of the source (only, in the SPIMP approach, these are integrated in a holistic framework). Thus, to quote Proust, the exploration "…is not about travelling to new places, but to looking with different eyes". The main differences between the SPIMP approach and the ELM and HSM are described in table 1.

Table 1: Comparisons with ELM and HSM[6]

	Dual-process	Principle of reasoning	Interactivity	Normativity	Source credibility
ELM	✔	Seems to rely on formal logic	Seems to rely on solipsistic reasoning	Validity of logical structures	Peripheral cue
HSM	✔	Seems to rely on formal logic	Seems to rely on solipsistic reasoning	Validity of logical structures	Heuristic
SPIMP	✗	Subjective probabilistic estimations (Bayesian)	Communication and probabilistic estimations and is interactive between interlocutors	Consistency from degrees of subjective beliefs	Central element of persuasion processing

From this table, several points should be made. Firstly, the SPIMP approach is a single process approach to persuasion rather than a dual-process approach. This is motivated by two main factors. One, the experimental data concerning source credibility cited in 3.3 seems incompatible with the underlying assumptions of two separate systems since source credibility (a peripheral cue in the ELM and a heuristic in the HSM) integrates with content strength (a central cue in both the ELM and the HSM), which should not happen from a dual-process perspective. However, as pointed out in 1.7, a host of

[6] This table is constructed via a reading of the ELM and the HSM. As O'Keefe (2008) remarks, neither the ELM nor the HSM are clear in terms of defining the principles of reasoning nor on interactivity. As a consequence of this, the description in the table stems from a reading of the theoretical presentations, their studies, and analyses conducted in various papers (see chapters 1 and 2 for references)

studies suggest dual-process accounts. Thus, despite suggesting a single-process model of persuasion processing, this is a fertile ground for additional research. Two, given the remarks in the above concerning whether a cue is considered central or peripheral and how the two systems interact, it seems warranted to explore the possibility of a holistic and integrated model in which the elements are present, but may be valuated differently depending on the cognitive effort. Secondly, the SPIMP approach is grounded on principles of reasoning derived from probabilistic (Bayesian) reasoning. That is, the persuadee is thought to deal with the persuasive content from the perspective of subjective probabilistic estimations rather than adherence to logical structures[7]. That is, the constraints concerning consistency are imposed on the degrees of beliefs rather than the logic of the structures. Furthermore, the model integrates source credibility (expressed as trustworthiness and expertise) in the persuasion processing model. As such, the normative predictions from the subjective probabilistic estimations of content strength and source credibility follow mathematically, which is easily testable. That is, given the priors and likelihood estimations, the SPIMP approach makes predictions concerning the persuasiveness of an act of persuasion. The ELM and HSM have less stringent predictions due to the lack of detail in describing the principles of reasoning and decision-making inherent in the models.

Despite the difference in reasoning and cognitive assumptions, the thesis naturally takes the empirical evidence supporting the ELM and HSM seriously and as such, the SPIMP need to be able to account for this data in some way. Indeed, from the data, it seems clear that a cue may either by construed as a central cue, which is processed an effortful and slow manner, or a peripheral cue, which is processed via fast, heuristic processes. In order to accommodate these findings, the present framework assumes a gradient scale of cognitive effort in which the persuadee may exert more or less cognitive effort in processing the persuasive attempt. According to this gradient hypothesis, this results in differences in conclusions given a more or less stringent consideration of the persuasive attempt. For instance, in an election, a voter might invest heavily in processing the evidence, resulting in less influence from extraneous variables (peripheral and heuristics). However, importantly, these variables still might potentially effect the processing outcome even in high effort situations given the fact

[7] For a description of logic, probability, and rational choice paradigms of normative systems, see Chater & Oaksford, 2012

that they are assumed to frame the cognition as discussed in chapters 5, 6, and in 7.4. This is a working hypothesis in order to account for the data in the ELM and the HSM, and the hypothesis needs to be explored further through empirical evidence. However, rather than assuming two separate cognitive systems, the present approach assumes difference in valence and valuation between cues such that the content of the persuasive message and the credibility of the source are important factors of persuasion processing from a reasoning perspective whereas the likeability and attractiveness of the persuader are less relevant from a reasoning perspective. However, both types of factors are assumed to always be present in the context of the SPIMP approach such that these modify and influence the subjective probabilistic estimations of the persuadee, which in turn influence the normative predictions of whether or not the persuadee will find a particular act of persuasion persuasive[8]. For example, attractiveness, likeability, the current emotional state of the persuadee, the physical context and other variables all contribute to shaping the subjective probabilistic estimations in the situation, but given more cognitive effort, the influence of these may be diminished. In this way, the SPIMP approach may account for the findings of previous models given the fact that the peripheral route may be thought of as low cognitive investment (indeed, this is in line with the proponents of the ELM and HSM who label the central route as effortful and the peripheral as shallow). However, despite being potentially diminished, these cues are not thought of as a separate system, but rather as the backdrop against which the subjective estimations are made, which reflects the single process approach to persuasion in the SPIMP. That is, the 'peripheral' and 'contextual' factors are involved in the probabilistic problem of inferring another's mental state in non-communicative contexts (like normal sensory integration applied to humans), and inferring the communicative intention (as in persuasion) ought reasonably to be assumed to be similar.

Alongside the integration of content strength and source credibility, the theoretical approach in the present framework acknowledges the potential detrimental consequences of deception and misinformation. Indeed, the persuasive incident is a complex social phenomenon in which the aims and desires of the persuader and the persuadee may differ wildly. Epistemic vigilance is the vigilance against

[8] Content strength and source credibility are elements of the core model whereas the other factors belong to the psychological framework.

misinformation and constitutes the cognitive defence against deceptive persuasion. Indeed, the dynamics between the persuadee, the persuader, and the social context is seen as immensely important in the SPIMP approach such that the socio-cultural context may influence the probabilistic estimations and the dynamics between persuader and persuadee shape the potential for performative actions of language and reasoning. Consequently, the approach is described as interactive given the relationship between the interlocutors. In sum, the SPIMP approach may account for the data provided by the ELM and HSM given the inclusion of gradient cognitive effort, but constitutes an entirely different model given the single-process approach and clearly defined and integrated probabilistic information as well as the interactive dynamic between the interlocutors.

Two types of normativity

As will be evident throughout the thesis, I identify two separate and distinct notions of normativity that fulfil two separate purposes in the study of persuasion. The difference points to the variance in approach from a societal-desirable and an approximating point of view, and the different theoretical extrapolations regarding the type of normative evaluations fostered by such approaches. As argued in 2.2-2.4, the distinction between the types of normativity bears considerable consequences for argumentation, critical analyses, and persuasion processing. In general, the two types of norms considered here are social and functional norms where the latter is concerned with normative descriptions and predictions at a functional level (this includes probabilistic *and* logical norms since these are concerned with how humans, for instance, process evidence in persuasive situations) and where the former is concerned with what would be societally desirable. As will be evident, the thesis is concerned with the functional normativity whereas the societal might *include* what normatively should happen on a functional level, but which can be infused with other considerations as well.

Societal-desirable normativity Certain actions may be more desirable than others from a societal and ethical perspective. For instance, if a politician lies or misuses argumentative tricks in order to sway an audience, he may readily be challenged and criticised due to the fact that deliberate misinformation is undesirable for the greater society. That is, the normative standard here is concerned with the correctness and

ethics of persuasive attempts and critical analyses of the potential consequences of this. Persuasion studies may be identified as belonging to either of two separate foci, namely a narrow focus dealing with *how* humans are persuaded in terms of processes and appeals and a broad focus dealing with the societal issues, which includes ethical concerns.

Normative-functional approximation In the other hand, normative standards may be developed that disregard whether or not a particular action or psychological process is normatively desirable on a societal level. That is, a narrower focus. Such normative standards function at an entirely different epistemic, ethical, and critical level than the societal-desirable normativity. Rather than focussing on whether or not the particular persuasive attempt is societally desirable, the normative stance taken here is concerned with producing theories and analyses of the psychological processes the persuadee undergoes when faced with an act of persuasion regardless of ethics. That is, the normative stance approximates, describes, and potentially predicts how humans deal with particular persuasive incidents.

The normative difference may be summed up by analogy. Consider the act of running. From a societal point of view, it is a perfectly viable normative stance to argue that people should run (or exercise) more as this would yield significant benefits in terms of individual health, lower healthcare costs, longevity, and so on. From this perspective, humans who do not exercise or take care of themselves may be blamed (fairly or unfairly). Compared with this moralistic and societal, a different normative stance comes *from* medical sciences that attempt to describe how the heart functions, the importance of blood flow and so forth during exercise. This normative stance yields different normative predictions such as 'the heart rate should increase during exercise' regardless of whether or not this is desirable. To reiterate, the thesis is concerned with the latter normative stance to persuasion. Importantly, the desirable norm might be derived from functional norms concerning the effects of running. As such, the functional will often inform the societal normativity, but it is paramount that the societal, desirable, and ethical norms do not influence the description of the functional normativity since this should be describable whether it is positive or not.

The normative stance and the model presented and developed in the thesis are firmly lodged in the latter such that the model aims at approximating how humans

process persuasive attempts without considering whether or not this processing effort is societally beneficial or desirable. One clear difference between the two normative stances is how to deal with logical fallacies. These are argumentative structures that do not hold true logically, and from a desirable stance these should be shunned and disregarded. However, branching over both instances of real-life persuasion such as advertisements and political campaigns as well as empirical findings from argumentation theory, it seems to be the case that humans do not simply reject arguments despite logical fallaciousness. Consequently, in order to approximate the process that the persuadee undergoes as closely and faithfully as possible, whether or not a persuasive ploy is undesired should be irrelevant since the aim is to provide a psychological and not an ethical account of persuasion.

The ethics of studying persuasion

The study of persuasion is naturally marred by the popular reputation of the phenomenon as something deceptive, manipulative and propagandistic. Indeed, the 20th century saw demagoguery sway entire nations into terrible actions, and through and through history is awash with examples of manipulative rhetoric that misguides populations and entails horrendous consequences. It is easy, then, to be swept up in the pathos of the consequence and decry persuasion as a shallow and deceptive phenomenon that is best eradicated and should be challenged sternly whenever occurring. Indeed, much of rhetorical history has been somewhat apologetic because philosophers have decried the study of persuasion and description of the importance of emotional appeals as undesirable and something to be avoided (incidentally, this harkens back to the distinction between normative standards aimed at societal and desirable outcomes versus normative standards aimed at describing the state of affairs of a psychological and social phenomenon). Unsurprisingly, as a researcher in persuasion, I do not take this bleak view, but rather adopt the study of persuasion as something inherently interesting, as something that is telling of the human psyche, and as something potentially beneficial for the society if understood in greater detail. Furthermore, persuasion should be distinguished from malevolent misinformation and

deception such as propaganda[9]. Importantly, for the purpose of the thesis, persuasion is definitely not limited to actions that are designed to suppress rationality or judgement. Rather, as evident from chapter 1, persuasion is concerned with attempts to change the beliefs of the persuadee in situations where both (at least tacitly) recognize the persuasive intention and where motives can be benevolent or malevolent. As such, propaganda (as defined by Marlin) is a specialised case of persuasion.

Indeed, a greater awareness of the psychology of persuasion processing may yield beneficial insight on two separate and distinct levels related to the two normative stances described in the above. On an approximating level, it portrays the psychological mechanisms of an inherently interesting social phenomenon, namely the dynamic negotiation of uncertain beliefs in a complex situation in which there are potential asymmetric relations between the persuader and the persuadee on an epistemic level, in desires and aims, and in persuasive agency. Thus, studies in persuasion highlight a prevalent and important aspect of human interaction. Secondly, on a societal normative view, a more in-depth appreciation of the psychological processes may yield a more refined understanding of persuasive mechanisms in society. This, in turn, may facilitate more precise form of rhetorical and critical analysis such that the mechanisms of misuse may more readily be identified, discussed, and presented through scholarly work and journalistic effort. That is, the psychology of persuasion provides a foundation for in-depth criticism of practical use of persuasion.

Naturally, a greater insight into the psychological mechanisms of persuasion may yield greater insight into the mechanisms of manipulation, which may readily be misused by scrupulous individuals. However, regardless of any academic treatise on the matter, persuasion would still be studied (and misued). That is, without a proper academic understanding of persuasion, manipulation, and the psychology of both, scholars and critics would have a less developed standard against which to measure practical acts of persuasion. In sum, the study of persuasion is both necessary and warranted from an ethical point of view, as it provides valuable insight into a fascinating human phenomenon. Thus, a greater appreciation of the workings of

[9] Marlin defines propaganda as “The organized attempt through communication to affect belief or action or inculcate attitudes in a large audience in ways that circumvent or suppress an individual's adequately informed, rational, reflective judgment” (2002, p. 22).

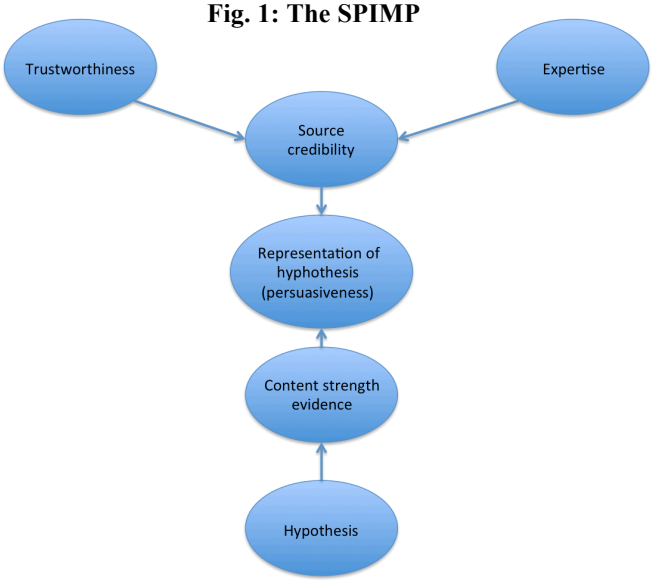
persuasion processing provides the foundation for critical analyses on a societal level by grounding the investigations on a psychological level.

Findings and future research

The main contributions of the thesis are described in table 2. Firstly, by exploring contributions from a variety of literature from psychology, rhetoric, marketing, and economics, I provide a broad theoretical foundation for the development of the SPIMP as well as for a critical assessment of the underlying assumptions of previous models and approaches such as the ELM and HSM. This review warrants the exploration undertaken throughout the thesis as it indicates the likelihood that there are several elements of these models that are not developed as thoroughly as desired and that an alternative model may be warranted. This is a contribution in negative space, as it does not add any solutions, but merely points to some of the potential limitations of the previous models. However, in order to move forward with a theory and model of persuasion based on subjective, probabilistic estimations, source credibility, and interaction in an integrated manner, it is necessary to faithfully acknowledge previous models and critically assess these concerning benefits and limitations. Secondly, given the prevalence of persuasion in the social sphere and consequently the fact that persuasion has been investigated from a variety of disciplines, it is not surprising that a variety of definitions have arisen. Part of the contribution of the thesis, then, is a review of literature on persuasion from a range of disciplines and a discussion concerning elements, which are necessarily connected to persuasion and which merely are conjoined or follow *from* persuasion. From this review, I identify a definition of persuasion that spans across disciplines and seems philosophically defensible given the scope of the thesis (concerning the normative standard of approximation). Finally and most importantly, the thesis provides a concrete alternative model of persuasion, the Subjective-Probabilistic Interactive Model of Persuasion (SPIMP). If the critical review of previous models exists in negative theoretical space, the production of a concrete model mirrors in the positive. The core model (fig. 1) posits the process the persuadee undergoes in the complex dynamic relationship from a probabilistic point of view in an integrated model describing how the persuadee approaches uncertain content strength

and source credibility[10]. The core model, however, is lodged within the interactive psychological framework described throughout the thesis.

Fig. 1: The SPIMP



In sum, the thesis provides a comprehensive definition of what is included in the persuasive situation, it provides a critical assessment of previous models, and it provides a concrete alternative model of persuasion processing based on extensive empirical work on reasoning, source credibility, language, and interactivity conducted in the past few decades. From this model, concrete predictions of persuasiveness may be tested.

Table 2: main contributions of the thesis

Main contributions of the thesis
1) Providing a critical assessment of the theoretical foundation of previous psychological models of persuasion 2) A discussion of elements necessarily and frequently associated with persuasion in order to facilitate a clear definition of the phenomenon 3) The development of a concrete model: The Subjective-Probabilistic Interactive Model of Persuasion (SPIMP) and the benefits and limitations of this

It is important to note the title of the thesis identifies the thesis as a prolegomena to a more in-depth exploration of persuasion processing. Although I cite numerous empirical reports (including a few I have published or produced myself in collaboration with others), the thesis is inherently theoretical, which includes an extensive literature review

[10] The model is presented in 7.3 whilst the psychological framework surrounding it is presented in 7.2.

throughout. However, the complexity of the persuasive situation is considerable given the fact that this includes, but is not limited to uncertain evidence, uncertain persuader aims, emotional content, source credibility, dynamics between persuader and persuadee, intonation, rhythm of spoken language, linguistic stylistics, division of the speech, a complex and dynamic temporal relationship, socio-cultural and contextual influences, and a gradient assertion of cognitive effort, to name a few of the factors involved in the holistic persuasive situation (in terms of the core model, fig. 1, and the psychological framework, table 7). Given this complexity, it is important to stress the initiating role of the thesis. I provide a theoretical framework and a concrete core model of persuasion to be further explored regarding the various elements just mentioned. As expected, it was not possible to test all of the mentioned elements and the relationship between these in the space of the PhD, but I intend to carry on researching persuasion and to test, qualify, and develop the SPIMP approach further.

The primary conceptual placement of the thesis resides in the discipline of cognitive psychology. The main novel contribution of the thesis is the SPIMP approach proposed in 7.3. The model is cognitive psychological since it is concerned with the cognitive processes the persuadee undergoes when faced with a persuasive attempt. However, key to the theoretical placement of the model, other factors are acknowledged as central to a theory of persuasion. Firstly, as discussed in 7.2, the psychological framework of the model include four components that underlie and influence the subjective probabilistic estimations of the elements in the SPIMP, namely internal and external influences, the scope of cognition, and the framework of cognition. The theoretical discussions throughout the thesis largely pertain to how the central elements of the model relate to these four influencing factors of the psychological framework. Secondly, persuasive intentionality is touched upon in the thesis (1.3 and 6.1). This is a fundamental philosophical issue that warrants further debate. Thus, the cognitive psychological contribution of the thesis, namely the development of the SPIMP, resides in a larger theoretical framework, which ranges from developmental and social psychology, phenomenological exploration of intentionality, and rhetorical theory (to name some of the most relevant disciplines that are touched upon by the model). As such, the model resides as explanatory psychology, and future work is needed to couple this with descriptive phenomenology and other relevant disciplines and critical

perspectives, in order to provide a richer psychological theory of persuasion processing as well as a more in-depth conceptual discussion.

The thesis

Alongside this introduction, the concluding remarks, the appendix, and the bibliography, the thesis falls in seven chapters, each of which contributes to the general theoretical picture needed to propose the SPIMP approach to persuasion in chapter 7. Overall, though, the thesis falls in three major parts. The first (definitions and central elements of the SPIMP model) is chapters 1-3. It is concerned with discussing the definition of persuasion as well as the identification of the two central elements in the core model (content strength and source credibility). The second part (psychological and theoretical framework) is chapters 4-6. It describes the conceptual framework surrounding the core model presented in part I. Finally, the third part (integration of core model and psychological framework) ties together the core model with the theoretical and psychological considerations from the second part.

The first chapter provides a foundational literature review from the various disciplines mentioned in the above such that a clear definition of persuasion may de ascertained. Given the fact that persuasion is a phenomenon spanning across a range of social situations, a definition of what is necessarily persuasion (an attempt to change the persuadee's beliefs in a persuasive setting) and what is frequently conjoined with persuasion (such as the ethical considerations of a persuasive attempt) is warranted. Indeed, much of the literature that approaches persuasion seems to entail different definitions depending on the discipline and consequently, in order to keep the discussion theoretically clean, a definition of persuasion is developed. The definition identified through a critical review of relevant literature revolves around changes in beliefs between two people (the persuader and the persuadee) in a situation where both interlocutors acknowledge the persuasive intention. This differentiates persuasion from communication and information updating in general such that persuasion is a special case of communication, and it also identifies persuasion as a broader phenomenon than Marlin's propaganda cited in the above. Finally, persuasion is different from argumentation as the latter is concerned with the production and evaluation of evidence

whereas the former also includes other elements such as source credibility, which makes the persuasive appeals and tools broader than the argumentative.

The second chapter is concerned with content strength (the first ot eht two central elements of the core model). It presents theories of reasoning in order to develop the framework for rationality in the persuasive situation. Initially, formal logic is considered as it forms the basis of many contemporary models of argumentation and persuasion such as the pragma-dialectical account and (supposedly) the ELM[11]. However, considering the epistemic limitations of formal logic in persuasive incidents, this framework is abandoned as the primary normative standard against which acts of persuasion are measured and evaluated by the persuadee. Rather, I argue, recent developments in probabilistic reasoning may provide a closer approximation of how human beings deal with uncertain information such as the one presented in persuasive attempts.

The third chapter presents source credibility (the second element of the core model) As such, it continues the line of thought set out in the chapter concerned with principles of reasoning. Following rhetorical theory, the credibility of the persuader is considered as a central element of persuasion processing. The role of source credibility in the ELM and the HSM is not entirely clear (whether it should be considered a central or a peripheral cue). For the SPIMP approach, source credibility is integrated in the model of persuasion processing developed in chapter 7. This distinguishes expertise and trustworthiness from Ad Verecundiam arguments and models source credibility from a Bayesian perspective, which falls in line with the principles of rationality presented in the second chapter. At the end of the third chapter, the two main elements of the SPIMP core model, content strength and source credibility, have been presented. This concludes part I.

In part II, having already presented the central elements, attention turns to language comprehension. The focus of the thesis is concerned with spoken, interpersonal persuasive attempts. Consequently, it becomes pivotal to consider the linguistic capability in the persuasive setting. As with the second chapter, formal logical models of linguistics are briefly considered before turning the theoretical attention to

[11] As mentioned in the above, this is speculative, as the principles of rationality are not thoroughly developed in the ELM. However, from reading the various papers, it seems that Petty and colleagues hint at a formal logical principle of rationality as the normative standard for central route processing.

subjective interpretation processes stemming from pragmatic enrichment. However, as evident from the discussion, pragmatic enrichments are not sufficient for describing the foundations of language and consequently probabilistic models of language evolution, acquisition, and processing are presented. Alongside this, dynamic models of language argue the distributed nature of natural languages, which firmly places communication in a cooperative and interactive framework.

The latter linguistic framework indicates the importance of the interactive. This focus falls in line with a range of findings, ranging from reasoning studies to social psychology. Indeed, the focus of the thesis is interpersonal persuasion between two and only two interlocutors, and consequently the fifth chapter considers the importance of the social and interactive dynamics in the persuasive setting. This has significant theoretical consequences for language dynamics, social influences, and reasoning and thus for the development of a theoretical stance to persuasion. As such, the theoretical framework that envelops the SPIMP core model is inherently interactive and contextual. This lodges the persuadee-persuader relationship in a complex dynamic situation for which a detailed description is necessary if this is to be analysed and criticised (as is the case in social and rhetorical criticism).

To move toward a more in-depth understanding of this relationship and the immersion of the persuadee in the context, chapter 6 discusses key concepts concerning intentionality and presence from a philosophical perspective. As mentioned, the contribution of the thesis is predominantly the presentation of the SPIMP approach. However, the approach only provides a snippet of the complexity of the persuasive situation from a cognitive psychological perspective. As evident from the discussions throughout the thesis, a holistic approach to persuasion entails comprehensive interaction between cognitive and social psychology, descriptive phenomenology, and critical analyses such as the ones produced in rhetorical criticism. As such, the theoretical limitation of the model is acknowledged and highlighted.

Finally, the seventh chapter ties together the elements elements of the core model (chapter 2-3) and the psychological framework (chapter 4-6) in order to flesh out a prolegomena to a theory of verbal, interpersonal persuasion. This formulates the general SPIMP approach (fig. 18) and discusses how the persuadee may cope with persuasive attempts. Alongside the specific theoretical and model contributions to

persuasion theory, the differences between the SPIMP approach and the ELM and HSM are discussed. The thesis is a prolegomena because there are still considerable questions to be answered in order to elicit a complex theory and model of persuasion. For instance, the influence of emotional content is barely considered in the thesis despite being a obviously important element of persuasion processing. However, this is simply due to a lack of time and space. As such, the theoretical and model contributions of the thesis serve as indications of a future research program designed to test and further develop elements of persuasion.

I hope you will find the theoretical discussions throughout the thesis as well as the proposed model interesting. Throughout my PhD, I certainly did[12].

Jens Koed Madsen

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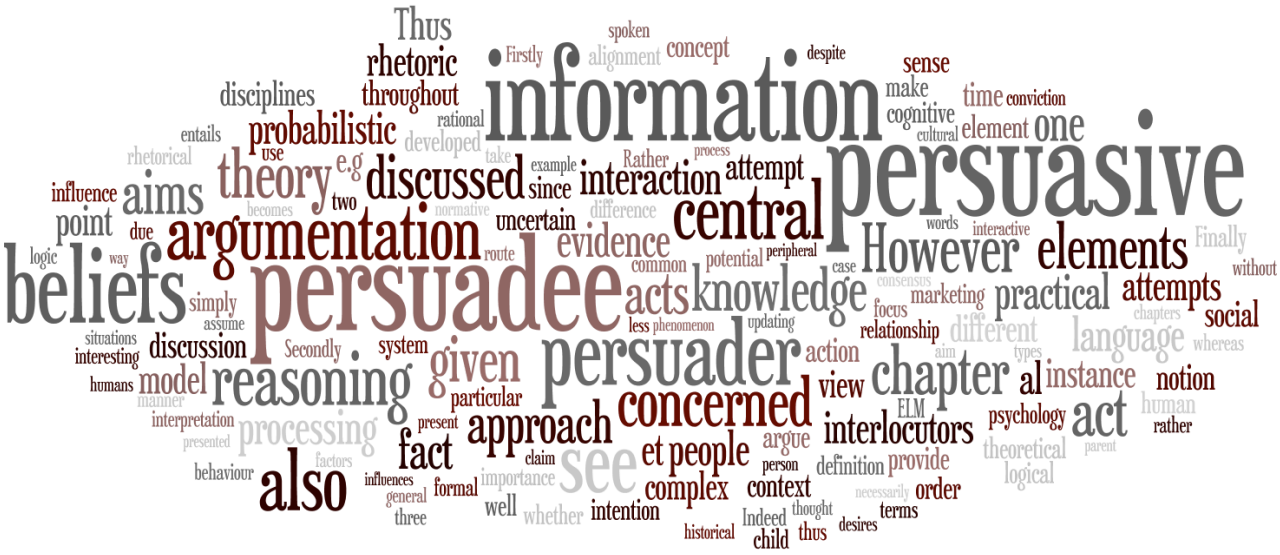
London, 25/9/2013

[12] On a visual note, a word cloud introduces each chapter (http://www.wordle.net). These are illustrations created from the frequency with which words are used in the text. Thus, the word clouds of individual chapters provide a visual approximation of the terms discussed in the chapter. However, the word 'persuasion' has been deleted from most of the word clouds as this term if mentioned so frequently in the thesis that it would distort the illustrations.

PART I

DEFINITIONS & CENTRAL ELEMENTS OF THE SPIMP MODEL

Chapter 1: Defining persuasion



Arguments are to be avoided: they are always vulgar and often convincing

Oscar Wilde

Nothing is so unbelievable that oratory cannot make it acceptable

Marcus Tulius Cicero

We might entertain an intuitive appreciation of what constitutes persuasion and persuasive attempts. However, the phenomenon becomes increasingly murky and challenging when going beyond the obvious cases. For instance, a politician clearly engages in persuasive attempts when trying to get elected, advertisers when attempting to sell products, and lawyers when they argue in court. These scenarios are easily understood as being persuasive since they involve interlocutors who try to mould the minds of their audience by changing their beliefs and potentially their behaviour. However, considering less clear-cut cases, it becomes less obvious whether an act can be considered persuasive. Should we, for instance, label vernacular discussions pertaining to the choice of restaurants as acts of persuasion? Furthermore, some situations are clearly designed to change our beliefs by updating or presenting new information about the world (such as the news, telling someone it is raining outside, and so on). If persuasion is defined as changes in beliefs, these cases should also be persuasive. As will be evident from the discussion in 1.3, a finer definition is needed to distinguish persuasion from information updating and argumentation. In particular, I argue that persuasion requires a persuasive intention from both interlocutors (see also 6.1 on intentionality). This chapter frames the academic setting of this central concept of the thesis so that the reader is clear as to what I define as persuasion and what elements are necessarily involved in processing persuasive attempts.

The thesis focuses on spoken persuasion between two and only two interlocutors in a physical environment in which they can see and act with one another. The scope is informed by two conceptual distinctions, which help limit the scope of the exploration. Firstly, there are differences between spoken and written or signed communication[13]. For instance, spoken and written communication differ in their temporal and linear nature and given they physical interaction written communication does not rely on the same immediate interpersonal cues as conversation between interlocutors of verbal communication (see e.g. Thibault, 2011, see also 6.4 for a discussion of the temporal aspects of verbal persuasion)**.** The scope also departs from investigations concerning signed persuasion, as this too is different type of

[13] Indeed, some authors argue that spoken language functions as a dynamic relationship between interlocutors making use of linguistic traditions and conventions whereas written language should be seen more as a lexigraphic representation of spoken language and thus removed from the dynamics of spoken language.

communication compared with spoken language (although it seems likely that signed persuasion will share many of the properties described here). For instance, sign languages differ in temporal relations, they make use of more visually motivated communication (iconicity), and referentiality may be different as pronouns are used differently (see e.g. Sutton-Spence & Woll, 1999; Johnston & Schembri, 2007)[14]. Secondly, the thesis explores persuasion between two interlocutors. As will be evident from the interactive perspective on reasoning and communication (see especially chapter 5), the influences from the social and the interactive play a key conceptual part in defining persuasion processing. The focus further distinguishes interpersonal persuasion from self-persuasion in which people argue with themselves in order to change their minds about certain issues since different psychological mechanisms may be involved in persuading oneself compared to others. The scope, however, also limits the exploration to persuasion between two and only two people since the social and argumentative complexity of a plethora of persuaders and persuadees would necessitate a different and more socially directed discussion. Thus, the limited scope of the thesis is a theoretical account and a model of verbal persuasion between one persuader and one persuadee. That is, a theoretical background for and a model of the cognitive processes the persuadee undergoes when faced with a persuasive attempt.

Persuasion research has been identified as belonging to either a narrow or a broad perspective (Madsen, 2012). The broad definition is concerned with how persuasion may influence societal matters, and which consequently entails discussions about the morality and ethics of persuasion[15]. There are two main stances in the debate in rhetorical circles. In the one hand, neo-Aristotelian critiques argue that rhetoric is concerned purely with practical effect on the persuadee, and that the more effective the speech is, the better it is. in the other, a wider assortment of rhetorical critiques, argue that rhetorical criticism and persuasion studies has an ethical obligation when analysing persuasive attempts[16]. The narrow definition is not, however, concerned with the ethical question. Rather, the focus here is to discuss the concept *of* persuasion and what this

[14] I am grateful to Dr. Gerardo Ortega for discussing these issues with me and pointing me to relevant literature. The comments on sign language refer to British and Australian sign language.

[15] In other words, the broad perspective is concerned with the societal-desirable type of normativity mentioned in the introduction.

[16] See the famous discrepancies in analyses concerning the effectiveness and ethical desirability of Nixon's *Silent Majority* (1969) speech; Hill (1972a, 1972b); Campbell (1972), see also Pontoppidan (2007); Madsen (2012) for a general discussion of the role of ethics in rhetorical theory and analysis.

entails. The thesis falls in the latter as a narrow focus on the psychological processes that the persuadee undergoes when faced with an act of persuasion, regardless of whether or not the outcome is ethically desirable.

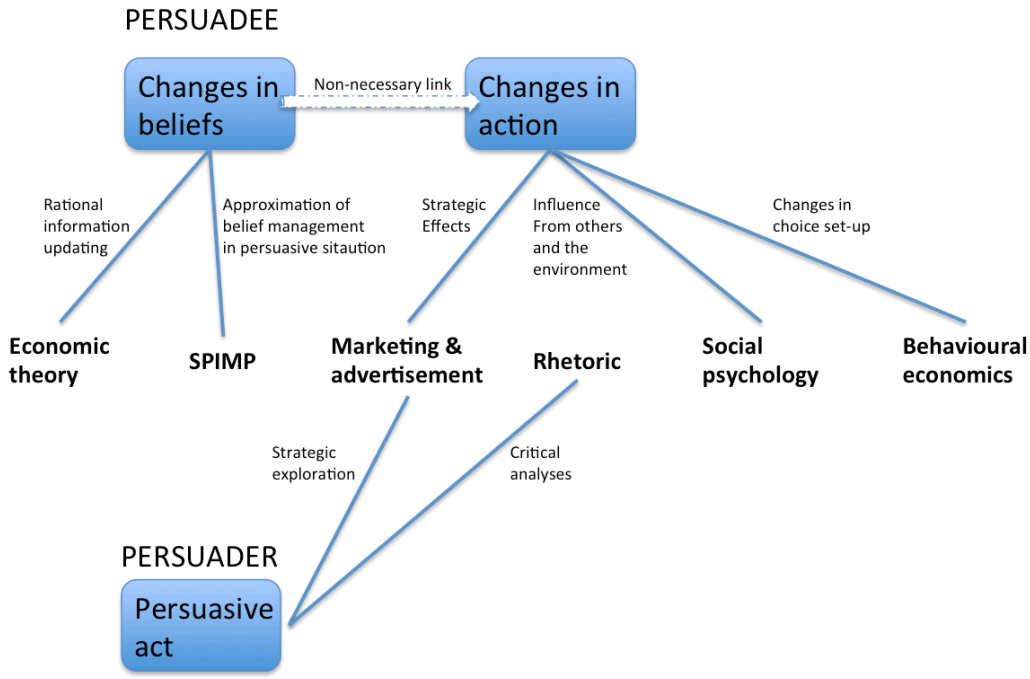
1.1. Approaching persuasion[17]

Historically, a range of disciplines has approached persuasion. This section presents a brief review of the main trajectories identified the various disciplines in order to frame persuasion as a historical and an academic concept. The disciplines mainly concerned with persuasion (aside from various philosophers) have historically been rhetoric, economics, marketing, and psychology. Despite having different foci, the four disciplines have all been concerned with important aspects of persuasion. As will emerge from the review, rhetoric predominantly explores persuasive artefacts through rhetorical critical analysis (e.g. Foss, 2004) centred on the persuader. Economic theory describes ideal axioms of rational choice and information transmission (e.g. Crawford & Sobel, 1982) whereas behavioural economics investigate the differences in decision when choice set-up is altered in ways that do not affect the consequences of the decision (and hence which should be irrelevant according to conventional economic analysis). Marketing tends to focus on explorations of the effect of persuasive strategies in terms of persuasive effect (Stafford, 1999). Finally, psychology approaches persuasion both from a social perspective that explores the influence of others (Cialdini, 2007) and the environment (Thaler & Sunstein, 2008) whereas cognitive psychology tends to focus on the psychological processes the persuadee undergoes when faced with a persuasive attempt (Petty et al., 1981; Chaiken, 1987)[18]. Naturally, these descriptions of the contribution of the disciplines are simplified since each discipline deals with other and often overlapping issues. However, the predominant foci are illustrated in fig. 2.

[17] See appendix 1 for a visualisation of some of the key figures and approaches to persuasion throughout history

[18] From this perspective, the thesis mainly falls in the cognitive psychological camp, as it discusses the theoretical background necessary for postulating a novel model for describing persuasion processing (the SPIMP).

Fig. 2: Conceptual relationships from disciplines to persuasion



In the following, I provide a brief literature review of the four disciplines and how they relate to the concept of persuasion such that the review collectively helps frame the theoretical concept and the boundaries. Underlying these historical approaches to persuasion, epistemological philosophy can be seen as a driving force since it is concerned with the interactive creation, mediation, and social negotiation of uncertain knowledge[19]. The main purpose of this section is to introduce these four disciplines as the theoretical exploration of persuasion in the present thesis owes much to the developments carried out in each of these disciplines. Furthermore, a study of the psychology of persuasion processing would hardly be complete without acknowledging the theoretical and empirical contributions of other disciplines that historically have dealt with the issue.

[19] As discussed throughout the thesis, the epistemological ground from which persuasion springs is from *un*certainty, rather than from certainty. In Antiquity, Gorgias expressed this sceptical stance toward absolute such that 1) nothing exists, 2) even if something exists, nothing can be known about it, 3) even it something can be known about it, no knowledge of it can be communicated to others, and 4) even if communicated, it cannot be understood (for a presentation of Gorgias, see Dillon & Gergel, 2003). The epistemological stance here is not quite so relative, but it does rely on subjective estimations of likelihood rather than objective truth-conditional dichotomies.

1.1.1. Rhetoric

Historically, rhetoric has been closely tied to persuasion. Pre-Aristotelian philosophers and rhetoricians and logographers looked to practical examples of speeches to discern and develop a theory and practical grasp of persuasion (e.g, Protagoras, Gorgias, see Dillon & Gergel, 2003 for a presentation of the Greek sophists, as well as Lysias). Aristotle, father of the rhetorical discipline, provides the first systematic exploration of persuasion, and he defines rhetoric as the ability "…to discover the available means of persuasion" (Kennedy, 1980, 1.1.1355b25-6). That is, to investigate how persuasion (i.e. strategic attempts to change the beliefs of someone else) can be brought about from a *practical* as opposed to a *logical* point of view[20]. He highlights the practical aspect of persuasion in *Nichomachean Ethics* (Aristotle, 1995h) as a way of governing policies concerning uncertain knowledge since Aristotle seemingly believes that the strongest argument eventually would triumph c.f. Habermas, 2003). Departing further from Plato's ideal of acquisition of perfect knowledge derived via the Socratic dialectical method, Aristotle introduces three persuasive appeals: reason (Gr. Logos), short, inflamed emotion (Gr. Pathos), and the character of the speaker (Gr. Ethos)[21]. Indeed, "The goal of rhetoric, in its traditional, rather than pejorative, sense, is to provide reasoned arguments why people should hold certain opinions, in areas where certain knowledge is impossible" (Oaksford & Chater, 2007, p. 8). This difference between certain and uncertain knowledge is crucial and central to the present conceptualisation and modelling of persuasion processing. Thus, at the very onset of the study of persuasion, the concept entered as relational to logic and formal reasoning, debating the limitations of these as compared with practical reasoning, the persuasive potential of emotional appeals, and the character of the speaker. The theoretical influence of this discussion will be clear throughout this thesis[22].

[20] Aristotle compared these two modes of enquiry, labelling rhetoric the sister discipline of dialectics (Aristotle, 1995a, see also his six-part work *Organon* on philosophy of language and logic, 1995b-1995g)

[21] Despite having an initial hard stance towards rhetoric in dialogues such as *The Republic*, *The Sophist*, and *Protagoras*, he eventually lessened his attacks in *Phaedrus* and *Gorgias*.

[22] Historically, this discussion has continued throughout the centuries. Thus, on the one hand some philosophers argue for the superiority of logical reasoning (a tradition invoked by the likes of Plato, 2000 and Descartes, 1996) and disown rhetoric as shallow manipulation and misguidance. On the other hand, other philosophers and rhetoricians have taken a kinder view on the complexity of human reasoning as involving emotional appeals as well (from the Ancient rhetoricians such as Cicero, 2003 to modern-day rhetorical theory such as Perelman, 2005). However, as the thesis is not a historical presentation of persuasion as a phenomenon, I will depart from this (but for a introduction to the history of rhetoric and

Modern rhetorical theory has clear links with the historical traditions set out by the Greeks. In defining rhetoric in relation to persuasion, Burke argues that "…rhetoric [is] the use of words by human agents to form attitudes or *to induce actions* in other human agents" (1969a, p. 41, for an introduction to Burke see Foss et al., 2002, chapter 7, see also Burke 1969b). Perelman & Olbrechts-Tyteca claim that argumentation is "…the discursive means of obtaining the *adherence* of minds (1969, p. 8, see also Perelman, 2005). Nichols defines rhetoric to mean "…the theory and practice of the verbal mode of presenting judgment and choice, knowledge and feeling… It is a means of so ordering discourse as *to produce an effect* on the listener or reader" (1963, pp. 7-8). Ehninger defines rhetoric as "…an organized, consistent coherent way of talking about *the practical discourse* in any of its forms or modes" (1968, p. 15), and Foss takes rhetoric to mean "…the use of symbols *to influence thought and action*…" (2004, p. 4)[23]. Exploring the richness of the discipline, it becomes evident that rhetoric is other and more than mere "discourse architecture and adornment" (Bender & Wellbery, 1990, p.4).

In order to define persuasion, I have italicized some key elements above. Firstly, Ehniger notes that rhetoric and persuasion is concerned with *practical discourse*. As will be evident throughout the thesis, this stance is reflected theoretically and empirically in that the approach discussed here relies on uncertain, practical information based on probabilistic reasoning rather than formal logical reasoning adhering to logical rules of argumentation and information updating. Secondly, Nichols describes persuasion as *producing an effect* on the listener. Given the notion of interactivity discussed in chapter 5 and 6, this seems to indicate a classic sender-receiver model of persuasion in which the persuader provides a message, which the listener will appreciate and assimilate. This somewhat static notion of persuasion is challenged in the thesis given a more interactive approach. Perelman and Olbrecht-Tyteca's notion about *adherence* (in the sense that the persuader brings the persuadee to adhere and agree with his beliefs) will be discussed in terms of alignment and agreement in 1.5 – however, I argue that epistemic alignment is not a necessary quality of persuasion, especially in deceptive cases. Finally, Burke (the veritable father of

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the rhetorical discipline, see Fafner 1977, 1982; Conley 1990; Jørgensen & Villadsen, 2009). For an interesting empirical study of policy persuasion, see Jørgensen et al. (1994).

[23] All italics are mine, for a depiction of modern rhetorical theorists, see Foss et al. (2002)

modern rhetoric) and Foss argue that rhetoric and persuasion is concerned with *influencing thought and action*. As discussed in 1.2, action is not a necessary quality of persuasion. However, the approach developed in the thesis supports the claim that persuasion is concerned with modulation and alteration of thought in terms of probabilistic estimations of evidence strength (i.e. continuous probabilistic estimations between 0 and 1 rather than dichotomous truth-conditionals of 0 or 1) in a complex social and interactive context.

Rhetorical theory offers a wide range of concepts that centre persuasion as an act not exclusively concerned with argumentation and logic, but also with emotional content and the character of the speaker. This integrated understanding of persuasive appeals is highly influential in the present view of persuasion processing. Alongside ethos, pathos and logos mentioned in the above, rhetorical theory argues that the aim of rhetoric is not simply to inform (Lat. docere). Rather, the act of persuasion also encompasses delighting the audience (Lat. delectare) and to move these emotionally to action (Lat. movere). That is, the rhetorical discipline firmly places persuasion in relation to but going beyond *pure* argumentation and information transmission and as an act concerned not only with informing the persuadee, but also entertaining and moving her in order to change her beliefs. In this way, the rhetorical tradition provides the overall lens through which persuasion may be discussed. Whereas rhetoric importantly provides a general context in which persuasion can be appreciated, the following disciplines have dealt with persuasion in more specialized ways.

1.1.2. Economic theory and Judgement and Decision Making

One of the central contributions of the thesis is to develop a normative framework that approximates how the persuadee should relate to and process acts of persuasion (this leads to the development of a new model, the SPIMP). This facilitates discussions of good and bad persuasion since such standards should be included in persuasion research (Kock, 2011) due to the fact that intuitively there are better and worse forms of acts of persuasion[24]. Economic theory provides a foundation for such a framework via game

[24] In the period following the Second World War, authors were keen on describing the potential pitfalls of persuasive rhetoric due to the demagogic success of Hitler (e.g. Burke, 1973). The normative standard developed here, however, is not concerned with the ethics of persuasion (i.e. a desirable normativity as described in the introduction), but rather with how we may conceptualize and discuss the evidence

theory and information transmission theory (ITT)[25], the former being a foundational element of the latter, as well as of judgement and decision-making theory (JDM). The mathematical framework of information transmission developed in ITT provides a significant attempt to frame some normative rules of how argumentation should be perceived by a listener. The normative standard is achieved by exploring rules of information updating from a purely rational, mathematical point of view (Crawford & Sobel, 1982; Jung, 2009), which may be derived from the axioms of probabilistic reasoning or formal logic, where the former is concerned with the content of the argument (i.e. how likely the argument is) whereas the latters is concerned with the structural framework for the argument (i.e. how valid the structure of the argument is). Given the axiomatic assumptions underlying these approaches (see chapter 2), ITT may deduce whether people process information in a rationally optimal manner, or if they fall short of the normative ideals of rationality.

Whereas ITT develops a normative standard for evaluating information processing, JDM investigates influences on decision-making from a rational point of view. For persuasion research, this is particularly interesting given the fact that humans processing persuasive attempts will have to do something with the evidence presented by the persuader. Such considerations inform the question of approximating normativity, since it becomes interesting to investigate whether humans depart from the strict normative standards developed in formal logic and ITT if these rely on objective utility functions. Indeed, empirical studies challenge the formal normative standards mentioned in the above by providing evidence to suggest the contextual and anchoring influences on decisions and reasoning (e.g. Stewart et al., 2006). I will return to this issue in chapter 2 and chapter 5 when discussing rationality and context.

Taken together, ITT and JDM offer interesting points of view on the issues of reasoning both as a normative and a descriptive phenomenon. Given formal logic and ITT, we may provide one potential normative standard for processing acts of persuasion. However, theoretically and empirically we might challenge this approach by exploring situations in which human beings seem to fail to conform to such rigorous

provided in spoken persuasion from a normative standard (i.e. an approximation of what people psychologically do).

[25] For references on the principles of game theory, see Nash (1951); Neuman & Morgenstern (1953); Gibbons (1992); Mas-Colell et al (1995). For references on the principles of information transmission theory, see Crawford & Sobel, 1982; Jung, 2009.

structural and objective standards. Throughout the thesis, I argue that this may be due to the possibility that human beings do not predominantly reason from formal, logical modes of thinking. Rather, in a flow of cultures and contested contexts, human beings make use of uncertain information conceptualized as subjective, probabilistic estimations of evidence strength. At this has not been previously explored in the psychology of persuasion, this approach developed in the thesis that offers a novel normative model of reasoning and persuasion.

1.1.3. Marketing and advertising

The field of marketing is related to economic theory as standard economic theory, ITT, and JDM provide foundational elements of conceptualizing the marketing of persuasion. However, research in consumer behaviour and advertisement are unique fields of study. Marketing and advertisement approach persuasion from the point of view of effect of particular cues and strategies, i.e. whether people and their direct behaviour are affected by specific types of persuasive attempts (for comments on the relationship between persuasion and marketing, see Stafford, 1999), which sometimes may resemble the field of rhetoric in scope and literature (McQuarrie & Mick, 1996; Phllips & McQuarrie, 2004). Furthermore, the discipline studies are also turning towards psychological accounts of interaction such as mentalizing (the ability to infer different mental states and knowledge in other individuals, see 3.2) in order to account for phenomena within the field of marketing and management (e.g. Dietvorst et al., 2009)[26].

Consumer and advertisement research has explored a range of topics relevant to persuasion (for an extensive review of advertisement, see Vakratsas & Ambler, 1999). Amongst these, we find for example effects on individual agents (Pedrick & Zyfryden, 1991; Deighton et al., 1994), the influence of rhetorical theory on advertisement (Scott, 2008), and a persuasive hierarchy paradigm (MacInnis & Jaworski, 1989; MacInnis et al., 1991). Central to much advertisement research is the investigation of persuasive effects by exploring the potential and measurable outcomes of persuasive attempts.

In particular, the Persuasion Knowledge Model (PKM) offers a specific marketing model of persuasion (Friedstad & Wright, 1994, 1995, but see also Campbell

[26] Indeed, all fields mentioned often overlap in terms of foci, theory, and evidence.

& Kirmani, 2000; Kirmani & Campbell, 2004; McAlister & Cornwell, 2009; Kachersky & Kim, 2010; Pelsmacker & Neijens, 2012). The PKM relies on a dynamic and temporal relationship between persuader and persuadee (or, 'agent' and 'target' in their terminology). The model focuses on three types of knowledge invoked as peruadee's try to "cope" with persuasive attempts. These types are persuasion, topic and agent knowledge. The central element of the PKM is the recognition by the persuadee that she is being presented with a persuasive attempt by directing the attention of the persuadee to

> "…one's own response goals and response options, supplies situational information relevant to selecting response tactics, predicts which strategies will best achieve one's goal(s), evaluates the adequacy of one's coping attempt, and retains useful information about how one interpreted and coped with this particular persuasive attempt" (Friestad & Wright, 1994, p. 3)

Thus, from increased persuasion knowledge, the persuadee should be able to cope more effectively with persuasive attempt and consequently serve her own goals more efficiently. In comparison with the approach developed in this thesis, the PKM requires a considerable cognitive load and requires concrete consciousness and awareness of the three types despite the fact that Friestad and Wright (1994) emphasises that "the degree to which people access their persuasion knowledge may shift over the course of a particular persuasion episode" (p. 4). Indeed, the authors acknowledge that the characterization of the goals "…is not based on prior empirical research… It is purely a theoretical proposition…" (p. 6). Rather than a psychological model of the mechanisms of persuasion processing, the PKM is predominantly concerned with the success of coping mechanisms from greater or lesser knowledge of the persuasive attempt. I briefly discuss coping mechanisms in 7.4, but to unify the concepts of persuasion processing with coping strategies present a fertile ground for future research, as this would provide a more holistic and thorough theory of the psychology of persuasion. Rather than approximating persuasion processing with inherently complex cognitive tasks related to one's own goal-oriented behaviour, future planning and revision, the approach developed here assumes a less strenuous effort in dealing with uncertain evidence at a more local level. However, this stance will become clearer as the thesis progresses. PKM also includes a temporal aspect of persuasion memory (see Schmidt & Sherman,

1984; Friestead & Thorson, 1993) in which memory of previous persuasive attempts becomes central to processing other persuasive attempts, which will be discussed in 1.4.

As identified in rhetorical theory, the interpretation of the speaker central to persuasion processing since this mediates and modulates the perceived strength of a persuasive attempt and thus influences how human beings evaluate and process acts of persuasion. Interestingly, recent developments in marketing research have seen an interest in mentalizing (see e.g. Sujan, 1999; Dietvorst et al., 2009, for a discussion of mentalizing see 3,2)[27]. Marketing predominantly explores mentalizing as a management and negotiating tool, but it reflects on persuasion in that the focus on how mentalizing may be used practically is inherently relevant for defining persuasion since it informs us of how the persuadee relates to the other. Indeed, as will be evident throughout the thesis, the interaction between individuals is central to persuasion in that interactivity and the social mediate the context through which language, evidence and probabilities are negotiated.

In sum, marketing and advertisement provide initial ways of approaching persuasion from an effect point of view. As discussed in 1.2, persuasion is difficult to measure given the definition that action is not a necessary entailment of persuasion. However, researching effects of advertisement campaigns provides tentative evidence for the apparent success and failings of particular persuasive strategies, which in turn provides indirect evidence for exploring and subsequently describing the psychological processes underlying persuasion. The evidence is indirect due to the fact that persuasion need not necessarily result in specific behaviour whereas (unobservable) belief changes are sufficient and necessary (see 1.2). Secondly, by exploring mentalizing, the field of marketing indicates the importance of interactivity and the understanding of others in acts of persuasion, which are central elements throughout the thesis.

1.1.4. Psychology

Finally, psychology has dealt with persuasion in mainly two ways that provide equally interesting perspectives on persuasion and influence, namely cognitive and social

[27] However, as will be evident from the discussion in chapter 3, mentalizing is a high-level cognitive process, which necessitates more fundamental accounts of interaction and common knowledge. Rather than assuming a sender-receiver relationship in mentalizing, the account developed here focuses more on the negotiated context and joint action of understanding one another in persuasive settings.

psychology. The cognitive psychological literature predominantly aims at describing the concept of persuasion in the sense of the psychological mechanisms involved in processing acts of persuasion whereas social psychology more focuses on the influence of others (Cialdini, 2007) and the environment (Thaler & Sunstein, 2008) in shaping beliefs and behaviour. The theoretical contribution of the thesis mainly falls within cognitive psychology despite drawing extensively on theories and empirical work from other disciplines such as rhetoric, philosophy, economics, marketing, social psychology, and formal logic.

Petty and colleagues developed the hitherto most influential model of persuasion processing in cognitive psychology. The model is called the Elaboration Likelihood Model (ELM) of persuasion (Petty et al., 1981, 1999; 2005 Petty & Cacioppo, 1984, 1986, 1990; Petty & Wegener, 1999; Petty & Briñol, 2008; O'Keefe, 2008). ELM is a dual-process theory of persuasion, which means that in the one hand it relies on fast, frugal heuristics at the unconscious level (labelled the peripheral route) and in the other on slow, effortful reasoning at the conscious level (labelled the central route)[28]. The model predicts that evidence processed and accepted via the central route has longer longevity, whereas persuasion via the peripheral route is less fundamental.

In the central route, the persuadee elaborates on the message (act of persuasion) in two fundamental ways. The first way is concerned with deciding whether the advocated position is pro-attitudinal or counter-attitudinal for the persuadee, i.e. whether the persuasive attempt aims at reinforcing already held beliefs or aims at altering the beliefs of the persuadee in a different direction (regardless of whether or not the persuader is pro- or counter-attitudinal – the focus is on the proposition). The second is concerned with the quality of the argument. Here, the persuadee aims at evaluating the strength of the persuasive attempt. As already noted in the introduction (see also O'Keefe, 2008), the ELM does not provide a concrete framework for deciding whether a piece of evidence or an argument is strong or weak whereas the framework developed in this thesis introduces exactly this notion (see 2.3-2.4). In the central route, then, the persuadee evaluates the aptitude and strength/validity of the proposition. The peripheral route, on the other hand, relies on heuristic strategies for coping with the persuasive attempt. O'Keefe (2008) mentions three of the prevalent heuristics discussed in the

[28] For a discussion of dual-processing models of cognition, see 1.7

ELM: credibility, likability and consensus (p. 1477), which are taken to be implicit, fast and automatic without the control of the subject[29]. A central entailment of the ELM is that persuasive attempts processed thoroughly via the central route should be more fundamental and enduring whilst peripheral persuasion is shallower and less enduring. That is, persuasion can be processed through two inherently different systems (the interaction of which remains an open question, O'Keefe, 2008).

The ELM has been criticised in a number of ways. Hamilton et al. (1993) argues that the ELM does not add anything significant to persuasion theory since "The current model of the peripheral route is logically inconsistent with the mode for the central route [due to its reliance on heuristics rather than rule-based reflection]" (p. 63). Hamilton and colleagues argue that information processing systems such as the ones presented in the economics section hold more merit due to logical consistency. As will be evidenced, the thesis agrees with neither position since the position advocated here is relies neither on dual-processing nor on a logical framework of reasoning. Rather, the model developed below, the SPIMP, assumes an integrated, interactive, and probabilistic understanding of persuasion processing.

The Heuristic-Systematic Model is another influential model of persuasion from cognitive psychology, which also drawing on dual-processes (HSM, see Chaiken, 1987; Chaiken et al., 1989; Chaiken & Maheswaran, 1994; Kim & Paek, 2009). In the same manner as the ELM, the HSM assumes that when persuasive attempts appear inconsequential to the persuadee (Chaiken, 1980) or are constrained by mitigating factors that do not allow the persuadee to carefully consider the attempt, e.g. time constraints (Ratneshwar & Chaiken, 1991), the heuristic (system 1) route will be used rather than the systematic (system 2) route[30]. The systematic system, according to Chaiken and colleagues, has the potential to "…suppress the occurrence of heuristic processing" (Chaiken & Maheswaran, 1994, p. 460), which conceptually entails a combative rather than a supplementary relationship between the systems in the HSM. Expert opinion and popular endorsement provide two concrete examples of heuristics since "…heuristic processing would lead people to expect messages to contain more

[29] Indeed, the ELM has directly influenced research in implicit-explicit attitudes (e.g. Rydell et al., 2006)
[30] Note that Chaiken (1980) distinguishes between the use of source and message in persuasion processing. The current approach argues that the use source and message is *always* present in persuasion processing (see 3.3 on the conceptualisation of the interpretation of the speaker).

valid arguments when they stem from expert rather than nonexpert sources and to expect attitude objects or attitudinal positions to be more worthy when they are liked or endorsed by many rather than few people" (Ibid., p. 461). As evident from 3.3, the framework adopted in the thesis can integrate the notion of source credibility in a Causal Bayesian Network model.

Whilst the ELM and the HSM provide fascinating cognitive psychological models of persuasion processing, a range of studies in social psychology explore the importance of other peoples' behaviour when we think and act (for a general review of these, see Cialdini, 2007)[31]. The assumption that human cognition and behaviour are influenced by the behaviour of others underlies the social psychology studies. For instance, the perception of authority may influence how we act (Milgram, 1963), the social act of others may also influence how we manage our choices (Bandura et al., 1967; Phillips, 1974; 1983), and the outcome of congressional elections may be predicted with some certainty simply by eliciting from voters which of the candidates look the most competent (Toderov et al., 2005, for a discussion of the social importance of trust and facial expression, see Rezlescu et al., 2012). Thus, social norms and behaviour influence our perception of our immediate surroundings and how we can process the information available, which consequently influences how we approach, estimate and evaluate evidence provided in acts of persuasion[32]. Taken together, the importance of social influence and interaction shows that acts of persuasion can never be thought of in a vacuum and that analyses of persuasive attempts should not be divorced from the social context in which they are lodged (as, for instance, some de-contextualised examples of Conversation Analysis). Indeed, the context in which people are immersed when they are subjugated to persuasive attempts may carry a lot of meaning and persuasive potential. The importance of the interaction with the interlocutor and the social aspects of persuasion are discussed in more detail in chapters 5 and 6 where a discussion of how to conceptualize persuasion as an inherently social act relying on interaction between humans is carried out.

[31] For a popular-scientific presentation of the social influences on persuasion, see Goldstein et al. (2009)
[32] Thaler & Sunstein (2008) further discusses how extraneous circumstances and the immediate surroundings may influence choice architecture – however, this is concerned with the choices people make, which is not necessarily persuasion (for a discussion of persuasion and action, see 1.2).

In review, some main points may be drawn forth to capture the initial complexity of persuasion. As clear from rhetorical theory, persuasion should not be limited to a study of formal, logical transmission of knowledge given the fact that other elements such as pathos and ethos also should be considered. Secondly, persuasion has been investigated both from a quantitative as well as a qualitative point of view to provide a foundation for appreciating acts of persuasion normatively and descriptively. Indeed, the theoretical contribution of the thesis relies on discussing persuasion from a quantitative and predictive point of view, which nonetheless requires qualitative descriptions in order to analyse *specific* acts of persuasion (see 7.2). Thirdly, as evident from social psychology persuasion is necessarily social and interactive. Finally, as will be discussed further below, verbal interactive persuasion resides in an interesting position that draws on reasoning from uncertain evidence, interaction with others, how communication is managed interactively, and how the persuadee immerses herself in the context. This holistic approach to persuasion is reflected in chapters 5-6, which deal with these elements. As evident from the brief literature review, it clearly emerges that different disciplines *primarily* deal with different issues pertaining to the description, modelling, and analysis of persuasion. As mentioned in the beginning of the chapter, fig. 2 illustrates the main conceptual interest of the reviewed disciplines. Naturally, the illustration is approximating at best, as most, if not all, of the disciplines provide a more complex approach to persuasion. The illustration, then, is merely an indicative map of the literature reviewed in the above and their conceptual relation to persuasion research.

1.1.5. Initial conceptualisation of persuasion

In order to further approach a conceptualisation of persuasion from a psychological perspective, imagine a game theoretic scenario involving an urn containing 100 purple and yellow balls. The colour of the balls is either mainly purple or yellow (e.g. 70/30). In the game, person 1 (the persuader) may look in the urn and select 10 balls without showing the balls to person 2 (the persuadee). Despite now showing the balls, the persuader does report the colour of the balls – the report may be truthful or deceptive (i.e. reporting the actual colour versus misrepresenting information). Following the presentation of information, the persuadee has to decide whether the urn contains mainly purple or yellow balls. The game is antagonistic such that the aims of the

interlocutors are opposed. The persuadee wins if she guesses correctly, but loses if she guesses wrongly. The question is: what should the persuadee do in terms of the information provided by the persuader? This scenario is a simplified version of many persuasive situations in which the persuader and the persuadee have different, or perhaps even opposing, aims, and in which there is an asymmetrical relationship in terms of the access to information and the power to present and frame this information[33].

From a reasoning perspective, we should expect that a perceived low trustworthiness of the source should drive down the posterior estimation of the validity of the information (see also Harris et al., 2012; Harris et al., submitted). This hypothetical case, then, is in no way difficult since the trustworthiness is low, which subsequently should yield a sceptical stance towards the information presented by the persuader, i.e. the best strategy of the persuadee is to ignore the evidence, as she remains at chance no matter what he displays. However, when considering the aims of the persuaders, we are often faced with a dilemma since these more than often have different or additional aims than the ones being communicated. For instance, companies advertising for their products are predominantly interested in selling products but will claim an interest in improving the lives of the individual customer as well as their own employees and politicians run for office to be elected as well as to serve the people. Naturally, these aims are complex and mixed in the sense that without a good product, which *does* improve the life of the costumer, the company cannot continuously sell their products in the future and without any wish to improve the lives of their constituency, few politicians would presumably run for office. However, aims and desires of the persuaders are often unknown to the persuadee and may even be at odds with the aims and desires of the audience, which mirrors the scenario in the above in three interesting ways. Firstly, the aims of persuader and persuadee may differ (see 1.4). Secondly, the persuader can, to a large extent, choose which information to present[34], which provides an epistemological asymmetrical relationship between persuader and persuadee (see van Buiten & Keren, 2009). In particular, the persuader will almost always have more information pertaining to the particular case as compared to the audience, and he may

[33] For an excellent book on communication and power relations, see Castells (2009)
[34] Disregarding for the time being the complexity of situations in which information may be forced into the public such as legal settings, audits etc.

not wish to provide the audience with a full account of the details. Finally, again to a large extent, the persuader can frame the information in a manner that best suits his personal aims, which creates an asymmetrical contextualizing relationship. Given that in real life people alternate between being persuader and persuadees in different situations, it should be known both interlocutors that an asymmetrical relationship exists on three levels: aims, epistemology, and framing potential. Hence, a puzzle arises. If the audience conforms to pure probabilistic reasoning, we should expect posterior ratings to be low in many persuasive situations (e.g. a sales pitch) whereas in reality audiences seem less sceptical. In other words, it is puzzling why people should be open to persuasion at all in these circumstances due to truth-conditional volatility and source credibility. As such, persuasion goes beyond the confinements of naïve reasoning theories in which audiences *only* process the evidence provided to them as well as the credibility of the source[35]. Indeed, given persuasion in reality, this seems a realistic position. The thesis is concerned with exploring this puzzle more in-depth[36].

The urn game entails some interesting points to consider when defining persuasion. Firstly, it is a simplified scenario given the fact that information in the urn game, at least for the persuader, is certain: he knows for certain the content of the urns. As will be evident in the discussion of the epistemic relationship between the persuader and the persuadee, such a naïve approach to knowledge cannot be assumed in all acts of persuasion. Rather, knowledge may be mediated, negotiated and uncertain for *both* persuader and persuadee, although with important degrees of difference since the epistemic asymmetry persists. Secondly, the persuadee's posterior belief may be mathematically calculated given identifiable nodes in a complex Causal Bayesian Networks (see Pearl, 2000). The immediate conclusion is that the persuadee should be less inclined in believing the information provided by the persuader if the persuader is unreliable and has motivation to misinform[37]. However, this is a simplified model compared to real cases of persuasion. For instance, despite having every reason to misrepresent information and beautify data, many consumers still rely on advertisements. Finally, the case indicates that a simple calculation of the probabilities

[35] To name a few considerations, a purely rational information-updating approach would ignore the intentionality issue discussed in 1.3 as well as the notion of epistemic non-alignment as discussed in 1.5.
[36] As a more in-depth example of the persuasive puzzle on Nixon, see Madsen & Chater (in prep)
[37] Thus, if the persuader has motivation, the subsequent posterior belief should decrease and vice versa. This makes use of complex causal networks (see e.g. Harris et al., submitted).

of information cannot be sufficient in describing persuasion. Without having interactive common knowledge about the context, an interpretation of the persuader, and some language capability, the above game would make no sense to the persuadee.

By exploring this simple game, we may identify central elements of persuasion that will be discussed throughout the thesis. Firstly, in any act of persuasion at least *some* information has to be mediated. As evident from the urn game, the information is epistemologically uncertain and will consequently be discussed from the point of view of probabilistic reasoning (chapter 2). Secondly, the persuadee has to have some kind of interpretation of the persuader, which will be discussed in chapter 3. Thirdly, the interlocutors have to engage in some act of spoken language in order to be understood and understand to some degree although this too is negotiable and mediated in context. The communicative will be discussed in more detail in chapter 4. Finally, the context in which the information is provided and how the interlocutors interact with one another become central elements of persuasion given the fact that the theoretical foundation is concerned with subjective and contextually mouldable concepts. The interaction and immersion of the persuadee in the context is discussed in chapters 5 and 6. Three specific models of persuasion were identified (ELM, HSM, and PKM). They provide a comparison to the present model, which will be discussed in greater detail 7.5, in terms of how they relate to the approach developed here as well as the theoretical and empirical evidence cited as ground for the approach. In sum, the thesis explores the theoretical interface of reasoning from uncertainty, language comprehension, and the interpretation of the speaker in a cultural context in constant change as identified as central elements of a persuasive setting by exploring the hypothetical case of the urn.

1.2. Elements of persuasion

Taillard (2000) identifies three elements of persuasion: beliefs, desires, and the intention of action. Taking point of departure in the latter, the intention of and subsequent carrying out of action may be seen as a potential result of persuasive attempts. For example, if I vote for a particular candidate in a political election, I am indeed acting according to the direction of the intended outcome of the act of persuasion. However, intention of actual action is not a necessary element of persuasion in that actual action may be difficult to observe for a number of reasons. For example, a person may be

persuaded to alter her beliefs pertaining to a particular political candidate, but also be dejected by the political scene in general, which entails that she does not vote at all. This does not mean that the person has not been persuaded in some form concerning her beliefs. However, as Burke (1969a) notes, a hierarchy of beliefs is possible such that her belief in not voting takes precedence over the belief that was changed as a results of the persuasive attempt, and thus she still refrains from voting despite a successful act of persuasion. Therefore, action is an often conjoined and subsequent *consequence* of acts of persuasion, but it is not a *necessary* element. Furthermore, a person might act different without changes in her belief (such as coercion). That is, action can spring from other wells than beliefs. However, studies in behaviour change and action does provide potential information pertaining to persuasion such that explorations of the effects of advertisements provide indirect evidence for persuasion given that these measure action. Indeed, given the fact that beliefs are not directly measurable, observations of actions and outcomes (and thus indirect evidence) may be the best we can do in terms of approaching measuring the success and effects of persuasive attempts[38].

Whether desires should be included in a theory of persuasion depends on the definition of the concept. If we take desires to mean goal-directed orientation of some type, then surely certain types of desires permeate acts of persuasion. In line with Sperber and colleagues (e.g. Sperber, 2000; Sperber et al., 2010), I assume that humans generally desire to have as accurate information about their surroundings as possible in order to function as optimally as possible. This entails epistemic vigilance, which is discussed in 3.1. However, desires may not be conscious for humans. Thus, if desires have to do with the fulfilment of a passion, it does not seem to be a central element of persuasion although it may be a frequent conjoined element. In *The Republic*, Plato remarks that humans can desire contradictory objects (for a discussion of this, see Bouchet, 2011). Thus, in its weaker instance of being directed, (un)conscious, and self-sustainable goals, desires permeate and dominate the scope and aim of acts of persuasion.

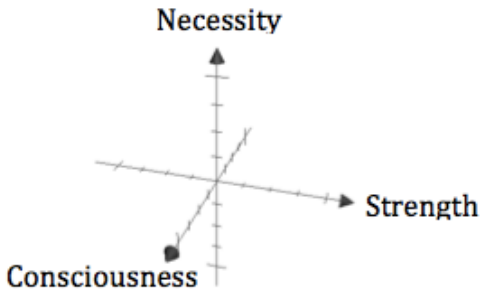
[38] On another level, a theory of persuasion might very well inform a theory of behaviour change and influence regarding what it means that behaviour is charged with meaning and belief (as well as which meaning and belief) in communicative contexts.

Finally, beliefs are, in the conceptual framework of this thesis, at the heart of persuasion. Epistemologically, this stance agrees with Budzynsky & Kacprzak (2008) who argue that "…persuasion refers to beliefs not knowledge" (p. 53). A belief may be seen as a mental state of having some attitude or opinion about whether a proposition or an idea is likely to be true, and beliefs may be construed as central building blocks of thought. Simon & Jones (2011) define the concept broader by saying that "…beliefs are what we each personally consider to be true or probable" (p. 41). In accordance with the latter definition, I take beliefs to refer to a psychological state pertaining to the likelihood of information and evidence. Importantly, this definition includes significant implications for persuasion compared with more rigorous propositional theories of beliefs. The implications relate to consciousness, necessity, and strength of the beliefs. As shown later, these dimensions are of vital importance when examining persuasive attempts from the theoretical strands of literature applied in this thesis.

Beliefs can be conceptualized to contain various elements that qualify these. Firstly, in the definition offered here, beliefs are not necessarily, and perhaps very seldom conscious in the sense that we all have a plethora of beliefs about the world-of-affairs. For instance, I will have a host of beliefs that are underpinning my more conscious acts of thinking such as beliefs of gravity and intuitive physics, temporal and spatial relations, personal and socio-cultural contested histories and so on. These beliefs can be called into question, and consequently human beings can consciously revisit these in thought, discussion and interpersonally in acts of persuasion, but most of the time these are latent and unconsciously held (for instance, I rarely ponder my belief in gravity). They may, however, have an impact on the probabilistic evaluation of the individual in the process of persuasion. Secondly, despite the fact that beliefs may be expressed propositionally (e.g. "I believe that the earth revolves around the sun"), I do not assume that beliefs are necessarily propositional in their nature. Rather, I take beliefs to refer to mainly latent entities that are neither well defined nor stable. Thus, I take beliefs to exist in a fluctuating continuum in which these may be brought to the attention of the person in a varying degree of consciousness. Alongside the gradient of consciousness, some beliefs are more central to our understanding of the world-of-affairs than others. For instance, I might believe that Lagos is the capital of Nigeria, I

might believe that the people who call themselves my parents are in fact my parental units, and I might believe that the earth revolves around the sun. The qualitative difference between these beliefs is the degree of necessity that these represent for me. If someone corrects me by reminding me that Abuja and not Lagos is actually the capital of Nigeria, this does not fundamentally alter my beliefs of the world-of-affairs save a minor correction in my beliefs about Nigeria. However, my beliefs about my upbringing and the astronomical position of the globe are more central to my understanding of myself and the world in general. That is, in a similar vein that beliefs may exist on a continuum of consciousness, they also exist on a continuum of necessity. Finally, the degree to which I believe a belief to be true is a central element, which will be the focus of chapter 2 when discussing Bayesian rationality and probabilistic reasoning as a foundational aspect of persuasion processing. On a gradient scale, I might believe more or less strongly in a belief (from 0 to 1). Beliefs, then, are not directly commensurable on a one-to-one basis, but can rather be distinguished qualitatively from one another depending on these three elements. As a helpful tool in conceptualizing beliefs, the three essential dimensions of beliefs presented in this section are summarized in fig. 3.

Fig. 3: Elements of beliefs



In conclusion, for persuasion to take place, as a minimum, persuader has to try and change the beliefs of the persuadee, whereas desires (depending on the definition) and (intention of) action are not necessary elements. Information updating also will always be involved in the process of alteration of beliefs, as information necessarily need to be presented[39]. However, this raises a central question concerning information updating and argumentation theory, namely whether persuasion is equal to these. However, as discussed in 1.3, simple information updating and argumentation cannot alone constitute persuasion since the former could simply be the act of someone else updating

[39] Note here, than, that I am in line with Burke (1969) who observes that coercion cannot be persuasion since it does not involve the freedom to disagree.

your information pertaining to the weather without any form of persuasive intention between interlocutors. That is, the focus is on persuasive settings in which interaction between people becomes central to the process. Spoken interpersonal persuasion, then, is a special type of belief alteration that involves other processes than simple information updating since it also has to involve persuasive intentions (see section 1.3) and interaction in a contextually, epistemologically, and an aim-wise asymmetrical setting[40].

1.3. Persuasive intention

The notion of persuasive intentions adds to the previous definition of persuasion, where it was defined as changes in beliefs. Persuasive intentions help distinguish persuasion from information updating and argumentation (as discussed in 1.6). Being updated on the weather condition does not constitute an act of persuasion, but rather of information due to the fact that there is not necessarily any *persuasive* intention in simply updating knowledge or beliefs about the state of the world (although, as clear from the example with *Life of Brian* later in this section, there can be)[41]. Given the focus of interpersonal, spoken persuasion, the acts of persuasion defined here have to include more than one person. However, this does not entail that every situation with new information and more than one person is necessarily persuasive. Consider two similar scenarios in which a child in a kitchen is reaching for a cookie and is spotted by a watchful parent. In the first scenario, the child does not know that she is being observed and is thus simply reaching for the cookies without intending to communicate anything to the parent. Note that the parent will still be able to consider the mental states of the child (e.g. she is peckish, hungry, aware that she is doing something without the consent of her parents) and is thus able to mentalize, to update his beliefs about his child and to be induced to action. He may even provide the child with a cookie, thus fulfilling the wishes of the child. However, this does not constitute persuasion since the child had no intention of persuading the parent (unaware of his presence) to provide her with a cookie. Beliefs

[40] Of course, the notion of belief has been subject to very intensive philosophical analysis over the past century. I shall not consider these issues in any detail here, but rather consider how persuasion relates to the notion of belief, fairly independently of whatever turns out to be appropriate the analysis and definition of belief.

[41] Note that this does not entail that updating one's beliefs in general is devoid of intentionality (see 6.1). However, this is significantly different from persuasive intentions the concept is presented here.

have been altered, but not due to persuasive effort. In other words, there was no intentional or shared interaction between the father and the child. In the same setting, imagine that the child is aware that the parent is observing her. She may then try to persuade her father by communicating her wishes by telling him about her wishes[42]. The persuasive strategy may be forthright (asking for a cookie), misleading (denying reaching for the cookie), or anything in between[43], but essentially the child needs to will a change in beliefs in the parent concerning the cookie. The central point is that the father and the daughter engage interactively in the context of cookies in which both parent and child realizes that the other has intentions concerning the beliefs and outcome of the situation. These intentions may not be transparent for the interlocutors. For instance, the parent may readily assume the child wants a cookie, whilst the child may assume that the parent wants to give her a cookie without this being the case.

The persuasive intention, however, is not a simple construct. Rather, it can be divided into three separate and mutually important intentions (persuader, persuadee, and mutual) towards the situation in which, as discussed later, two of the three intentions are necessary for a persuasive incident to arise[44]. Firstly, the persuader may intend to alter the beliefs of the persuadee. This is a wilful action in which the persuader strategically can choose his words and arguments (recall the asymmetrical nature of persuasion) in order to alter the beliefs of the other. Secondly, the persuadee intends to engage with the persuasive attempt such that she complies with the SPIMP approach described in the thesis (see 7.3). Finally, there need to be a mutual intention of engaging with one another from a communicative and information-sharing perspective. If either interlocutor opts out of conversation, the persuasive incident comes to a grinding halt. As such, the persuasive situation is permeated by a three-layered intentionality, which theoretically makes it possible to discuss different types of alignment on a communicative versus an epistemic basis (where the two interlocutors need alignment on the first, but not necessarily on the second).

[42] The communicative act may be both verbal and nonverbal. However, given the focus of spoken persuasion, I will assume verbal communication

[43] Interestingly, human beings seem to become strategically shrewder as they mature (see e.g. Friestad and Wright, 1994).

[44] The individual intentions (persuader and persuadee) are closely tied to the persuasive aims of each interlocutor, see 1.4

As noted by Simon & Jones (2011), the notion of a persuasive intention is fluent with grey areas, since situations may occur in which speakers do not wish to persuade, but are in turn ascribed with persuasive intentions by the persuadee. In other words, given the interpretation of the speaker, there may be discrepancies on either side of the persuasive attempt, and whether or not the persuader intends to persuade the persuadee may be negotiable and fluctuating in context. But this interpretation of the social, and whether or not the act is considered social (as it is to be understood here), predominantly lies with the persuadee. Consider Monty Python's *Life of Brian* in which Brian, believed by followers to be the messiah, finds himself with his unwanted disciples in the desert. They are hungry, and Brian points to some bushes with juniper berries. This is a completely informative act of communication from the point of view of Brian. However, the followers infer that Brian has produced the food out of thin air and is showing them the miracle to persuade them of his godliness. This is a humorous example, detailing the fact that the complex act of interpretation of the persuasive intention is mediated between the persuader, the persuadee and the context. That is, the persuasive intention is something inferred by the persuadee despite the fact that the persuader is the one supposedly performing the act. This highlights the interactive nature of the persuasive attempt. The persuader may to some extent provide the framing, the setting, and the message, but it is equally important that the persuadee engages in this act. In the case of Brian, it was sufficient for a persuasive situation to arise given the mutual and the persuadee intention. However, it is also sufficient with the persuader and the mutual intention. For instance, examples where the persuadee enters the social situation expecting information updating, but unwittingly ends up in a persuasive situation without recognising it. Propaganda and biased news organisations provide examples of this instance. In both situations (lacking either of the individual intention), the mutual intention of engaging in a social exchange has to remain. Therefore, in order to talk about the persuasive, the mutual intention and one of the other *have* to be present, but most often the social situation will be such that both interlocutors acknowledge the persuasive and thus all three intentionalities are bound within the social (see 6.1 on intentionality). We cannot divide the roles of persuader and persuadee in an unproblematic manner. This interactive effort is discussed at more length in chapter 5.

In sum, in order for the phenomenon to constitute a persuasive intention, several conditions need to be fulfilled. Firstly, the interaction between the persuader and the persuadee has to be such that they both recognize one another[45], hence the example with the girl reaching for the cookies. Secondly, the interaction also has to include that the persuader intends to alter (or is inferred to intend so by the persuadee) some of the persuadees' beliefs in a manner, which does not simply constitute information updating. Thirdly, that the exchange potentially is strategic and that the persuadee may be epistemically vigilant (see 3.1). Finally, the persuader and the persuadee will engage in communicative action. If these conditions are not met, the act cannot be an instance of persuasion, but rather of information updating, bodily interaction (such as meeting in a hallway and coordinating so that the people do not bump into one another), or similar instances of interaction that are not persuasive.

1.4. Aim and temporal relationship of persuasion

Alongside the necessary elements and persuasive intentions, one must look to the potential scope and aim of persuasive acts given the fact that such situations may not entail the same direction of aim between interlocutors. For instance, acts of persuasion may be manipulative in the sense that the persuader (perhaps covertly) aims to persuade the persuadee of something that may not be beneficial to her. This could be providing misinformation regarding certain issues (e.g. when deciding whether or not to intervene in Iraq due to WMDs), deceptive representation of the situation (e.g. Bill Clinton's account of the Monica Lewinsky affair) or simply due to misalignment of aims (e.g. a car salesman and a potential costumer). That is, in studying persuasion, we cannot assume that interlocutors will have a Habermasian aim of consensus and truth-seeking (Habermas, 2003). Nor can it be assumed that the persuader has benevolent intentions for the persuadee. On the other hand, persuasion is not simply manipulation and misrepresentation of facts. If persuasion is taken to be an interactive event involving two interlocutors, persuasion may also serve a beneficial purpose. For instance, a nurse trying to persuade an inhabitant of a care home to take her medication would be an act of benevolent persuasion. In other words, persuasion can neither be taken as something

[45] Note that this does not entail a one-to-one recognition. For instance, a politician speaking to a crowd does not recognize any individual per se, but rather recognizes the crowd as potential persuadees. However, as the focus of the present is on one-to-one persuasion, this remains, at the moment, irrelevant.

inherently malevolent nor as something inherently beneficial[46]. Depending on the context, persuasion may serve a range of purposes. This claim will be increasingly obvious as the thesis progresses. On the whole, however, the thesis is in line with Sperber's (2000) remarks on communication that *overall* persuasion needs to be beneficial. Otherwise, the persuadee should opt out of the situation immediately when she realises the persuasive intention, and clearly this is not the case.

Persuasive aims As will be discussed in 1.5, persuasion may be directed towards alignment of beliefs and reaching consensus. However, we cannot necessarily assume benevolent consensus-seeking behaviour in persuasion – neither from the persuader nor, in fact, from the persuadee. The persuader is relatively straightforward given the fact that persuaders in some situations will attempt to maliciously manipulate the beliefs of the persuadee to fit their personal agenda, which may differ significantly from the goals and benefits of the persuadee. One could imagine, however, that the persuadee should seek to align her beliefs with the proposed act of persuasion. However, there are other factors to consider. Firstly, the persuadee should be aware of the fact that persuaders from time to time will exactly try to manipulate and deceive. Consequently, given epistemic vigilance (Sperber et al., 2010, see 3.1), the persuadee may approach the act of persuasion from a perspective of non-alignment and distrust. Secondly, the persuadee may have an overarching aim reaching beyond the act of persuasion in the sense that she may want to use the information gathered in the act of persuasion to further other aims that counter the perceived aims of the persuader. Thus, it does not seem straight-forward that we should expect benevolence, neither from the persuader nor from the persuadee. This discrepancy from both interlocutors is on an epistemic level relating to the individual directedness of intentionality towards the situation. That is, we cannot expect epistmic alignment. However on a communicative level, some form of alignment *has* to take place since without any common point of reference, acts of persuasion and persuasion processing would be impossible. That is, given the fact that I do not speak Swahili, I would not be able to be persuaded by spoken persuasion in Swahili simply due to the fact that I would have no idea of what was being communicated. This holds true for cultural and historical references as well;

[46] Indeed, it is easy to infer the necessity of malice where there is only the potential of malice. However, this should not cloud the definition.

some form of alignment on the level of mutual intentionality of engaging with the social situation has to occur for the persuasive incidence to take place.

Temporal relationship of persuasion As discussed throughout the thesis, acts of persuasion, like acts of communication and interaction in general, carry with them complex notions of competing aspects of time. The integration of time-scales in persuasion studies is vastly complex and lies beyond the scope of the thesis (but see Madsen, submitted). However, given its importance in communication and epistemology (see 4.4 and 6.4), it has to be mentioned as a central element of persuasion processing. Bohner & Dickel (2011) hints at the importance of the temporal by citing memory as an integral part of persuasion[47].

The act of persuasion is in a relatively confined space in time given that a particular, single-event persuasive attempt will usually be fairly brief (typically between a few seconds in advertisement to a few hours in debates or political speeches). The thesis is concerned with defining the cognitive processes that the persuadee undergoes in this confined, flash of a moment vested in a larger flux of a time-scale(s). However, in order to make sense of the present time-scale, the persuadee *and* the persuader have to make use of larger movements concerning language, culture, and common knowledge. The complex notion of time in persuasion thus has to acknowledge at least four separate strands of time, each of which entails a complexity that is beyond the scope of the thesis. Firstly, given the importance of the developmental background of beliefs throughout the life of the individual (Hood, 2012), the individual's psychological framework (7.1) is essential since this posits the frame for the possible communicative interpretations a subjective estimation in the situation. These involve personal memories, cultural upbringing, personal histories and other events that have occurred in their respective lives[48]. Secondly, historical and cultural incidents go beyond the lives of the individuals engaged in the act of persuasion. Thus, despite residing on a different time-scale, both individuals will have to be aware of, or at least be unconsciously influenced by, historical, socio-economic, and cultural factors. These factors are contested in that they might entail different things to each individual.

[47] Note that he ELM also integrates temporal relations on a basic scale in their approach, e.g. the PAST model (Petty et al., 2006).

[48] To explore this issue and flesh out a theory of how the individual backgrounds may facilitate interaction, an in-depth study of developmental studies as well as interactive literature would have to be investigated.

Thirdly, in order to make use of language in the present, human beings rely on a complex trajectory of past uses of language and communicative conventions. Thus, I am able to write this thesis due to the fact that millions of people throughout the past hundreds of years have been speaking and writing English from Chaucer to RZA. These over-arching linguistic trajectories are manifest in grammatical structures[49]. However, the use of language is also subjective in that words can take on a plethora of meanings and mutate with novel uses of language. Finally, as noted in 1.6, persuasion exists in an interesting epistemic state given the fact that many acts of persuasion are concerned with beliefs and potential behaviour in the future (e.g. who to vote for in the next election). Thus, interlocutors also have to keep a potential future time-scale in mind when engaging in persuasive interaction. In sum, both the persuader and the persuadee occupy a complex space that relies on personal time, historical and cultural time, and possible futures. That is, a variety of time-scales ranging from on-the-spot Pico-time interaction (Pedersen, 2012; Steffensen, 2013) to complex, intersecting time-scales. This will be discussed further in 6.4.

1.5 Alignment, consensus and persuasion

Bordering persuasion research, theories of consensus, agreement and alignment may provide valuable insights into how human beings deal with uncertain evidence and the epistemological aims they entail. Indeed, in terms of communication and evidence, there has to be *some* form of alignment for persuasive attempts to even make sense to the interlocutors[50]. In his seminal paper, Aumann (1976) shows that, from a fully rational purely probabilistic point of view, "if two people have the same priors, and their posteriors for a given event *A* are common knowledge, then these posteriors must be equal" (p. 1236). That is, given the same probabilistic estimations and the same common knowledge, interlocutors should reach the same posterior estimation and thus consensus when seeking truth (although, of course, they might both arrive at a flawed conclusion). Mathematically, this is the same for economics of information (DeGroot, 1972; Grossman & Stiglitz, 1976, for economic information transmission theory, see

[49] How solid and innate the grammatical structures are is still a hotly debated issue in lingusitics, see chapter 3

[50] This issue will be explored in more detail in chapter 5 concerning the joint action, common knowledge and interactivity in persuasion.

e.g. Crawford & Sobel, 1982; Jung, 2009). Intuitively, persuasion may be approached from a similar view of alignment in the sense that the persuader makes an attempt to align or synchronise the beliefs of the persuadee so that she conforms to the ones he proposes. Indeed, in such an intuitive alignment-seeking view of persuasion, this could be a definition of success. However, as discussed in the previous section, persuasion may differ from consensus-seeking activities.

Aumann notes that the key notion of agreement is "common knowledge" (p. 1236) and that the imparting of knowledge requires "the full description of a state *w* [the "true" state of the world] of the world" (p. 1237) as the manner information is transferred. According to Aumann, the Harsanyi doctrine, that "…differences in subjective probabilities should be traced exclusively to differences in information" (ibid.), permeates the notion of alignment as long as the discussion is not concerned with "innate" differences in priors (Aumann, p. 1238, see also Harsanyi, 1968). There are at least four interesting assumptions and remarks concerning the nature of persuasion that may be elicited here to gauge at the limitation of alignment theory in persuasion. Firstly, in mathematics and set theory the notion of common knowledge may be straightforward, but in psychology it is not. It does not seem epistemologically warranted to assume that interlocutors have common knowledge in the full state of the world, *w*. Therefore, we may assume that interlocutors will have to have *some* common knowledge, but that this notion is more complex than assumed in Aumann. Secondly, to reach agreement it is necessary to entertain the same prior probabilistic estimations. Like common knowledge, this cannot be assumed in practical situations given the fact that people will have had different upbringings, belong to different cultures/sub-cultures, and thus entertain different priors (Hood, 2012; Haidt, 2012, see also 6.2 and 7.2 for a discussion of this) – even in situations in which interlocutors are presented with the same information, we cannot expect humans to arrive and conform to the same priors given difference in the psychological framework against which the evidence is perceived (see 7.2). Thirdly, the assumption of knowledge in the full also seems unwarranted in practical settings. The complexity of practical reasoning entails that no one can entertain full knowledge of a situation, as it would require a massive amount of

information concerning politics, data collection, cultural awareness etc.[51] Finally, the mathematical proof hinges on the assumption that interlocutors engage in benevolent information transmission with the purpose of reaching a mutual understanding and agreement. As noted in the above, such Habermasian ideals of striving for consensus and common understanding cannot be assumed in persuasive settings given the complex divergence of persuasive aims as discussed in 1.4[52]. A formal proof of alignment is indeed "mathematically trivial" (Aumann, 1976), but only given certain assumptions that we epistemologically cannot assume in persuasion given the finite limitations of human cognition and the epistemological and communicative asymmetry that invariably persists given the differences in aims and power between interlocutors. Therefore, despite the fact that interlocutors *have* to have common ground and interaction in order to communicate and make sense of one another, this does not entail that interlocutors align on an epistemological level. In other words, alignment can be assumed communicatively, but not epistemically. This will be discussed further in chapters 4-5.

1.6. Persuasion and argumentation

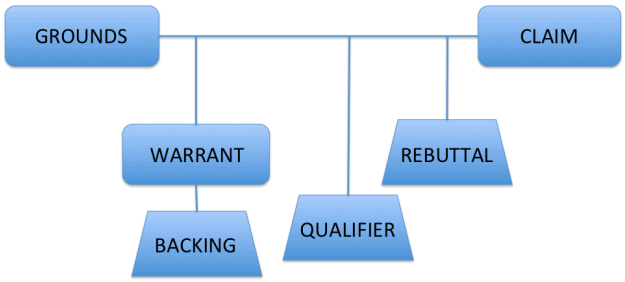
Persuasion and argumentation are frequently linked closely in the literature. For instance, Perelman and Olbrecths-Tyteca (1969) argue from an Aristotelian perspective that persuasion is concerned with doxastic reasoning from practical argumentation, pragma-dialectical theories argue that argumentation underpins persuasion (Eemeren & Grootendorst, 2004), and even popular scientific books frequently make this link (e.g. Hansen, 1961; Whyte, 2003; Pirie, 2007; Schopenhauer, 2009). The argumentative models used vary between logical (Priest, 2008) and practical argumentation (e.g. Walton, 1995; 2008a; 2008b). Toulmin's model of practical argumentation (Toulmin, 2003) is one of the central developments of practical reasoning (see fig. 4). The model consists of three essential elements always present in practical argumentation (claim, warrants, and grounds) and three non-essential elements (backing, qualifier, and

[51] Let alone suppose an epistemic keyhole through which objective information could be ascertained. Proponents of quantum mechanics have eloquently dismissed the notion that we, even at the level of observations in physics research, may observe events objectively (see e.g. Heisenberg, 1930).

[52] For an in-depth critique of Habermas, see Hauser (1999). For further discussion of persuasion, alignment and consensus, see Tormala et al. (2009), Plantin (2012), and Corazzini et al. (2012). Circumventing a lengthier discussion of the topic, however, the thesis claims that we cannot assume consensus as a driving aim, neither for persuader nor persuadee.

rebuttal). The model remains a structural model of over-arching elements that are present in argumentation and reasoning, and it does not go beyond this structure to account for how people *do* reason and make use of the elements in the model. That is, despite being a looser approximation of practical argumentation, Toulmin's model is concerned with structure rather than content. Recent developments in Bayesian argumentation provide a suggestion for approaching how people reason from uncertain evidence in the practical situation (e.g. Oaksford & Hahn, 2006a; 2007b; Harris et al., 2012). The Bayesian approach, however, will be explored in more detail in 2.4.

Fig. 4: Toulmin's model of argumentation



In order to discuss persuasion it becomes central to discuss the conceptual difference between argumentation and persuasion. The difference, I argue, depends on the notion of argumentation and persuasion in which the former is a central element *of*, but not equal *to* persuasion. Here, I focus on the difference between persuasion and practical rather than logical argumentation since the thesis focuses on practical reasoning and persuasion and logical argumentation and reasoning will be questioned later (in 2.2). Indeed, a driving claim throughout the thesis is that the complexity of human reasoning, language, and persuasion cannot be encompassed by the rigorous structural qualities of formal logic, but has to be approached from the probabilistic perspective of uncertain knowledge.

Argumentation may be defined as "... a verbal, social, and rational activity aimed at convincing a reasonable critic of the acceptability of a standpoint by putting forward a constellation of propositions justifying or refuting the proposition expressed in the standpoint." (Eemeren & Grotendorst, 2004, p. 1). The first sentiment concerning the verbal and social makes this definition particularly relevant, as the focus of the thesis is on spoken persuasion. Further, the model proposed here also describes persuasion processing from a rational perspective (albeit, a subjective rational

perspective from probabilistic estimations rather than from formal logic)[53]. Alongside this, reasoning does not seem to exist in the vacuum of the purely rational, since our emotion states shape the way we estimate information, i.e. we cannot approach information objectively (for a discussion of the importance of emotions in reasoning, see Damasio 2005; Blanchette, 2006; Melo et al., 2010; for a review, see Blanchette & Richards, 2010, see also 6.2 for a discussion of the concept of subjectivity). If we take argumentation to be the production and refutation of standpoints (leaving aside the notion of propositionalism as discussed in the above), this seems to be an idealized approach to reasoning since interlocutors often make use of argumentative diversions or persuasive ploys such as ad hominem. Argumentation in practice thus seems to be less rule-governed (tying together with the notion that the aim of persuasion and argumentation is not necessarily consensus and alignment). Persuasion further departs from argumentation in that persuasion is concerned with alteration of beliefs *in general*, which entails alterations that do not stem from the specific propositional information. That is, argumentation theory deals with how we should deal with the content and structure of the argument, whereas persuasion also includes how we approach this content (from a subjective perspective) and how we manage the perceived aims of the other. Further, argumentation can occur as a purely information-updating excersise, which cannot be the case in persuasion, as the persuasive intention would be missing. In this way, argumentation (understood as how we deal with evidence) is an absolutely central and important aspect of persuasion, which provides insight into how humans reason about uncertain evidence, but it does not constitute a theory *of* persuasion.

Like persuasion, practical argumentation deals with a different epistemic entity than formal logic (Kock, 2006, 2009) such that it is concerned not only with factual knowledge, but also hypothetical simulations of future outcomes of decisions such as policies (Evans, 2003), counter-factuals (McCoy et al., 2012, and uncertain information (Madsen, 2012). Indeed, a variety of disciplines operate under the assumptions that vernacular reasoning is uncertain or defeasible (e.g. artificial intelligence, McCarthy & Hayes, 1969; in cognitive psychology, Holyoak & Spellman, 1993; Chater & Oaksford, 1999; Oaksford & Chater, 2007). This is due to several

[53] As will be clear throughout chapter 2, the notion of rational behaviour in the thesis differs significantly from the definition of rationality in pragma-dialectics.

factors. Firstly, much of practical reasoning is not concerned with factual statements. Consider the following

1a) If the Spanish economy collapses, the Euro will fall

1b) If Walcott scores another goal, England will win the match

1c) If you fall down the stairs, you will get hurt[54]

1a-1c are all concerned with predictions of future outcomes, and cannot by consequence be labelled as factual statements given that they have not yet occurred in the moment of utterance. Rather, there is a gradient probabilistic value for the outcomes. Thus, 1c is very likely, 1b depends on the state of the match, the opposition (e.g. if England is playing Spain or San Marino), etc., and 1a depends on a myriad of complex systems that may or may not influence the fate of the Euro. However, factual knowledge also plays a part in acts of persuasion. For instance, persuaders may cite historical incidents, legal documents etc. However, despite being factual, it is very rare that we have an absolute certainty that something is true or false[55]. That is, even knowledge labelled as factual is uncertain on a gradient scale. Thus, this thesis assumes that evidence produced in practical settings including persuasive settings is inherently uncertain and thus the persuadee is taken to reason from uncertainty (subjective probabilities) rather than from certainty (logic), see Oaksford and Chater (2007) for a discussion on the difference between the two reasoning stances (see also chapter 2).

Persuasion and conviction Similar to the distinction between persuasion and argumentation, some authors suggest a distinction between 'persuasion' and 'conviction' (Perelman & Olbrechts-Tyteca, 1969; Perelman, 2005; Petri, 1968; 2002; Scarantino, 2008)[56]. Persuasion$_{P+P}$ "…is situated within a pragmatic, hence an emotional, values-based frame of reference… which aims to produce *assent* from among those who are engaged by the discourse" whereas conviction "…aims at the truth, is not immediately pragmatic and is not value-based but *fact*-based" (both quotes,

[54] Note that these have been expressed as conditionals, see Evans & Over, 2004 for a discussion of conditional reasoning.

[55] For instance, documents disputing and updating current historical knowledge may be found, new pieces of evidence may be uncovered in a legal case questioning prior beliefs, and the whole discipline of scientific exploration relies on the claim that we can argue something more confidence given evidence, but given the axiom of falsification, we can never be absolutely sure that we have perfect knowledge.

[56] The discussion is muddled by the fact that 'persuasion' as a term is used both by Perelman, Preti, Walton and myself with slightly different theoretical meanings. To represent this difference, I use persuasion$_{P+P}$ for Perelman and Preti's term, persuasion$_{W}$ for Walton's and persuasion$_{G}$ for the general term discussed throughout the thesis.

Scarantino, 2008, p. 23). That is, Persuasion$_{P+P}$ aims at assent and is based on values-based persuasive attempts while conviction is aimed at truth based on facts. The distinction between the concepts are "…thus thematized out of the concept of *audience*" (Scarantino, 2008, p. 23) as well as differences in aims.

In investigating persuasion$_G$, it is a fundamental question whether there is a qualitative difference between persuasion$_{P+P}$, conviction, and persuasion$_G$. Previously, I defined narrow persuasion as being fundamentally concerned with changes in beliefs void of any ethical considerations – whether or not these changes occur consciously or unconsciously is beside the theoretical point for the moment being. This change in belief may occur both via rational, fact-based argumentation, but it may also occur due to emotional appeals, by references to the character of the speaker or by other means[57]. That is, beliefs are not only influenced by pure rational argumentation. Construed thusly, persuasion$_{P+P}$ and conviction are merely *special* instances of persuasion$_G$, the former relying mainly on pathos whereas the latter trails towards logos. It should be noted that the difference between rational and emotional appeals is both theoretically important and valid (even though most practical arguments will involve a degree of both). There is, in other words, a theoretically valid reason to distinguish between persuasion$_{P+P}$ and conviction, but both terms fall within the realm of persuasion$_G$, as it is conceptualised here. Another aspect of Perelman and Preti's definitions involves the difference between aims of persuasion$_{P+P}$ and conviction. One is aimed at assent; the other is aimed at truth. This distinction is *not* warranted in the framework of this thesis. Rather, logical, emotional and other types of persuasive attempts are aimed at probabilistic information concerning the proposed beliefs. As long as both types of persuasion$_G$ are concerned with practical argumentation, I assume that rational and logical argumentation is not qualitatively different in its pursuit of "truth" compared to other types of argumentation[58]. Both involve inherent uncertainty and thus be treated in a similar manner in terms of probabilistic reasoning. Throughout the thesis it will be increasingly evident that theoretical, analytical, and empirical evidence support this

[57] In other words, the definition used in the thesis covers logos, ethos *and* pathos.

[58] If, however, the argumentation becomes formal (such as symbolic discussions of internal mechanisms of mathematics or logic, Priest, 2008), logical argumentation may be said to search for "truth" within that particular system of investigation. However, the "conviction" term presented here does not seem to be concerned with formal-mathematical proofs. Therefore, I reject the difference of aims when it comes to practical, informal argumentation.

claim. In other words, persuasion theory needs to move away from a distinction between logical and other types of persuasion and argumentation and towards a more holistic, probabilistic theory.

Walton (2008b, see also Walton, 1995; 2008a) defines persuasion$_W$ as a difference in opinion, where both internal and external proofs are used methodologically to persuade. For example, Walton contrasts this with action-seeking, educational and five other dialogue types (Walton, 1989, p. 10; see also Sigrell, 2003, s. 117). Persuasion$_W$ thus becomes a sub-set of persuasion$_G$ in the same manner as persuasion$_{P+P}$ in that persuasion$_W$ covers a particular type of persuasion$_G$. As discussed in the section on the central elements of persuasion, however, Walton's action-seeking concept falls within the broad concept of persuasion whereas persuasion$_W$ falls within the narrow. Walton's terms comment on various aspects of argumentation and persuasion. As discussed previously, there is a qualitative difference between appeals to action and changes in beliefs. This is not included in Walton's conceptualization of practical argumentation. In sum, persuasion$_{P+P}$, conviction, and persuasion$_W$ are all special instances that fall within the narrow scope of persuasion$_G$.

1.7. Cognitive processing theories

The two main previous approaches to persuasion processing in cognitive psychology (ELM and HSM) are based on dual-processing theories (see 1.1.4.). The underlying assumptions of such models, however, have been questioned by the recent parametric unimodel theory of persuasion (Kruglanski et al., 2006). The main difference between the dual-process theory and single-process theory is that the former assumes two distinct types of reasoning (system 1 and system 2) whereas the latter assumes an integrated, continuous cognition from the same type of system (see also Oaksford & Chater, 2010). As will be evident from the SPIMP (7.3), the current argument is in favour of an integrated model of persuasion processing. One of the main reasons for the integration is the data concerning source credibility (3.3) in which this interacts with content strength despite presumably belonging to two different processing systems. However, the data presents a challenge rather than a definite response to dual-processing theories of persuasion.

In dual-processing models of reasoning, system 1 has been labelled associative (Sloman, 1996; Smith & DeCoster, 2000), heuristic (Evans, 2006, see also Evans, 2003), reflexive (Lieberman, 2003) and holistic (Nisbett et al., 2001), whereas system 2 has been labelled rule based (Sloman, 1996; Smith & DeCoster, 2000), analytic (Evans, 2006; (Nisbett et al., 2001)), and reflective (Lieberman, 2003)[59]. Despite varying in labels, the idea is that system 1 is concerned with "unconscious, rapid, automatic, and high capacity" processes whilst system 2 is "conscious, slow, and deliberative" (both quotes, Evans, 2008, p. 256). Fundamentally, the dual-process approach implies that system 1 is an automatic process that humans cannot control. Conversely, humans exhibit a high degree of control over system 2 as a conscious, rule-based system of thinking[60].

Departing from dual-processing accounts of cognition, the position adopted here is akin to physical multi-sensory integration (Deneve & Pouget, 2004; Lewkowicz & Ghazanfar, 2009), which describes "…the capacity of combining of information coming from different sensory modalities to get a more accurate representation of the environment and body" (Deneve & Pouget, 2004, p. 249). The elements of persuasion identified throughout the thesis are all taken to be necessarily involved in processing particular instances of persuasive attempts. That is, no act of persuasion can exist without some form of interpretation of the speaker (including extraneous and supposedly superfluous traits such as attractiveness), the processing of uncertain information, and an act of communication. In this way, rather than assuming a high and a low route to processing information, these elements may receive more or less attention by the persuadee. However, no matter how much the persuadee contemplates the persuasive attempt, the nature of the source, the emotion states, and the attractiveness of the source will exert some form of influence on the overall evaluation of the act of persuasion[61].

[59] This is an incomplete list of labels. For a more extensive list of different labels bequeathed onto the two systems, see Evans (2008), table 1, p. 257. Here, I follow Evans (2008) and use the more prevalent System1 and System 2 (Stanovich, 1999; Kahneman & Frederick, 2002).

[60] Note that the rules do not have to be formal logical rules. Some models assume that formal logic underpins the mind (such as the mental logic model, e.g. Braine, 1978; Rips, 1983, 1994, and the mental model view, e.g. Johnson-Laird, 1983; Johnson-Laird & Byre, 1991). For a discussion of these, see chapter 2.

[61] Even in instances where the source is unknown since information in this instance may then be presumed to be less certain due to the fact that the persuadee knows nothing about the source, the aim of communication etc. In spoken persuasion, however, this will occur less frequently.

O'Keefe (2008) comments on the division of systems in the ELM (p. 1478). He notes that the model is meant to encompass more fine-grained integration of the systems in the sense that a cue may be peripheral in one setting and central in another. As an example of this, O'Keefe invokes attractiveness, which is well known to potentially influence decision-making. Attractiveness is described as a factor that may have potential to enhance persuasion where attractiveness may serve as an argument ("in the case of advertisement products"), to inhibit persuasion ("if attractiveness enhances message scrutiny and the message contains weak arguments [or vice versa]") or have a relatively little influence on persuasion "if other factors play larger roles", all quotes O'Keefe (2008, p. 1478). Given this potential for serving as an elaborating element and thus facilitating of central routes at the same time as having the potential for serving peripheral cues and everything in between begs the question: is attractiveness a central or a peripheral cue? The point of departure in this thesis is that all factors in persuasion processing such as evidence strength, attractiveness, the credibility of the source, and other elements identified throughout the thesis exist on a continuous scale of relevance for any given persuasive incident, and that they are always in some form present (see 7.4 for a discussion on coping mechanisms and the gradient influence of extraneous factors such as attractiveness). This indicates that the elements are intimately integrated in a more complex processing practice, and that the integrated unimodel seems a more plausible cognitive model in describing the interaction of the elements in the thesis. Thus, factors considered peripheral in the ELM or heuristic in the HSM are always present and will always contain the potential of influencing. This does not entail, however, that careful consideration by exertion of greater cognitive effort does not alter the way the persuadee processes the acts of persuasion – far from it. I argue that the persuadee may assert herself to a greater or lesser extent depending on the attention and importance of the act of persuasion so that the persuadee will generally make more carefully considered evaluations given greater cognitive effort (see also Apperly et al., 2006, 2008).

1.8. Overview of the thesis

Having gone through a brief history of the concept of persuasion from a variety of disciplines, a discussion of the central elements of persuasion, and a discussion of

cognitive processes, we may now summarize the discussion in an initial definition of persuasion, which will be explored and expanded upon throughout the rest of the thesis. Overall, then, interpersonal persuasion is understood as a strategic attempt to alter the beliefs (1.2) of the persuadee in a situation where one or both of the interlocutors acknowledge the persuasive intention, but in which both acknowledge the mutual intention (1.3). This is approached via a probabilistic and interactive framework.

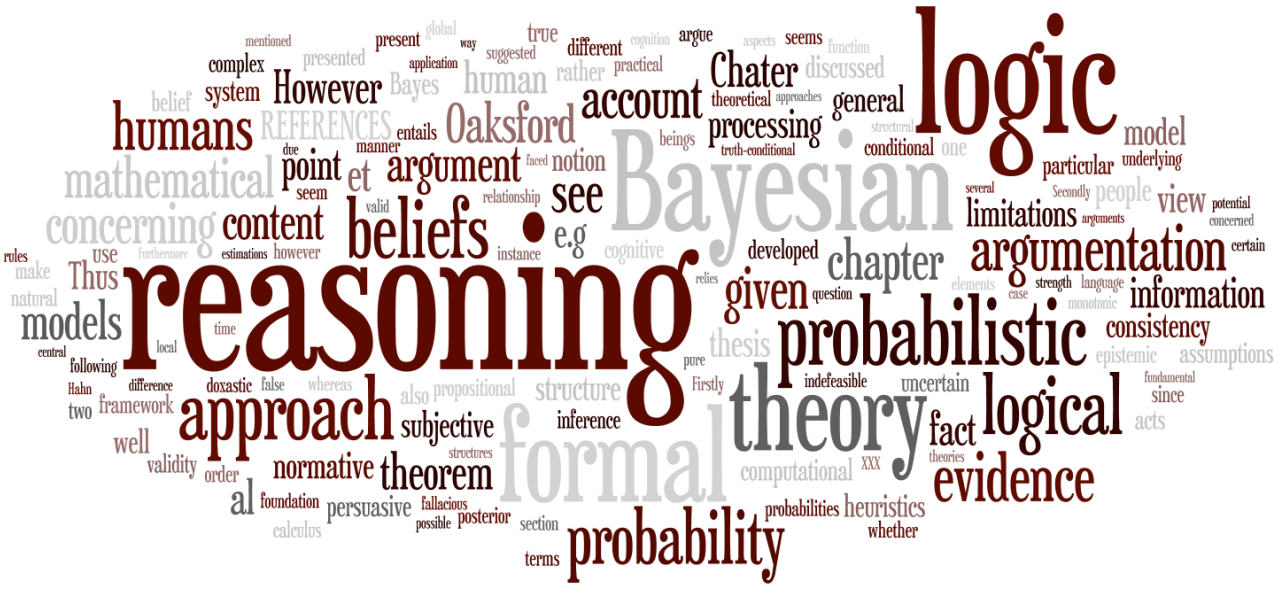
In the framework of the thesis, persuasion is defined as an interactive act where interlocutors go beyond pure information processing to alter the beliefs of the persuadee and where both acknowledge the persuasive intention (or, as mentioned, as least one interlocutor recognises the persuasive intention and both recognise the mutual intention of exchanging information in the social situation). The central element of persuasion is the alteration of beliefs, which has to do with processing of uncertain information in an epistemically unstable world, the dynamic use of language and communication, and the credibility of the source (from the point of view of the persuadee). The estimations of content strength and source credibility are approached inherently subjective, probabilistic and contextual in nature. Furthermore, the dynamic relationship between the interlocutors happens in a complex time frame in which overarching socio-cultural historical factors, personal histories, and the interaction between these have to taken into account. The aim of persuasion cannot be assumed to be oriented towards alignment or consensus (1.4-1.5). This may be the case in *some* instances of persuasion, but since it cannot be assumed in persuasion as a phenomenon in general, it cannot be assumed in a theory and model of persuasion. More broadly, I have shown that persuasion cannot be equated with argumentation (1.6) or conviction about a belief despite the fact that these are indeed central elements in defining and discussing persuasion processing, and as such I will return to these issues throughout the thesis. As discussed in 1.7, persuasion and cognition may be thought of as a dual-processing phenomenon or an integrated model. The thesis argues the latter given the complex integration of each element in the persuasion model developed in the thesis.

The remaining chapters fall in two main parts in which chapters 2-3 (Part I) present the central elements of the core SPIMP model whereas chapters 4-6 (part II) present the psychological framework. The final chapter (part III) provides a novel approach to persuasion as a human phenomenon and indicate the theoretical and

analytical path to a more in-depth understanding by integrating the core model with the psychological framework.

Thus, chapter 2 deals with reasoning from uncertainty in acts of persuasion, chapter 3 deals with source credibility. Going beyond the elements of the core model, chapter 4 discusses communication in the persuasive setting, and chapter 5 deals with contextual influences and interaction. Chapter 6 invokes phenomenological terminology in order to discuss how the persuadee immerses herself as a subject in the persuasive context. Finally, chapter 7 ties together the elements in order to present a theoretical framework and the concrete model of persuasion processing suggested in the thesis (SPIMP). The linear nature of this thesis fails to do justice to the integrated nature of the elements of persuasion presented. In an integrated view, the elements naturally affect one another (e.g. how we understand language affects how we elicit information, but how we process information also influences how we subsequently understand language). Consequently, the elements, though presented linearly, should be read in a circular manner so that some conclusions and claims produced in earlier chapters borrow from discussions in subsequent chapters. This is unavoidable given the nature of the thesis as a linear document, but the reader should be aware of this. We now turn to the issue of describing how the persuadee engages with uncertain evidence in the persuasive incident. That is, chapter two describes uncertain reasoning, as it relates to persuasion processing in the model developed throughout the thesis.

Chapter 2: Reasoning from uncertainty



We can't solve problems by using the same kind of thinking we used when we created them

Albert Einstein

You may fool all the people some of the time

You may even fool some of the people all of the time

But you cannot fool all of the people all of the time

Abraham Lincoln

In 1.8, persuasion was defined as a strategic attempt to alter the beliefs of the persuadee in a situation where one or both of the interlocutors acknowledge the persuasive intention. In this definition, it was clear that information processing is insufficient to function as a theory of persuasion, although it remains a necessary element since the persuadee *has* to relate to and evaluate the evidence that the persuader presents in some way. Therefore, argumentation and reasoning theories are central in developing a holistic approach to persuasion. Alongside formulating the principles of reasoning, normativity is a central issue in persuasion (Kock, 2011). The Bayesian approach allows for a potential normative account of persuasion, which nonetheless remains flexible to the constraints of the context.

Reasoning and argumentation have been approached in a plethora of ways, ranging from various formal and informal logical accounts (e.g. Priest, 2008), rule-based argumentation theory (e.g. Eemeren & Grootendorst, 2004), and, as followed here, from a probabilistic point of view that acknowledges the uncertain epistemological state of practical knowledge (e.g. Hahn & Oaksford, 2007a). The approach advanced here is a probabilistic view of reasoning. Specifically, I employ the Bayesian approach (Oaksford & Chater, 2007) to reasoning as an approximation of the type of practical reasoning that the persuadee undergoes when processing the evidence in acts of persuasion. However, as also argued in this chapter, a pure, mathematical instantiation of the Bayesian cannot account for persuasion in and of itself since this is concerned with pure information updating, which cannot constitute persuasion (as discussed in chapter 1).

The general argument of the chapter is twofold. Firstly, I argue for a probabilistic account of reasoning as opposed to a logicist approach. This establishes the general form of reasoning that functions as the basis for the theory of persuasion developed throughout the thesis. In doing so, though, I do not reject the importance and usefulness of formal logic. Nonetheless, rather than functioning as the foundation for reasoning capabilities, I argue that formal logic is reserved best as a formal tool of analysis against which argumentation and persuasion can be measured whereas the probabilistic approaches to reasoning are more useful as the foundation for a psychological theory of persuasion processing. This springs from the recognition that formal predicate logic predominantly is concerned with dichotomous truth-values with a

structural focus whereas the probabilistic accounts focus on the content of the persuasive attempt. Thus, logic takes the conceptual place of an analytical tool of evaluating the validity of a persuasive attempt, as the beneficial cleanliness and rigorousness of formal logic should not be ignored or neglected. Secondly, the chapter presents some potential limitations of reasoning paradigms regarding acts of persuasion. This shows that a holistic approach to persuasion has to encompass and surpass pure theories of reasoning given the complexities presented in chapter 1. Finally, the chapter sets out the framework for the normative stance that describes how people should respond to persuasive acts.

The chapter falls into five parts. In order to embed the discussion concerning reasoning, argumentation and information processing within persuasion, a brief review of theories throughout Western thought is presented. Following this, a discussion of formal logic including potential benefits and limitations is carried out. Despite the fact that the model developed in the thesis departs from a logicist point of view and takes a probabilistic point of view instead, the logical tradition is nonetheless important for two reasons. Firstly, logic has been a cornerstone in philosophy and persuasion since the Ancient Greeks (see e.g. Copleston, 1993). Secondly, several theories of argumentation and persuasion (e.g. the pragma-dialectical, the ELM, and the HSM) rely to some extent on the predictions and evaluations stemming from formal logic (such as logical fallacies, for a discussion of these see 2.4). 2,3 present the probabilistic approach to reasoning theory in general whereas 2.4 presents Bayesian reasoning as one particular model of probabilistic reasoning that will be employed as the foundation of reasoning in the theory of persuasion developed here. Finally, limitations of Bayesian reasoning are presented to indicate the need to go beyond a theory of information processing in persuasion studies as well as remarks concerning the difference between local and global consistency.

2.1. Reasoning in persuasion: A brief history

Since persuasion studies began with the Greek sophists (Dillon & Gergel, 2003), reasoning, argumentation, and the question of normativity have been intimately linked in various ways with the former two informing the conclusions drawn concerning the latter. As already noted, one of the main differences in Western history of thought

harkens back to the fundamental disagreement between Plato and Aristotle concerning the achievability and worth of epistemological truth and doxa (Gr. 'belief'), the latter being expressible as probabilities whereas the former depends on truth-conditional dichotomies. Consequently, the desirability concerning normative standards in persuasion studies have been comments and developments on this initial debate. The main standard bearer of 'good' reasoning in Western thought, however, has been logic and logical models. Reasoning, rationality, and normativity are indeed important concepts in a theory of persuasion for a number of reasons. Mainly, given the fact that human beings *do* seem to approach acts of persuasion from some sort of rational standpoint, i.e. humans do not seem inherently irrational when presented with evidence (as will be evident from the empirical work on Bayesian argumentation, see 2.4).

Throughout history, several types of logical inference have been suggested to function as a normative theory for persuasion theory and argumentation. Setting out the discipline, Aristotelian logic (see Aristotle's *Organon*, 1995b-g) is concerned with sentential and propositional logic in which arguments phrased in natural language are identified as being of certain structures, which may be rationally valid or fallacious. Well-known valid argument structures are modus ponens (if P, then Q; P; Therefore Q) and modus tollens (if P, then Q; not Q; therefore, not P), whereas Aristotelian fallacies include affirming the consequent (if P, then Q; Q; therefore P) and denying the antecedent (if P, then Q; not P; therefore, not Q). The underlying structure of Aristotelian logic is the syllogism revolving around the concept of deductive reasoning, classically phrased so that

P_1 (major premise) All humans are mortal

P_2 (minor premise) Socrates is human

C (conclusion) Therefore, Socrates is mortal

Aristotle framed a theoretical suggestion for evaluating argument quality normatively by investigating the general structure underlying the argument. Note, however, that Aristotle acknowledges doxa as a valid basis for argumentation when the topic is concerned with uncertain epistemic areas such as deciding the course of future action, policy suggestions etc. (Aristotle, 1995h)[62]. As we shall see, however, the notion of

[62] The stance taken here is similar: formal logic is naturally a valid system of reasoning if information is objective and certain and as such, it provides a normativity of structurally desirable argumentation.

determining the structure of an argument and drawing conclusions pertaining to the validity of this argument from the overall structure is a tradition that is still active in modern argumentation and persuasion theory (e.g. ITT, pragma-dialectical argumentation theory, dual-process theories and others).

Kantian logic (Kant, 1988) is a development of Aristotelian logic in which Kant makes use of syllogistic reasoning and natural language logic in a metaphysical manner that substantiates his general philosophical project. The use of natural language as the foundation for logic, however, was to be altered shortly hereafter due to the fact that logicians moved from sentential to formal, mathematical symbolic logical notation. Key to this development in the middle of the 19th and in the beginning of the 20th century, mathematicians (most notably Russell, 1992, Frege, 2007, and Boole (see Burris, 2010)) developed a formal, symbolic logic that would provide the foundation for modern logical systems such as the ones presented and discussed in the following section. This allowed logicians to posit with greater clarity and mathematical precision assessments of structural validity for arguments. In other words, logical inference had moved from natural languages to mathematical notation – a move that will pose serious challenges to logical models if they are to be construed as the foundation of rationality for a theory of spoken persuasion in natural languages involving uncertain information. The previous models on the cognitive psychology of persuasion (ELM and HSM) seemingly rely on formal logic as the viable normative model for argumentation and persuasion. This stance will be questioned throughout this chapter.

Importantly, reasoning theories throughout the ages have been focussed on the notion of epistemological and argumentative validity. That is, reasoning theory (be it probabilistic or logical) has been preoccupied with developing procedures for determining the foundations of knowledge in terms of the epistemological well from which the conclusions are drawn or the structures by which the arguments are developed. In other words, the basic idea that one could start with certain prescribed foundations that entail valid arguments (whether in mathematics, science, or religion). As a complementary issue to this, reasoning theories have had normative traction (as mentioned in the introduction) such that the conclusions reasonably follow the

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However, for practical, uncertain information, probabilistic reasoning might be more appropriate, as discussed throughout this chapter.

premises. In other words, if I believe the premises, I ought to (on the face of it) believe the conclusion[63].

2.1.1. Structure and content

The relationship between structure and content is a complex issue where the two types of normativity mentioned in the introduction (desirable and approximating) come to the foreground. As an example of the discrepancy between focussing on structure versus on content, consider conditional reasoning (for an excellent discussion of conditionals, see Evans & Over, 2004). From a structural perspective, conditional reasoning takes the form of A→B in which B follows A. Whether the overall argument is true or false, however, depends on the truth-values of A and B. Thus, the argument should be true if A is true and B is true, or if A is false and B is true whereas instances in which A is true and B is false, the argument is not true in an overall manner. However, the important issue here is the fact that the structure determines the rules by which the argument is evaluated such that an overall truth-value might be assigned if the truth-values of each component is known. Thus, the logical structure prescribes the normative conditions for these statements. However, consider the following

> 2a) If the moon is made of cheese, Jens Koed Madsen wrote this thesis
>
> 2b) If the Spanish economy had collapsed completely in 2009, the EMU would have been dissolved

Noticeably, both 2a and 2b have the same structure, but they differ in content in terms of epistemology and in terms of relevance. 2a is a well-formed argument and it follows the truth-values of the above-mentioned structures such that A is false whereas B is true, both of which are factual statements. 2b, on the other hand, is also a well-formed argument, but the truth-values here are different since A is a counterfactual and B is a hypothesis that is a probable or improbable consequence of the counterfactual. Furthermore, the link between A and B in 2a is irrelevant, as the former has no bearing on the latter. Both the aspect of relevance as well as the epistemological differences might be difficult to pick up structurally, as they refer to the content rather than the structure.

[63] This epistemological connection, however, might not be so straightforward. As Harman (1988) argues, people might begin doubting the premises rather than accepting the conclusion. This epistemological discussion, however, reaches beyond the scope of the thesis.

Logical models are concerned more with structure whilst probabilistic models primarily describe the content. This emerges as an underlying difference between the two approaches, and will be a central element in the thesis. Thus, the aim is to introduce to persuasion theory a normative account of argument strength, which captures the emotional, subjective, and contextual nature of persuasion processing whilst retaining a predictive, normative element. That is, a normative account, which on the one hand contains predictive power and is capable of evaluating good and bad persuasion from the point of view of argument strength (since humans clearly find some persuasive attempts and argument more persuasive than others), but which on the other hand acknowledges the fact that the same persuasive structure and content may *reasonably* invoke different effects depending on the persuadee's priors and likelihood estimations, the socio-cultural context, and the discrepancy between the local and the non-local. In other words, a normative account that hinges on a subjective and contextual variability between persuadees. Given the epistemic uncertainty necessarily contained in the persuasive situation, such a normative account, as we shall see, cannot primarily rely on formal logical models of reasoning and argumentation, but is more closely described by invoking probabilistic reasoning models such as Bayesian reasoning and argumentation theory. This does not entail that logical reasoning has no merit in a persuasion framework. However, it entails that formal logic takes on a analytic rather than an explanatory and predictive potential. Before introducing probabilistic reasoning, the following section presents logical reasoning and the benefits and limitations from approaching persuasion from such a framework.

2.2. Logical reasoning and logicist cognitive models

Logical reasoning is prevalent in approaches to persuasion in at least three central manners pertaining to the processing of argumentation, to epistemology, and to general reasoning. For instance, pragma-dialecticians make use of formal logic as their normative point of departure when discussing argumentation in general (Eemeren & Grootendorst, 2004) and when assessing the argumentative worth of what is labelled logical fallacies (Eemeren et al., 2009, 2012)[64]. The pragma-dialectical approach makes use of the logical rules for normatively distinguish between good and bad

[64] I present and discuss the pragma-dialectical approach in more detail in 2.4

argumentation in order to derive certain argumentative rules of conduct. Epistemologically, formal logic assumes interesting notions concerning truth-conditionals, how these are formalised, and how they should be applied to acts of persuasion and processing thereof (see e.g. Budzynsky & Kacprzak, 2008). Finally, despite the fact that the idea of formal logic as the foundational aspect of human cognition has been criticised (e.g. Oaksford & Chater, 1991; 2007), prominent models of cognition still make use of formal logic. For instance the mental logic view (Braine, 1978; Rips, 1983, 1994), which claims that reasoning involves logical calculation of symbolic representations and the mental model view (Johnson-Laird, 1983; Johnson-Laird & Byre, 1991), which argues that human beings make use of representations containing true formulas of situations rather than using an inherent logical calculus. One direct consequence of such approaches to reasoning is their evaluation of actions and reasoning that seems irrational. Thus, "…mental logics may explain errors in terms of the accessibility of different rules, whereas mental models theory explains errors in terms of limitations in how mental models are constructed and checked, and how many models must be considered" (Oaksford & Chater, 2007, p. 5)[65]. Common to the approaches, though, is the reliance on indefeasible systems. In terms of the ELM (which possibly is the most influential psychological account of persuasion), it is unclear whether the central route should be taken as a logical statement due to the fact that the ELM neglects to specify the mechanisms of the central route (O'keefe, 2008), however in exploring their analyses and experimental set-ups, it seems that the central route relies on a formal logical paradigm[66]. In sum, the presentation and investigation of formal logic is not only warranted due to the immense historical impact of the discipline, but also due to the fact that contemporary theories and models of argumentation, reasoning, and persuasion make frequent use of formal logic as the normative framework.

[65] For data seemingly inconsistent with the two approaches, see Evans et al. (1995)

[66] As mentioned in the introduction, the fact that the ELM, HSM, and PKM neglect to specify how arguments may be stronger or weaker is a limitation to the frameworks. The model of persuasion processing argued here presents such a normative foundation in the shape of Bayesian reasoning.

2.2.1. Introducing logic

One of the objectives of modern, formal logic is to provide a mathematical account that distinguishes between good and bad arguments purely on the basis of their structure. That is, given the formalisation of arguments into symbolic, logical notation (as described later in this section), the rules of formal logic aims at differentiating between good (valid) and bad (invalid) argument structures. In exploring the validity of arguments expressed in natural languages, formal logic needs to account for the truth-values of these expressions. However, as mentioned in 4.2, the surface form of natural languages might be too unruly to serve as the basis for such a theory[67]. That is, natural languages might be too ambiguous to create an unambiguous, mathematical language with a precise set of inferential rules defined over it, which formal logic needs (this will be explored further in chapter 4).

Formal logic is derived from mathematical expression developed amongst others by the early positivists such as Boole (see Burris, 2010), Frege (see Beaney & Reck, 2006; Frege, 2007), and Russell (1992) as well as logical positivists such as the early Wittgenstein (1996), and Ayer (2001)[68]. These authors are the historical proponents for introducing a mathematically sound system of formal logical reasoning to areas such as argumentation and analytic philosophy[69]. As will be discussed in this section, formal logic predominantly (but as will be evident from investigating doxastic logic not exclusively) relies on truth-conditional dichotomies (discussed in this chapter) and a code-like approach to language (see 4.1-4.2). The present section will deal with the epistemic level of formal logic and how this entails benefits in terms of structural clarity and completeness of quality estimations as well as limiting the epistemology of practical reasoning and persuasion as well as empirical limitations when structure is put above content in the analysis. Specifically, I present underlying epistemological

[67] For instance, the potential problem of empty names such as 'nobody', which syntatically seems to function as a noun without picking out any reference and Russell's example of 'The king of France is bald' (Russell, 1905)

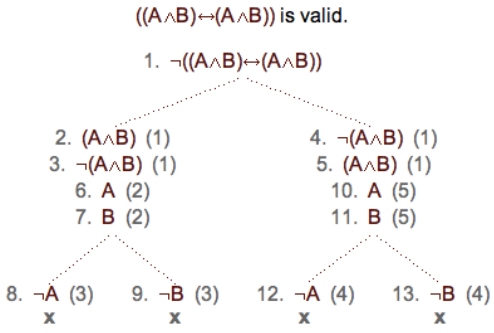
[68] Note, however, as a minor point that formal logic and mathematics are inherently undecidable systems in that they cannot prove the principles of mathematics without relying on the principles of mathematics to prove them. This complex mathematical epistemological tautology is described in Gödel's incompleteness theorems (see Gödel, 1931, see also Gödel, 1995; Nagel & Newman, 1958; Hofstadter, 1979). Furthermore, it is mathematically possible to construct a non-halting Turing Maching (such as the busy-beaver function, BB(n), see Rado, 1962, see Turin, 1936, 1038; Prager, 2001) for first-order logic, which underlines the potential undecidability.

[69] For a good introduction to formal logic, see Priest (2008) and Strawson (1952), and for mathematical logic, see Bell & Machover (1997)

assumptions of formal logic as well as two instantiations of the logical approach, namely predicate and doxastic logic. Alongside the presentation of these specific models, I discuss both benefits and limitations of approaching persuasion from the point of view of formal logic and ends by discussing the role of logic in the theoretical approach developed in this thesis.

The most basic system of formal logic is propositional logic to instances of which are predicate and modal logic. Propositional logic functions as the basis for more complex models of logic that have subsequently been proposed such as doxastic logic (see later), fuzzy logic (Priest, 2008, chapter 8), and intuitionist logic/possible world semantics (Kripke, 1965, 1980; Haack, 1974, chapter 5; Dummet, 1977)[70]. Propositional logic, as it is well-known, is made up of a strict vocabulary of logical connectors such as ¬ (negation), → (conditional, if… then), ⊢ (therefore), and, including connectors in modal logic, such as ◊α ('it is possible the case that α'). The basic vocabulary of predicate logic allows for well-formed formulas to be phrased and analysed. Thus, to prove that (αΛβ)↔(αΛβ) is a logical truth (i.e., is true purely on the basis of its structure, irrespective of what it is about), one follows the rules of logical connectors and draws a semantic tree diagram (for an illustration of this basic structure, independent of the content, see fig. 5). Further, modal logic allows for more complex formalization of argument structures by including in the vocabulary notions of necessity and possibility such as statements necessarily true in all possible worlds and statements that are only true in some possible worlds (see e.g. Kripke, 1980).

Fig. 5: semantic tree in logic



Despite eventually arguing for a probabilistic approach to persuasion when describing how humans relate to the content of an act of persuasion, it should be noted that the

[70] For a general introduction to these including predicate and modal logic, but excluding doxastic logic, see Priest (2008), chapters 1-4, 6, 11, 12, 20, and 25

mathematically valid system of propositional logic (both predicate and modal) entails significant analytical benefits on a structural level. Here, I present two central benefits concerning the cleanliness of evaluation from logical structures and the analytical reverberations hereof concerning the de-contextualization and universality of assessments. The latter is particularly beneficial from the manner by which it deals with logically fallacious argumentation and persuasion. Firstly, formal logic, as a mathematical formalization of argumentative structures, enjoys the benefit of clean evaluations. That is, no matter what content is inserted in $(\alpha\Lambda\beta)\leftrightarrow(\alpha\Lambda\beta)$, the overall logical structure axiomatically remains true. In other words, by reasoning from a purely mathematical basis, we may posit strict rules of conduct for evidence, argumentation, and reasoning in general. Furthermore, these rules posit the remits of validity universally.

From the first benefit of universally applicable, clean rules of reasoning follows the second benefit, namely that this may be applied to assess acts of persuasion in real life to determine whether they fall within the normative boundaries of logical validity. If they do, the argument is deemed logically valid, if they do not, it is a logical fallacy or error. This is particularly appealing in argumentation and persuasion studies given the fact that especially the latter is often wrought with fallacious and malevolent instances of misinformation and mistaken argumentation. Thus, formal logic allows for a formalization of any given argument by transcribing it to logical symbols as conjunctions with the structure $\alpha\Lambda\beta$ and must subsequently all be subject to the same truth-conditional treatment[71]. In this way, formal logic allows for a transcription from natural to formal, de-contextualized language that makes for absolute discriminations between good and bad argumentation from a structural point of view. That is, given the universal nature of formal logic, we may use this analytically to determine whether humans conform to the rigorous rules of logic or if these rules are violated. The latter, according to formal logic, is fallacious and bad argumentation whereas the former is desirable and valid. Given the murkiness of practical argumentation and persuasion, such cleanliness of analysis and evaluation is indeed alluring. However, as the next section argues, this focus on structural validity poses significant limitations to the

[71] I return to these conjunctions in 4.2, but note already here that this 'extra' enrichment of the conjunctions might be captured by non-logical processes such as pragmatic inferences (see Grice, 1989)

applicability of formal logic to describe what humans computationally do when processing persuasive attempts.

2.2.2. Limitations of formal logic

The limitations to be discussed here cluster around three main themes. Firstly, when dealing with acts of persuasion, formal logic is faced with epistemic limitations or challenges. Secondly, logic is faced with challenges concerning the fact that, as described in the above, the universality of the structural assessments is challenged with empirical data describing what humans do. Finally, in order to function as a normative framework for argumentation in general and spoken persuasion in particular, the formalization of natural languages entails challenges with how this mapping functions. However, as this will be discussed further in 4.1 and 4.2, I will refrain from developing this argument here. Instead, I focus on the former two limitations, viz. epistemic and empirical limitations.

As noted in 1.6, acts of persuasion invariably take place in an epistemically uncertain world in which interlocutors cannot be entirely certain of the validity of the evidence. Rather, both the persuader and the persuadee rely on uncertain knowledge, which may be more or less likely depending on the evidence. However, formal logic is constructed on the epistemic notion of dichotomous truth-values (i.e. that a proposition is either true or false), and that we may assign a truth-value to each node in the well-formed formula. If we cannot assign truth-value to the predicates, we may not arrive at an evaluation whether or not the argument is true overall (e.g. for $\alpha \Lambda \beta$, if we know that $\alpha=1$, but have not knowledge of β, we cannot determine whether the well-formed formula is logically valid since both α *and* β need to be true). Logicians have tried to circumvent the limitation of dichotomous truth-values by introducing doxastic characteristics (i.e. graded beliefs) rather than epistemic characteristics (i.e. dichotomous truth-values) in the so-called doxastic logic, but a discussion of this is beyond the scope of the present thesis[72]. However, propositional logic (as it is employed

[72] However, see Segerberg, 1995, 1999; Lindström & Rabinowicz, 1999; Wansing, 2000, see also Hendricks & Symon, 2006; Ditmarsch & Labuschagne, 2007. Interestingly, Budzynsky & Kacprzak (2008) developed a logic for dealing with persuasion processing constructed on the premises of doxastic logic coupled with graded modalities (Fattorosi-Barnaba & Caro, 1985, 1988; Caro, 1988). Much like the current approach, their approach to persuasion acknowledges the importance of different sources since "…the same arguments can cause different results depending on an agent who performs them" (p. 64).

in the approaches mentioned in the above) suffers from the epistemic limitation of truth-conditional dichotomies that may not be assignable in practical reasoning.

The uncertain epistemological nature of persuasion situations may thus indicate a potential limitation of the use for a formal logical framework in dealing with natural language, semantics, and truth-conditionals in the natural world. This is reminiscent of the liar-paradox (Simmons, 1993), which reads

3a) This sentence is false[73]

Truth-conditionally, if 3a is true, it is false. However, if 3a is false, it is, qua the phrasing of the sentence, true[74]. Thus, it is impossible to determine a truth-conditional, as each refers to the other. Kripke (1975) suggested a potential solution by introducing the notion of many-valued logic (see e.g. Bochvar, 1939; Kleene, 1952). Introducing the #-value, which reads "neither true nor false". However, this leads to the revenge liar-paradox.

3b) 3b is either false or neither true nor false

which entails the same truth-conditional undecidability as 4a. In sum, formal logic runs into a truth-conditional challenge if it retains a demand to have dichotomous conditionals. Natural language, quite simply, is more flexible than stable truth-conditionals. The liar-paradox is not restricted to referentiality, but extends into epistemic fields as well (Eldridge-Smith, 2011). Consider Pinocchio stating the following

3c) My nose grows now

Given what we know of Pinnochio, this is a self-defeating statements since if it is true, his nose would nor grow, making it false, which would make his nose grow and come full circle. Thus, the epistemic, or doxastic, knowledge may influence and shape paradoxes of truth.

However, Budzynsky and Kacprzak build upon the notion that persuasion is concerned with consensus and belief alignment (as opposed to the present framework) and it assumes the rules of predicate logic as a baseline for reasoning as opposed to the probabilistic framework adopted here. However, a detailed discussion of Budzynsky and Kacprzak's framework goes beyond the limitations of the present thesis.

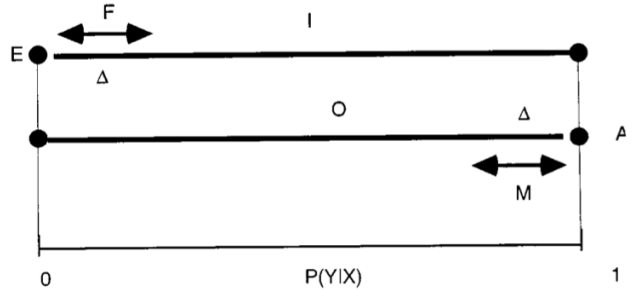
[73] This paradox might spring as a consequence of Tarski's (1983) definition of truth, which states that " P is true if and only if P"

[74] Smullyan (1986) extends the liar paradox y arguing that Gödel's second incompleteness theorem may be applied to the semantics of logic such that a reflexive, stable type 4 reasoner (a reasoner with complete information of predicate logic, who believes that his beliefs are closed under modus ponens, and is consistent in his beliefs, i.e. if he believes P, he believes that he believes P) "…can never believe p and can never believe ¬p without becoming inconsistent in either case" (p. 350).

The second challenge for formal logic, as a computational basis (for a description of the various levels, see Marr, 1982), is the application of formal logic to practical reasoning. In particular, formal logic assumes that structure enjoys hegemony over content in that a logically fallacious structure should be disregarded from a normative point of view no matter the content. Thus, by introducing a slippery slope, the arguer commits to a logical fallacy and the argument (and by extrapolation the persuasive attempt) should be dismissed. As I will explore more in 2.4, this does not seem to fit with the data from argumentation theory as it is developed in the Bayesian, probabilistic approach. Rather, humans seem to place the content of an argument over and above the formal structure. Here, I focus on syllogistic and conditional reasoning due to the fact that these may be considered the basic structures of formal reasoning.

Syllogisms take a variety of forms[75]. The standard elements of syllogistic reasoning is: all X are Y (A), some X are Y (I), No X are Y (E), and Some X are not Y (O), with Chater & Oaksford (1999) adding 'most' (M) and 'few' (F). From the traditional elements, 64 types of syllogisms may be constructed. Of these, 22 are traditionally identified as having valid conclusions (Chater & Oaksford, 1999, p. 196). To deal with syllogistic reasoning probabilistically, Chater and Oaksford describe the probability heuristics model containing three main principles, namely the *min*-heuristic (choose the quantifier of the conclusion to be the same as the quantifier in the least informative premise), the p-entailments (the next most preferred conclusion will be the p-entailment of the conclusion predicted by the *min*-heuristic), and the attachment-heuristics[76]. They explore the semantics of the probabilistic heuristics model, Chater and Oaksford

Fig. 6: The probabilistic semantics for the quantifiers AMFIEO[77]



[75] For a table comparing treatments of various types of syllogistic reasoning by Aristotle, Johnson-Laird & Byrne, and Frege from a logical perspective, see Oaksford & Chater (2007), p. 216.
[76] The definitions are taken from Oaksford & Chater (2007), pp. 219-227
[77] This figure is taken from Chater & Oaksford (1999), p. 201

From this point of view, Chater & Oaksford (1999) argue that "…probability theory rather than logic provides a more appropriate computational level theory of human reasoning" (p. 239). They investigate syllogistic reasoning from a probabilistic perspective involving fast, frugal heuristics (McKenzie, 1994; Gigerenzer & Goldstein, 1996) and argue that such heuristics may be highly adaptive "…insofar as they approximate optimal solutions" (Oaksford & Chater, 2007, p. 227)[78]. That is, people pay more attention to the content of the syllogism rather than the strict structural validity, as would be prescribed by formal logic.

The aforementioned mental model theory (Johnson-Laird, 1983; Johnson-Laird & Byre, 1991) also investigates conditional reasoning (Johnson-Laird & Byrne, 2002; Byrne & Johnson-Laird, 2009; Johnson-Laird et al., 2009, for a more in-depth critique of this model and how it deals with conditionals, see Evans et al. 2003, 2005; Evans & Over, 2004). Formally, table 3 identifies the truth-conditionals for conditional reasoning.

Fig. 7: Venn diagram of conditional reasoning

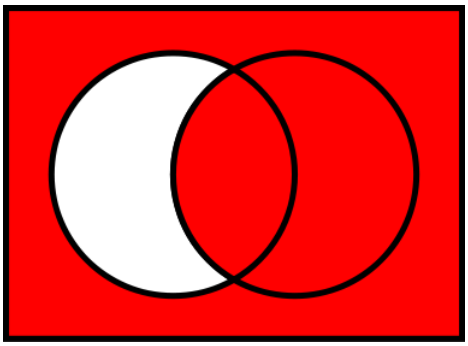


Table 3: truth-table for conditional reasoning

P	Q	P→Q
T	T	T
T	F	F
F	T	T
F	F	T

Given the rules of formal logic, conditional structures are only logically invalid if P=1 and Q=1. Otherwise, conditional reasoning is structurally valid. However, as Oaksford & Chater (2007) notes, this seems counterintuitive given that this means that the following are logically valid.

4a) If Mars is made of cookies, then the moon is made of milk (F→F)

4b) If Mars is made of cookies, then Jens Madsen wrote this thesis (F→T)

The first appears false, nonsensical, or metaphorical at best whereas the antecedent in the second bears little relevance for the consequent. That is, no new information is added with 4b concerning whether or not I have written this thesis. Clearly, formal logic

[78] For a discussion of the reliance on heuristics in persuasion theory, see 2.3.

is faced with a challenge in accounting for the logical validity and argumentative worth of such sentences (a fact which is discussed more in-depth by Oaksford & Chater, 2007, chapter 5). Furthermore, the challenge of mapping formal language onto natural languages as discussed in 4.2 is evident from the fact that "…no current analysis of the conditional provides a satisfactory account of the wealth of natural language sentences" (Oaksford & Chater, 2007, p. 71, see also Bennett, 2003). Furthermore, if conditionals are considered as material implications combined with logical machinery, they do not "…allow conditional statements to admit exceptions", which entails a puzzle concerning "…how it is possible for the cognitive system systematically and successfully to rely upon a store of knowledge, almost all of which consists of false statements [such 'for all objects, x, if that object is a bird, then it flies']", which is a false statement given that "…almost all natural language rules are defeasible" (all Oakfsord & Chater, 2007, pp. 71-72). In terms of information and in terms of relevance, and the challenge of mapping logical conditionals as material implications onto natural languages converge on suggestion the limitation of formal logic in providing a framework for reasoning with conditionals in natural languages, practical reasoning, and when processing acts of persuasion. As with syllogistic reasoning, probability theory offers a different perspective on conditional reasoning (Oaksford et al., 2000, 2003, 2007; Evans et al., 2003, 2005; Evans & Over, 2004), the rest of the chapter deals with benefits and limitations of probabilistic models of cognition as the foundation of persuasion processing).

Both syllogistic and conditional reasoning are fundamental aspects of reasoning, and both seem to struggle when faced with non-trivial cases when explored from a formal logical perspective. In 2.4, I explore fallacious structures of argumentation such as slippery slope, circular reasoning, and ad Hitlerum to provide further evidence for the contention that humans approach the strength of the content of the evidence before they attend to formal structural issues, which further calls into question the applicability of formal logic as the basis for a psychological theory of persuasion processing. Indeed, as will be evident, people are sensitive to modulations in content despite being confronted with logically fallacious arguments. Thus, taken together with the philosophical remarks concerning the epistemological uncertainty of practical reasoning and persuasion attempts, evidence suggest that formal logic is faced

with serious challenges when accounting for human reasoning from a structural perspective. Consequently, the role of logic in the persuasion theory developed in this thesis is fundamentally different from previous models making use of formal logic to determine good or bad argumentation and, consequently, persuasion. That is, rather than assuming the validity of formal logic on a *computational* level, I argue that formal logic is better reserved as an *analytical* tool to criticise instances of persuasion within the limitations of formal logic since the considerable benefits of cleanliness and structural assessments derived from formal logic should not be ignored. Formal logic appears inadequate as the computational foundation to formulate a theory of persuasion given that it struggles to account for practical reasoning and argumentation However, I will assume that logical consistency *does* contribute to the validity of a persuasive argument such that structure (S) is supplementary, but subordinate to content (C) such that $S_+C_+ > S\_C_+ > S_+C\_ > S\_C\_$. This remains an open empirical question to be explored further. However, given this assumption, formal logic may well function as a powerful analytical tool for discussing persuasion attempts and the desirability of these provided that the critique retains the limitations mentioned in the above and in 4.2. The logical analysis, however, are normative on a societal, ethical, and desirable level more than normative on an approximating level.

2.3. Probabilistic reasoning

As mentioned, the focus of formal logic is the validity of the structure of the argument. Compared with this, probabilistic reasoning is predominantly concerned with the content of the argument. Thus, departing from the pastures of formal logic, probability theory has been suggested as the computational foundation for human cognition (Schum et al., 1967; Chater et al., 2006; Tenenbaum et al., 2006, 2011). As argued convincingly in Oaksford and Chater (1991, see also Oaksford & Chater, 1998, 2001, 2007), probabilistic reasoning provides a viable alternative for modelling reasoning to logicist accounts relying on formal logic. Indeed, rather than being geared toward the rigour of logical reasoning as described in 2.1, probabilistic reasoning aims at modelling how humans computationally and algorithmically (Marr, 1982) deal with "the uncertain character of everyday reasoning" (Oaksford & Chater, 2007, p. 67) in which we have

doxastic, uncertain information and beliefs rather than Platonic, epistemic knowledge. Thus, rather than seeing human beings as irrational because they fail to live up to the standards of formal logic, probabilistic approaches argue that humans may indeed be rational, although from an uncertain point of view. That is, in an epistemically uncertain world, humans cannot have certain information (and hence, cannot rely on the premises of certain inference, i.e. formal logic). Such an approach has been invoked to account for seeming human reasoning flaws (e.g. Wason's selection task, Oaksford & Chater, 1994). Thus, humans are thought to approach situations from a probabilistic point of view such that they estimate the likelihood of particular pieces of information to gauge at the validity of the argument. As such, actions that may seem illogical and irrational from a formal logical perspective may be entirely within reason from a probabilistic perspective (e.g. arriving at very different conclusions concerning the same content, which will occur if the priors, likelihood estimations, and perception of source of the same persuasive act differ)

2.3.1. Introducing probability theory

Probabilistic approaches have been applied to a range of topics such as confirmation or disconfirmation of scientific hypotheses (Mackie, 1969; Good, 1984; Milne, 1996), argumentation (Hahn & Oaksford, 2006a; 2006b; 2007a; 2007b), and language evolution and comprehension (see 4.3). Furthermore, as mentioned in 2.2, there are indications that humans make use of probabilistic reasoning when considering conditional reasoning (Over et al., 2007; Oaksford & Chater, 2007, chapter 5), when engaging with in argumentation (such as employed in Harris et al., 2012, see 2.4 for a more in-depth discussion of argumentation), syllogistic reasoning (Chater & Oaksford, 1999), and it has been employed to deal with other frequent phenomena such as counterfactual reasoning (e.g. Zultan et al., 2012; McCoy et al., 2012). In sum, probability theory has wide-ranging possible applications. This thesis argues for a probabilistic approach to persuasion as a fundamentally different approach to previous accounts of persuasion mentioned earlier in the thesis such as the ELM and the HSM.

Fundamentally, probability theory relies on three axioms set out, amongst others, by the Russian mathematician Andrey Kolmogorov (see Howson & Urbach, 1996). Firstly, probabilities are constrained to be real numbers between 0 and 1. That is

rather, than assuming truth-conditional dichotomies as with propositional logic, probability theory assumes truth-conditional uncertainty between 0 (completely certainty that something is *not* the case) and 1 (completely certainty that something *is* the case). Epistemologically, this is a big difference, which entails significant consequences for how persuasion processing is conceptualized in the thesis. Secondly, tautologies are assigned probabilities of 1. This allows probability theory to postulate and conclude similar conclusions as propositional logic given a tautological, certain estimation of probability. In reality, however, almost no (if any) claim can be conceptualized as 1 due to the limitation of human knowledge[79]. Thirdly the joint probability of mutually exclusive events is equal to the sum of their individual probabilities[80]. From these three (or potentially four) axioms, all mathematical laws of probability necessarily follow. One expression of such mathematical calculation of probability is given by Bayes' theorem, as presented later in this section. That is, Bayesian reasoning fundamentally relies on these axiomatic assumptions.

When presenting Bayesian reasoning in 2.4, it will be clear that probabilities here are considered subjective. The notion of subjectivity is naturally a vastly complex issue that has been discussed repeatedly throughout the history of philosophy, psychology, and other disciplines. In the context of the present framework, I understand the subjective estimation of probabilities as a degree of belief given some state of knowledge. This degree of belief springs from the individual person's states of knowledge and related beliefs rather than from an objective truth-value (for instance, a person might subjectively entertain a high degree of belief in astrology even though the objective evidence for this belief is minimal). Thus, the degree of belief is subjective rather than objective. Importantly, as discussed in chapters five and six, the conceptualisation of subjectivity is inherently interactive, contextual, and cultural rather than solipsistic (see also Madsen, submitted, for a discussion of the importance of temporal aspects in subjective probabilistic estimations). That is, the subjective estimations might spring from the individual, but they do not emerge in isolation.

[79] Note that even mathematical validity may be called into question due to Gödel's incompletenss theorems.

[80] However, as we will see in 2.5, this may be challenged to some extent – not mathematically, but from a persuasive point of view by investigating the persuasiveness of narratives. Also, some authors consider the definition $P(a \mid b) = \frac{P(a \& b)}{P(b)}$, where $P(b) \neq 0$, to be a fourth axiom of probability (e.g., Howson & Urbach, 1996).

Furthermore, historically, Bernoulli (1954, 2005, see Oaksford & Chater, 2007, pp. 78-80) argued that probabilities are subjective (see also Keynes, 1921). This harkens back to a fundamental distinction between accounts of probability theories that rely on frequencies and accounts describing probability estimations as inherently subjective. As Oaksford & Chater (2007, p. 10) notes, the difference does not hinge upon the mathematics, as this is "neutral" between the two approaches. Rather, the difference between frequentists and subjectivists boil down to the *application* of probability. Frequentists argue that "…probability calculus can only be applied where frequencies can be obtained – e.g. for events such as throwing a dice…" whereas subjectivists "…are fundamentally concerned with degrees of belief, given certain bodies of evidence, where those beliefs may be about any proposition [concerning] whatever" (both, Oakfsord & Chater, 2007, p. 10). That is, subjectivists have no problem speaking about probabilities of single events[81]. The Bayesian account of persuasion processing suggested here relies on a subjectivist notion of probability estimations such that propositions and beliefs, which are not necessarily expressible in terms of obtainable frequencies, fall within the framework. Thus, a probabilistic estimation of both the following makes sense in the present framework

5a) The likelihood of rolling 1, 2, or 3 of a fair dice is ½

5b) Homosexuals cannot marry because the bible says so

The probability of the former may be easily obtained by probability calculus combined with the physical properties of rolling a dice, whereas the latter makes sense as a degree of belief that may differ depending on the subjective estimations of the individual person. For the argument developed here, I assume that this estimation is an amalgamation of various factors such as personal upbringing (e.g. one's childhood), socio-economic influences, more immediate influences concerning emotional aspects, as well as larger influences such as language, historical, and cultural aspects[82]. That is, the subjective estimation of strength drawn from the individual degrees of beliefs in a particular proposition may result in great differences such that the argument in 5b may

[81] There may be a terminological confusion of how to conceptualize subjectivity in probability theory due to the fact that the notion of degrees of belief has developed in different ways (e.g. Keynes, 1921; Cox, 1946, 1961; Savage, 1954). Here, I use the term as Oaksford and Chater (2007). Note that in the close relationship of subjectivism in Bayesianism, Oaksford and Chater "use the terms *subjectivist* and *Bayesian* interchangeably" (p. 11)

[82] The framework that surrounds the development of subjective beliefs is discussed further in 6.2 and 7.2

seem very strong and likely to someone who have grown up in a fervent Christian-fundamentalist home whereas someone who is not bothered strongly with the biblical text may find it thoroughly weak and unconvincing. The challenge for a psychological theory of persuasion is to account for these individual differences such that, given each individual's upbringing and subjective beliefs, two people may be confronted with the same argument and arrive at inherently different conclusions pertaining the validity and persuasiveness of the evidence. Indeed, given the wide range of beliefs (political, religious, scientific, etc.), a psychological theory has to encompass individual differences as well as the notion of epistemic incommensurability.

It is worth noting that Bayesian reasoning by far is not the only model around for reasoning about uncertainty. Various authors have suggested different models of cognition relying on probabilistic or defeasible reasoning rather than formal, propositional logic. These include, but are not limited to, plausible reasoning (Rescher, 1976), fuzzy set theory (Zadeh, 1965; see also Schum, 1988, 1994), epistemic belief theory (Spohn, 1990), possibility theory (Dubois & Prade, 1988). The preceding theoretical proposals are pre-eminently normative accounts, but probabilistic theories have also been employed descriptively such as decision-by-sampling (Stewart et al., 2006; Stewart & Simpson, 2008)[83]. The purpose of the thesis is not to discuss probability theories and measure them against one another, and the thesis is based on Bayesian reasoning in particular (Oaksford & Chater, 2007, see 2.4). However, it would seem disingenuous not to acknowledge other models of probabilistic reasoning here. The rest of this section, then, is devoted to presenting some more general remarks concerning probabilistic reasoning as a foundation for a theory of persuasion processing. In the following, I will briefly go through two issues for probability theories, namely plausibility versus probability and the role of heuristics. Each present a general challenge to general probability theory (for more in-depth replies to these queries, see Pearl, 1988, 2000; Adams, 1998; Oaksford & Chater, 2007; Harris, 2009)

[83] See also logical, argumentation-based approaches to uncertain reasoning and decision-making (e.g. Fox, et al., 1992; Amgoud et al, 2005, as well as doxastic logic, which was presented in 2.2). I am particularly thankful to Dr. Adam Harris for pointing out these theories and providing me with the theoretical background (see also Harris, 2009, chapter 1).

2.3.2. Probability and plausibility

Conceptually, some authors have argued that uncertain reasoning is captured better in the framework of a plausible rather than a probable framework (Walton, 2004, see also Pollock, 2001). In other words, these authors call for a *plausibilist* framework as a third reasoning alternative to deductive and inductive reasoning. The motivation for suggesting a third reasoning option rests on Theophrastus' rule, which states that the strength that a chain of deductively linked arguments confers on the conclusions cannot be weaker than the weakest link. As noted in Oaksford and Chater (2007), this is a condition that cannot be guaranteed by probability calculus, and consequently this opens a possibility for a third reasoning alternative. Whether or not this plausibilist approach is a viable alternative remains an open question, and I will not venture into a larger discussion due to the limited amount of space available here. But for the sense of conceptual completion, it deserves mentioning when presenting the probabilistic framework.

Citing Oaksford and Chater, two arguments can be made against the inclusion of a plausibilist framework in general reasoning theory. Firstly, there is discrepancy between what constitutes plausible reasoning and how this should be conceptualized formally. Thus, Pollock ranges plausibilities from 0 to ∞, whereas Fox and Parsons (1998) operate with a notational system of ++, +. -, and -- (as familiar in many-valued logics). Thus, at present no consistent system of plausibility is available, and consequently the case for plausibility theory springs more from intuitive attractiveness than from a consistent systematic approach[84]. This is a minor point of criticism as many fields need time to solidify and agree upon a common notational system, and indeed most disciplines would find internal terminological discord. Thus, given time and development, the plausibilist argument might alleviate this worry by coming up with a coherent system. Secondly, and more seriously, it may be argued that any account of uncertain reasoning invariably ends up in the calculus of probability theory (see e.g. Howson & Urbach, 1996). If this holds true, there is little reason to develop and introduce a new set of theories, which ultimately converge upon a mathematical point, which is explainable by previous probabilistic models of cognition. As such, proponents of plausible reasoning need to account for a more consistent string

[84] Note that this might be alleviated if a single plausibility theory is agreed upon.

of cases that probability theory fails to deal with. However, this too may be solvable. Thus, for the moment being, I restrict the remark to introducing the notion of a potential third reasoning capability alongside deduction and induction, but leave this as an open question for future research.

2.3.3. Probabilities and heuristics

Heuristics have consistently been suggested as a viable psychological explanation for a range of cognitive phenomena (see e.g. Tversky & Kahneman, 1974; Kahneman et al., 1982; Gigerenzer, 1991; Gigerenzer & Goldstein, 1996; Kahneman & Frederick, 2002; Gigerenzer & Brighton, 2009; Gigerenzer & Gaissmaier, 2011) [85]. Given the probabilistic approach in the present framework, it seems necessary to comment briefly on the relationship between probabilistic and heuristics. To describe cognitive strategies for coping with the plethora of information available, some of the above quoted authors suggest that humans rely on baseline heuristic strategies, which are fast, frugal, and effortless. Authors argue that such heuristics are at the heart of cognition and may provide a faster cognitive model compared with complex computation accounts such as probabilistic approaches. Indeed, several heuristics have been suggested such as the availability (Tversky & Kahneman, 1973), representativeness (Kahneman & Tversky, 1972), escalation of commitment (Staw, 1976), the scarcity principle (Cialdini, 2007), the similarity heuristic (Read & Grushka-Cockayne, 2011) as well as several others not listed here. Such evidence is compelling and interesting given the principle of Occham's razor that a simpler explanation should be preferred to a more complex one. However, heuristics are faced with two fundamental problems discussed in Oaksford and Chater (2007, pp. 276-278). Firstly, the existence of heuristics and their subsequent success in reasoning tasks are confounded or limited by considering how heuristics *can* function, if not underpinned by some rationality in form of goal-directed actions, information from the environment as well as some basis to evaluate what is the 'right' course of action. That is, heuristics seem to come full circle and require the very rational analysis that they argue against. Secondly, the list of heuristics provided is far from exhaustive. Several other heuristics have been identified, which begs the question whether any

[85] In the psychology of persuasion, heuristics have also been influential such that the ELM and HSM both rely on heuristics in peripheral-route persuasion processing – recall that the H in HSM stands for 'Heuristic'

slightly new situation would elicit a new type of heuristic to solve the situation. That is, a firm description of set heuristics that perform one type of task seems incomplete when faced with the immense flexibility of the human cognitive capability. That is, if we truly do rely on heuristics as a baseline for cognition, we may assume hundreds if not thousands of situations requiring slightly different heuristics or a combination of already existing heuristics. Indeed, Gigerenzer and Brighton (2009) rely on the cognitive system as an "adaptive toolbox". However, if we postulate the existence of a host of heuristics that are combinable in a number of ways, it seems to defeat the purpose of creating fast, frugal mechanisms since surely this is a highly complex network of heuristics. Furthermore, the heuristic mind is also faced with the challenge of accounting for *how* humans decide which heuristic to make use of. The stance taken here, then, is compromising between hard-core computational and heuristic positions in that the model developed here assumes a computational basis for cognition, but concedes to the fact that human beings may indeed learn some simple ways of dealing with complex information in the future. That is, confronted with a new situation, we may need to consider the case more carefully, but with experience we may develop simple strategies to deal with complex situations. As discussed in 7.4 on coping mechanisms, a learning trajectory over time may account for the fact that humans *may* become more critical as they are exposed to persuasive strategies such as logical fallacies, emotional appeals and so on. That is, we may learn how to cope strategically with persuasive strategies, but these heuristics may not be the computational baseline of what we do when we are confronted with acts of persuasion in general.

Alongside the general argument against probability theory from Gigerenzer and colleagues, empirical evidence might suggest that people are unable to even approximate the prescription of probability theory. These are reasoning errors such as the conjunction fallacy (e.g., Tversky & Kahneman, 1982) and base rate neglect (e.g., Kahneman & Tversky, 1973), probabilistic fallacies (Tversky & Kahneman, 1973), biases of overconfidence (e.g., Lichtenstein, et al, 1982), conservatism (e.g., Phillips & Edwards, 1966), and framing effects (e.g., Tversky & Kahneman, 1981; McKenzie 2004, however, see Harris, 2009 for an account of how probabilistic theory can deal with the findings of prospect theory). Thus, despite being very real grounds for

probabilistic concern, this does not amount to a dismissal of the underlying assumptions.

Branching over probability theory, several theoretical points emerge. Firstly, and most importantly for the present epistemological purpose, probability theory differs significantly from propositional logic in its graded, subjective estimations of strength and probability as compared with truth-conditional dichotomies. This stance is more in sync with the epistemological remarks concerning acts of persuasion as they were identified in 1.6. Furthermore, as will be evident from 2.4, probability calculus enjoys a closer fit with behavioural data such that it may account for and potentially predict with greater accuracy how human beings approach uncertain evidence, as is the case in any persuasive situation. However, proponents of probability theory must also concede to the fact that such a model of cognition entails less rigorous analytical claims concerning argumentative structure. Indeed, as will be argued, human beings may find an argument compelling *despite* the fact that it is formally fallacious (such as the slippery slope argument). This seems to indicate that humans approach content before structure. Consequently, analyses become less clean structurally, but enjoy greater psychological validity as compared with formal logic. Whether probability theory is sufficient in account for acts of persuasion will be discussed in 2.5, but for the time being it suffices to note that a cognitive framework relying on probability theory seems more reasonable and plausible when describing uncertain situations such as acts of persuasion. In 2.4, I discuss Bayesian reasoning as a potential specific candidate for providing the theory of persuasion developed here with a model for probabilistic reasoning.

2.4. Bayesian approach to cognition and argumentation

Bayesian reasoning (Oaksford & Chater, 1998, 2007) is a particular instantiation of probability theory, which, like other probabilistic accounts, depart epistemologically and analytically from indefeasible monotonic logic as presented in 2.2 and which consequently has been suggested as a viable alternative to logicist reasoning (Oaksford & Chater, 1991). Bayesian reasoning follows from the axiomatic assumptions described by Howson and Urbach (1996) presented in 2.3. Like general probability theory, Bayesian reasoning and inference has been applied to a wide range of topics such as the

informativeness of quantifiers (Oaksford et al., 2002), incomplete game theory equilibriums (Gibbons, 1992; Mas-Colell et al., 1995), information processing (Kirby et al., 2007) the evaluation of scientific evidence (Corner & Hahn, 2009)[86], vision (Yuille & Kersten, 2006; Moore, 2012), and legal reasoning (Lagnado et al, 2012). Of particular interest to the present discussion, research has also applied Bayesian reasoning computationally to human decision-making (Oaksford & Chater, 2007) and argumentation (Hahn & Oaksford, 2006a, 2006b, 2007a, 2007b), which will be discussed later in this section.

2.4.1. Bayes' theorem

Mathematically, the Bayesian approach relies on the, to quote Oaksford & Chater, 2007 'Bayes' celebrated theorem' (p. 72, see Bayes, 1763), which describes manipulations of probabilities. Formally, the theorem is phrased as

$$P(h \mid e) = \frac{P(h)P(e \mid h)}{P(e)}$$

where P(h|e) represents the posterior degree of belief that a hypothesis h is true after having received a type of evidence, e. P(e|h) represents the probability of receiving the evidence e if the hypothesis is true, and P(e) represents the probability of the evidence occurring regardless of the truth or falsity of the hypothesis. This may be calculated from P(h), P(e|h) and P(e|¬h) (the probability of receiving the evidence if, in fact, the hypothesis is not true (¬h). That is, the subject entertains a prior concerning the topic in hand as well as the relationship between P(e|h), the likelihood of receiving the evidence if the hypothesis is true and P(e|¬h), the likelihood of receiving the evidence if the hypothesis is false. This relationship is called the likelihood ratio, $\frac{P(e|h)}{P(e|\neg h)}$. From this, the initial theorem presented above may be expanded to

$$P(H \mid e) = \frac{P(H)P(e \mid H)}{P(H)P(e \mid H) + P(\neg H)P(e \mid \neg H)}$$

The posterior degree of belief that *h* is true following *e* depends on perceived relevant relationship between *e* and *h* compared with the likelihood of *e* occurring regardless of *h*. The conditional probability of *h* given *e* equals "…the probability that both H and E

[86] For an alternative, logicist account of scientific reasoning (or the child as "scientist"), see Carey (1988) – however, see also Oaksford & Chater, 1991; 2006, chapter 3 for an assessment of the logicist approach to reasoning.

occurs, divided by the prior probability that E will occur" (Gibbons, 1992, footnote 12, p. 80). The output of the formal theorem is the posterior belief, $P(h|e)$, which refers to a person's degree of confidence that a particular belief is true. In complex instances such as practical reasoning, $P(h|e)$ may be calculated via Causal Bayesian Networks (Pearl, 2000), which are a graphical representation of structure of probabilities representing their random variables and conditional dependencies via directed acyclic graphs (Bang-Jensen, 2008), which provide a representation to make explicit the connection between the priors and coherence. Such networks have been used to account, for instance, for reasoning in legal settings (Lagnado, 2012, see Pearl, 2000 for a discussion of Causal Bayesian Networks). Bayesianism may either be regarded as an inference of posterior probability (Brase et al., 2006) or as confined to the more strict definition of complying with Bayes' theorem (Brase, 2002). Without discussing this at length due to lack of space, here the approach taken is the former such that the theorem acts as an approximation of how human beings infer posterior probabilities and subsequently make use of these probabilities to reason about a complex world. This inference is made from the priors and likelihood estimations as formally described in the theorem.

2.4.2. Normativity, structure, and content

Most Bayesian models are normative (Tenenbaum et al, 2006; Oaksford & Chater, 2007). That is, given an identified prior and likelihood ratio, a clear posterior mathematically follows such that the rating for how a person *should* adopt and update from new evidence is given as a normative standard. The normative approach is also suggested for the model of Bayesian argumentation[87]. This is of particular interest given that Bayesian inference in this way may function as a strong, normative alternative to indefeasible, monotonic logic. Despite this prevalence of normativity, some authors have suggested that rational algorithms (such as Bayes' theorem) may be applied descriptively on a computational level (see e.g. Sanborn et al., 2010)[88]. Despite the fact

[87] As mentioned in the introduction, this harkens back to the distinction between the normativity of the desirable and the normativity of the approximated. The SPIMP approach is normatively predictive given the subjective probabilistic estimations concerning content strength and source credibility. As such, it is normatively predictive. However, given the complexity of the psychological framework (as described in 7.1), this outline in practical analyses would involve descriptive elements.

[88] Further tentative evidence for the claim that Bayes' theorem may be applied qualitatively come from Chang & Setter (2007) who argue that qualitative knowledge can be used and translated into a set of

that this issue is still being debated, I will, for the remainder of the thesis, assume that probabilistic reasoning as expressed by Bayes' theorem may at least *approximate* subjective reasoning on Marr's (1982) computational level. That is, the theoretical proposal developed in the thesis is conceived as a process theory, but should be understood as a computationally descriptive theory (i.e. *what* people do, not necessarily *how* they do it). In this way, the Bayesian approach is normative on the one hand, as the mathematics clearly prescribe how probabilistic inferences should be made given certain priors and likelihood estimations. One the other hand, given the complexity of the psychological framework that underpins the subjectivity of the probabilistic estimations (see 7.2), the analytic potential of the Bayesian account of persuasion might function descriptively.

The relationship between structure and content is particularly interesting for the Bayesian inference perspective due to the fact that the mathematical structure underlying this approach differs from the one underlying indefeasible, monotonic logic in that they target and describe two inherently different qualities of argumentation: structure (formal logic) and content (Bayesian). That is, the relationship between formal descriptions (formal logic and the mathematical foundation of Bayes' theorem) and application is an essentially different relationship for formal logic and Bayesian inferences. The Bayesian approach represents a formal, mathematical way of approximating human reasoning from a content-oriented perspective. This is represented in two general ways. Firstly, the theorem is a formalized mathematical expression constructed on the same mathematical principles as indefeasible, monotonic logical models. In this central manner, the Bayesian approach does not differ from these models (in that they both rely on the validity of mathematical expressions). Secondly, Bayes' theorem formally calculates the manipulation of probabilistic content, i.e. how the likelihood-ratio mathematically manipulates the prior such that a posterior emerges. This application of Bayes' theorem is a direct consequence of the mathematical qualities inherent in the theorem. Thus, the fundamental formal aspect of Bayes' theorem is derived from the axioms of probabilities described earlier, and the formula is a mathematical representation and expression following these axioms.

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constraints on the Bayesian model space (even for inconsistent qualitative knowledge, Chang et al., 2008).

When applied in a practical setting, the formal aspects of Bayes' theorem and the representations of the Bayesian networks (Pearl, 2000) remain a frame through which the application of the theorem in general may be perceived. That is, the application of the formal to the non-formal, i.e. from mathematical expression to approximation of and the mapping onto human reasoning. For a theory of persuasion this would specifically entail the manner by which human beings reason about and approach *content* that is being proposed to them in a persuasive setting[89]. This is a significantly different aspect of the Bayesian approach that is not formal in the same way that the theorem is formal. In other words, the application of the theorem and networks approaches instances of persuasive attempts and approximates these by describing them in terms of the theorem. Formally, Bayes' theorem is a mathematical expression that describes the manipulation of probabilities. That is, how probabilistic calculus function mathematically. Practically, the approach relates to how people estimate, approach, and assess persuasive content. This is a crucial difference between the formal (mathematical) and the practical (content-driven) aspects of the Bayesian approach. The fact that the approach contains both strengthens the account.

This relationship between the formal and the informal, practical aspects of Bayesianism is interesting in another way: empirical testability of whether participants reason in a Bayesian manner. Studies indicate that people are not very good at calculating complex probability mathematically. It might be argued that if subjects cannot calculate probabilistic content mathematically, they are presumably not approaching the content probabilistically. For instance, humans find the Monty Hall problem difficult (Selvin, 1975a; 1975b, but see Gill, 2002 for a Bayesian approach to the problem), Villejoubert et al., (submitted) report that subjects have trouble dealing with pure mathematical expressions of probability in card games compared to situations in which they can manipulate with the physical world, and Hoffrage et al. (2005) report that the mode of presentation of statistical information affect success-rate in solving statistical problems. However, if the assumptions underlying Bayes' theorem are to be taken as a formal expression approximating how people approach informal content as discussed in the above, such a formal, truth-conditionally dichotomous problem should

[89] As will be evident throughout the thesis, 'content' refers more than simply the information provided in the persuasive setting. Thus, authority, emotional content, source credibility and more is taken as nodes in a complex, causal network as described in the interim conclusion.

indeed be expected to be difficult for people without training in mathematics, statistics, or probability calculus. That is, there is a conceptual difference between being able to do complex mathematical equations expressed formally and performing acts that may be approximated or described *using* mathematics (e.g. the computational complexity of catching a ball in the air is immense whereas humans seem to be able to do this fairly easily). Thus, if the probabilistic content were presented in another manner by which people were more accustomed, reasoning would presumably be easier. Indeed, there is evidence indicating that subjects *do* perform better when they are given physical manifestations of the probabilistic problems when solving problems (Villejoubert et al., submitted).

2.4.3. Bayesian argumentation

We now turn out attention to the application of Bayesian reasoning to argumentation theory since this is central to developing a probabilistic approach to persuasion (given that reasoning and argumentation are central elements of persuasion as mentioned in 1.6). Oaksford, Hahn, and colleagues have explored argumentation from this point of view (Hahn & Oaksford, 2006a, 2006b, 2007a, 2007b; Hahn et al., 2012). The two main aims of these investigations have firstly been to suggest Bayesian theory as a viable model of argumentation processing and secondly to highlight the difference between the Bayesian account of argumentation compared with frameworks making use of indefeasible, monotonic logical models such as the pragma-dialectical approach (Eemeren & Grootendorst, 2004). The difference between Bayesian and indefeasible, monotonic logical models has predominantly been explored by investigating logically fallacious argument structures. Logically fallacious structures are violations of logical rules, which should result in the dismissal of the argument. For instance, a slippery slope argument is fallacious due to the fact that one outcome does not logically or necessarily entail the trajectory prescribed by the slippery slope. Given the hegemony of structure in indefeasible monotonic models, we should expect that subjects should treat all fallacious structures equally harsh. However, if subjects do *not* dismiss the argument despite of its logical shortcomings, but rather differentiate this weakens the rigorous positions and strengthens positions such as the Bayesian, which argue that humans predominantly focus on the content of the argument. That is, subjects may be

confronted with the same structural message (e.g. an ad hominem argument), which from a logical point of view should be dismissed, but from a content-driven point of view may be more or less valid/persuasive. Consider the following examples of slippery slope arguments where 6a might be somewhat likely and 6b is very unlikely.

> 6a) If we allow voluntary identification cards for youths, obligatory cards will follow
>
> 6b) If we raise taxes any more, we will soon pay 100% in taxes

The Bayesian claim goes that despite the structural similarities, humans evaluate the two arguments differently given the difference in the likelihood or their content. Indeed, the data supports this claim. In line with the Bayesian framework, empirical evidence indicates that people are sensitive to relevant probabilistic features of an argument. This has been examined across a variety of argument fallacies, including argument from ignorance (Hahn, Oaksford & Bayindir, 2005; Oaksford & Hahn, 2004), slippery slope arguments (Corner et al., 2011) and circular arguments (Hahn et al., 2005), ad hominem (Oaksford & Hahn, 2013), and the ad Hitlerum (Harris et al., 2012). Furthermore, empirical works have examined people's treatment of source expertise in a manner, which seems consistent with Bayesian prescriptions (Hahn et al., 2009; Harris et al., submitted, see also 3.3). Corner & Hahn (2009) demonstrate that the evaluation of arguments concerning current scientific issues is also in line with Bayesian descriptions. Thus, there is a considerable body of experimental work being compiled to argue that there is a connection between how human beings process evidence and argumentation understood as in the above and how humans reason from a Bayesian perspective.

Typically (though not exclusively), the method of investigation in these experiments mentioned in the above is to derive the prior degree of belief concerning a particular piece of evidence, then present the subject with additional information, which is weighted, and then elicit the posterior degree of belief and see whether Bayes' theorem may help account for the decision-making and reasoning process that the subject goes through. That is, the formal theorem is used to account for the practical implications of the argument content and is thus an instantiation of the formal-informal relationship between structure and content. That is, the formal structure is used to account for the informal content. One of the significant strengths of the Bayesian approach is that the theory resides in this interesting relationship of being mathematical

in the one formal hand and content-driven in the application other. The mapping *from* formal theory *to* application seems to be experimentally supported. As a theoretical consequence of this, the Bayesian approach enjoys strengths from both sides of the veritable pond the credibility of which is supported by the empirical success of the individual studies cited in the above. Furthermore, a few studies have shown that the Bayesian explanation can function predictively as well (e.g. Harris et al., submitted). The approach differs significantly from the predictions from rule-based models of argumentation theory constructed on the premises of indefeasible, monotonic logic such as the pragma-dialectical approach (Eemeren & Grootendorst, 2004) as the Bayesian account acknowledges that humans may treat the content of an argument in a strength-wise gradient manner *even if* the argument strictly speaking is a logical fallacy[90]. The relationship between reasoning with uncertain beliefs, Bayes' theorem and persuasion should emerge clearer as the thesis presses on and elements such as phenomenology and social aspects are incorporated.

However, the picture is not entirely clear, and indeed evidence that does not fit perfectly with Bayesian networks has been found. For instance, Lagnado & Harvey (2008) investigate how evidence is discredited in legal scenarios. Here, the findings are more in line with coherence-based models of juror reasoning (e.g. Simon & Holyoak, 2002) than Bayesian networks[91]. Thus, it is not possible given the evidence to state with certainty that human beings reason in a Bayesian manner. Given the subjective nature of Bayes' theorem, it is not unfeasible to assume that evidence against the theorem *may* be influenced by factors that are not accounted for in the data analyses (this is purely speculative, though, see also Jones & Love, 2011a). Omitting particular biases in the calculation would skew the mathematical predictions of the theorem and cause data to

[90] The pragma-dialectical approach was developed as a normative account of rule-based argumentation processing under which interlocutors are meant to follow given codes of conduct (derived from ethical or logical considerations) in argumentation (for a list of the ten rules of critical discussion, see Eemeren et al., 2002, pp. 182-183). Amongst other issues, these rules are concerned with the freedom to produce arguments, the relevance of the information, and the validity of the reasoning. Note here, then, that this is concerned with argumentative conduct and as such registers as a normative framework for proper and decent argumentation rather than a normative account of how people process the evidence. This harkens back to the distinction between the societal and the functional normative approaches mentioned in the introduction. In the same way as logic, then, I argue that the pragma-dialectical is immensely important in analysing argumentation and for critical purposes, but that it fails to describe how people (mis)use argumentation in persuasive incidents. It is essential to keep these types of normative approaches apart.

[91] However, Lagnado (in press) suggests that people *are* sensitive to intricate conditional dependencies between evidence items in legal scenarios

appear inconsistent with the theorem. Regardless, there is a great amount of evidence (as cited above, see also 5.1) that suggests that human beings *are* affected by other humans, contextual biases, limitations of memory and other influences, which entails that beliefs are not as stable as assumed in traditional defeasible models of logic. The Bayesian account is a strong contestant in accounting for human reasoning in contextually influenced situations.

Bayes' theorem, then, may be used as a formal approximation of people's subjective relationship to uncertain content. For a theory of persuasion this has several interesting consequences. Firstly, it supplies the present framework with a normative account of rationality that departs from the epistemological assumptions of indefeasible, monotonic logical models. Secondly, the model of persuasion proposed in the thesis argues for a interactive, contextual, and subjective account of persuasion. As a theory of reasoning and argumentation, the Bayesian approach seems particularly well suited to function as a theory of rationality in such a framework given its subjective estimations of probabilistic content. As discussed throughout the rest of the thesis (and in particular in chapter 7), the Bayesian account can potentially function as one of the cornerstones of such a theory of persuasion. However, the approach is not without question and authors have suggested limitations to Bayesian inferences. In 2.5, I will go through some of the potential limitations, which ultimately suggests that persuasion theory does well by relying on Bayesian reasoning, but that it cannot do so exclusively given that persuasion, as argued, cannot be reduced to information processing, there are temporal issues (Madsen, in prep B), and unanswered questions remain in the literature.

2.5. Limitations to Bayesian reasoning

Alongside the challenges to probabilistic theory in general mentioned in 2.3, some particular issues should be discussed concerning the Bayesian approach, especially given its position in the theory of persuasion developed here. The challenges predominantly cluster around a version of Bayesian inference, which *solely* relies on computational and mathematics since mathematical models, alongside considerable theoretical benefits such as cleanliness and clarity of expression, suffer from limitations *from* mathematical notation (from a linguistic point of view, such potential limitations concerning conjunctions will be discussed in 4.2). Here, I briefly present three separate

issues concerning computational complexity, narratives and the complexity of acts of persuasion, and finally some unknown elements of Bayesian inference.

The real world of affairs in which we live is massively complex and involves an almost infinite amount of data (which may account for the reliance on intuitive physics, Gerstenberg et al., 2012). If Bayesian inferences are conceptualised as a concrete calculus concerning uncertain information, it needs a stopping mechanism since humans could potentially include a seemingly endless amount of contextual information. This may potentially cause computational problems for Bayes' rule since this posits that human should integrate information across domains and use their subjective probabilistic estimations of information to arrive at their response to a particular issue (Bramley et al., submitted). Computing relevant information is by no means a trivial matter since it is not clear what information should be considered relevant. For instance, watching a speech by Obama, I have to comprehend a foreign language (English), make use of visual information, make sense of my subjective position in the world, recall a myriad of information about the presidential elections, infer a multitude of conclusions and implications from the suggested policies and so on and on. It remains an open issue, but some proponents of Bayesian accounts do not consider complex computation as a model for how cognition should be appreciated in a Bayesian framework (see e.g. Griffith et al., 2010. Indeed, the issue of complex computation nonetheless presents an enticing problem for proponents of a Bayesian approach that need to be addressed by discussing how to tease apart relevant information and whether this may aggregate computationally across complex causal networks. In other words, proponents of a Bayesian approach need to account for a stopping mechanism that circumvents the complexity issue.

Secondly, narratives (Velleman, 2003; DeSanctis, 2012; Goldie, 2012) provide an interesting case concerning pure accounts of Bayesian inference since, mathematically, the temporality and order of evidence should not matter since the computation of evidence mathematically should yield the same posterior regardless of their position in the argument. In other words, this states that evidence may be presented in any order, and that mathematically the subsequent posterior should be equivalent. Madsen and Lagnado (in prep) investigate the persuasiveness of narratives in order to explore whether the temporal order of information presented in narrative form in a legal

setting matters when subjects estimate and judge who committed a murder. Given the assumption that humans experience time in a thermo-dynamic sequence, it may not be surprising if temporal order does indeed effect how we perceive evidence. However, this is a mathematical challenge for a pure Bayesian inference account, which becomes less strained if considering Bayesian calculus as *an* element rather than *the* element in persuasion processing, and whether or not this poses a serious challenge for a Bayesian account of persuasion processing remains to be explored. I will, however, briefly return to the case of conjunction and linguistic order effects in 4.2.

Finally, there are some elements that remain undecided in terms of learning, epistemology, and "Bayesian fundamentalism." Regarding the former, the Bayesian approach does not as of yet specify how human beings go from posterior to prior. That is, given a set of prior beliefs (subjectively manifested in a truth-conditionally gradient manner) and some evidence, a Bayesian reasoner should arrive at a posterior. However, it remains an open question how to proceed from this point. That is, how does the posterior subsequently become the prior for the next piece of evidence? This should happen in some way given that we may use information we have acquired to guide our subjective estimation of any subsequent pieces of evidence of acts of persuasion. Perhaps, as used in Hahn and Oaksford (2004) and Hahn et al. (2012) in calculating simulations, the posterior might simply turn into the next prior. Or perhaps the posterior will it be forgotten over time, so that a new prior may be quite different from the former posterior? In that case it would be quite difficult to know something about the prior since it may have been formed by a series of unknown incidents or perhaps even be more or less random. Such a situation would require the formalisation of a person's knowledge in total, which would be a monumental task.

Related to this, proponents of Bayesian inference need a thorough account for how humans arrive at priors in the first place. Presumably, as discussed briefly 6.2 and 7.2, this is an amalgamation of single events throughout our lives in terms of upbringing, socio-economic context, cultural aspects, memories, friends and family, and so on. But the pure Bayesian framework needs to provide a richer story in order to go beyond mathematical calculus and toward reasoning from uncertainty in real life as it is experience and lived by humans.

A general remark concerning the challenges and potential limitation is warranted. These problems seem to arise insofar that Bayesian inference is understood in a fundamental manner as pure probability calculus (Jones & Love, 2011a, 2011b; Bowers & Davis 2012). However, as Chater et al (2011) note, it is not clear if there are any proponents of such a strict account of Bayesian inference do really exist, or if it is a straw man. This, however, remains an open question. Despite this, the general trend emerges that a *pure* mathematical account runs into challenges in much the same way as indefeasible, monotonic logical models, and that persuasion includes elements that are difficult to capture in such a pure account. For example, throwing the mind back to the urn example in 1.1.5, it is difficult to see for how a pure, or naïve, Bayesian inference calculus could solve the scenario. Given low source credibility, the posterior conclusion should invariably be low simply due to standard probabilistic calculus. That is, in a situation in which persuadees may realistically expect persuaders to be less frank, or downright deceptive, the low source credibility should translate into a low posterior estimation of argument strength. However, confronted with actual cases of persuasion such as advertisement, political oratory, and judicial rhetoric, this clearly is not the case since people are readily swayed by these acts of persuasion *despite* the fact that the persuaders should be deemed low in trust given that the asymmetricality of aims should be apparent. It is not at all clear how a pure Bayesian would explain away the data from real life cases of persuasion (see Madsen & Chater, in prep. for a brief analysis of Nixon's *Checkers* speech as an example of this, Nixon, 1952). In conclusion, a theory of persuasion may gain much from exploring reasoning from uncertainty in a probabilistic manner in terms of conceptualising how the persuadee deals with uncertain evidence in a persuasive setting, but it would seem that a pure mathematical instantiation of the approach cannot be the whole story.

2.7. Local and global consistency

The theoretical components proposed here deal with the complexity of content strength from a probabilistic, Bayesian perspective. The argument will be extended in 3.3 to provide a formalisation of content strength as well as source credibility. The underlying assumptions derived from the Bayesian component entail at least two potential problems revolving around the issue of consistency. Firstly, it may rightly be questioned

whether humans really are capable of carrying out the complex computations necessary to comply with Bayesian inferences (as mentioned already in 2.6). Several studies report the fact that participants are faced with difficulties when having to perform probabilistic inferences from a mathematical point of view without the aid of external resources of graphical representations (for a discussion of this and potential helpful graphical representations to facilitate statistical information processing, see Hoffrage et al., 2005; for a discussion of potential helpful systemic embodiment, see Villejoubert et al., submitted). This issue, then, is concerned with whether or not the ecological assumptions are reasonable or if the computational component proposed here is too idealistic and demanding for everyday reasoning humans perform when the faced with a persuasive attempt. Secondly, the mathematical properties of priors pose the question whether human beings are consistent with their own beliefs. Indeed, a consistent system should mathematically be constant throughout concerning the global beliefs. However, the existence of cognitive dissonance (the ability to hold two beliefs at the same time) indicates that humans are not globally consistent (for instance, it is conceivable that a left-leaning British person favours policies of equality at the same time as favouring the monarchy despite the fact that ideals of equality are directly contradicted with a support for a monarchy, which is constructed on the premise that some are born royal[92]). However, the fact that cognitive dissonance seems to bother humans also indicates the desire to strive *towards* consistency rather than tolerating inconsistencies. Thus, the existence of cognitive dissonance indicates that humans are not globally consistent, but also supports the general aim of being consistent and correct, as postulated in 1.3 regarding the persuasive aims. The mathematical properties of a Bayesian system would entail no such inconsistency, as the same priors would lead to the same posteriors across the system given they are not the aim of the persuasive attempt. That is, a person's subjective prior estimate concerning ideals of equality should permeate throughout the system and feed into all relevant issues pertaining to this (such as whether or not to support the monarchy). In this section, I provide some tentative replies to these objections in order to further qualify the theoretical background that supports the theory of persuasion developed here, although both warrant a more in-depth discussion that goes beyond the scope of the thesis.

[92] Thanks to (soon to be) Dr Rebecca Chamberlain for this example

The ecological validity of computational reasoning from a probabilistic point of view may rightly be called into question due to studies that show how people experience difficulties in dealing with mathematical expressions of probability. This evidence seems particularly damaging for the probabilistic approach given the fact that the notion of rationality derived from the Bayesian approach explicitly deals in mathematics (from Bayes' theorem). If people, then, are unable to perform relatively simple computations, how is it then possible to assert that the fundamental approach to reasoning may be expressed in the calculus of probabilities? An initial reply to this comes from the conceptualisation and use of Bayes' theorem. Despite the fact that probabilities are expressible in mathematical terms and that a normative theory of reasoning may be derived from such terms, this does not entail that the Bayesian approach necessarily assumes that humans actually *perform* these calculations in their minds (be it consciously or unconsciously). Rather, the stance of Bayesian reasoning may simply *approximate* how people reason from a normative point of view (as expressed, for instance, in the approach taken to argumentation from a Bayesian perspective). Understood in this way, humans should do better if the probabilistic information is expressed in ways that are more natural to their environment, and indeed evidence exist to support this notion (Vallé-Tourangeau & Villejoubert, in press; Villejoubert et al., submitted). In sum, the notion of computational description remains an open question, but the stance taken in the current approach is that probabilistic, Bayesian reasoning provides the best normative account of ecologically valid reasoning that takes into account how humans approach evidence from a subjective point of view.

By bringing in the notion of completeness*, Oaksford and Chater (2007, pp. 89-91) bring to the foreground an essential philosophical component concerning the underlying assumptions of probabilistic reasoning. Completeness* is concerned with the problem of "…providing a formal characterization of everyday knowledge that picks out all, and only, the common-sense inferences that people endorse" (pp. 89-90). The notion of completeness and subsequent consistency needs to be taken into consideration when arguing for a probabilistic approach to persuasion processing. Consider the following excerpt from an interview conducted by *The New Left Media* during the 2012 American presidential election:

Woman: His [Obama's] father was a Muslim, an atheist, and a communist

Interviewer: So, was his father a Muslim or an atheist?

Woman: [thinking] he is all three

On the face of this exchange, it may be thought that the woman does not know what being an atheist and a Muslim entails given the fact that you cannot be both given the mutual exclusion. However, it seems unlikely that the woman has *no* idea that there is a difference between believing that there is no god and believing in Allah. Therefore, there are at least two possible explanations for the seeming irrationality and inconsistency at this point. One plausible explanation is that the woman lumps the three terms (Muslim, atheist, and communist) into one category concerning people, in her view, toward whom you should be suspicious (or some similar unfavourable category) without distinguishing between the three concepts. In this way, it does not matter whether Obama's father was either or all since he is placed in such a category. An alternative, but not mutually exclusive, explanation could be that the woman simply has not devoted much cognitive effort into considering the theoretical ramifications and entailments of what she says, and she speaks more from a conceptually shallow pond than from a place of consistency. In either case, such cases of cognitive dissonance (the ability to entertain two mutually exclusive ideas) seem prevalent in human society. From a Bayesian perspective, as mentioned in the above, this should not be the case since the priors should lead to consistent posteriors across the Bayesian system. By introducing the theoretical distinction between global and local consistency as well as some remarks concerning the general aim of vernacular reasoning, some of these potential problems may be explained, alleviated, or simply softened. The following theoretical distinction between global and local beliefs and consistency depends on the underlying assumptions of the propositionality of beliefs as well as the aim of reasoning.

I define global beliefs as being a propositional and finite set of beliefs that covers everything in which a person believes. This entails several assumptions concerning beliefs and how these manifest psychologically and cognitively. Firstly, the notion that humans may be globally consistent entails some degree of stability within the beliefs in $\mathbb{B}_G$. That is, given a person's subjective estimation of the content strength pertaining to the notion of equality, this should permeate throughout the system, which indicates stability in beliefs. Secondly, in order to permeate the system, such beliefs

would appear propositional in nature, as they would refer to fixed propositional beliefs to which a subjective probabilistic estimation is ascribed. That is, the propositions make up the underlying belief identify of the person. Note that these beliefs might change with novel evidence and experiences, but if one proposition alters in probabilistic estimation, the system should update in general. Such an update would hinge upon a notion of belief clusters in which propositionally expressed beliefs may influence other beliefs, thus creating a hierarchy of beliefs in which some beliefs are fundamental to others (like the notion of equality is fundamental to a variety of issues ranging from labour laws, the issue of the monarchy, women's rights, same-sex marriages and so forth). From this, a complex network of intertwined beliefs may be drawn, which could be said to describe the personality of the individual. However, a recent suggestion from developmental and cognitive psychology challenges this classic notion of the self and personality by pointing out the instability of the self and the permutations of beliefs (Hood, 2012). Indeed, beliefs and the notion of the self do not seem stable when confronted with developmental evidence. This leads to the notion of local consistency, which depends on different psychological assumptions. In accordance with Hood's notion of the changing, contextual, and mutable self, in this framework, I assume that humans are geared towards consistency of beliefs, as these cognitively are beneficial compared to entertaining inconsistent beliefs, but also that humans are cognitively limited and finite beings who might not be able to integrate evidence across a global belief system (which also assumes some notion of stability across the global system), but rather that evidence first and foremost is evaluated on a local scale. That is, in the above example, a person might believe strongly in the equality of humans when it comes to equal opportunities, anti-discriminatory laws, and so forth, but the same person might well be fond (to some extent) of the British monarchy despite the fact that this directly contradicts with the general belief of equality of humans.

Rather than assuming a stable network of beliefs, local beliefs are expressed in the moment of relevance directed towards and constructed in the situation, but where humans can be consistent with past beliefs and actions mainly due to experiences and memory. In the above, global beliefs were defined as a propositional and finite set of beliefs, which covers everything in which a person believes. In order to have consistency within such a system, a range of assumptions concerning the stability

of beliefs and identity had to be assumed. Relying on developmental evidence arguing for the contextual and cultural upbringing of beliefs (e.g. Hood, 2012; Haidt, 2012) as well as previously cited literature in reasoning and judgement and decision making that argues for the claim that humans are subjective, cultural and contextual in their assessments of beliefs, local beliefs may de defined as a subjective estimation concerning a contextually salient belief in a limited temporal frame. This carries different assumptions compared with global beliefs. For instance, whereas consistency on a global scale requires a systemic consistency in which beliefs permeate throughout the system and influences all relevant conjoined beliefs, beliefs on a local scale do not make the same grand system assumption concerning the cognitive make-up of the individual. Rather, given the limited time-scale, limited cognitive capability and investment, and the contextual nature of the probabilistic estimations, local belief consistency aims for consistency within the beliefs in the specific act of persuasion. This bears interesting consequences for the notion of consistency and the cognitive and philosophical aspects of reasoning as humans from this point of view consider the local first, and the potential global second[93]. This ties well with the assumptions concerning reasoning provided by the present understanding of Bayesian rationality since this assumes contextual and immediate estimations. That is, given an act of persuasion, the persuadee supposedly has a range of probabilistic estimations given the topic in hand, which are influenced by factors such as culture, context, and emotions. The persuasiveness of the act is then concerned with how likely the attempt is locally such that the immediately salient beliefs are considered related with one another. Then, depending on the level of cognitive effort invested in evaluating the quality of the persuasive attempt, the persuadee may consider the more global aspects of the act. However, this is not a necessary cognitive process. Furthermore, Foley (1979) presents compelling evidence that humans are able to entertain justified inconsistent beliefs concerning particular issues such as the lottery and preface paradox[94].

[93] Note, than, that local beliefs do not exclude the possibility of global beliefs. Indeed, as argued in 7.4 and mentioned later in this section, factors such as upbringing, intelligence might influence how well a particular individual may keep beliefs consistent across issues.

[94] Lewis Carroll provides a humorous example of entertaining competing beliefs when the White Queen states ”Why, sometimes I’ve believed as many as six impossible things before breakfast”. This quote reflects the local and potentially incoherent nature of beliefs.

The notion of beliefs and local consistency assumed here further relies on the notion that beliefs are relational rather than categorical. That is, beliefs are relative in nature rather than fixed across a global system. Burke (1969) notes that humans think of persuasion and beliefs in hierarchical rather than atomised terms. Extrapolating from this general idea, a belief cannot be viewed in isolation from the beliefs that are related to this – or, at least, to separate beliefs atomically from the context on which they depend entail a qualification and alternation of the estimation of the belief. This hierarchical, non-atomic, and relational conceptualisation of beliefs links to the notion that beliefs might incommensurable with other beliefs such that two beliefs might not be directly comparable despite pertaining to the same issue (e.g. economic versus ethical concerns of the effect of a policy, see e.g. Kock, 2009). For instance, consider a policy concerning economic growth versus ethical considerations. Proponents and opponents of the policy might well agree of the likelihood that a given consequence of the economic policy is likely to occur if the policy is implemented, and of the likelihood of undesirable ethical entailments of the policy. However, despite agreeing on the probabilistic content, different humans might value these economic and ethical consequences differently depending on the hierarchy of beliefs (whether economic growth is more important then ethical considerations, for instance). Further, the conclusions drawn from economic and ethical premises might yield different conclusions despite being argued rationally given the fact that the premises from which they spring might be different. As such, the conclusions are incommensurable. In this way, the beliefs are relational and relative (indeed, decision-by-sampling studies lend support to this notion, see Stewart et al., 2006) as well as potentially incommensurable. In relating to the previous local-global assumptions, the premises of the thesis hypothesises that humans first and foremost are attentive to local consistency and only potentially global (depending on a range of factors such as cognitive effort, intelligence, reasoning capabilities, cultural background etc.).

Following from the assumptions and arguments produced in this section, the aim of reasoning and mutatis mutandis the aim of persuasion processing is understood in a clearer light as to what it entails for the theory and model presented in the thesis. Rather than a mechanism to appreciate global consistency across a multifaceted and multivariate system of beliefs, persuadees are thought to approach acts

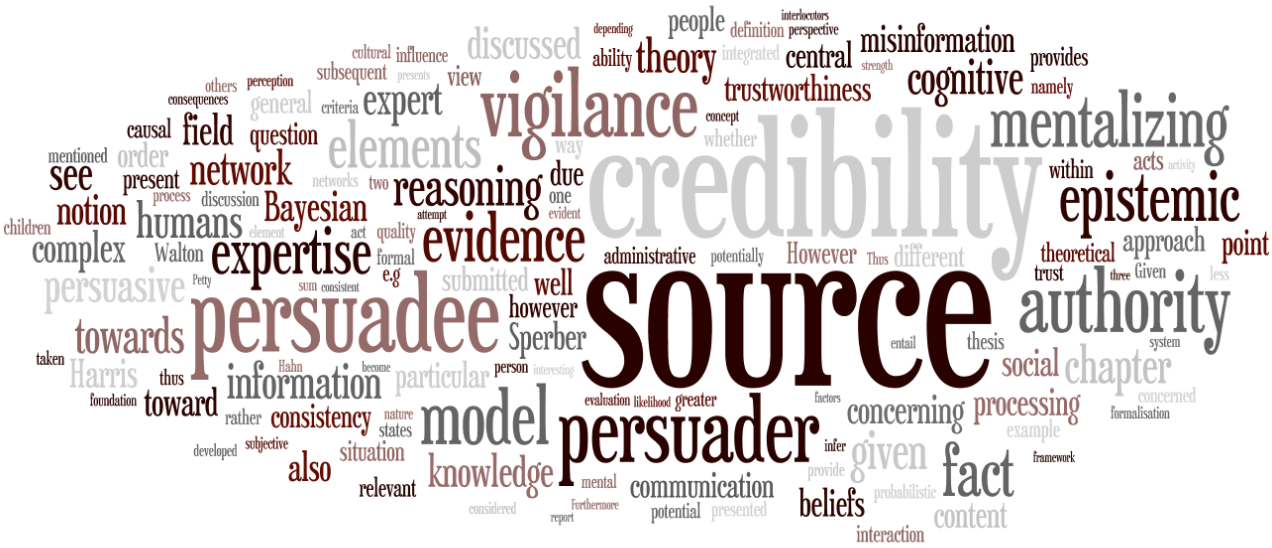
of persuasion as a local phenomenon in which they estimate the probabilistic strength of the content, the credibility of the source, and the validity of the reasoning. The model presented in the thesis is concerned with this immediate and instantaneous assessment. This, however, does not exclude the importance of socio-economic background, cultural influences, and personal history. As discussed in 6.2, 7.2, and 7.3, these are integral elements in describing a more in-depth account of the trajectories that lead to the assessment of the persuasive attempt in the moment as well as coping strategies[95]. Reasoning, then, is the vehicle through which the persuadee attempts to optimize local and potentially global consistency by considering the evidence in relation to what she believes. This is not a logical exercise, but rather a probabilistic approximation as the one described in 2.3.

Summary Branching over the second chapter, several points of discussion emerge to push forward a theory of persuasion. Firstly, the normative frameworks based on indefeasible, monotonic logic such as they are employed (or suggested) in several theories of persuasion seem inadequate in dealing with the epistemological complexity of reasoning that departs from the rigorous standards of a formal logical model. Rather, a probabilistic point of view seems more compatible epistemologically, empirically and theoretically with the definition of persuasion presented in 1.8 given that this emphasises persuasion as an interactive, subjective, and contextual phenomenon. Thirdly, Bayesian inference is suggested as a particular model of uncertain reasoning in order to deal with the uncertain evidence presented in acts of persuasion. The Bayesian model, however, is not without limitations and should be construed as an important element rather than the whole story. That is, given the potential limitations of Bayesian inference from the point of view of computational complexity, temporal and narrative effects, and unanswered questions, the thesis will subsequently look beyond a pure Bayesian model and toward a model of persuasion constructed on a dynamic and interactive foundation. Finally, it is assumed that humans strive for local consistency. Despite the fact that Bayesian reasoning may invoke mathematically stringent global consistencies, this seems cognitively infeasible on a global level, as it would require

[95] Indeed, given the differences in socio-economic background, cultural upbringing, level of education and other such factors, we should expect, even from just a reasoning perspective, the same act of persuasion to carry with it significantly different assessments from different people. Interestingly, this brings the notion of time-scales to a focal point of a theory of persuasion.

massive fact and error-checks every time new information enters the system. Rather, as a baseline assumption, humans firstly strive for local consistency *in* the moment and secondly (if possible and given the amount of cognitive investment and capability) on a global, systemic level. This distinction between local and global puts the cognitive effort in perspective as humans in this view are not required to be perfect reasoners. That is, local beliefs are placed as a fundamental theoretical assumption underlying the theory of persuasion developed in the thesis. Compared with global beliefs, local beliefs assume that humans are geared towards optimization of consistency in a limited temporal scope with the possibility of a more global consistency across beliefs. The former, however, requires more cognitive effort than the latter, which is why local beliefs are assumed to be the point of departure in terms of evaluations of the quality of persuasive attempts.

Chapter 3: Interpreting the persuader



The ultimate authority must always rest with the individual's own reason and critical analysis

Dalai Lama

Believe those who are seeking the truth. Doubt those who find it

André Gide

This chapter presents the theoretical approach of the thesis with regard to the interpretation of the persuader. Initially, I revisit the epistemological relationship between persuader and persuadee and introduce the notion of vigilance toward misinformation, as taken from Sperber et al (2010). Following the presentation of how vigilance is incorporated in the theoretical framework of the thesis, I discuss two conceptualisations of mentalizing (simulation-theory and theory-theory) since these has been suggested as a central cognitive capability to infer beliefs, wishes, and intentions of other people as well as a foundational aspect of communication as a metarepresentational function (e.g. Sperber & Wilson, 1995). The discussion is then taken further towards source credibility, as this is a central element both in persuasion literature since the Ancient Greeks and as a central element in the SPIMP developed in the thesis. Finally, the conceptualisation *and* formalisation of source credibility in the SPIMP model is presented.

The importance of source credibility in argumentation in general and persuasion in particular is no new idea. As far back as ancient Greece, Aristotle (1995a) mentions in *Rhetoric* ethos (the character of the speaker) as one of three essential persuasive appeals (alongside logos (reasoning) and pathos (short, inflamed emotional outbursts)). It is important to note that in persuasive situations other humans constantly surround us. We are inherently social, and a growing body of theoretical and empirical evidence suggests that reasoning, rather than serving solipsistic information processing, is geared towards argumentation with others (Mercier & Sperber, 2011; Oaksford, 2011; Mercier & Landemore, 2012)[96]. Further, evidence from language studies (e.g. Steffensen, 2013) shows that humans make use of one another in order to manage communicative situations. Taken together, then, reasoning *and* communication inherently relies on interactions with others rather than a reliance on the individual's capability of reasoning *without* others. Taking our point of departure in this realization, persuasion, as a special type of interaction, also becomes inherently social, and the persuadee consequently has to acknowledge and interpret the persuader in order to navigate the persuasive situation and evaluate the quality of the persuasive attempt. The

[96] Oaksford (2011) agrees with Mercier and Sperber in that reasoning is social and argumentative, and expands upon this by introducing the Bayesian qualification of argument strength already discussed in 2.4. That is, the framework for persuasion developed agrees with both these contentions: that persuasion is inherently social and that it relies on probabilistic, uncertain reasoning.

chapter focuses on central elements involved in interpreting the persuader as well as a concrete model describing, from a probabilistic perspective, how humans deal with source credibility.

As noted previously, we live in an epistemologically uncertain reality, and the plausibility of beliefs may constantly shift. In other words, information is uncertain from an epistemological point of view. Furthermore, the benefits of communication, as pointed out in Sperber (2000), rely on the fact that we might obtain information from others that we would not be able to ascertain ourselves. In this way, humans need to engage with others in order to share and gain information. That is, of the amount of information that any given human being contains, much of it will come from other human beings in form of information about history, scientific explorations, everyday conversation and so forth. Given this benefit of communication and information negotiation, persuasion becomes a central aspect of human social existence, as humans are able to strategically push each other's beliefs. To reap the great benefits of communication, there has to be some degree of trust between the interlocutors such that the information presented by the persuader is taken to be more or less reliable. However, as Sperber et al. (2010) discuss, the communication picture is not always beneficial. One specific danger of communication in general and persuasion in particular is the potential of being misinformed and deceived such that the persuadee alters her beliefs to something that seems more likely to her, but is less likely in reality (e.g. believing that the 1969 moon landing was fake despite overwhelming evidence to the contrary). This can occur when the persuader is malicious or has deceptive aims that differ from those of the persuadee. In this way, the persuadee's interpretation of the persuader from the point of view of perceived expertise and trustworthiness become central elements of approaching acts of persuasion.

Invoking Bayesian inferences in particular, and probabilistic reasoning in general, as the underlying model of reasoning, the subjective and contextual nature of processing persuasion becomes apparent. Investigations in social psychology strongly suggest that humans are susceptible to their immediate environment both in terms of what other people do (Cialdini, 2007) and how their choices are framed (the so-called choice architecture) (Thaler & Sunstein, 2008). There is an important element of defining persuasion lurking here since the social context, interactions with others, and

the physical context might well alter the behaviour of the persuadee. That is, the influence of others as well as the environment is capable of changing the way we act and possibly also of affecting our beliefs. As discussed in 1.8, this constitutes influence since behaviour can be altered in a variety of ways that need not necessarily involve change in beliefs (for instance, coercion, suggestive contexts, following the acts of others, etc.). The definition of persuasion offered in the first chapter is concerned with the change in beliefs, which may or may not entail changes in behaviour. Thus, the evidence cited in Cialdini (2007) and Thaler and Sunstein (2008) is concerned with influence, not persuasion. However, these influences also have the potential of changing the beliefs of the persuadee. Indeed, given the assumptions from Hood (2012) concerning the importance of interactions, the socio-cultural upbringing, etc. on beliefs it would be contradictory to suggest that social interactions and the environment only affect behaviour and thus functions as influence. In other words, the premises of the thesis fully acknowledge that social interactions and the context has the capability to change beliefs and thus function as a *type* of persuasion. However, the thesis explores verbal persuasion between two individuals. Therefore, the potential belief changes stemming from socio-contextual factors, though essential in describing the conceptualisation of subjectivity, is another type of persuasion than the one investigated here. Nonetheless, it remains an incredibly interesting topic and future research should explore the relationship between persuasive utterance (as explored here), persuasive social interaction (on beliefs, not necessarily behaviour), and the persuasive potential of the environment (also, focussing on changes in beliefs).

As mentioned in 2.3.1, this indicates the remits of the subjective element of the probabilistic estimations. That is, the estimations *are* personal and subjective springing from states of knowledge and beliefs, but, as evident from social psychology and nudging studies, the estimation does not happen in isolation from others. Rather, the frame from which the subjective estimation is possible relies on the presence of the other interlocutor. The notion of interaction and immersion will be discussed further in chapters 5 and 6, as the focus of the present chapter is concerned with discussing the notions of vigilance, motives, and source credibility as central concepts of persuasion processing. In particular, I argue that vigilance toward misinformation is a crucial element in the persuasive situation due to the inherent risk of deception in persuasion.

The concept of vigilance, as discussed in 3.1, is motivated by the perception of persuasive motives such that the same person might yield different estimations of credibility and expertise and beckon different levels of cognitive effort in the form of vigilance depending on the situation. In 3.2 the discussion of mentalizing offers a more in-depth understanding of how the capability to infer beliefs, wishes, and intentions of other people affects vigilance as well as source credibility in general. Finally, 3.3 and 3.4 outline how trustworthiness and expertise constitute the credibility of the source from a probabilistic perspective in line with Harris et al. (submitted). The formalisation presented is an attempt to integrate on a conceptual level the definitions of uncertain reasoning from the previous chapter.

3.1. Persuader and persuadee: Vigilance toward misinformation

Sperber rightly points to the immense benefits of social interaction and human communication. He argues that instead "…of being restricted in one's knowledge to the products of one's own experiences and thinking, communication makes experience and thinking available by proxy" (Sperber, 2000, see also Sperber, 2001). However, this beneficial phenomenon entails certain vulnerabilities since being open to new information that the person has not experienced herself makes her open to misinformation. This does not entail that humans lie frequently, however, as compared with honest communication in everyday conversation. A diary report by DePaulo et al. (1998) report that college students on average lie only 1.96 times per day (see table 2, p. 984, see also O'sullivan et al., 1988). This low level compared to the amount of times students are honest makes sense given the proclivity to lie is tied to situations in which one interlocutor has something particular to gain rather than, say, misinforming a stranger as to what time it is. Thus, in most situations, humans should thus expect their interlocutor to be honest (e.g. when asking a stranger for the time). If lying was more prevalent, we should expect a rapid breakdown of communication due to a high likelihood of misinformation. However, when approaching other humans, we need to keep the potential in mind that they may have the intention to misinform us. Nonetheless, given the pervasiveness of communication, it may be assumed that people in general are well equipped to evaluate the source of information such that communication becomes overall beneficial (Sperber, 2001; Bergstrom et al., 2006). If

they were not, communication would be non-productive and would soon come to a grinding halt. Sperber's (2000) argument for the necessary benefits of communication in general can, mutatis mutandis, be made for persuasion.

As Sperber et al (2010) remark, the problem with communication is often not concerned with the competence of the speakers, but with honesty and diverging intentions. Communication and persuasion, as discussed in 1.3, needs the perception of intentionality when conveying information (recall the example with the child and cookie jar in which the communication was only conceptualised as persuasive if both interlocutors acknowledged the persuasive intention of the child). Without an intention to engage in a persuasive setting, beliefs may be altered, but in this framework they are not altered due to persuasion unless (at least one of) the interlocutors are aware (to some extent) of the fact that they are engaged in a persuasive situation. The potentially diverging aims of the persuadee and persuader thus become central to the interactive situation in which the persuasion takes place. In acts of persuasion, DePaulo's data may potentially be an underestimation since persuasion represents a particular type of communication in which the potential difference in aims between interlocutors might cause the persuader to lie, deceive and misrepresent information more frequently than in vernacular conversation (e.g. the difference between selling a car and telling the time to a stranger). Persuaders, as previously mentioned, cannot expect to entertain the same aims as the persuadee, and persuasion may be antagonistic and manipulative. Furthermore, as remarked in 1.5, persuasion, in a goal-oriented manner, cannot be equated with alignment and consensus due to the potential different aims of the persuader and the persuadee[97]. As a direct consequence of this, we may expect acts of persuasion to invite more vigilance towards misinformation on the part of the persuadee

[97] As a baseline assumption, however, I expect that most instances of persuasion will still involve benevolent intentions (such as everyday arguments, political discussions, scientific debates and so on where interlocutors *do* try and persuade one another, but from benevolent intentions). I assume this firstly because of the vast pervasiveness of persuasion and the societal benefits of these and secondly due to the fact that if persuasion were mainly manipulative and deceptive, interlocutors should opt out of these situations as soon as they realize that are in a persuasive situation. However, this is not the case, and consequently I assume that the amount of lies may be greater than in everyday conversation, but not so great as to undermine the general aim of persuasive efforts such that it benefits both persuader and persuadee.

since she can be taken to be aware of the potential deceptive element involved in persuasion[98].

The tendency to vigilance is increased due to the epistemological uncertainty of the world in general and in acts of persuasion in particular. DeRose (1992) expands upon this by introducing the notion of epistemic contextualism. This is the notion that standards of knowledge and meaning vary across different epistemic states of contexts of communication (De Rose, 1992, see also Origgi, 2008). That is, depending on the situation, the persuadee may require a different weight of evidence in order to be persuaded depending on the possible consequences of misinformation. In other words, the same information pertaining to the same issue may be evaluated very differently depending on the potential outcomes of acceptance. Origgi (2008) provides an example concerning the existence of weapons of mass destruction in Iraq where the epistemic nature of such a question is less pressing at a dinner table than if the same contention is uttered in a political context. Hearers in the latter would naturally assert more vigilance toward misinformation whereas the same hearer might not bother to think too much about the issue in the former situation. That is, hearers "…adjust [their] interpretations according not only to [their] pragmatic expectations, but also to [their] epistemic needs" (Origgi, 2008, p. 41). Here, I take epistemic needs to refer to the epistemological considerations *for* the persuadee given the persuasive situation. That is, the directedness of her intentionality towards consistency (as discussed in 2.5) and the persuasive aim of obtaining likely beliefs (as discussed in 1.4)[99]. This relates to the notion that humans may invest a varying degree of cognitive effort in being vigilant towards misinformation depending on potential future outcomes (Evans, 2003, see also 7.4)[100]. So, to sum up, the present thesis assumes vigilance because divergent aims, epistemological uncertainty, and the potential of misrepresentation in the situation.

In order to describe the differences in interpretations that spring from the varying epistemic needs, Sperber et al (2010) presents the notion of epistemic vigilance, which is "…targeted at the risk of being misinformed by others" (p. 359). Epistemic

[98] Like with previous distinctions, this naturally is a gradient distinction since some persuasive incidents would involve little cause for epistemic vigilance (e.g. a teacher trying to change the beliefs of her students).
[99] The intentionality stance is further discussed in 6.1
[100] Note, however, that the account developed here does not entail a dual-process mechanism despite referencing Evans. This will be discussed later in the thesis.

vigilance, then, is aimed at describing the degree of trust or distrust you invest in a person, the content, or the reasoning. Vigilance toward misinformation has been applied to a range of topics ranging from children's attitudes towards deception (Mascaro & Sperber, 2009), consumers' persuasion knowledge in the PKM (Kirmani & Zhu, 2007) as well as general epistemic vigilance towards misinformation and deception (Sperber et al., 2010). Notice, however, that vigilance is not the opposite of trust; it is the opposite of blind trust (Yamagishi, 2001). That is, given trust, the persuadee may accept *some* of the proposed statements; given blind trust the persuadee would accept *all* statements. In formal terms, epistemic vigilance is the negation of a universal quantifier of trust ($\neg\forall$), rather than a negation of the existential quantifier ($\neg\exists$). As such, epistemic vigilance exists on a gradient scale of trust in which the persuadee may invest more or less energy in examining the act of persuasion. By invoking a potentially gradient scale of vigilance, we may assume that the persuadee may invest a gradient amount of cognitive effort such that more vigilance requires a greater effort. Sperber et al. (2010) hint at this by reminding the reader that "…if you happen to hear a comment on the radio about a competition in some sport you neither know nor care about, you are unlikely to invest any extra energy in deciding whether or not to believe what you hear" (p. 362). As will be discussed in 7.4, divergence in cognitive effort and divergence in experience may be central elements when accounting for the fact that some people are easier to persuade than others.

In the persuasion situation, there are several elements that the persuadee may be vigilant towards. Some important elements are vigilance toward subjectively estimated source credibility and the content strength of the persuasive attempt. The former is concerned with the interpretation of the persuader, which in the formalisation of source credibility in the SPIMP concerns trust and expertise. As such this aspect of vigilance is the main focus of this chapter. As Oaksford (2011) notes and as discussed in the previous chapter, the conceptualization of argument strength as well as reasoning from uncertain evidence may well be captured in a Bayesian framework. To reiterate from chapter 2, the persuadee makes use of her probabilistic estimations to drive her interpretation and evaluation of the evidence and the reasoning in the act of persuasion. Having already discussed the theoretical considerations for this from a persuasion perspective, I will say little of this here. I will, to provide a thorough theoretical

background for the theory of persuasion developed throughout the thesis, briefly discuss vigilance toward the reasoning in the act of persuasion and how this reinforces the role of formal logic discussed in 2.2, namely that people may well aim for logical consistency, but that this cannot be the psychological underpinning function in describing what humans computationally do (as in Marr's (1982) levels).

Naturally, the way the persuader presents himself is not necessarily honest. This is already observed in rhetorical theory, which bequeaths the rhetor as 'first persona' (see e.g. Black, 1970), meaning that the rhetor may don a mask and present himself in a favourable way to a particular audience. That is, the persuader often presents himself strategically such that it will suit his aims the best. This is hardly surprising, but it does present an extra layer of difficulty when the persuadee has to manage the interaction with the persuader, namely that the persuadee cannot (in any way) be certain that the persuader presents himself in an honest manner. As will be discussed in 3.3, the persuadee's attitude towards the source may be broken down into a variety of elements including amount of expertise on the subject, the perception of how benevolent/malevolent the persuader is, and the perception of his qualities from an ethical perspective. The particular variables considered in the present formalisation of how the persuadee deals with source credibility in a persuasive situation are trustworthiness and expertise. Source credibility, alongside he subjective estimation of content strength, is the central element of the SPIMP. Extraneous elements such as authority, height, and attractiveness might also play a part in our perception of our interlocutors, and consequently the present conceptualisation concerning source credibility lodges in a larger discussion concerning source credibility that also takes into account these extraneous variables and explores how they influence trustworthiness and expertise. The relationship between the central elements of the model and modifying factors (such as extraneous variables, the interaction with others, and emotion states) should be further explored in future research in order to sharpen, test, and expand upon the SPIMP. Given these elements of the perception of the persuader, the persuadee may be more or less inclined to believe him[101]. For instance, if the persuadee believes the

[101] As with reasoning in general, bear in mind that the perception of the persuader is taken to be inherently subjective such that two people may entertain vastly different opinions about the speaker. The model presented in 3.3 takes this into account in the same way that differences in the perception of probabilistic estimations of argument strength is taken into account in the Bayesian framework: different

speaker to be an expert in the given topic, but simultaneously believes that he is malevolent, both traits will feature in a complex causal network that describes how we approach source characteristics. As discussed in 6.3 and 7.4, whether we focus on particular elements of source credibility is a matter of persuasive presence, cognitive effort, and cognitive limitations, which will subsequently influence the ultimate evaluation of the persuasion attempt.

Vigilance towards the quality of reasoning may be seen as tied to a somewhat larger reasoning perspective, namely consistency (see 2.5 for a discussion as to why consistency in the present framework is assumed to be geared towards local rather than global consistency). In the persuasive situation, there are at least two types of consistencies that are essential. One is the consistency of the evidence provided by the persuader. That is, when presenting the evidence, the persuader might provide contradictory evidence. This should naturally decrease the persuasiveness of the attempt, as the intentionality of the persuadee is assumed to be directed towards consistency. The second, and conceptually trickier, type of consistency is the consistency of beliefs of the persuadee compared with the persuasive attempt. The reason for the increased complexity is due to the fact that this type of consistency is tied to the persuasive aims of both interlocutors. In the one hand, it is assumed the intentionality of the persuadee is directed towards consistency such that she aims to ascertain as credible and grounded beliefs as possible. As such, evidence that is consistent with what is (locally) credible according to her prior beliefs should be more persuasive. However, the persuader is assumed to know the persuasive aim of the persuadee, which entails that he should direct his evidence such that it seems maximally consistent and persuasive. Thus, this type of consistency between the evidence and the prior beliefs of the persuadee is complex since it adheres to both aims of the interlocutors in a potentially deceptive situation. Throughout the chapter, I argue that the perceived persuasive motives (whether or not the persuader aims to deceive or inform) and the credibility of the source (as formalised from trustworthiness and expertise in 3.3) influences the amount of cognitive effort invested in being epistemically vigilant, as discussed in this section. In other words, evidence-persuadee consistency represents a challenging phenomenon, which is influenced heavily by

estimations of the speaker yields different posteriors given the fact that they skew the perception of the acts of persuasion differently.

interactions and the context since it features in both interlocutors' aims in a potentially antagonistic situation. The exploration of source credibility and vigilance in the following sections of the chapter is concerned with the persuadee-evidence consistency rather than the more simple evidence-based consistency. The concepts of epistemic vigilance, motives, and source credibility are central to discussing evidence-persuadee consistency.

Sperber (2000) coins the term logico-rhetorical ability connected with consistency-checking, which exists "…as a means to filter communicated information, and, on the other hand, as a means to penetrate the filters of others". That is, the persuadee is directed towards consistency of the information presented to her such that greater consistency should yield greater argument strength[102]. As argued in 2.5, consistency in general is a desirable aim for the persuadee given the benefits of a consistent belief system. However, as argued, the consistency-checking first and foremost occurs on a local level. Indeed, global consistency might be an unrealisable aim, since a perfectly consistent global belief system requires full access to all beliefs and enough cognitive effort to cross-reference all beliefs when confronted with novel evidence. Such a (limitless) system containing all knowledge should mathematically yield consistency throughout the system. However, this is cognitively unattainable. Humans are incapable of living up to such standards and the subsequent consequences for global belief consistency due to limited cognitive capabilities, limited knowledge, and limited time. For now, then, it suffices to remind that humans are assumed to be geared towards being locally consistent with their immediately recalled beliefs in the present moment (see also 6.3 for a discussion of presence), and that this primary local focus is an aim for the persuadee: to be as consistent as possible with as well-informed beliefs as possible given that this will entail greater consistency in mental structures, world knowledge, and general performance,

Since epistemic vigilance provides an interesting framework for conceptualizing the epistemic relationship between persuader and persuadee an

[102] Note that consistency in no way is the only argument quality. Thus, a proponent of slavery may take point of departure in certain assumptions and develop a fully consistent argument (we only need to look to history for examples of this). This does not entail that a persuadee should accept the argument due to the fact that the premises may be flawed, other interpretations of evidence may be provided etc. That is, consistency does not necessarily entail persuasion despite the fact that being consistent helps the persuader.

investigating of literature from this field is of central benefit. However, the ontogenesis of epistemic vigilance falls beyond the scope of the thesis. Studies of children's' development have shown interesting aspects of vigilance that may provide an initial picture concerning the question of vigilance toward misinformation. Various authors show that vigilance toward misinformation develops throughout early childhood as children become more capable of critically evaluating the intentions and persuasive strategies of others. For instance, children at the early age of four exhibit traits of vigilance towards deception (Couillard & Woodward, 1999; Mascaro & Sperber, 2009), around the age of seven they seem to acquire beliefs about strategic deception (Beal & Belgrad, 1990; Peskin, 1992), and during adolescence children become more sceptical towards different forms of social communication (Boyes & Chandler, 1992)[103]. Identifying trustworthiness and expertise as the two main factors of source credibility (see 3.3.), it is interesting that children already at the age of three have a propensity to prefer informants who indeed appear competent (Clément et al., 2004) and benevolent (Mascaro & Sperber, 2009), which supports the assumption that these traits are central to evaluation of source credibility already at an early age. Despite this evidence, relatively little is known concerning the offset of vigilance and the knowledge of persuasion strategies (Boush et al., 1994)[104]. Nonetheless, it seems fairly safe to assume that humans gain an increasing amount of knowledge about and vigilance towards deception and deceptive strategies, but that differences remain between individuals in terms of how critical and vigilant they are capable of being (incidentally, this is in line with the predictions of the Persuasion Knowledge Model, see Friedstad & Wright, 1994, 1995, since greater knowledge of persuasion strategies should entail that the individual is better equipped to critically assess persuasive attempts).

In sum, the three types of vigilance central to persuasion theory (content, reasoning, and source) may readily be integrated in the framework suggested in this thesis. Firstly, in terms of content, probabilistic reasoning is invoked such that the vigilance toward misinformation should be captured by the subjective element of

[103] For a review of developmental literature on vigilance towards misinformation and persuasion strategies, see Heyman (2008), but also Friestad & Wright (1994), pp. 6-8; Sperber et al. (2010), pp. 371-374.

[104] The illusiveness of pinning down the developmental ability to cope with persuasion attempts may to some extent be due to the fact that children are exposed to increasingly varying education, cultures, etc. as they grow up, which would facilitate differences in coping mechanisms, see 7.4

probabilistic estimations. That is, given vigilance toward a piece of evidence, we should expect the probabilistic estimation to be lower. This may materialize either as vigilance stemming from the persuadee's priors or from her estimation of the likelihood of the given piece of evidence. If she is highly vigilant towards misinformation, the subsequent posterior should therefore be lower. It remains an open question how this vigilance develops and materializes throughout life, but given vigilance toward evidence, the present model expects lower estimates of either priors of likelihood.

Essentially, the notion of vigilance is intimately connected with the perception of motives. The concept of motives underlies the necessity of vigilance and frames the credibility of the source, and, as such, it is a central element to conceptually describe persuasion processing. Notably, I do not assume that the persuadee necessarily has a conscious and reflected perception of the motives of the persuader (this links to the use of the concept of mentalizing as discussed in 3.2). However, as noted in 1.3, the type of persuasion discussed in the thesis is one in which both interlocutors acknowledge the persuasive intention. As such, I assume that the motive of persuasion is recognised in the situation. However, there might be supplementary motives accompanying the persuasive intention (such as the motive to earn money, deceive, pick up, etc.), and these might not be recognised in the situation. However, in navigating a persuasive situation effectively (i.e. avoiding deception), a greater appreciation of the motives should facilitate a greater awareness of when vigilance towards misinformation is necessary.

Importantly, the perception of motives and the potential ramifications for persuasion processing mechanisms are influenced by context and topic. To exemplify the context- and topic-dependency of the perception of motives and the consequence for the potential evocation of vigilance, consider a car salesman. A person might converse with the salesman in a situation in which the salesman tells the person about the well-being of his petunias. Here, there is no immediate perception of a persuasive, or deceptive, motive, as an everyday conversation regarding flowers is epistemically 'safe'. This, however, can be considered an information transmission rather than a persuasive situation given the potential lack of persuasive intention. More closely related, the same salesman might engage in a political debate with a clear persuasive intention, recognised by the interlocutor. Again, the interlocutor might not attribute any

particular motive to the salesman (other than a desire to triumph in discussion or to persuade the interlocutor of a particular belief) since the salesman does not stand to gain a particular boon by persuading the persuadee. Conversely, the same salesman might inform a costumer about the performance of a particular car in a sales situation. Here, the persuadee might rightly expect an accompanying motive of profit to the persuasive intention and consequently we might expect vigilance toward misinformation to be activated to a higher degree. Thus, the notion of motive, as an underlying factor for vigilance, is context- and topic-dependent. Furthermore, the perception of an antagonistic motive, alongside facilitating higher degree of vigilance, might also influence the perception of trust-worthiness.

Secondly, I approach vigilance toward reasoning from two angles. Firstly, as discussed in 2.4, Bayesian argumentation theory provides clear predictions concerning the validity of practical argumentation that are supported empirically. In this way, subjective probabilistic reasoning provides the computational background for conceptualizing vigilance toward the quality of reasoning in the act of persuasion. Secondly and underpinning this, it is assumed that humans generally are geared towards being consistent with themselves from a logico-rhetorical (as described by Sperber, 2000) perspective in order to function as optimally as possible. Recall here, that there is a distinction between global consistency as a goal and local consistency as an achievable aim. I assume that humans are directed towards being consistent, but that they often find themselves faced with cognitive limitations, contradictory beliefs, and normatively flawed reasoning due to a lack of ability to be consistent[105].

Finally, Vigilance toward the source is the focus of both 3.2 and 3.3, but as a preliminary remark it is worth noting that a similar relationship should take place such that a source estimated to be incompetent, containing undesirable character traits, or malicious should yield lower posterior outcomes. In 3.3, I formalize the notion of source credibility and integrate it in a complex, causal model in order to provide a snippet of the picture.

[105] I speculate that this inconsistency may stem from a range of influences such as cultural background, your upbringing, your mental faculties, your attention, your education etc. To investigate this further would be a very interesting field of research that could potentially discuss differences in how easily humans are manipulated and persuaded.

3.2. Mentalizing

To further approach vigilance, source credibility, and the concept of the psychological other as a central element in processing acts of persuasion, we turn to mentalizing capabilities. Recent developments in psychological literature offer a theoretical description a particular type of cognitive activity humans seem to perform when they interpret the beliefs and actions of other humans. Mentalizing refers to "…our belief that other people have minds different from our own and also to our capability to infer beliefs, wishes, and intentions of other people in order to predict their behaviour…" (Frith, 1992, see also Hooker, 2008)[106]. The concept has been applied to a range of areas such as child development (e.g. Surian, et al., 2007) and marketing (Sujan, 1999; Dietvorst et al., 2009). To support the behavioural evidence, neuroscientific research has further explored mentalizing. The results of the studies suggest that mentalizing is an activity spread over a large area of the brain. Thus, Grèzes et al (2004a; 2004b), Gallagher et al. (2002), and Fletcher et al. (2002) report mentalizing activity in the medial prefrontal cortex (MPFC), Saxe and Wexler (2005) report mentalizing in both left and right temporo-parietal junctions (TPJ) whilst Frith and Frith (2003; 2006) report activity in the temporal pole (TP). Dietvorst et al. (2009) find support for both MPFC and TPJ[107]. The fact that neuroscientific evidence places the mentalizing ability in such a variety of brain regions might indicate that mentalizing can be taken to be a complex, high-level ability that might be activated in a plethora of social and interactive situations (hence the difference in activation of ROIs).

Mentalizing can be phrased as two different psychological concepts, namely theory-theory (TT) and simulation-theory (ST). This will be discussed later, but refers to whether or not a high-level propositional theory is necessary for mentalizing or not. As will be evident from the subsequent discussion, the stance taken here argues that humans have the *capability* to infer complex mental states in a propositional manner (e.g. "I think he is lying"), but that the mentalizing process involved in persuasion does not need to be conscious. As such, the acknowledgement of the fact that the interlocutor has different knowledge, intentions, and motivations, a conscious reflection upon this

[106] Mentalizing is similar to Theory of Mind (ToM), which "…refers to the capacity to interpret, predict, and explain the behaviour of others in terms of their underlying mental states" (Scholl & Leslie, 1999, p. 132, see also Leslie, 1987; 1994; Fodor, 1992).
[107] For a review of neuroscientific research in social cognition see Frith & Frith (2008). For a general introduction to neuroscientific research, see Ward (2006).

fact is not necessarily involved in persuasion processing. As noted regarding the role of motives, the recognition of the persuasive intention is necessary, but more complex inferences of motives are not *necessary*, although they might be very useful for the persuadee. Note also that high-level metarepresentational and propositional mechanisms face serious challenges in functioning as the baseline for cognitive mechanisms such as persuasion processing (see Madsen et al., in prep). Thus, despite the *potential* involvement in persuasion processing, high-level TT mentalizing from a theoretical and empirical point of view cannot be the foundation of reasoning and communication (this concerns metarepresentational constructs in general. The argument against these as foundation cognitive mechanisms is developed in 4.2. The argument for the limitations of mentalizing follows mutatis mutandis, as mentalizing can be construed as a specialised form of metarepresentation). Given the prevalence of the concept in various disciplines with a number of practical applications alongside the neuroscientific evidence, it seems safe, though, to assume that humans are able to perform mentalizing activities, even though such a cognitive function might be high-level rather than cognitively foundational. That is, human beings are able to guesstimate the mental states of other people given gradient cognitive investment. However, as argued in 5.3, some interaction with the other *is* necessary in reasoning and communication (and consequently in persuasion), but that this might be better approached foundationally from a mechanistic perspective. Indeed, as evident from the Sally-Anne tests (Wimmer & Perner, 1983; Baron-Cohen et al., 1985)[108], the sense of the other is fundamental to reasoning and interaction, as humans are able to distinguish between the type of knowledge entertained by different people as opposed to their own knowledge structures (such that for example I reliably can infer that the meteorologist knows more about weather conditions than I do myself). As will be evident from 3.3, such differences in knowledge (or: expertise) play a major role in defining source credibility in persuasive settings.

[108] The Sally-Anne test is briefly that the child watches two dolls play with an object. Following the game, they place the object in a container and one doll is removed. The remaining doll then plays with the object again and places it in a different container. After this, the removed doll is reintroduced and the child is asked where she will look if she wants to play with the object. To answer correctly, the child has to be able to sustain the knowledge that the remove doll has less information. Thus, if the child is unable to mentalize, it thinks the removed doll has the same information as itself and will look in the new box. Elder children, however, are able to say that the removed doll will look in the now empty container. Incidentally, autistic people have difficulty with this, indicating their difficulty with mentalizing and consequently with navigating social situations (White et al., 2009).

The beneficial aspects of including mentalizing in an integrated theory of persuasion lie in the fact that the persuadee conceptually needs a cognitive mechanism to guide her perception of the persuader given the assumption that persuasion is interactive and contextual. Given the volatile and potentially antagonistic nature of persuasion, the ability to form an impression of the other interlocutor is essential for both the persuader and the persuadee. From the persuadee's perspective, every persuasive situation carries with it the presumption that there might be differences in aims between her and the persuader – as discussed in the previous section pertaining to epistemic vigilance. In order to navigate more effectively, she consequently needs to entertain a notion of these differences, and here mentalizing offers an interesting account of the type of high-level cognitive activity that may occur[109]. By inferring the mental states and differences in knowledge, the persuadee may more successfully be epistemically vigilant toward misinformation. For the persuader, on the other hand, the story is inverted. In order to circumvent the epistemic vigilance (in antagonistic situations), he may proffer from having an idea of his interlocutor. That is, without such awareness, the persuader would find strategic communication difficult (or downright impossible) to deceive and manipulate. Conversely, in beneficial situations, the persuader needs some approximation of shared knowledge in order to be informative. In sum, some form of mentalizing, or at least the concept of the other, is necessarily involved in persuasive settings both from the point of view of the persuader and the persuadee. To further this conceptual discussion, 3.3 formalizes source credibility as an evaluation of source credibility concerning expertise and trustworthiness as central elements that the persuadee has to (consciously or unconsciously) infer.

From a conceptual point of view, mentalizing defined in the above as "…our capability to infer beliefs, wishes, and intentions of other people" (Frith, 1992) is a related, but more narrow concept in comparison with the concept of empathy[110]. In

[109] As before, I stress that mentalizing varies on a gradient scale of effort such that the persuadee may invest a lot of energy in trying to interpret and understand the persuader, but she might also invest next to no cognitive effort. For instance, imagine the difference between the efforts exerted that a text message might invoke. If a teenager in love receives one message, she may spend hours considering the intentions and beliefs underlying the message whereas if the same message were sent several months into a relationship, less cognitive effort would be exerted.

[110] Mentalizing has also been proposed as a foundation for empathy (see Hodges & Klein, 2001, pp. 438-440 for a review of definitions, see also, Hooker et al., 2008; Schnell et al., 2011; Shamay-Tsoory, 2011), which is a quality that might be important in persuasion processing given the potential influence of emotion states on probabilistic estimations. Note, however, that persuasion processing *at its most basic*

order to ascertain a closer terminological exploration of mentalizing and its role in persuasion processing, it is necessary to further explore the concept. Two main descriptions of mentalizing has been put forth, namely theory-theory version (TT, see e.g. Gopnik, 2008)[111] and a simulation-theory version (ST, e.g. Gallese, 2001, see Zahavi, 2011b, for a discussion of simulation theory and subjectivity). TT refers to a type of mentalizing in which the person has in mind a theory on a propositional level of the interlocutor. ST, on the other hand, does not assume a propositional theory, but rather a simulated experience from which the person infers the mental states of the other (for a presentation of this, see Gallagher & Zahavi, 2008; Zahavi, 2011b)[112]. That is, TT is concerned with a mental inference concerning the mental states of someone else. This is indicated well by the fact that the approach is described as a theory of the mental states of the other. ST, on the other hand, is empathetic in nature in the sense that it presupposes that humans not only infer and hypothesise about the mental states of others, but also that they engage with these in a way such that they feel these themselves. Traditionally, these approaches have been theoretically separate. However, recent discussions in the philosophy of phenomenology suggest that the separation may not be as clean as previously thought (see e.g. Gallagher & Zahavi, 2008). That is, at a basic level, ST provides a simple mechanism for emulating and appreciating the feelings and thoughts of others without necessarily involving a direct propositionally expressible mental theory of the other. However, given the cognitive cost of mentalizing, it would be unsurprising if more investment *could* in fact yield more complex and conscious inferences such as posited in the TT. In this way, TT is merely an extension of a more basic ST mentalizing ability. As such, the basic concept of mentalizing invoked here as a fundamental element of persuasion processing need not be propositional or metarepresentational (as in TT), but can spring from an engagement with the interlocutor. It might be hypothesised that some form of mentalizing could function as the cognitive foundation for inferring the motives of the interlocutor. That

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does not require empathy from a TT perspective (although whether or not empathy in a simple ST manner is required to conceptualise the other remains unclear). Rather, persuasion processing requires subjective estimations of content strength and source credibility. But subjectivity, as discussed in part II, is framed by a psychological framework (see table 7), which necessarily involves the context, the socio-cultural, *and* the other interlocutor.

[111] Zahavi (2007) further argues that Dennett's concept of subjectivity and mind is akin to a theory-theory, see p. 23

[112] For a general introduction to the notion of theory of other's minds, see Carruthers (2006, pp. 174-186)

is, some form is indeed necessary in inferring the motive since such an inference requires the realisation of different mental states of the other, which is a key feature of mentalizing. In the above car salesman example, the persuadee would have to recognise the fact that the car salesman has different beliefs, access to different knowledge, and potentially has different motives. As such, in order to elicit and infer motives (beyond that of recognising the persuasive intention), some form of mentalizing has to occur. Therefore, it is essential for a theory of persuasion to indicate the cognitive foundation from which it emerges, and here I assume, as a baseline, that mentalizing is interactive (as discussed in chapter 5) and not necessarily propositional, although this higher-level form of mentalizing naturally is possible given more cognitive effort (for instances in cases where the motive is considered to be doubtful, the persuadee might invest more in epistemic vigilance as well as contemplating the motives of the persuader in a more direct fashion)[113].

Despite the evidence for the existence of mentalizing, however, the higher-level version of the concept is difficult to utilise as the foundation for interaction between humans in a persuasive situation. In particular, T-T mentalizing appears to be a high-level cognitive ability that relies on a more basic mechanistic interactivity (for a further discussion on the relationship between higher-level cognitive mechanisms such as metarepresentations and mentalizing and a mechanistic foundation, see chapter 5). That is, the cognitive assumptions underlying mentalizing do not guarantee empathy, coordination and other behavioural aspects necessary for a well-founded approach to interaction[114]. Specifically, some accounts of mentalizing – especially those relying on

[113] Incidentally, the simulation theory might be supported by the recent findings in mirror-like systems, which argue that humans make use of cues from other humans in guiding their perception of these, and that humans, to some extent, cognitively 'mirror' their actions, see Fadiga et al., 1995; Rizzolatti & Craighero, 2004; Iacobini & Dapretto, 2006, for a general introduction to the mirror-neuron hypothesis (see also Gallagher & Zahavi, 2008 for a philosophical account of how this matches with phenomenological approaches to subjectivity). Note, though, that the evidence is merely sketchy support for ST, as the mirror-neuron studies have not, to my knowledge, explored the notion of mentalizing. However, it does indicate that we, to some extent, simulate when understanding the emotions and mental states of others.

[114] It should be made clear that empathy is not a necessary element in persuasion processing, if the phenomenon, as here, is approached from the foundation of a mechanistic interaction (see 5.3). That is, on a fundamental level, empathy is not involved (if understood as a higher-level cognitive function in which the person empathises with the other). If empathy, however, is understood as a mirror-like mechanism through which we inform our perception of others, it might play a part as a fundamental element in conceptualising the other *in* the interactive immersion. This depends on the definition of empathy (as a low- or high-level function)

TT – are extrapolated form theories of metarepresentational capabilities[115]. The incapability of metarepresentational systems to function as the foundational basis of cognition bears relevance for a plethora of theories thought to be fundamental such as pragmatic enrichment and mentalizing, as these might be considered higher-level cognitive functions that are *possible*, but not *necessary* functions when communicating, reasoning, and interacting with others (see 4.2).

By revisiting literature on common knowledge, coordination and joint action in 5.2-5.3, I provide an approach to the other by introducing a mechanistic notion of interaction, which provides a foundation for the interpersonal relationship in persuasion processing. That is, given the evidence (developmental, neuroscientific, as well as anecdotal) it is safe to assume the existence of some form of mentalizing despite the fact that this might not function as the foundational element of interaction of mutual understanding. Some form of mentalizing is clearly a central aspect of persuasion processing such that the persuadee has to acknowledge (on some level) the otherness of the persuader and some qualities of the persuader (such as expertise and benevolence, which will be discussed in 3.3). In this way, mentalizing provides a key element in developing a holistic theory and model of persuasion processing.

In particular, mentalizing is a complex cognitive process, which requires cognitive effort. As a higher-level cognitive mechanism and sophisticated tactic for navigating persuasive attempts by inferring the beliefs of the other, mentalizing is very useful in the process of evaluation of the credibility of the persuader, i.e. the source of the persuasive attempt. However, this is not a necessary cognitive involvement in persuasion. Rather, a simple form of mentalizing is required in order to consciously or unconsciously conceptualise the other (i.e. to acknowledge that others have different minds from our own). In its simple form (acknowledging the cognitive difference of the other), it is required in persuasion processing since the persuadee needs to engage with the proposed belief by interacting with another interlocutor. However, a more complex definition of mentalizing in which the persuadee consciously infers and contemplates the make-up of the beliefs of others is not necessary for persuasion processing. For

[115] The notion of metarepresentations and the limitations of theories extrapolated from this will be discussed further in 4.2-4.4 when discussing the theoretical limitations of relevance theory as a theory of communication. Consequently, the discussion of the limitations of mentalizing is abridged here as many arguments will be similar, mutatis mutandis, in 4.2

example, the SPIMP takes into account the perceived trustworthiness and expertise, which does not necessarily include an idea of the mental states of the other. As such, the persuadee might perform *some* mechanism akin to an ST, but not necessarily a TT function when approaching the other. Finally, as argued in 4,2, higher-level cognitive mechanisms that rely on metarepresentational qualities (such as mentalizing) cannot be the foundational element from which a theory of cognitive behaviour and processing theory can emerge.

3.3. Source credibility[116]

Following, 3.1 and 3.2, it remains clear that the otherness of the persuader is a central element when the persuadee processes acts of persuasion[117]. In particular, by entertaining an idea of the mental states of the other and by engaging in epistemic vigilance, both interlocutors need to interact on some level in order to successfully navigate a persuasive situation. This section presents a specific model for source credibility to further explore the complex process of otherness in persuasion. Historically, source credibility is recognised in rhetoric under the guise of *ethos* (see e.g. McCroskey & Young, 1981; Aristotle, 1995a; see Conley, 1990 for a the use of the concept throughout rhetorical history). As mentioned in 1.1, ethos was split into three distinct sub-categories, namely phronesis (practical wisdom), arête (virtues), and eunoia (goodwill). As will be evident from the definition and formalisation of source credibility in this section relies on an updated, but similar idea of source credibility as being made up of various entities.

Alongside investigations in persuasion and attitude research in social psychology (e.g. Chaiken, 1980; Schum, 1981; Petty & Cacioppo, 1981; Chaiken & Maheswaran, 1994; Briñol & Petty, 2009, for a review see Pornpitakpan, 2004), source credibility has been applied to a range of topics relevant for a theory of persuasion. These include, but are not limited to, advertising (Braunsberger & Munch, 1998), judgement and decision-making (Birnbaum & Mellers, 1983), as a predictive parameter

[116] The content of the present section, though theoretically expanded and distinct, owes much to Harris et al. (submitted) and consequently, there will be similarities between the theoretical proposal here and the one presented in their paper.

[117] Alongside the psychological and philosophical literature on the other mentioned here, it is worth noting that literary and anthropological theory deal with the complex notion of 'otherness', referring to something along the lines of DEFINITION (I am indebted to Ana Baeza Ruiz for pointing me to relevant literature in these disciplines)

for how testimonies *should* be evaluated (Hahn et al., 2012), and in argumentation (Harris et al., submitted)[118]. As Mascaro and Sperber (2009) convincingly argue, the development of the epistemic need to interpret and evaluate other begins early in childhood (see also Harris & Corriveau, 2011, for a review of children's ability to distinguish between reliable and unreliable sources). As mentioned in 3.1, 7-year old children seem to acquire beliefs about strategic deception (Beal & Belgrad, 1990; Peskin, 1992), and adolescent children become increasingly sceptical towards different forms of social communication (Boyes & Chandler, 1992). In other words, the notion and use of trust in social situations seem to stem from childhood, and remains an important capability in various phenomena, as shown by the breadth of the studies cited in the above concerning the psychology of trust and expertise.

To approach a working definition of source credibility for a theory of persuasion processing, Walton (1997, p. 223) in his seminal contribution defines six main criteria for qualifying the relevance and strength of a particular source (see table 4)[119].

Table 4: Walton's (1997) criteria for source credibility

Expertise question	How credible is the source as an expert source?
Field question	Is the source an expert in the field that the issue concerns?
Trustworthiness question	Is the source a personally reliable source?
Opinion question	What did the source assert that implies the conclusion?
Backup evidence questions	Is the source's assertion based on evidence?
Consistency question	Is the conclusion consistent with what other expert sources assert?

Two remarks deserve to be discussed regarding Walton's definition of source credibility. Firstly, there is no mentioning of the motives of the source as a factor in evaluation credibility. For reasons discussed in 3.1, motives seem to be a key element in distinguishing between the credibility of different speakers. Secondly, the boundaries between the criteria are not clearly defined and limited, as the first two criteria overlap significantly (if not entirely). As such, we might question the theoretical validity of Walton's criteria, as they seem to overlap and omit motives as a key factor in source credibility. The criteria of 'expertise' and 'trustworthiness' are incorporated in the

[118] Evidence also suggests that the use of particular language may increase/decrease source credibility, e.g. by using stereotypical representations (Abbate et al., 2004). For a review of the use of expertise and trust in psychological research, see Harris et al. (submitted).
[119] See also Walton (2008b), p. 218

formalization of the source credibility in the present thesis whereas the other criteria mentioned by Walton are incorporated as content elements or supplementary issues.

Eventually, as discussed below, the definition of source credibility in this thesis will hinge upon issues concerning 'expertise' and 'trustworthiness', which conceptually are more clearly teased apart. Given this, a few remarks need to be made concerning Walton's criteria. His first two criteria (expertise and field) are directly applicable to the formal definition of source credibility in the thesis given the fact that 'expertise' (in the formalization) very much reflects whether or not the source can be considered an expert source, but also whether the expertise is within a relevant field. Thus, if debating economic policies, a meteorologist may very well be an expert (in weather conditions), but not an expert in the relevant field (economics). Overall, then, in a debate on economic policies, the meteorologist should *not* be considered an expert given the fact that her field of expertise is something else. Thus, expertise and field underlie the subsequent notion of 'expertise' (in the general model developed in this thesis). To continue, the 'trustworthiness' criterion in Walton's criteria is directly represented in the subsequent model in that the reliability of the source is a major factor in the overall interpretation of the persuader (see conceptualization of trust later in this section). That is, the persuadee may well believe that the persuader is an expert within a relevant field, but retain the notion that he is unreliable or untrustworthy, which consequently will bring down the persuasiveness of his act of persuasion. For instance, on April 27 2010 in the wake of the financial crisis, Lloyd Bankfein (Chairman and CEO of Goldman Sachs) was summoned to defend and explain the dispositions of the bank and the part the firm played in conjuring up the crisis. Bankfein is clearly an expert in a relevant field, but listeners to the inquiry might question the trustworthiness of the statements. That is, in any persuasive attempt, the persuader may present compelling evidence in a field within which he is an expert and still find that the persuadee does not believe him if she believes that he is untrustworthy[120]. Indeed, here the notion of motives resurfaces as important, as Bankfein presumably has a strong motive to avoid censure, which entails low trust in this specific case. However,

[120] Indeed, a lack of trust is particularly damaging for a persuasive attempt given the fact that little trust entails little confidence in the evidence presented so that the entire act of persuasion is stultified given the fact that the persuadee would think the persuader might be lying about the evidence (and potentially his expertise).

importantly, although this motive would often be inferred, it is not a *necessary* component of the persuasive transaction since all that is required for persuasion to occur (from the scope of the present investigation) is for both interlocutors to realise the persuasive intention regardless of other accompanying motives. That being said, motives will most likely feature in most persuasive attempts, as persuadees should be able to recognise ulterior motives and potential differences in aims to some extent. As such, motives might very well become a motivating factor in determining the amount of cognitive effort and epistemic vigilance, but it is not necessarily involved since the persuadee, in principle, could be naïve and fail to realise any accompanying motives above and beyond the persuasive intention.

Thus far, the expertise, field, and trustworthiness question all fall within the subsequent model of source credibility. However, the opinion and backup evidence questions touch on a slightly different nerve as this is concerned with the content of the statements that the source references rather than the evaluation of the source in and of himself. Naturally, producing high quality evidence will eventually increase the perception of the persuader's source credibility, but mainly due to the fact that producing such content (with relevant backup evidence) eventually entails that he is an expert within a relevant field. That is, the quality of the content of the evidence (as conceptualised in 2.4) is concerned with how likely the evidence is rather than how credible the source is *in the moment* (the notion of time in acts of persuasion will be discussed further in 6.4)[121]. Thus, opinion and backup evidence are concerned with the content of the message rather than the credibility of the source. Finally, the consistency question touches upon whether the source agrees or disagrees with other experts within the relevant field. As will be evident from the subsequent model of source credibility, this is readily integrated in the approach as a supplementary issue when interpreting the persuader. In sum, Walton (1997) provides a strong and relevant point of departure for conceptualizing credibility despite the fact that some elements (opinion and backup evidence) are concerned with content rather than with source per se. Nonetheless, it remains that source credibility is a major element of persuasion. To sum up, the criteria

[121] As reiterated throughout the thesis, persuasion cannot be reduced to a single moment in time in which the persuadee and the persuader interact. However, separating source credibility from quality of content conceptually requires the distinction between content and source despite the fact that these will interact with one another over time.

of 'expertise' and 'trustworthiness' are incorporated in the formalization of the source credibility in the present thesis whereas the other criteria mentioned by Walton are incorporated as content elements or supplementary issues.

The reliance on source credibility, however, has been questioned in philosophical literature when examining the highly related concept of authority, which refers to information about the source without relevance for the actual persuasive information and act. As discussed in more detail in this section, authority can be divided into three distinct types of authority, namely epistemic authority (e.g. judges regarding legal issues), administrative authority (e.g. policemen whom you have to follow, not because of expertise, but because of the legal power vested in them), and cultural authority (e.g. Lady Gaga on legal issues who has authority due to popularity, but lacks expertise and administrative authority). The later formalisation of source credibility is concerned with epistemic authorities because it is closely related to expertise as well as trustworthiness and as such, this is the main focus of the remaining of the chapter. However, for the sake of completeness, the following briefly discusses the different types of authority.

Appeal to authority (or *ad verecundiam*) is seen as a general logical fallacy (see e.g. Schopenhauer, 2009) due to the fact that it does not follow logically from a statement that simply because the statement is uttered by an authority, the content is necessarily true. However, I argue that this applies to a sub-set of elements pertaining to source credibility (such as administrative or cultural authority) whilst other elements are perfectly reasonable to consider when processing acts of persuasion (such as epistemic or cognitive authority). Nonetheless, the fact remains that interpreting the other interlocutor is a multifaceted and difficult process that involves a myriad of different elements. As a consequence, the remarks here are preliminary in nature (as indicated in the title of the thesis as well) that point toward future research in order to integrate source credibility with content sensitivity (see 7.2).

Given Walton (1997) and Harris et al. (submitted) we may qualify and expand upon the notion of *ad verecundiam* by exploring the difference between expertise and authority – or more generally, between information about the source,

which is or is not relevant for assessing the quality of an act of persuasion[122]. Harris et al. (submitted) distinguishes between epistemic authority (what Walton (1997) would label as cognitive authority) and administrative authority. Expertise may be conceptualized as the former, which entails that the person possesses "…superior knowledge about a specific field" (Harris et al., submitted). For example, a doctor possesses expert knowledge about medicine and should thus be considered an epistemic authority on the subject of health. Note, however, that expertise is tied to a specific field. Thus, the aforementioned doctor cannot be said to be an expert on high-risk trading[123]. Administrative authority, on the other hand, "…relates to those who have had authority bestowed upon them, and are thus in a position of power" (Ibid.). The example provided by Harris et al is that of a policeman to whom you should adhere concerning the laws of the land despite the fact that the policeman may not be a judicial expert. A crucial difference between the epistemic and the administrative authority is the consequences of disobedience. If I fail to adhere to the law, the administrative may exert upon me legal punishment whereas noncompliance with advice provided by the epistemic authority may result in undesirable consequences (e.g. not following medical advice from the doctor), but it cannot result in legal consequences.

To this definition of two types of authority, one might add yet another type of authority, namely that of a cultural authority (which could theoretically include elements such as attractiveness, social standing, etc. as such factors might potentially be important to persuasion). Whereas the epistemic authority (or, the expert) enjoys a particular standing due to superior knowledge within a specific field and the administrative authority may exert influence due to the fact that power has been bestowed upon them by society, a group of people exert authority despite the fact that no social institution has bestowed any authority upon them. In the case of the administrative authority, the policeman should be adhered to only qua the fact that society (and the judicial and political experts who shaped the laws that the policeman upholds) has signed a social contract deeming him an authority. Compare this with

[122] As will be evident, however, both elements that are and are nor deemed to be relevant for assessing the quality of persuasion are present in any process of assessment (the prevalence and influence of relevant and non-relevant information is discussed more in-depth in 7.4)

[123] In order to further understand the notion of expertise and the reliance on this, it would be interesting to investigate potential spill-over effects of expertise given the fact that some people ask doctors for advice on other than strictly medical issues despite the fact that the doctors are not experts on this per se.

celebrities who, to a large extent, shape the beliefs of those who admire them despite the fact that they are given authority neither by possessing specialist knowledge about political, ethical, or environmental issues nor by a social contract with established society[124]. For instance, celebrities might be asked to comment on a variety of situations in which there are neither experts nor authoritative sources such as the financial crisis, animal welfare, and so on.

In sum, authority may be sub-divided into (at least) three distinct entities, namely epistemic, administrative, and cultural, and this bears serious consequences for the conceptualization and subsequent evaluation of the *ad verecundiam*. This is due to the epistemic fact that information is uncertain, precarious, and difficult to obtain (especially specialist knowledge). For example, to diagnose whether or not you are affected with typhus, requires knowledge that takes years to obtain. Therefore, to rely on the information provided by a medical expert is entirely within the confinements of rational behaviour due to the fact that we cannot all be experts within a field. To adhere to administrative authority may also be considered rational due to the fact that the social consequences for breaking the law may be dire. Finally, though, to follow the advice of a cultural authority, with no epistemic or administrative authority, is the closest instance to *ad verecundiam* as a fallacy given the fact that the information provided by a cultural source should not be considered any more reliable than information provided by a random stranger with no epistemic or administrative authority[125]. The formalisation of source credibility does incorporate epistemic authority since it builds on expertise, and also indirectly cultural authority since being an esteemed person from a cultural group may very well enhance the trustworthiness of this source among members of that group. Administrative authority is not incorporated since this type of authority mainly affects behaviour directly, and is not directed much towards affecting beliefs. The formalisation

[124] This may be qualified a bit, as I fully acknowledge that stardom may be seen as a form of social contract between the celebrity and the rest of society in which celebrities are hoisted to a position of administrative authority *qua* their celebrité. However, this is a qualitative difference from the social contract by which the policeman gains his administrative authority and consequently should be considered, if not absolutely distinct, then different enough to warrant specific commentary. For instance, the issue of legal ramifications differ between the administrative and the cultural authority.

[125] Naturally, these definitions will often blur in real life as some celebrities *do* in fact possess epistemic knowledge, and disobedience with the administrative authorities may be rational for other reasons (for instance in an oppressive and tyrannical regime). The three types of authority, then, should be seen as stereotypical archetypes rather than definite categories.

of source credibility thus relies on expertise and trustworthiness, including authority elements as mentioned.

Throughout the chapter, several points concerning motives, vigilance, and source credibility have emerged to set the tone for a subsequent formalisation of source credibility (as will be presented in the next section). In inferring the persuasive intention and potentially inferring accompanying motives, the persuadee has to recognise that the persuader has different aims, different access to knowledge, and might potentially be deceptive. As such, some basic form of mentalizing is needed since this describes the ability to infer the mental states and knowledge of others. However, as discussed, the type of mentalizing assumed in the thesis is non-propositional and weak in nature since it is not necessarily conscious, despite the fact that the persuadee *can* invest cognitive effort in mentalizing consciously. From this acknowledgement of the persuader, the persuadee infers the persuasive intention and potentially motives, which influence both the amount of epistemic vigilance needed as well as the credibility of the source. The following formalisation of source credibility relies on two factors, namely trustworthiness and expertise, both of which are influenced by motives and epistemic vigilance. Thus, evidence produced in the persuasive attempt might be very persuasive in and of itself, but given the perception of malevolent motives, the final posterior conclusion can be weaker. For instance, in the above car salesman example, the salesman might mention that the car has a low mileage. From a trustworthy source, this would be a good quality and consequently the customer should be more favourably disposed towards the car. However, given the inference of a motive for profit, the posterior should take on a different quality since the trustworthiness of the salesman is low. That is, the strength of the *evidence* remains high, and so does expertise. But trustworthiness might be low, which ultimately yields a lower posterior even though the evidence is consistent with beliefs regarding cars that the persuadee might already entertain. It is important to note that the persuadee might still think the evidence is compelling, but also be reasonably unconvinced given low trustworthiness from the inference of motives and epistemic vigilance. From this example, it seems clear that the perception of trustworthiness and expertise (grounded in the inferred motives, epistemic authority, persuasive intention, and need for epistemic vigilance) are central elements of persuasion processing.

The following section further explores source credibility from the perspective of these elements and formalises them in a Bayesian framework such that the underlying assumptions are in line with the ones for uncertain reasoning presented in 2.4. The formalisation of source credibility does incorporate epistemic authority since it builds on expertise, and also indirectly cultural authority since being an esteemed person from a cultural group may very well enhance the trustworthiness of this source among members of that group. Administrative authority is not incorporated since this type of authority mainly affects behaviour directly, and is not directed much towards affecting beliefs. The formalisation of source credibility thus relies on expertise and trustworthiness, including authority elements as mentioned.

Formalising source credibility

In order to provide a formal framework for conceptualizing persuasion, the following is a formalization of source credibility that can be integrated in the model of persuasion processing to be developed in 7.3. Alongside theoretical benefits from defining source credibility in a more rigorous manner, formalization provides an empirically testable framework that lends credence to persuasion research. Hahn et al (2009) as well as Harris et al. (submitted) provide such a test from a Bayesian perspective that formalises credibility in a complex network (see also, Hahn et al., 2012) and the model presented here is largely taken from these papers[126]. Following Hahn et al (2009) and Harris et al. (submitted), the notation in the following is made clearer by replacing the original Bayesian notation 'e' with 'H_{rep}', which refers to the representation of the hypothesis. A key point here is that H_{rep} is treated as 'data' for the persuadee, which treats utterances as evidence and which uses a standard measure of the strength of evidence as a measure of the persuasiveness of the attempt (see 2.4). One such measure of strength of evidence, given data D, is $Pr(H|D)/Pr(H|\neg D)$[127]. So this is a different approach than ordinarily taken in probability theory in which the probability of H is seen as independent of its representation. In the SPIMP approach developed here it is, however,

[126] For a brief presentation of complex, causal networks, see 3.4

[127] Note that others are possible. For instance, $\log[Pr(D|H)/PrD]] = \log[Pr(H|D)/Pr(H)]$ in which equivalence follows from Bayes' theorem. Alternatively, one can look at the absolute value of $Pr(H|D)-Pr(H)$. The specific method of measurement is less of an issue here, as equivalence follows from Bayes' theorem. For a discussion of measurements, see Fitelson, 2007; Fitelson & Hitchcock, 2011; Crupi et al., 2013

of decisive importance to incorporate how the representation of the hypothesis may affect the strength of the evidence. By doing so, the credibility of the source as discussed above may be evaluated.

Given the likelihood ratio mentioned in 2.4, an argument should thus be more persuasive the greater the value of $\frac{P(Hrep)|H)}{P(Hrep)|\neg H)}$. This follows from the notion that the more reliable the source, the greater the likelihood ratio, which subsequently should yield greater posterior ratings (on Bayesian approaches to source credibility, see Bovens & Hartman, 2003; Corner et al., 2010 as well as the references already cited in the above). The two key factors in formalising source credibility in the approach to persuasion developed here, then, are expertise and trustworthiness. This reflects the insights derived from the importance of source credibility in persuasion from in previous psychological literature (such as the abovementioned Chaiken, 1980; Schum, 1981; Petty & Cacioppo, 1981; Chaiken & Maheswaran, 1994; Briñol & Petty, 2009) and from a rhetorical point of view, the formal model described here reflects Aristotle's notion of *ethos*. As mentioned, Aristotle describes three main elements concerning source credibility in ethos, namely arête (the perceived virtues of the persuader), phronesis (the practical wisdom or competence of the speaker), and eunoia (the goodwill towards the persuadee)[128]. Arête is indirectly featured in the model given the fact that virtues do have an impact on trustworthiness, but in the current approach virtues are taken as an extraneous influence that does not specifically entail whether or not a person is an expert. Indeed, in discussing source credibility, Fiske et al. (2007) identify the latter two as central elements, and the present formalisation is in accordance with this view. In this way, the formal approximation of source credibility is in line with a range of previous studies that investigate or theorize about this phenomenon.

From a mathematical point of view, as mentioned in Harris et al. (submitted, see also Schum, 1981; Hahn et al., 2012), both the influence of expertise and of trustworthiness may be captured in one likelihood ratio, namely $P(H_{rep}|evidence)$ where $P(H_{rep}|H)$ may be found by marginalizing out the conditional probabilities that depend on the evidence by invoking the chain rule for joint probabilities such that

[128] In a later development, McCroskey and colleagues identify specific elements connected to source credibility and ethos (McCroskey 1966; 1997; McCroskey et al., 1974; McCroskey & Young, 1979; 1981) such that they have identified a plethora of aspects of the concept.

$$P(H_{rep} \mid H) = \frac{P(H_{rep}, H)}{P(H)} = \frac{\sum_{evidence} P(H_{rep}, evidence, H)}{P(H)} = \frac{\sum_{evidence} P(H_{rep} \mid evidence, H) P(evidence \mid H) P(H)}{P(H)}$$

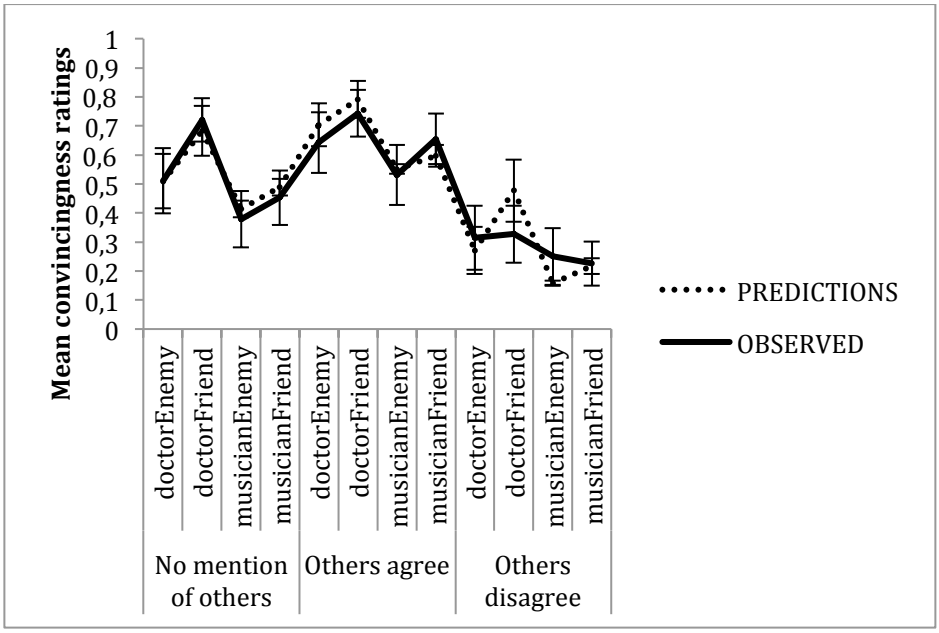
This provides a probabilistic measure for describing the influence of source credibility on the persuasiveness of the attempt. As already mentioned previously, the persuasiveness of the utterance, H_{rep}, depends on the perceived strength of the evidence as well as the credibility of the source from the perspective of trustworthiness and expertise. Again, the perception of ulterior motives is an essential backdrop from which these estimations emerge since the perception of a deceptive motive might yield greater epistemic vigilance and lower trustworthiness. Indeed, the persuadee might well expect that the persuader is likely to produce a strong and likely H_{rep} even if H is false if they are deceptive. As such, the persuasiveness of the attempt goes beyond the evidence given the integration of source credibility. In the above car salesman example, this is illustrated by the fact that the persuadee might be more vigilant towards misinformation and estimate a lower trustworthiness given the situation, which causes her to expect the salesman to provide compelling evidence, even if this evidence is false[129].

Given the importance of source credibility in the theory of persuasion presented in the thesis, it is worthwhile reporting the central findings from the empirical test of the formal model of source credibility as provided in the above. Investigating arguments concerning the effectiveness of fictitious medicaments involving dialogues with interlocutors either conceived as an expert (doctor) versus non-expert (rock musician) and trustworthy (friend) versus untrustworthy (enemy). The study in Harris et al. (submitted) was designed to "…test the degree to which participants' quantitative probability ratings approximated the prescriptions of a Bayesian formalisation of the appeal to expert opinion incorporating the notions of expertise and trustworthiness". The participants were asked to imagine a scenario in which one interlocutor (either friend or enemy and expert or non-expert) provides information pertaining to a made-up medicament. Having followed the dialogue, the participant is asked a question in the form of "How likely do you think it is that Keith would deliberately give James wrong information about whether taking Proftanine lowers cholesterol?" to which the

[129] Notice that to really formalize this in probability theory we would need a probabilistic account of how the probabilities of different utterances depend on different pieces of evidence, the knowledge states of the persuader, etc. This is currently too ambitious and goes beyond the scope of the thesis, as the thesis merely proposes a probabilistic measure.

participant responds by moving a slider from "I'm completely convinced he would NOT deliberatively give James wrong information" to "I'm completely convinced he WOULD give James wrong information". Responses thus elicited a percentage value for the convincingness of the argument given the particular source. Expertise and trustworthiness estimations were elicited, and the potential of another source agreeing or disagreeing with the information was included. The above equation on p. 130 was used to predict the expected convincingness of arguments given participants' prior beliefs concerning expertise and trustworthiness. Harris et al (submitted) report an excellent fit of data with the model: The Bayesian quantitative predictions derived from eliciting the priors of the participants account for 89% of the variance ($p<0.001$, see fig. 8 – fig. 5 in Harris et al.). As such, the experiments lend support to the notion that source credibility might be formalisable from a Bayesian perspective, which follows the line of reasoning developed in the second chapter in which persuasion processing is conceptualised from the perspective of probabilistic, uncertain reasoning compared to certain reasoning from a logical perspective.

Figure 8. The fit between the Bayesian predictions and the observed convincingness ratings
Error bars show 95% confidence intervals.



Harris et al. (submitted) proceed by comparing the model with a potentially competing analysis of the data stemming from a relative-weight averaging model

$$R = \frac{w_1 H + w_2 Exp + w_3 T}{w_1 + w_2 + w_3}$$

in which R is the convincingness of an argument and w_1 is set to equal 1 a prior (this setting was taken from Birnbaum & Meller's, 1983, fit of the related scale-adjustment averaging model). Compared with the Bayesian prediction (which accounts for 89% of the variance and 93% if outliers responding 1 are removed), the averaging model accounts for 87,5%. Furthermore, a 4-way ANOVA identifies more local deviations within the Bayesian model compared with a more global deviation of the data in the averaging model.

As mentioned earlier, both the ELM (e.g. Petty & Cacioppoe, 1981; Briñol & Petty, 2009) and the HSM (e.g. Chaiken, 1980; Chaiken & Maheswaran, 1994) acknowledge the importance of source credibility in persuasion processing. However, it is not clear how these approaches deal with the seemingly integrated nature of source credibility, which is also reported in Hahn et al (2012) and Harris et al (submitted). The results in Harris et al (submitted) are problematic for the ELM and the HSM since both models do not specify how the integration between a peripheral cue (source credibility) and a central cue (argument strength) should be conceived. On a more fundamental level, it might be questioned that if there *is* interaction between the systems, can they subsequently be considered distinct and separate systems, or should the interaction allow for a uni-modal approach (such as the formalisation of source credibility that integrates with content strength in Harris et al, submitted)? This harkens back to the discussion concerning the potential limitations of the dual-process approaches to persuasion: the data, especially from Harris et al. (submitted) suggests that the content strength and source credibility are integrated in some manner (which may be approximated by a Bayesian approach), but neither the ELM nor the HSM specify how this integration should take place. That is, if supposedly peripheral cues are integrated in supposedly central elements, it begs the question whether the model really *is* dual-process or merely an integrated process in which elements may enjoy more or less influence. The theory and model developed in the present thesis argues the latter, namely that humans assess acts of persuasion from a subjective point of view in terms of content strength and source credibility, and that less desirable influences such as attractiveness always play a part, but that these may play a smaller or greater role depending on a variety of factors (such as the culture in which the persuadee is immersed, the amount of cognitive effort exerted, and the reasoning training of the

persuadee). In any case, the data reported in the above represent a serious challenge to the ELM and the HSM. These models need to be able to account for the data with greater precision than the Bayesian integrated approach if they are to maintain their hold as the prevalent models of persuasion processing. Indeed, the conceptualisation and question of integration of cues is a central distinction between the SPIMP and the ELM/HSM, and consequently it provides ample ground for future research in re empirical distinctions and tests that distinguish between the approximating capabilities of the three models.

In sum, source credibility is centred as a vital element in persuasion processing from a subjective, probabilistic point of view. The Bayesian network identified and tested in Hahn et al (2012) and Harris et al (submitted) lend credence to this approach, which in turn challenges the conceptualisation of source credibility in the ELM and the HSM. Expertise and trustworthiness are identified as two key factors in formalising how the persuadee approaches and assesses the source credibility of the persuader, which is in line with the literature from rhetorical theory on the concept of ethos. This provides the subsequent theory and model of persuasion with a clear concept of source credibility that may readily be integrated in a more holistic conceptualisation, theory, and model of how persuadee's approach persuasive attempts in the moment (the temporal relationship between theory and model will be discussed further in 6.4 and chapter 7 in general). Before proceeding, however, a few remarks should be made concerning the theoretical make-up of the conceptualisation presented here due to the fact that this makes use of complex, causal networks.

3.4. Complex, causal networks

A Bayesian network is a way of graphically representing conditional dependencies between concepts in a given argument such as the one in fig. 8 below (Pearl, 2000). Such a network may be drawn in different manners depending on the elements involved in the network (e.g. environmental networks may look very different from legal networks; or networks may be more or less comprehensive and complex). For example, Hahn et al. (2012) provide a comprehensive causal network through which source credibility may be conceptualized. This expanded network importantly captures all elements identified by Walton (1997, table 4 in the above) in a formal manner, which is

readily subjected to empirical tests. However, given the theoretical considerations and arguments in the above, some elements may be subsumed by others and eventually make way for a cleaner network focusing entirely on trustworthiness and expertise. For example, the back-up question identified by Walton should not be considered on the same level as persuasiveness derived from source *qua* credibility. Rather, per definition back-up evidence is concerned with presenting evidence and information to validate the original claim[130]. The quality of expertise is essentially that one may be persuasive without providing back-up evidence *because* of one's expertise within a field (for example, a doctor rarely cites medical journals when describing an illness because it is assumed that she has expert knowledge about this).

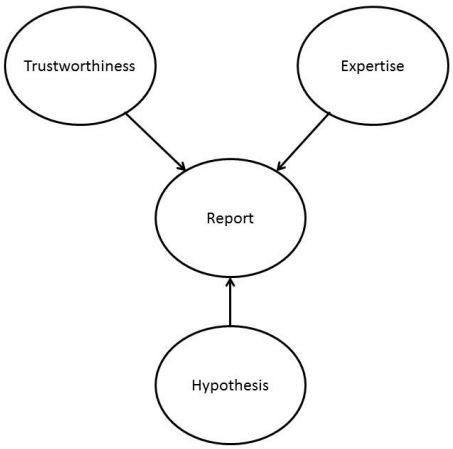
Furthermore, as assumed in the cleaner network model it is entirely conceivable that persuasion takes place between two and only two people rather than in a more complex social situation (although, obviously, most actual acts of persuasion take place in a vastly complex social sphere that involves a plethora of persuaders, diverging interests, and different levels of expertise in a variety of fields). To conceptualize how the persuadee relates to the *specific* persuader may be formalized in a simpler manner without resorting to other interlocutors. However, in more complex situations (such as real life examples of persuasion), the expanded network provides a closer approximation to the elements involved in processing source credibility. The use of a network to represent a complex causal issue is in no way novel. For instance, recent developments in legal decision making employs networks in order to account for the juror decision making process (Lagnado et al., 2012; Fenton et al., in press; Lagnado, submitted).

The account of source credibility in the above relies on causal structures, which may be graphically represented in such a complex, causal network. As Pearl (2000) describes, "a graph consists of a set *V* of *vertices* (or *nodes*) and a set *E* of *edges* (or *links*)" (p. 12). One of the key questions when drawing up a graphic representation of a complex system is whether the nodes are linked cyclically or if they are acyclic. This describes the potential mutual influence from one node to another in which more complex systems may contain variables that cyclically influence one another. Given the fact that the graphical formal representation of source credibility in the present context

[130] This reminisces of 'backing' in Toulmin's model of practical argumentation, see 1.6, fig. 4.

(fig. 9 below, fig. 2 in Harris et al., submitted) contains no directed cycles, however, the formalisation of source credibility is acyclic and thus represents a Causal Bayesian Network (as described and defined by Pearl, 2000). The figure is a sketch of the form that a model might take, and it illustrates how source credibility might be described graphically. The convincingness (the report, or H_{rep} in the SPIMP presented in the introduction and in 7.3) is not only influenced by the likelihood of the hypothesis (H), but also by the trustworthiness and expertise such that seemingly good evidence (high H) might still be estimated at a lower overall posterior given low trustworthiness and expertise. As mentioned previously, this predicts direct involvement of source credibility in persuasion processing unlike how source credibility is treated in the ELM (as a peripheral cue) and the HSM (as a heuristic)[131].

Fig. 9. Graphical representation of source credibility in the present model[132]



Alongside notions concerned with the theoretical foundation of the Bayesian account and the previous empirical data to support the representation of source credibility in a direct acyclic graph (DAG), Pearl (2000) notes several advantages for representing DAGs as causal rather than associational systems. Firstly, judgements in such graphs "…are more meaningful, more accessible, and hence more reliable" (p. 21) given the fact that the dependencies of the nodes become more apparent and subsequently easier to tease apart theoretically, empirically, and analytically. As Pearl notes, "dependencies

[131] The specific role of source credibility in persuasion processing should be explored further, as this is an element where the SPIMP directly predicts different involvement compared to the ELM and HSM. As such, the first tentative evidence from Hahn et al. 2012 and Harris et al., submitted needs to be replicated and elaborated upon in order to challenge the data from ELM on source credibility (see Petty & Cacioppo, 1984b).

[132] Note that this is a sketch of the form a model might take and not necessarily a complete account of the model. Indeed, as noted in the above, a full probabilistic account of source credibility needs to take into account the different utterances and how these depend on different pieces of evidence, the knowledge states of the persuader, etc., which is beyond the scope of the present thesis.

that are not supported by causal links are considered odd or spurious and are even branded 'paradoxical'" (Ibid.). This focus on causality may, however, rightly be questioned from the point of view of disciplines that traditionally depart from such rigorous assumptions of necessary causality (such as the terminology from the phenomenological tradition, as it is briefly presented in 6.1)[133]. Secondly, DAGs provide "…the ability to represent and respond to external or spontaneous *changes* (Ibid., p. 22). This is due to the fact that local reconfigurations, with only minor modifications to the general network, may be translated into an isomorphic reconfiguration of the network topology. That is, by making minor changes in the network, the system is capable of responding to outside change.

Given too much flexibility, however, networks potentially runs the risk of lacking falsifiability such that they are adaptable and changeable to any new information (as mentioned in 2.5, this is an objection raised against Bayesian reasoning in general, see Jones & Love, 2011a; 2011b). The network described in the above, however, is less flexible given the nature of the theoretical foundation as compared with a garden sprinkler system (the example in Pearl, 2000). That is, a mechanical system may easily be amended with the inclusion or isomorphic alteration of particular nodes and/or links. However, the definition and formalisation of source credibility as presented in the above is incommensurable on a theoretical level with a sprinkler system due to the fact that the theory of source credibility and how it filters into persuasion processing in general is thought to be an explicit definition. In other words, some additions and alterations may be warranted given certain cultural contexts, but the formalisation is thought to be a basic model of how humans make use of information from the trustworthiness and expertise of a source to subsequently form their overall evaluations of acts of persuasion[134].

As with the second chapter, the present discussion presents some key issues that help shape the prolegomena to a theory and model of persuasion processing.

[133] Indeed, as will be evident from the eventual theoretical foundation presented in the thesis, I acknowledge this scepticism by distinguishing the broader contextual context in which the persuadee is immersed and the narrower application of the SPIMP approach *in* the moment of persuasion evaluation. Thus, the causal elements are not stretched to be deterministic nor are they meant to be all-inclusive of a very complex process of persuasion, which needs to be explored in more detail in future research. For now, however, the assumption of causality in DAGs stands.

[134] Note, though, that the internal flexibility of the formalisation remains such that the estimation of each node remains subjective according to the probabilistic principles.

Firstly, it is argued that the epistemic asymmetric relationship between persuader and persuadee entails the importance of the interactivity between the interlocutors. This leads to potential epistemic vigilance towards misinformation, which is a defining characteristic in persuasion situations. As noted in 3.2, however, mentalizing cannot account for this alone, and a more mechanistic notion of interaction, joint action, and common knowledge is necessary to define the interactivity in persuasive attempts. The outlines for such a mechanistic process is presented in 5.3. A complex Bayesian network as derived from Harris et al (submitted), however, may approximate source credibility and thus provides an integral and focal element of the subsequent model of persuasion presented in 7.3. The network defines expertise and trustworthiness as potential factors to describe how humans assess the quality of the source and the ensuing influence of the quality of the source on the general quality of the act of persuasion in general. Finally, persuasion is an inherently social and interactive phenomenon, which takes seriously the notion of source credibility and epistemic vigilance in order to described the cognitive challenges with which the persuadee is faced. In navigating this complex social situation, the persuadee first and foremost considers the local consistency before potentially extrapolating the subjective estimations of the strength of the persuasive attempt to a more global system.

In sum, the chapter shows the importance of the perception of the persuader for the cognitive mechanisms involved in processing a persuasive attempt. On a conceptual level, the perception of motives (alongside the persuasive intention) might yield differences in the amount of epistemic vigilance and cognitive effort invested in processing the attempt. Thus, if a deceptive motive is perceived, it has direct consequences for the trustworthiness of the source, the amount of cognitive effort invested, and the epistemic vigilance asserted regarding the evidence. From a formal perspective, lower trustworthiness and expertise yields lower convincingness of the evidence presented in the argument, as shown in Harris et al. (submitted). This indicates that source credibility is an integrated aspect of persuasion processing (and not, as suggested by the ELM and HSM, a peripheral cue). The direct involvement of source credibility, however, remains an open issue, as much needs to be explored if a richer account of different types of authorities (epistemic, administrative, and cultural) is to be developed. For now, thought, it suffices to note it is theoretically possible and

empirically viable to integrate the notion of source credibility in describing persuasiveness from a probabilistic perspective, as is attempted in the present thesis.

PART II

PSYCHOLOGICAL & THEORETICAL FRAMEWORK

Chapter 4: Language comprehension

But if thought corrupts language, language can also corrupt thought

George Orwell

Speech is an arrangement of notes that will never be played again.

F. Scott Fitzgerald

The central elements of the core SPIMP model (content strength and source credibility) were introduced in chapters 2 and 3 (part I of the thesis). These are the central elements in the conceptualisation of the alternative model of persuasion, which is sketched out in the present thesis, i.e. the Subjective-Probabilistic Interactive Model of Persuasion (SPIMP). As evident from the discussions in the previous chapters and as will be discussed in 7.3 (where the model is presented in more coherent detail), content strength and source credibility may be formalised and approximated via Bayesian reasoning models from subjective estimations of probability and these elements are seen as required, but not necessarily exhaustive in the attempt to formulate the broader theoretical framework through which the SPIMP approach to persuasion processing functions as an alternative model to the prevalent ELM and HSM[135]. Having established the central elements needed to construct the model of persuasion (content strength and source credibility), the theoretical attention turns to the psychological framework in which the core model is lodged (part II of the thesis). The framework takes persuasive verbal communication (chapter 4), interactivity (chapter 5), and the immersion of the subject *in* the persuasive situation (chapter 6) into consideration. This provides the conceptual background against which the central elements of the model should be appreciated[136]. Given the assumption that the persuadee entertains estimations of likelihood, which may be approximated in modelling via Bayesian probability theory and given the fact that the focus of the thesis specifically squares on interpersonal and verbal persuasion, it is necessary to attain a fundamental understanding of how language is comprehended by the persuadee and how persuasive communicative functions. The present chapter provides the main issues of relevance for this additional theoretical foundation for the model.

It is essential to mention that the present chapter (as well as the following two chapters) are not concerned with the specification of an exhaustive theoretical foundation for a complete model of persuasion, but rather with the conceptualisation of some of the required foundations for the formulation of the theoretical framework and assumptions of the model. That is, the Subjective-Probabilistic Interactive Model of

[135] A direct comparison of the three models is presented in 7.5. In this section, I present the potential benefits and shortcomings of the SPIMP approach compared with the ELM and the HSM

[136] Note, however, that the model is labelled Subjective-Probabilistic *Interactive* Model of Persuasion. The notion of interactivity is presented in chapter 5 given the fact that this has bearings both on the notion of language as well as reasoning invoked in the thesis.

Persuasion provides a framework for understanding how the persuadee normatively should deal with uncertain information from an uncertain source in terms of how she should evaluate the content strength and the source credibility in the persuasive situation. However, the notions of language comprehension (the specific type of persuasion explored throughout the thesis is verbal communication), interaction, and subjectivity provide additional theoretical frameworks for the model. Accordingly, the present chapter provides a sketch of some of the required communicative elements related to language comprehension, chapter 5 does the same for interactivity, and chapter 6 considers subjectivity. As mentioned in the introduction, the thesis is a prolegomena, as the SPIMP model needs to be further explored, sharpened, and substantiated. The same might be said for the additional theoretical frameworks underlying the model (as discussed in the present and the following two chapters): the thesis represents only the fundamental work and future research definitely has provide a more in-depth understanding of how language comprehension, interactivity, and subjectivity play a role for the central elements of the model (content strength and source credibility).

Given the scope of the thesis as *spoken* persuasion between two individuals, the concept of language comprehension becomes pivotal to shape the theoretical setting for two distinct reasons. Firstly, and most obviously, considerations pertaining to how language may function in a persuasive setting from a linguistic point of view are a central theoretical point for developing a theory of spoken persuasion. This involves tracking the complexity of language from traditional code-like models (4.1) via pragmatic enrichment (4.2), probabilistic approaches to communication (4.3), and interactive, distributed models of communication (4.4) to finally consider the importance of style, rhythm, and sound (4.5), which throughout the centuries of rhetorical enterprise have been considered a cornerstone of persuasion. Indeed, of the five elements of persuasion identified by Aristotle, style (elocutio) is a major element[137]. The purpose of the discussion, then, is to engage with language acts to

[137] The other elements are the invention of the persuasive argument (Lat. inventio), the disposition (Lat. dispositio), memorizing the speech (Lat. memoria), and the delivery (Lat. actio). Historically, elocutio has a special significance in persuasion studies as Ramus (15th century philosopher) placed inventio and dispositio as philosophical disciplines and memoria and actio as belonging to the performing arts. This left rhetorical theory with elocutio and reduced the disciplines to a discussion of tropes and rhetorical

discuss how this relates to persuasion processing. Secondly, and more concretely, as argued throughout the chapter, language may perform a central role with regard to probabilistic estimations, the possibility of epistemic vigilance, and the emotional stance of the persuadee. These traits are directly influencing how the SPIMP approach conceptualises persuasion processing from a subjective-probabilistic point of view. Alongside these two main reasons for discussing language, given the fact that Bayesian inference is concerned with what humans do when confronted with uncertain *information*, a natural course of action is to pursue how human elicit information in the persuasive setting, namely via communicative acts.

The flow of the present chapter begins by looking at more static models of language comprehension (4.1). In particular, this mirrors the discussion concerning logic in that logical frameworks have been employed to appreciate and understand comprehension in a structural and more rigid way to mirror the cleanliness and clarity of logical expression in argumentation theory. However, as will be argued, this does not seem to function as an underlying element of natural languages. Rather, I present theories that rely on contextual cues in the form of pragmatic enrichment (4.2), which leads to more comments on communication from a probabilistic point of view (4.3). This places communication as something inherently interactive and cooperative, which is explored further by discussing theories from the distributed language approach (4.4). That is, the flow of the argument takes point of departure in minimally contextualized logical settings and ends in a wholly interactive, contextual, and probabilistic point of view, which will drive the understanding of communication in the persuasive setting.

Throughout the chapter, the literature reviewed suggests at least three key theoretical points of interest for a theory of persuasion. Firstly, it will become clear that language cannot be reduced to a code-like approach that centres on the logical and reduced linguistic content of the utterance. Rather, communication is seen as pragmatically enriched, socially coordinated and mediated, and distributed between interlocutors in a complex manner. Secondly, a probabilistic perspective is suggested to describe the foundation of language evolution, acquisition, and use. This framework points toward an interactive approach, which is explored further from a distributed point of view. Finally, some remarks concerning stylistic aspects of persuasion (such as

figures for centuries to come, which in turn affect the general reputation rhetoric has today: form without content (see Conley, 1990 for a presentation of Rhetoric in the European tradition).

rhythm, sound, and the novelty of expression, 4.5) are discussed to suggest the fact that persuasive acts are inherently imaginative and innovative. Together, the remarks on persuasive communication point towards an interactive and coordinated perspective discussed in 5.3[138].

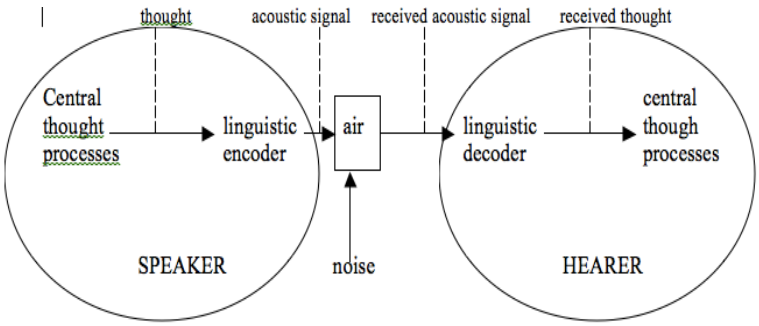
4.1. Traditional theories of language

Given the prevalent and significant function of language in human interaction and society building, it is not surprising that language as a phenomenon has been studied throughout millennia. Despite obvious differences in the respective theoretical approaches and with some notable exceptions (such as Vico, 2000; see also Catana, 1996), most theories of language before the 20th century resemble a code-like philosophy of language in which, as Francis Bacon puts it, language is the medium through which thought is expressed, received, and understood. In this view, communication is a phenomenon that facilitates the expression of inner mental states and thoughts. Here, language is the container that clads the thought in a way that may be unpacked by the received who subsequently, if the unpacking is done correctly, divines the intended meaning of the sentence, which thereby succeeds in transmitting the thought from sender to receiver. Conversely, an unsuccessful communicative attempt is one in which the receiver decodes in a flawed manner and thus reaches a different mental state. Importantly, this relationship hinges on the assumptions that thoughts are essentially propositional in nature, that thoughts are transmittable mental states, and that words and sentences refer to mental concepts that may be understood and transmitted via language. The viability of these points will be discussed and considered in this section and throughout this chapter it will become increasingly clear that such a conception of communication seems unfeasible for a number of reasons such as pragmatic enrichment, the distribution of language, and the manipulation of common ground as discussed in 5.3. Taken from Sperber and Wilson (1995, p. 5), fig. 10

[138] It is important to note that the essential elements of the SPIMP approach (as described in 7.2 and 7.3) are content strength and source credibility. The present chapter discusses language comprehension, as the thesis is concerned with verbal persuasion. Nonetheless, the specific approach to language presented here is not strictly necessary (that is, the SPIMP might fit within other approaches to communication). However, given the probabilistic and subjective foundation of the SPIMP, the assumptions underlying the presentation of communication given here are in accordance with the model. But the approach to communication remains linked with the SPIMP rather than necessarily needed.

illustrates the relationship between sender and receiver in a traditional code-like philosophy of language. In particular, the figure illustrates a communicative process in which the speaker first produces a thought (in code-like approaches thoughts are often conceptualised as a propositional entity). This thought is then encoded in linguistic elements (from phonemes to words to entire sentences), which are then transmitted (spoken) as an acoustic signal. The signal travels through a medium (in verbal communication, this would most likely be air), which may or may not contain noise. The hearer receives the acoustic signal after it has been transmitted through the potentially noisy medium. After receiving this, the hearer uses her linguistic knowledge to decode the linguistic elements (in code-like approaches, the decoding if most prominently described via logical processes, and indeed many such accounts rely on a logical framework, see e.g. Stanley 2000, 200). Having decoded the linguistic information, the hearer may (more or less successfully) obtain the central thought process initially clad in linguistic form by the speaker. As evident, this view of language transmission relies on a clear sender and receiver, on packaging information, and on a propositional nature in which the information *as a whole* is encoded and decoded in order to obtain sense. That is, the logical interpretation needs to entirety of the sentence to decode and arrive at the thought. A fitting metaphor for the code-like approach might be a mental gift, which is linguistically wrapped and subsequently opened to discover the thought residing inside.

Fig. 10: representation of traditional code-like philosophy of language



Central to the code-like philosophy of language is the assumption that communication is reducible to linguistically encoded messages expressible in propositional form that, given a minimal contextual salience, is readily decoded by the receiver in order to elicit

the meaning of the sentence[139]. As illustrated by fig. 10, this propositionally expressible encoded thought is transmittable between speaker and hearer. Historical proponents of a code-like approach to communication are philosophers such as Locke (1996) whereas more recent proponents come from a variety of disciplines such as the linguistic semanticists (Stanley, 2000; 2002), proponents of logical languages such as Lojban (as discussed later in this section), and biological behaviourists (Krebs & Dawkins, 1984).

Researchers on animal behaviour in biology argue that human communication, akin to other animal communication, is reducible to a sender-receiver relationship of information that is encoded and decoded. Indeed, communication between bees seems to function in this way such that the dance encodes and transmits to the other bees the location of fertile fields of pollen. However, human communication seems to be more complex than the one found between bees simply due to the fact that humans have a more extensive range of communicative expressions (facial, tonal), modes (including irony and sarcasm), and acts (as noted by Austin, 1961, see 4.2). Therefore, it is not immediately clear how applicable animal communication studies are in order to describe human communication. To facilitate human-computer interaction and communication (HCI), computer scientists work to develop a code-like form of communication that is reducible to logical inferences that are computable by a computer. This would be advantageous since this would improve the possibility of interaction between humans and computers. However, given the fact that such a language has to be invented is an inverse argument for the claim that human communication is exactly *not* reducible to logical inferences. If human language were, HCI should be able to simply use English to facilitate communication between computers and humans. Finally, linguistic semanticists make a compelling case for a code-like approach to communication (depicted in fig. 10).

Branching over the various approaches, the essential qualities of the code-like approach are that language is propositional, thoughts are transmittable, and communication is an encapsulated phenomenon with encoded messages that are solvable by the listener. In conversation, this somewhat mentally static back and forth

[139] Note, concerning pragmatic enrichment, as Carston (2002, p. 206) notes ”one important consequence of the underdeterminancy thesis and the thorough cognitivazation of pragmatics is that the concept of what is explicitly communicated cannot be equated with [the] linguistically encoded meaning, or with some minimal boosting of it so as to fill linguistically indicated slots or to meet some logical requirements of minimal propositionality”. This will be discussed in 4.2

between sender and receiver is reducible to the rules of formal logical inference and analysable from the same theoretical point of view[140]. In order to further formalise and described language, Chomsky (1975) made impressive strides in setting out a formal way of describing sentences (see fig. 11a and 11b for examples of such a formalisation of the passive and active sentence 'the dog ate the bone' and 'the bone was eaten by the dog').

Fig. 11a: Active syntactic tree

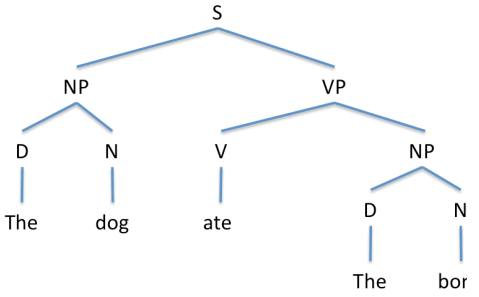
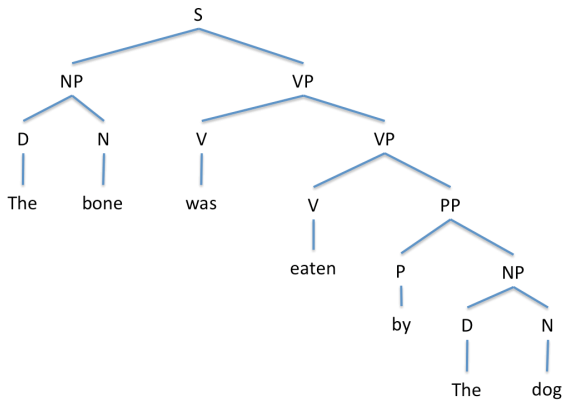


Fig. 11b: Passive syntactic tree



In the sentence, the various components relate to specific syntactic elements that are present in the utterance (such as the verb phrase, VP, and the noun phrase, NP, here containing a determiner, D, and a noun, N). These grammatical elements allow the researcher to fragment a given sentence and to rigidly analyse the grammatical structure (incidentally, such an analysis is central to analysing the encoded linguistic elements in the code-like approach mentioned in the above since the Chomskean analysis allows for a logical fragmentation and interpretation of individual linguistic elements, which subsequently should elicit meaning from structure and semantics). Importantly, these elements fall in a specific order in which the elements relate to one another. If the order is changed from the universal grammatical principle, the original structure remains with elements moved out or their place such that a trace remains[141]. Central to the Universal Grammar (UG) hypothesis is the idea that linguistic capability stems from an innate, language-specific module in the mind that shapes the grammatical structure in such a

[140] Note that the limitations to formal logic in terms of reasoning as presented in 2.3-2.4 also apply to language. In addition to the limitations concerning reasoning mentioned previously, this chapter presents some limitations for formal logic when applied to communication.
[141] According to theory, this is why passive sentences are harder to read given the fact that the NP is moved and the general structure is changed, leaving traces and movement that is harder to process compared to an active sentence (see fig. 11b).

way as to conform to the principles of UG (for potential problems of this, see Chater & Christiansen, 2010 and 4.3). There are a range of UG accounts, but generally these are expressed either as adaptionist or non-adaptoinist accounts[142]. Despite differences between theories, however, the above seem to permeate as underlying assumptions for the various theories of UG.

In 2.2, I argued that formal logic is not an appropriate framework through which to approach how humans practically reason due to the rigidity of and focus on structure as well as the truth-conditional dichotomies. Interestingly, the rigidity of formal logic has been applied to natural languages in an attempt to create a model of communication to supplement the theory of reasoning such that both reasoning and communication may function logically and consequently might form a stronger foundation for describing human phenomena such as persuasion. The underlying assumption is that logic may be used to describe communication in the same way that it may be used to describe reasoning. One example of the marriage between formal logic and communication is the development of the artificial language, Lojban, which is constructed to facilitate a culturally neutral language with the potential of developing precise and user-friendly human-computer linguistic interfacing, but that also retains the expressive power of natural languages (Nicholas, 1996; Cowan, 1997; Nicholas & Cowan, 2003; Hallberg, 2005; Speer & Havasi, 2005; Goertzel, 2005; 2006, for the official website of the language, see www.lojban.org). That is the cleanliness of formal logic combined with the expressiveness of natural languages. However, for Lojban to function as a language, several assumptions have to be fulfilled. Firstly, the linguistic codes, given the fact that they have to work in a computer, have to be de-contextualised. Secondly, there can be no linguistic ambiguity. Thirdly, given a construction on the premises of formal logic, propositions are modular and atomic, meaning that $P \wedge Q = Q \wedge P$. As discussed in 4.2, none of these assumptions seem to be warranted for natural languages. Indeed, as mentioned, the fact that there is a need to artificially create a language that rests on the premises of formal logic is an indirect argument for the claim that natural languages are not since if they were, there would be no need to develop a language that has those specific qualities: English would be sufficient if it was perfectly

[142] See Chater & Christiansen, 2010 for proponents of both of these accounts.

formalisable from the point of view of formal logic. The following section deals with this in more detail.

4.2. Pragmatic enrichment and relevance theory

In the 1950s, several linguists and philosophers rejected the notion that language was encapsulated meaning wrapped in codes and moved toward construing language as a phenomenon concerned with action, expectancies, and contextual enrichment[143]. One of the essential developments was the change of theoretical heart by Wittgenstein. In *Tractatus*, he is might be thought to position himself within the code-like approach by famously stating that "The limits of my language is the limits of my world" (1996, 5.6)[144]. With *Philosophisches Untersuchen* (2001), he departs radically from his earlier mantra of the link between language, thought, and potential immserion in the world by introducing language games (Sprachspiel) that points to the inventive and collaborative nature of communication. Wittgenstein marks the beginning of a novel approach to language in Anglo-American literature that takes inspiration from William James' notion of pragmatism (see Putnam, 1997) rather than from John Locke's notion of the individually transmittable thought (1996).

Continuing the train of thought initiated by people like the late Wittgenstein, Austin (1961) and Searle (1969) argue that communication is not just the transmission of mental states, but functions inherently as a performative act. That is, humans *do* things (e.g. beg, order, request) when they communicate above and beyond the mere transference of thought and meaning from A to B. In order to describe this performative element of communication, Austin (1961) describes three distinct communicative functions of language, namely the locutionary, the illocutionary, and the perlocutionary. Roughly speaking, the differences are as follows. A locutionary act is

[143] It should be recognised that earlier breaks with the code-like model can be identified. For instance, theories of language from a continental that relies neither on propositional nor logic assumptions, some might argue Saussure (see Sanders, 2004), and definitely Vico (see Catana, 1996). These represent breaks from the general, historical trend of a code-like approach and should therefore be acknowledged. However, only in the recent decades have the break with the traditional code-like assumption manifested clearly throughout philosophy, linguistics, and psychology, hence the present focus.

[144] This reading of the early Wittgenstein can be controversial since it is not entirely clear whether Wittgenstein thinks of thoughts as hidden mental states, transmittable by language or as constituted by linguistic acts (which seems more in line with his later thinking). In either case, the quote from *Tractatus* suggests an intimate relationship between thought, language, and potentially the perception of truth such that the early Wittgenstein in some fashion proposes a code-like approach to language.

concerned with the surface meaning of the utterance (i.e. what is said). As will be evident from the following discussion of pragmatic enrichment, this can be said to include not only the specific linguistic content, but also be extended to include explicatures (enrichments that follow from the utterance, which nonetheless affect the truth-conditional estimation). For instance, the utterance "is there any salt?" functions as a direct question concerning the existence of salt, not in general in the world, but in the immediate presence (due to enrichment following the relevance of expressions). An illocutionary act is the implicatures (see also later) concerning the utterance. Thus, the same question is also an invitation for the rest of the dinner party to pass the salt to the speaker rather than to be taken as an informative situation (indeed, most would probably find it rude, if someone merely responded 'yes' without passing the salt despite the fact that this strictly speaking would fulfil all the linguistic requirements for reciprocity, but it would not respond to the illocutionary request). Finally, the perlocutionary act is viewed as the psychological consequences of a particular speech act. This might be expressed as offers, requests, invitations, etc. In other words, the perlocutionary act follows from the locutionary and the illocutionary acts. From Austin and Searle, we clearly see that humans do things above and beyond the linguistic meaning when they communicate. For persuasion, this is a particularly relevant insight as the implicatures and psychological consequences (from the persuadee's subjective point of view) are central to the evaluation of the act of persuasion as this is concerned not only with the transmission of information, but potentially also social and behavioural consequences.

Most relevant for the present section, however, is the notion of pragmatic enrichment initiated by Grice (1978; 1989). A foundational insight of pragmatics is the fact that meaning is not limited to the linguistic content, but is mediated by implicatures and explicatures (see 4.2.1). The foundation of Gricean pragmatics is the co-operative principle, which states that interlocutors should "make [their] conversational contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged" (Grice, 1989, p. 26). That is, the conversational part has communicative merit is when it somehow brings forward relevant information pertaining to the situation whereas if, for the persuadee, the communicated act does not bear relevant information, the act can be considered irrelevant for processing in the situation (note that this estimation is not necessarily

conscious). To elucidate the co-operative principle, Grice develops four maxims of quantity, quality, relation, and manner (see table 5). Given the definition of persuasion as something potentially malevolent without necessarily being aimed at epistemic alignment, the Gricean maxims seem to be curtailed by an intrinsic ethical stance of open, honest consensus-seeking rather than strategic, persuasive communication in which stylistic embellishment is a dominant feature (see also 4.5). Consequently, the maxims seem too idealistic when faced with persuasive communication. Relevance theory (Sperber & Wilson, 1995, but see also Carston, 2002) is an interesting development from the fundamental Gricean insights (that communication goes beyond the encapsulated linguistic content) [145] . Rather than assuming co-operative communication, relevance theory focuses on the cognitive enrichment of language in order to arrive at a theory of cognition involved when processing statements. The guiding principles driving relevance theory are the principles of relevance (see table 5). The presentation of pragmatic enrichment in the present section takes primary point of departure in relevance theory. This is mainly because of its prevalence in the linguistic literature but also due to the fact that it posits a cognitive theory of enrichment, which is of theoretical importance to the cognitive theories of reasoning presented in previous chapters.

Table 5: Gricean maxims and the principles of relevance

Gricean maxims [146]	**Principles of relevance**[147]
Maxim of quantity 1) Make your contribution as informative as is required (for the current purpose of the exchange) 2) Do not make your contribution more informative than is required Maxim of quality 1) Do not say what you believe to be false 2) Do not say that for which you lack adequate evidence Maxim of relevance 1) Be relevant Maxim of manner 1) Avoid obscurity of expression 2) Avoid ambiguity 3) Be brief 4) Be orderly	The cognitive principle of relevance The human cognitive system as a whole is oriented towards the maximization of relevance The communicative principle of relevance Every act of ostension communicates a presumption of its own *optimal relevance*

[145] Note that the pragmatic framework has been substantiated by empirical evidence alongside theoretical considerations (see e.g. Katsos, 2008; 2009)
[146] Grice (1989), pp. 26-27
[147] Carston (2002), p. 45

Despite representing one of the most significant recent developments in terms of going beyond the traditional code-like approach to communication, pragmatic enrichment suffers from some theoretical limitations as well. This will be clear throughout the section, but for now it suffices to remark that Gricean enrichment and relevance theory may be considered to be an extended type of code-like approach given the fact that the enrichments in the end describe the content of the message – the difference being that pragmatic theories allow for extra-linguistic enrichment, which makes for a more complex code. In other words, despite departing from the rigidity of focussing on the linguistic content, pragmatic enrichment remains oriented towards a clear distinction between the speaker and the listener and how the listener interprets and enriches the linguistic content in order to elicit meaning. The focus, that is, remains on the construction and interpretation of meaning rather than a broader communicative and, more importantly, interactive focus (as discussed in 5.3). Despite limitations, pragmatic enrichment provides a strong point of departure for tracing the multifaceted and complex nature of persuasive language.

4.2.1. Underlying assumptions

The reliance on maxims or principles, as mentioned in the above, highlight the theoretical importance of the difference between explicatures and implicatures, as well as, most centrally, the reliance on metarepresentational content make up the underlying assumptions for relevance theory. However, before jumping into the theoretical deep end of the pool and presenting the assumptions that underlie pragmatic enrichment in general and relevance theory in particular, a few choice examples are in order to illustrate and make concrete the main points of pragmatic enrichment.

7a) I am starving! I haven't had breakfast

7b) She left him and he took to the bottle

7c) He took to the bottle and she left him

7d) Most doctors drink

Clearly, 7a-7d need additional contextual information to make relevant sense. 6a, for instance, literally states that the person has not had breakfast [period]. A more relevant interpretation of this would be that the person has not had breakfast on that particular day. Similarly, there is a causal connection between the clauses of 7b such that the fact

that he took the bottle is a direct consequence of her leaving him. Reversing the connected elements, the causal relation is such that she left him because he took to the bottle (see 4.2.2 for a discussion of the enrichment of conjunctions). Finally, 7d, in its literal sense, provides little information as the sentence merely states that most doctors drink some form of fluid, e.g. water. However, this is a trivial fact given the fact that without water, humans quickly perish. Therefore, most would enrich 7d to specifically mean drink [alcohol]. Note that this directly affects the truth-conditional (or in the framework set out in 2.4: probabilistic estimations) of a proposition.

8) I cannot allow you to drive – you have been drinking all night!

The intended meaning of 8, much like 7d, is concerned with alcohol consumption. Indeed, without the pragmatic enrichment, the statement is equally valid if the other person has been consuming water all night in which case the disallowance would make little sense. These enrichments may seem trivial, but none are present in the linguistically encoded content. The insight that the intended meaning of most utterances relies on other and more than the linguistic content is an important driver for pragmatic theories of language such as relevance theory. The fact that meaning is constructed with the help of enriching the encoded linguistic meaning is called the underdeterminancy hypothesis. Importantly, "Linguistic 'underdeterminancy'… does not entail that there is not fact of the matter as regards the proposition expressed, but rather that it [meaning] cannot be determined by linguistic meaning alone" Carston (2002, pp. 20-21), a point which challenges the code-like assumption that meaning is found by decoding the linguistic content. In other words, a key insight from pragmatic enrichment consists of the fact that the encoded linguistic content cannot be sufficient to explore what is communicated given the fact that the linguistically encoded content is enriched by implicatures and explicatures (see below), which in turn may be driven by a variety of factors such as cultural influences, body language, tonality of voice, etc. This insight is key to conceptualising spoken persuasion, as the linguistic underdeterminancy shows that the persuasive attempt cannot be reduced to the raw linguistic material. In other words, analyses and psychological models of persuasion processing need to take into account extra-linguistic factors and pragmatic enrichment in order to appreciate the complexity of the linguistic interaction.

As mentioned in the above, Gricean pragmatics and relevance theory account for enrichment in different ways. In Grice's perspective, interlocutors adhere to the co-operative maxims of conversation whereas the cognitive principles of relevance guide the enrichment from a relevance theoretic point of view. Notably, the maxims operate from an ethical stance such that conversation in this view is open, honest, and contributing directly to the topic in hand. This reminisces of the aforementioned pragma-dialectical stance to principles of decent argumentation in which interlocutors are meant to keep to their respective turns of contribution, avoid logical fallacies if possible, and carry forth the argumentation in a straightforward manner (Eemeren & Grootendorst, 2004, see also Eemeren et al., 2009; 2012). It is important to note that this is a different normative scope than the one presented here. As mentioned in the introduction and 2.4, we have to be careful concerning the type of normativity in theoretical play. The maxims, as well as the pragma-dialectical account, seem to be constructed on premises derived from an ethical stance concerning the societal and epistemological desirability of conversation and argumentation. That is, given an open and honest conversation, it *would* be desirable if interlocutors were brief, concise, to the point, and so on[148]. However, in social situations in which the goals of persuader and persuadee may vary and even contradict, and persuasive communication is embellished and strategic, most utterances could be considered to breach the ideals set forth either by being too stylistically embroidered, by omission of warrants, or by other persuasive tactics, which are psychologically successful, but societally undesirable. For a theory of persuasion and persuasive communication to arise, such behaviour has to be accepted on a psychological foundation despite the fact that they may seem ethically repellent.

4.2.1.1. Explicatures, implicatures and their importance for persuasion

Relevance theory provides a step towards a theory of communication, which is less entrenched in maxims concerning desirable communicative conventions (such as the notion that the speaker should be as informative as possible in situations, such as persuasive situations, where this cannot be assumed), and concerned more with the process of how humans subjectively interpret utterances in a cultural context. The cognitive and communicative principles of relevance aim at describing this process.

[148] Whether these maxims would be floundered in a poetic and stylistic context is unclear.

Here, rather than how humans should converse from a foundation of maxims, the theory is concerned with how we enrich the linguistically encoded content with pragmatic effects that makes relevant sense in the context. A crucial distinction for appreciating this is the distinction between explicatures and implicatures. Sperber and Wilson (1995, p. 182) describe the difference between the two

> i) An assumption communicated by an utterance U is *explicit* if and only if it is a development of the logical form encoded by U[149]
>
> ii) An assumption communicated by U which is not explicit is implicit

That is, the frame for developing explicatures stem from the conceptual schema delivered by the encoded logical form[150]. In other words, what follows logically from the logical form (or, as will be suggested, the probabilistic estimations and possibilities of the epistemic content).

Implicatures, on the other hand, stem only from pragmatic enrichment and some utterances, like a brief response to a stranger pertaining to which direction to take, may convey no implicatures at all. That is, implicatures are the implied pragmatic enrichment that takes place between interlocutors when conversing. Centrally to this, it should be noted that this makes the implicatures inherently subjective in interpretation. Consider the following

> 9) We have to make Britain prosper

The explicatures are, to a large extent, confined by the linguistic content such that the proposition expresses a hope for rebuilding the strength of Great Britain. However, the implicatures may vary greatly depending on the specific speaker. What constitutes a prosperous Great Britain varies significantly from speaker to speaker (whether the speaker is Nick Griffin, David Cameron, or Ed Miliband) given the fact that the

[149] As noted after the Carston (2002, p. 144) example presented on the following page, it is not entirely clear what constitutes a logical consequence of the explicature. Indeed, proponents of relevance theory need to account for the precise definition of the logical form encoded in the utterance since it is not clear what the logical form is and how this is developed (although, the development presumably is linked with the principles of relevance (see table 5, see also Levinson, 1987 who argues that apparent problems with explicatures follow from the original definition by Sperber & Wilson, 1995)

[150] Note, however, the fact that the explicatures following from the alleged logical form seems difficult to pin down as a multitude of explicatures can be drawn from the same linguistic content (see examples in Carston, 2002, throughout chapter 2). This lends support to the claim that explicatures derived from the linguistic content should be seen in a probabilistic rather than a logical light.

pragmatic enrichment given cultural background, expectations from the situation/speaker etc. may vary between each individual. Following the theoretical distinction, we are now able to posit the difference between explicatures and implicatures with an example from Carston (2002, p. 144).

Ann: Shall we play tennis?

Bob: It's raining

Explicature: It's raining at location$_{A/B}$

Implicated premise: If it's raining in location$_x$, then it's not possible to play tennis at location$_x$

Implicated conclusion: Anna and Bob can't play tennis at location$_{A/B}$[151]

For persuasive communication, the conceptual introduction and difference between explicatures and implicatures point to two conceptually interesting notions. Firstly, from an analytical point of view, it indicates the potential of the conclusions drawn from persuasive artefacts in analyses. For instance, when Clinton stated 'I did not have a sexual relationship with that woman, Ms. Lewinsky', the distinction between explicatures and implicatures allow for a more seamless analysis of the difference between what the explicated and the implicated premises and conclusions, which thus enriches the terminological scope of persuasion analysis. Indeed, as seen in a variety of rhetorical analyses (as referenced throughout the thesis), the same persuasive artefact may very well be interpreted very differently by different audiences, not only in terms of the more confined explicatures, but also the less constrained implicatures. Keeping with the Clinton example, this allows for a distinction between a discussion of what it said (in terms of explicatures) and what is implied (in terms of implicatures)[152]. Thus, for the persuasion analyst, this distinction is important to keep in mind when discussing persuasive attempts. Secondly, the linguistic conclusions point to the subjectivity of language comprehension and communication in general. That is, the free pragmatic enrichment from sparse linguistic content may vary greatly depending on the

[151] It is not clear why this specific explicature follows from the logically encoded material of the utterance. Indeed, this reading of the explicatures seems to be one of other possibilities (such as 'it is raining here'). As mentioned in the above, the notion of development of the logically encoded material in the utterance needs to be accounted for. However, as argued later in the chapter, relevance theory, as a foundational and cognitive theory of language, is faced with problems given the fact that it relies on metarepresentational content. This issue will be discussed in 4.2.1.2.

[152] In the implicatures, concepts from chapter 3 concerning potential motives and intentions alongside the persuasive intention become central in the interpretation process.

background of the individual[153]. In the present framework, this subjective foundation of interpretative processes is in line with the subjective estimation of content strength and source credibility. That is, reasoning from uncertainty as well as eliciting information in the persuasive setting are inherently subjective processes (although, as mentioned in 5.1, the notion of subjectivity is not solipsistic, but rather social).

4.2.1.2. Metarepresentations

Like mentalizing (presented in 3.2), relevance theory relies on the concept of metarepresentations. Sperber (2000) describes these such that metarepresentations represents the content of representations. In further elucidating, Sperber presents three types of metarepresentations, namely mental, public, and abstract. These metarepresentations form the cognitive and propositional basis for subsequent higher-level phenomena such as explicatures and implicatures (as well as mentalizing). From Sperber (2000) the following can thus be described according to the different types of metarepresentations in which these are written in italics.

10) Peter thinks that Mary said that it is implausible that pigs fly

10a) Peter thinks that *Mary said that it is implausible that pigs fly* (mental)

10b) Mary said that *it is implausible that pigs fly* (public)

10c) It is implausible that *pigs fly* (abstract)

The abstract metarepresentations "…are reduced to their logical, semantic, and epistemic properties…" (Sperber, 2000). Public metarepresentations are concerned with an act that "…typically occurs in the common environment of two or more people; it is an artifact aimed at communication" (Ibid.). As such, the public represents an act of communicating in public, such as attempting to persuade someone else. Finally, the mental metarepresentation is concerned with the inference of the intentions of the interlocutor. As mentioned in chapters 1 and 3 regarding the specific persuasive focus on verbal acts of persuasion between two interlocutors, it is essential for persuasion processing to occur that both recognize the persuasive intention. Thus, the three types of metarepresentations provide a terminological apparatus for discussing different elements of persuasion, namely the probabilistic estimation of the content, the publically communicated act and the intentionality. However, as argued in Madsen et al.

[153] For a more in-depth discussion of explicatures/implicatures, see Carston (2002), chapter 2. See also, Carston (1988; 2004; 2009)

(in prep), metarepresentations are faced with difficulties (see 4.2.2) in terms of functioning as the terminological foundation for persuasion processing. They do, though, provide a helpful terminological screen against which a theory of persuasion might be developed since they are useful in the attempt to distinguish between act and intension.

Pragmatic enrichment as well as relevance theory relies on several assumptions, some of which are challenged here. Firstly, metarepresentations are the cognitive foundation from which more complex processes such as pragmatic enrichment are derived and explained. In 4.2.3, this is challenged from a theoretical point of view. The distinction between explicatures and implicatures is a central concept that sheds light on a higher-level linguistic process, which may clearly be used in persuasive communication; to analyse whether something is explicitly stated in the linguistic content, whether it follows logically *from* the linguistic content (explicatures), or whether it is a result of loose, free pragmatic enrichment (implicatures)[154]. However, the notion that explicatures follow *logically* from the linguistic content may be challenged from a probabilistic point of view. Indeed, explicatures are not *necessarily* derived, but are subject to subjective interpretive processes.

The notion of explicatures/implicatures is central to a later discussion of the subjective interpretation and subsequent evaluation of persuasive communicative attempts. In particular, the subjective process of understanding and enriching language *given* a particular interlocutor links up very well with the formalisation and estimation of content strength and source credibility since these processes are rooted in the subjective estimations and interpretations rather than in some objective measurement. This facilitates a linguistic approach comparable to the Bayesian approach to reasoning given its subjectivity. Given this theoretical link between language and reasoning, it is worth noting the differences in underlying assumptions and how these potentially may be reconciled (as will be a focus throughout this and the following chapter). With this in mind, I now turn to the potential benefits and limitations of pragmatic enrichment from the point of view of the subjective approach to persuasion processing.

[154] The case of Bill Clinton in appendix A briefly investigates a rhetorical case in which the explicature-implicature boundary is used in a fascinating manner.

4.2.2 Pragmatic enrichment: Benefits and limitations

Compared with traditional code-like approaches to language in which there is a direct symbolic relationship between word, thought, and meaning, relevance theory provides a theoretical foundation with concrete cognitive assumptions for bringing language into fore a more contextual, cultural, and subjective interpretive sphere. In particular, the explicatures/implicatures distinction is a helpful tool to describe the contextual implications present in persuasive attempts. To elucidate the benefits from relevance theory, consider the case of conjunctions (see Carston, 2002, chapter 3).

Benefits From a logical point of view, conjunctions (P∧Q) are simple constructs, which are easily captured in the formalised language of mathematical logic (see table 6 for the truth-conditionals to illustrate the logical conjunctions). Importantly, from a mathematical point of view P∧Q= Q∧P due to the notion of interchangeability between conjunctions given the logical rules for truth-conditions (see table 6).

Fig. 12: Venn diagram of logical conjunction

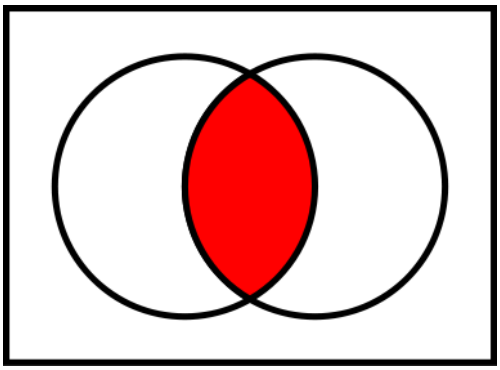


Table 6: Truth-table of logical conjunction

P	Q	P∧Q
T	T	T
T	F	F
F	T	F
F	F	F

From a logical point of view, then, conjunctions are simple. In 2.2, I considered the limitations of formal logic as the appropriate theory of reasoning for the uncertain information provided in a persuasive situation. Here, the argument that formal logic is badly suited to deal with the complexity of persuasion is enhanced by the fact that it struggles to deal with the multiplicity of potential interpretations of simple conjunctions in natural languages. That is, if logic should be the model par excellence for analysing persuasive attempts, it should certainly be able to capture simple conjunctions expressed in natural languages. However, consider the following

7b) She left him and he took to the bottle

7c) He took to the bottle and she left him

11a) I went to Paris and I spoke French

11b) It rains in Copenhagen, and it is sunny in London

These sentences are all of the P∧Q form. As mentioned in the above, the causality in 7b and 7c is very different as the links between cause and effect is effectively reversed. However, from a logical point of view, this should not be problematic as the conjunctions are simply reversed and should thus entail the exact same truth-conditional. The pragmatic enrichment of conjunctions goes beyond causal links such as 11a. Here, there are potentially a plethora of relevant interpretations such as a simple conjunction concerning the linguistic capabilities of a traveller. But it also indicates a temporal relationship concerning the *use* of linguistic capabilities *during* a travel. Finally, 11b is a purer conjunction as the clauses could be reversed without alteration of meaning[155]. On an analytic level, then, a logical approach can encompass only the conjunction expressed in 11b, but struggles with the rest due to the subjective interpretations of explicatures and implicatures. From a pragmatic point of view, it becomes clear that the multitude of potential interpretations and implications in a simple conjunction is impossible to capture in a formal logical framework. Rather, we have to acknowledge the constructed and contextual nature of language such that interlocutors interact on actions of language to make sense of one another.

From a theoretical point of view, then, pragmatic theory in general and relevance theory in particular bring to the table several advances in terms of understanding the complexity of natural languages. Firstly, it appears that the complexity of natural languages, despite attempts of proponents of Lojban and other artificial languages constructed on the premises of formal logic, cannot be reduced to linguistic content and logical structure given free pragmatic enrichments. Secondly, these enrichments are inherently subjective, which is essential to the present theoretical framework. The interpretive processes, much like priors in the probabilistic approach, have to be considered from a personal and subjective point of view such that the same utterance may entail very different implicatures depending on your cultural socio-economic, and personal background. In order to understand why the same persuasive message from e.g. politicians is understood very differently, we need to appreciate the subjectivity of these interpretive processes much in the same way that the subjective reasoning process needs to be grasped from this point of view. If not, we risk a

[155] However, the implicatures of 10b may be multiple if the interlocutors for example are talking about where to go on a holiday.

normative theory of persuasion that negates individual and cultural differences, which would be a serious mistake, as these seem to influence the perception of persuasive attempts to a large extent. As such, relevance theory provides an important step towards a contextual, cultural, and subjective interpretation of utterances that go beyond the constrained limitations of the concrete linguistic content, but acknowledges a richer and more elegant appreciation of natural languages and the creativity of this.

Limitations As evident from the above, the notion of pragmatic enrichment and the distinction between explicatures and implicatures are both very useful concepts in sketching out the verbal communication between interlocutors in the persuasive situation. However, the foundations of pragmatic enrichment as it is conceived by relevance theory rely on metarepresentational content (as described in 4.2.1.2), which carries with it some inherent potential problems and limitations. Sperber (2000) argues that for a metarepresentational account of communication to be possible between interlocutors, humans need 4^{th}-order metarepresentational content. Concretely, this means that 12_1 is the necessary metarepresentational extension of 12 in situations where two or more individuals attempt communication between them (that is, not talking to oneself).

> 12) Mary is saying: "*These berries are edible"*
>
> 12_1) Mary intends that he should believe that she intends that he should believe that *these berries are edible* (Sperber, 2000)

Firstly, theories of communication, according to Grice (1989) should adopt the simplest explanation available (he labels this Ockham's Modified Razor, OMR). From this principle, one might intuitively question the validity of a 4^{th}-order metarepresentation as a necessary cognitive component for communication between individuals given the fact that 12_1 is rather complex compared to the utterance it is meant to describe 12. In other words, the metarepresentational construct seems needlessly complicated to account for a relatively simple utterance. Secondly, the required linguistic movement required in language comprehension given the necessity of 4^{th}-order metarepresentations mandates that the listener receives the initial 0^{th}-order utterance "these berries are edible". Following this, the listener is then assumed cognitively to have in mind a 4-order metarepresentation of the utterance (as described in 12_1), after which the 0^{th}-order utterance becomes comprehensible. Such a movement between orders seems needless if

a simpler explanation is possible and, as such, defies the principles of OMR again. Finally, the notion of metarepresentations is faced with a challenge regarding the fact that the linguistic content that is ultimately the aim (the 0^{th}-order) is embedded within the more complex metarepresentation (the 4^{th}-order one). In other words, the elements of what is sought after (the meaning of the sentence) are already embedded within the more complex metarepresentation apparently necessary to extract itself. This seems contradictory since it requires that the listener already entertain in her mind the utterance, which is sought after.

For these reasons, theories of communication (as well as mentalizing, see 3.2) requiring metarepresentations are faced with significant challenges in overcoming these problems. However, the main conclusions concerning pragmatic enrichment and the explicatures-implicatures distinction are both valid observations despite the fact that the foundation from which they are developed within the relevance theoretic framework seems challengeable. Consequently, given the principle of OMR, it is interesting to explore whether another cognitive foundation than reliance on metarepresentations is possible. Recent developments in language studies have indicated that a probabilistic approach to language evolution, acquisition, and processing might yield a potential candidate for such a foundation since it does not require the same metarepresentational content. This possibility is explored in 4.3. Furthermore, the interaction between interlocutors as well as common knowledge has been shown to matter when humans communicate (see 4.4 and 5.2). As such, these possibilities are explored to ground pragmatic inferences in a collaborative, interactive, and probabilistic foundation, which does not require metarepresentations.

4.3 A probabilistic approach to language comprehension

The previous section argues that pragmatic enrichment seems reasonable to assume as well as relevant for persuasion processing since the recognition of implicatures places language comprehension in a position where the listener subjectively interprets and infers entailments of an utterance. For the approach to persuasion argued here concerning subjective probabilistic estimations as the foundation of persuasion processing, the subjectivity of language comprehension is central. Indeed, throughout the thesis, the notion that truth-values cannot be objectively gauged by the individual,

but always is subjectively mediated is a key assumption, which is thought to be fundamental to reasoning *and* language processes. As such, the pragmatic enrichments as well as the difference between explicatures (what is inferred from the linguistic content) and the implicatures (what is inferred alongside the linguistic content) provide key concepts to describe the effects of verbal, persuasive communication. However, given the reliance on metarepresentations the relevance theoretic approach is faced with significant conceptual challenges if it is to function as the foundation for a theory of (persuasive) communication (see Madsen et al., in prep). Thus, despite the fact that the pragmatic enrichments and explicatures-implicatures distinction lends a valuable conceptual addition to sketching out persuasive communication, it seems that additional foundations need to be invoked to account for these phenomena. As such, the following section presents a cognitive framework for language evolution, acquisition, and processing grounded in probabilistic approaches. Such a framework does not require metarepresentational content in the same way as relevance theory, and it is within the vein of previous assumptions of uncertain information since language, in this approach, is not seen as a code through which the thought is transmitted and inferred, but as a series of verbal and non-verbal cues.

Recent approaches to language evolution, acquisition, and processing have looked at a variety of linguistic phenomena from a probabilistic approach (see e.g. Chater & Manning, 2006, table 1, p. 336 for a table summarizing the probabilistic contributions to language in particular and cognitive processes in general), which resembles the probabilistic approach to reasoning argued in 2.3 and 2.4. These approaches assume probabilistic inference, meaning that rather than reasoning from certainty in which statements are true or false (0 or 1), the persuadee is taken to reason from uncertainty in which statements are more or less likely to be true between 0 and 1). Formally, this is captured by the Bayes' theorem (see e.g. Oaksford & Chater, 2007; Tenenbaum et al., 2011. Importantly, these estimations – and here, interpretations – are inherently subjective *and* social. Thus, two persuadees may listen to the same statement and reasonably arrive at different conclusions if one believes that the statement or argument is weak (e.g. 0.17) and the other believes it is strong (e.g. 0.85).

The evolution of language capacity over time as a cultural and human phenomenon may be described probabilistically (Chater & Christiansen, 2008a; 2008b;

2010; Chater et al., 2009). This longitudinal look at language may go beyond the life span of any individual as it may be concerned with the development of language strings over long periods of time. Slightly more confined in temporal space, language acquisition and development of linguistic capability in children may be approximated by probabilistic models. This focuses on the individual's linguistic development over time rather than the societal development and evolution of language. Both the general evolution of language as well as language acquisition takes place over a prolonged period of time[156]. Persuasive attempts, and in particular persuasion processing, are characterised by being lodged in a concrete moment of time[157]. Of specific relevance to a theory of persuasion processing, then, is language processing, which also has been approached from a probabilistic perspective. Of particular interest to the pragmatic enrichment, probabilistic processing might provide a lens through which the interpretation of implicatures and explicatures can be understood. As evident from the following, probabilistic approaches to language have been employed to explore a range of linguistic elements, ranging from general evolution of 2nd –order languages (see 4.4.), over the individual's acquisition of language to processing of communicative acts in the moment. That is, tracking communication from general development across eons to the development throughout the life of the individual to the active use *in* the specific communicative instance.

4.3.1. Evolution

A central consideration pertaining to evolution is whether the brain has evolved to fit a specific language and thus has a domain-specific language module such as argued in various accounts of UG (both adaptionist e.g. Pinker & Bloom, 1995 and non-adaptionist accounts of UG, e.g. Lightfoot, 2000), or if language is shaped to fit the brain without the existence of such a domain-specific model (e.g. Chater et al., 2009;

[156] As will be evident from 4.4, this reminisces of the distinction between first- and second-order language (Thibault, 2011)

[157] Persuasive attempts may naturally be recorded for posterity, which makes the time-scale of persuasive attempt more fluent. However, persuasion processing takes place at two potential periods of time: in the moment when the persuadee is confronted with the persuasive attempt and subsequently if the persuadee invests additional cognitive effort in evaluating the validity of the persuasive attempt. But being subjected to a persuasive attempt, however, is a phenomenon characterised by being in the moment and consequently processing the attempt in the moment.

Chater & Christiansen, 2010)[158]. An initial argument against the UG comes from a range of data concerning language acquisition (Pullum & Scholtz, 2002; Tomasello, 2003), the neural basis of language (Müller, 2009), and linguistic incompatible phenomena (e.g. Goldberg, 2006), which suggest that UG is not ideally suited to account for the uses of language. Indeed, some authors argue that certain aspects of UG hinders rather than advances communication (Chomsky, 2005; Lightfoot, 2000). Chater and Christiansen post three distinct 'logical problems' for domain-specific accounts (see also Hsu & Chater, 2010). Firstly, each UG should develop to a different linguistic environment given the dispersion of humans, which entails that UGs should diverge to fit their respective environments. However, there is no evidence to suggest that humans are more adapted to learn languages from their own language group. Rather, humans from birth seem to be able to learn equally any of the natural languages (see e.g. Dediu & Ladd, 2007). Secondly, given the fact that natural selection "…produces adaptions designed to fit the *specific* environment in which selection occurs" (Chater & Christiansen, 2010, p. 1134), the development of UG should be context-specific rather than domain-specific. Lastly, changes in natural languages occur *much* faster than changes in genetic make-up. Evolutionarily speaking, as Chater and Christiansen put it, this makes language a 'moving target' for evolutionary adaption. Taken together, these problems highlight the theoretical unfeasibility of an innate, domain-specific language module, and indicate that language is adapted to the brain and the socio-cultural environment rather than the other way around. Importantly, this places language development and use *in* the environment. That is, a process coming from outside the mind rather than an innate module coming from within such that humans learn from their surroundings.

4.3.2. Acquisition

Taking point of departure in the evolutionary notion that language is adapted to the brain and lodged in a social sphere rather than the other way around, Chater & Christiansen (2010) point to the difference in inductions. N-inductions are concerned

[158] Incidentally, the argument concerning the unfeasibility of a domain-specific language module shines a light on the discussion mentioned previously concerning whether or not pragmatic enrichment is neurologically modular. From the probabilistic point of view, the pragmatic enrichment is better explained by invoking cultural interchanges and coordination.

with the ability to understand and manipulate the natural world whereas C-inductions are the ability to coordinate with one another. These are very different types of induction. Thus, for N-inductions require an external world to be manipulated in which performance may be assessed as failed or successful. For instance, the individual effort of picking up a cup is an ability children have to learn to manage and navigate in the physical world. In this way, N-inductions may be solipsistic due to the fact that this is a skill that the individual learns and retains[159]. Compared to this, C-inductions are social in nature. That is, the objective is to do the same thing rather than 'the right thing' (Chater & Christiansen, 2010, p. 1137). Given the social and contextual influences in language acquisition, communication, including persuasion may be approached from a C-inductive perspective[160]. As will be evident from 5.2-5.4, the notion of interactivity and coordination is assumed as a baseline model of communication for persuasive attempts. Some empirical support is available to advance the probabilistic approach to learning. Experimental data suggest that probabilistic learning models may be successful (Chater & Vitányi, 2007; Tenenbaum et al., 2007; Safto & Goodman, 2008; Hsu & Griffiths, 2009; Hsu et al., 2011; Shafto et al., 2012). That is, rather than a innate language module that facilitates language capabilities, humans seem to be sampling positive learning from relevant interlocutors in a coordinated manner in order to make sense of communicative acts.

4.3.3. Processing

Finally, probabilistic models have been applied to language processing, which invariably is the most central element of communication as mentioned previously in this section (see Chater & Manning, 2006 for a review). As Oaksford & Chater (2007, p. 96) mention: "speech processing, in which the goal is to convert a hugely complex acoustic waveform into a discrete symbolic representation of what has been heard [i.e. meaning construction], must necessarily deal with uncertainty". Consequently speech processing

[159] Note, however, that the learning is almost never solipsistic. Either parents are around the child to teach and correct movements, or when faced with a learning opportunity without the presence of other people, it is still possible to remember how other people may have performed a particular movement. In other words, I am critical towards the notion of solipsism, but acknowledge that – compared to C-inductions – N-inductions are lodged more in the individual.

[160] As Chater & Christiansen (2010) point out, C-inductions are easier to perform than N-inductions. See Chater & Christiansen (2010) p. 1138 for a table classifying various problems of understanding according to the distinction between the two types of inductions.

also has to deal with probability. There is some evidence that probabilistic occurrences (that can be described statistically) may facilitate language processing and acquisition (Redington & Chater, 1998; Denis, 2005) such that language processing (including loose, free pragmatic enrichments) may be approached from a subjective probabilistic stance derived from the development of language throughout the life of the individual. Thus, if a child is exposed to a particular word such as 'bed' following the words 'go to', it is plausible that the child probabilistically will expect to hear 'bed' in the evenings. Statistical information can only provide a crude estimation of the potential direction of the utterance. As Chater & Manning (2006) note, however "…we use world knowledge, understanding of the social and environmental context, pragmatic principles, and much more, to determine what people might plausibly say or mean" (p. 339), bringing the connection of probabilistic models of language processing close to the pragmatic enrichment. In this way, the probabilistic approach may offer a foundational aspect of higher-level principles that enrich and shape interactions and communicative acts (including acts of persuasion, see also Rodd et al. 2012; 2013, who argue a similar approach to word retrieval and the use of context to prime the probability of word meaning).

Thus, the findings from the evolutionary development, the acquisition, and the use of language from a probabilistic point of view frame the existence of pragmatic enrichment. Indeed, if free pragmatic enrichment stems from subjective estimations and interpretations of uncertain acoustic and visual information (incorporating body language to the acoustic stimuli), probabilistic models are useful as baseline assumptions for language processing. Furthermore, from a theoretical point of view, it is interesting to note the potential connection between models of explanation in terms of reasoning and communication. Indeed, from a reasoning perspective the model proposed in the thesis is derived from the axioms of probabilistic reasoning. In a similar vein, the subjective interpretation processes from loose, free pragmatic enrichments may be described by invoking similar probabilistic assumptions that might explain such diverse aspects of language such as evolution, acquisition, and processing. Notably, probabilistic models in general and the C-inductive remarks in particular point to the conclusion that language inherently is interactive and coordinated in a social context between human beings. Naturally, we are able to think individually and by ourselves,

but language arises in a social context in which we learn to navigate linguistically. In 5.2-5.3, this notion of interactivity will be explored further as recent developments in psychology and computer science inform us about how humans perform in joint actions to solve complex social situations such as linguistic interaction. Alongside this interaction and coordination, the probabilistic focus presented here places language as phenomena, which is both inherently present in the moment of linguistic interchange, but also is a product of a millennia-long development that reaches back to the evolution of language. In the following section, I present some theoretical considerations concerning this temporal relationship stemming from the field of distributed language, as the general development of language intervenes in the specific persuasive situation.

4.4. Distributed language[161]

The previous two sections provide important concepts in sketching out the act of persuasive communication. However, thus far the theoretical contributions have been concerned with one agent providing a verbal cue to another. In this way, it might conform to the traditional sender-receiver model in which one agent sends a signal, which is subsequently received, interpreted, and inferred by another. However, verbal communication can be seen as inherently interactive and collaborative (in 5.2, the thesis explores the notion of collaboration and interactivity in communication in more detail). Indeed, the notion of distribution of tasks in language between interlocutors such that the sender does not merely send, but also receives bodily feedback from the receiver in the same way that the receiver communicates and sends signals whilst being addressed has been explored in recent years (see Cowley, 2011). For persuasion processing, this is important, as the presentation of persuasive rationales, non-rational influences, and communication often is explored in the traditional sender-receiver manner. Indeed, most methods in rhetorical criticism explore the persuasive artefact in isolation from the receiver (see Foss, 2004 for an introduction to the most prominent theories of rhetorical criticism) and argumentation theory tends to focus on the content and/or structure of the argument. By introducing the notions of interactivity, distribution, and collaboration in persuasive reasoning and communication, the notion of subjectivity and the emergence

[161] I would like to thank Stephen Cowley, Sune Steffensen, Paul Thibault, and (especially) Sarah Bro Pedersen for interesting feedback and stimulating conversations concerning this section.

of probabilistic estimations is placed in the framework of interaction rather than isolation, The potential for interpretation of language and evidence in a collaborative and social sphere is a key assumption of the SPIMP framework and the distributed language approach provides a stepping stone towards conceptualising persuasive attempts and how these are processed.

Pragmatic enrichment and probabilistic models of communication both push the idea that language is more than a referential task in which coding and decoding is the essence of the phenomenon. The notion of distributed language (and cognition) is relatively new and may be said to emerge with Hutchins' *Cognition in the wild* (1995, see also Cowley, 2009; 2011; forthcoming). One of the central tenants of the approach is to firmly place language in a dynamic view that "…integrates ecological, social, cultural, biological, material, and bodily dimensions" (Thibault, 2011, p. 3). Consequently, analyses from a distributed language view tend to focus on a holistic dynamic, which incorporates aspects that traditionally have been neglected in analytical philosophy of language such as the interaction between humans, gaze direction, bodily movements in general, and so forth (see e.g. Linell, 2009; Pedersen, 2012; Steffensen, 2013, section 4). That is, communication is seen as *both* dynamic and symbolic compared to the focus on the symbolic in traditional theories (Raczaszek-Leonardi, 2009; Cowley, 2011). Here, I present the distributed language view since it functions as a theoretical link to the comments already made pertaining to the socio-cultural and interactive foundation of language. That is, language is an organism-environment phenomenon grounded in bio-social with little or no distinction between internal and external (depending on the strength of the assumption). Here, humans navigate as optimally as possible in order to function as efficiently as possible individually as well as in society[162]. One caveat, however, is the fact that the distributed framework is relatively novel, which means that terminological issues are still being debated. The presentation here, then, is a theoretical trend that bears interesting theoretical and empirical findings and points in a stimulating direction for the communicative considerations already presented.

[162] As clear from my comments throughout, I do acknowledge an internal potential process and external influences. However, I assume that the internal processes (such as quite reflection) do not occur in isolation and without the influences of the external. As such, the internal-external distinction blends together to an immersed cognition in the environment.

4.4.1. Distributing language tasks

At the heart of the distributed language view is the awareness of the fact that investigations of linguistic acts should not take point of departure in fixed linguistic systems, but rather in real-time events in which language, action, and perception are integrated between humans in order to make sense of the actions of one another (see Cowley, 2011, see also Steffensen et al., 2010). This focus on interaction and coordination places distributed communication squarely in line with the probabilistic approaches to language, which points to joint action and coordination when humans communicate (this point is expanded upon in 5.2-5.3). From a persuasive perspective, this provides an interesting linguistic backdrop against which the communication between the persuader and the persuadee unfolds such that the act is not reducible to the transmission of codes, but rather persists in a interactive sphere in which both interlocutors act to move along conversation[163]. The coordination discussed in the distributed view is not reduced to the coordination of the linguistic code or the acoustic signals sent in communicated situations. Rather, coordination is 'full-bodied' (Cowley, 2011, p. 186), meaning that coordination takes place in a bodily context in which languaging goes beyond the conveyed words and acoustic stimuli and incorporates nods, gestures, and the complex interaction of movement (see Pedersen, 2012 for an analysis of meaningful bodily movement at a Danish hospital). The bodily grounding of communicative skills seem additionally warranted by Anderson (2008) who argue that the same neural basis might easily be employed for a variety of functions including language and motor acts. Incidentally, this employment should, according to Anderson, happen at various time-scales.

The important point to take away from the distributed framework for the purpose of the present thesis, is the fact that language cannot be reduced to a string of acoustic signals that may be analysed in absentia from the context and interaction in which they occur. Rather, acts of communication arise pragmatically in a bio-social context in which humans make use of their full bodily spectrum (and indeed the available ecology in which they are immersed) to communicate, convey meaning, and

[163] In order words, if communication inherently is interactive and mutually coordinated, strong assumptions of stable and clearly divisible turn-taking are difficult to entertain since the interlocutors work together to be understood and understand (as also posited by the mutual intentionality of the persuasive situation).

sway one another. This puts the process that the persuadee undergoes in perspective as persuasion between humans take on an interactive and coordinated basis such that the persuader does not have a classically understood one-way connection with the audience. Rather, meaning and persuasion are mediated in complex interaction between humans. Naturally, the level of interaction takes place in a continuum. For instance, when an act of persuasion takes place between two people who are face-to-face, the amount of interjections and potential shifts in the persuader-persuadee relationship is frequent. Less frequent interjections arise in situations such as a parliamentary hearing in which members of the opposition might call out during a speech, which makes the persuader reiterate, repeat, alter, or otherwise depart from the initial trajectory. Finally, in some situations interjections and conversational contributions can be near impossible. For instance, at Obama's inauguration speeches (2009; 2013a), persuadees' possibility for interjections is very constrained. However, even in situations such as these, there is a clear bodily interaction between persuader and persuadees such that ovations, shouts, and other reactions are clear interactive elements[164]. In this way, the persuadee may directly affect and influence the persuader as he is speaking, most obvious in face-to-face situations in which nodding, frowning, and other bodily reactions may cause direct conversational contributions for the situation to develop. In other words, the persuader and the persuadee can never be understood in absentia from one another, as language is coordination and interaction between interlocutors. This challenges the classical notion of the persuader delivering a one-way message to a passive audience, and reminds us of the integrated role humans play when persuading and being persuaded.

4.4.2 first and second-order languages

As already mentioned in 1.4, persuasion is a temporally interesting phenomenon given the fact that it represents a temporal intersection of complex influences in terms of past, present, and future. The model (SPIMP) developed in the thesis is concerned with the reasoning process that the persuadee undergoes in the specific persuasive attempt. However, in order to appreciate a richer extent of the persuasive situation, the past and the present have to be taken into account as well. The past (personal, cultural, and historical) is essential because it frames the type of response of which the persuadee is

[164] Note, however, that Obama's persuasive situation is beyond the scope of the present thesis, as the topic of the current discussion is verbal persuasion between two and only two interlocutors

capable and the priors the persuadee brings to the persuasive situation (see Hood, 2012 for a discussion of the developments of beliefs and the 'self'). Without an understanding of the socio-cultural and personal background of the persuadee, reactions that seem unwarranted may be entirely reasonable given the specific background. That is, the past that leads up to the specific moment of persuasion bears tremendous importance in terms of how the persuadee can evaluate and assess the persuasive attempt. The future, on the other hand, holds importance in persuasive situations as much persuasion is concerned with issues that directly affect the future context and choices of the persuadee, e.g. political elections, health decision, etc. are direct involvements in the life of the persuadee. Consequently, persuasion cannot be extracted from the socio-cultural context nor from the perspectives to which the act of persuasion points (as discussed in terms of the temporal influences on epistemic qualities and communication in 6.4).

Linguistically, the distributed framework discusses this temporal aspect by invoking the difference between first and second-order languages. First-order is concerned with a "…contextually determined process of investing behaviour or the products of behaviour (vocal, gestural, or other) with semiotic significance (Love, 2004, p. 530). That is, in the concrete situation of dynamic interchange between persuader and persuadee, a specific act of communication takes place that both have to relate to as an intentional phenomenon (importantly, persuasion has to be intentional as defined in 1.3). However, as already noted in terms of coordination in 4.3, this act is not solipsistic. Rather, it is dynamic, interactive, and coordinated *between* interlocutors. Such first-order behaviour is "…grounded in the real-time dynamics of interacting bodies in and through which persons coordinate their actions, intentions, perceptions, and feelings with each other" (Thibault, 2011, p. 6). Traditional views of language tend to abstract away the linguistic content, but as already seen, this significantly reduces the communicative and pragmatic action and diminishes the linguistic act given the fact that communication is inherently dialogical and cannot be contained in a one-way analysis where the persuader's persuasive attempt is analysed. In the distributed framework, this dynamic, bodily relationship is expressed in real-time from pico-scale events to larger units of time during the conversation. Thibault (2011, p. 7) describes the conversational importance of at least three time-scales.

> N+1: the (sense of) flow of situated social events (measured in second, minutes…)
>
> N: Microscale sayings and doings (roughly, the scale of "moves" and "turns" in discourse-analytical and conversational-analytical traditions… (measured in tens of seconds to seconds)
>
> N-1: Pico-scale bodily dynamics (milliseconds to tens of seconds)

Importantly, these time-scales have to be taken into account for an in-depth analysis of the interaction and joint coordination between interlocutors. Humans are exposed to these interactions on a daily basis throughout our lives, and slowly patterns emerge and solidify in conversational conventions and praxis and vice versa. In assembling such a meshwork of linguistic acts that eventually emerge as a more stable linguistic pattern, individuals play an integral part. This meshwork and stability is what is traditionally being considered 'language' from an analytic point of view (Steffensen et al., 2010).

Second-order language is these stabilized cultural patterns that manifest on longer and slower time-scales. That is, throughout years, decades, and centuries, humans interact and communicate with one another in a first-order, coordinated manner through which these patterns emerge (here, bear in mind the probabilistic evolution mentioned earlier). These may then take form in shape of grammatical structures, conventional explicatures and implicatures, conversational praxis, and so on. Importantly, the second-order is not rigidly fixed such that changes may occur throughout time. And indeed, this is observable in the development of languages, which may happen at different time-scales[165]. When interlocutors meet and perform first-order communicative acts, they make use of the second-order developments in order to have some stable ground from which the conversation might take off. We are, so to speak, dipping into the collective communicative pool of expression, grammar, and so on in order to make sense in the concrete situation. In the specific situation, humans are anticipatory beings who depend on their own predictions concerning the direction of the

[165] Think of the different types of developments of English. Globally, English moves somewhat slowly (although the Internet is increasing development speed), but pockets of language users may quickly develop conversational conventions within their own community (e.g. rappers, poets, cockney rhyming slang, etc.). These local developments may easily be integrated in second-order English globally, but this takes longer time since more people have to get use to the conventions (e.g. the integration of slang in vernacular speech).

conversation (see e.g. Bickhard, 2004; Thibault, 2005a; 2005b). The development of these conventions may subsequently be described over conditional probabilities (Hasan, 2009) as second-order developments are "…culturally transmitted and socially enforced as community standards through schooling and other formal and information learning situations" (Thibault, 2011, p. 10).

For persuasion, the distinction between first-order interaction and second-order development is essential because it hints at the complexity of the persuasive situation, in particular for the persuader. In order to make his case probable and appear both trustworthy and expert so as to make a compelling, persuasive case, he needs to dip into this collective communicative pool and speak *with* the persuadee, or as Burke (1969) would say "walk his walk, and talk his talk" (1969). Burke points to the process of identification between persuader and persuadee such that the persuadee has to be able to recognise an element of herself in the persuader in order to increase likeability, trust, and persuasiveness. For the present purpose, it suffices to note the importance of the development of conversational conventions. These are culturally negotiated and mouldable phenomena that are subject to constant change through individual first-order communicative acts. For instance, metaphors might readily be employed in a persuasive situation. The persuader can draw either from a stable set of conversationally known metaphors or develop a novel expression (as discussed concerning style and persuasion in 4.5).

4.5 Beyond meaning: Style, sound, and mood

Rhetorical theory readily accepts the claim that persuasion potentially is a creative action and that successful persuasive attempts need to contain both persuasive content, but also a compelling style. This is expressed by the fact that elocutio (style) and inventio (invention) make up two-fifth of the traditional rhetorical canon, and modern approaches to rhetoric such as Perelman and Olbrecht-Tyteca's *New Rhetoric* (1969) continue to argue for the inclusion of style as a central element of persuasion (as Plaintin, 2009, rightly notes, see also Kozy, 1970). However, throughout history, sceptics have pointed out that stylistic features distort and mislead rather than provide the audience with honest rhetoric.

The normative question of the inclusion of emotional content, stylistic panache, and auditory elements harken back to the two types of normative stances described earlier. Throughout history, a frequently voiced criticism of rhetorical praxis is concerned with the joint focus on style and content. Stylistic eloquence was seen as a manipulative and shallow way of persuasion from a philosophical point of view, when bare content should be sufficient. However, this normative stance is rooted in the societal type. The theoretical background developed here, though, is concerned with the normative stance of how human beings are persuaded despite what might be desirable, and stylistic ornamentation, auditory elements, and mood have to be acknowledged as important factors in this process as they provide the frame through which a persuasive attempt is evaluated (see 5.1 for a further discussion of framing effects in persuasion). For instance, Lincoln (1863; "a government of the people, for the people, by the people"), Churchill (1940; "I have nothing to offer, but blood, sweat, and tears"), and Kennedy (1961; "ask not what your country can do for you; ask what you can do for your country") are all examples of oratorical craftsmanship that conveys not only the content of the persuasive argument, but also clads the content in a persuasive style that invokes feelings of e.g. patriotism and self-sacrifice. Simply stating that the intended meaning is X or Z does not capture the persuasive potential of such rhetoric as it reduces the act of persuasion to enriched information transmission. Intuitively, the importance of stylistics in persuasion is readily acceptable if one bears in mind the immense labour put into this in advertisements, political rhetoric in campaigns, and so forth. And despite the fact that not much empirical research has been done in the area (especially in terms of discussing the implications of style on the psychology of reasoning), some research does exist to support the claim that style functions persuasively (see Blankenship & Craig, 2011 for a review of stylistic figures and their relation to persuasion[166], see also Sparks & Areni, 2008). Despite the focus on spoken persuasion, it is interesting to note that stylistic changes of visual expressions of a similar topic (in this case, the angle of a camera), may function differently in terms of changes in beliefs (Yang et al., 2010), and that verb types (passive versus active) in

[166] For the present discussion it is of further interest to note that both Sparks & Areni (2008) and Blankenship & Craig (2011) make use of the ELM when discussing the potential persuasive implications of style. A treatment of style in the present SPIMP framework is well beyond the scope of the thesis, but I argue that given the subjective interpretations and strategic potential in persuasion, style is an essential element, the psychological and persuasive effects of which should be investigated carefully.

writing enhanced reading enjoyment, which made the message more persuasive (Carpenter & Henningson, 2011).

The question, then, is how the issue of style is integrated in the reasoning framework developed throughout the thesis. This is still a very open issue given the lack of empirical research conducted in connection to Bayesian reasoning, but as will be evident, style and auditory elements of speech may function as a framing device, as a mood negotiation that can alter the probabilistic estimations, and as a mean to circumvent epistemic vigilance. This, it should be made clear, is speculative and follows from the general framework, and research is needed to further explore the effect of style on reasoning in general and persuasion in particular.

4.5.1. Style, rhythm, and sound

As already noted in the above, stylistics may influence the persuasiveness of an argument. Language is a multi-facetted and multi-performative tool. From a basic perspective, interlocutors need coordination and joint action in a shared environment (see 5.3). From this coordinated, bodily foundation, interlocutors make use of grammatical structures, semantics, and pragmatic inferences. In this linguistic environment, the persuadee combines auditory input (Cosmides, 1983) with body dynamics to facilitate sense-making in the situation by using second-order languages in a first-order manner. From a higher-level perspective, interlocutors may engage in mentalizing and metarepresentational practices to gain a more in-depth understanding of the utterances and bodily dynamics. No surprise, then, the perception of language is a complex stimulus (Pickett, 1999)[167]. To this complex picture, stylistics, rhythm, and sound add another level of difficulty in analysing and appreciating the persuasive potential of communication. In terms of sound, consider the following excerpt from *The Daily Show with Jon Stewart*.

> Jon Stewart (JS): [imitating George W. Bush] We will not apologize for our way of life. Nor will we waver in it's defence [smirky laugh]

[167] Note, that Pickett (1999) is concerned with the complexity of perceiving *words*. That is, the complexity reported in the book is not concerned with the added complexity of coordination and bodily dynamics.

> Jason Jones (JJ): wo-o-o-o-o, Jon, Jon! The cowboy days are over. God, when I even hear that it makes me wanna take off my shoe and jam it down your…
> JS: Right, But those aren't Bush' words. That was me reading the Obama quote you just played for me in Bush's voice. It's the same rhetoric.
> JJ: …*You're* the same rhetoric
>
> (The Daily Show, 20th of January 2009)

As the example humorously illustrates, particular sounds and ways of speaking may invoke powerful pragmatic enrichments concerning the implicatures of the message and the persuasive attempt. Moreover, sound may invoke emotional reactions that potentially skew our evaluation of what is being said. Rhythm is yet another element of communication that needs to be taken into consideration in a richer appreciation of persuasive attempts. Consider the melodic rhythm of Dr Martin Luther King, which is derived from sermons in churches and thus potentially invokes connotations of religiousness as well as audience participation (as Dr King frequently made use of call and response cues in his rhetoric). Finally, stylistics, as mentioned, is an important factor of persuasiveness. Atkinson (1984) notes, presenting political ideas in dichotomies, provide the persuader with an effective way of presenting his message. The final speech in *The Great Dictator* provides numerous stylistic figures. Amongst, the dichotomy is prevalent.

> We have developed speed, but we have shut ourselves in; machinery that gives abundance has left us in want. Our knowledge has made us cynical, our cleverness hard and unkind. We think too much and feel too little. More than machinery we need humanity, more than cleverness we need kindness and gentleness
>
> (Chaplin, *The Great Dictator*, 1940)

The use of dichotomies in this excerpt of the speech, juxtaposes the technological advances with the deprivation of human sensibility. Furthermore, Chaplin makes use of repetition to invoke a rhythmic pattern. Sound, rhythm, and stylistics have received extensive treatment throughout the history of rhetoric as these are acknowledged as

important contributors to the persuasiveness of an argument. However, from a psychological point of view (and especially in the present framework of Bayesian argumentation and subjective probability estimations), they have been scarcely researched and documented. To investigate these elements from a probabilistic perspective to enrich and further the present framework is a fascinating challenge for future research. However, a few speculative remarks may be made. Firstly, it may be hypothesised that emotional content may skew probabilistic estimations (e.g. when angry, a human may estimate the same content differently as compared with situations where the person is happy, see also 7.2). If this holds true, sound, rhythm, and stylistics may potentially influence the emotional content of persuasive attempts such that the persuadee is put in a particular emotional state, which may influence (positively or negatively) her probabilistic estimation. Furthermore, all language is enveloped in some style. Classical philosophers such as Descartes eschew ornamental style and condemn such elocution to be needless embellishment. In doing so and proposing a 'neutral' and 'objective' way of communicating, they forget that plain-speak, too, is a stylistic choice that may be invoked to connote particular implications and sentiments. That is, all words and sentences are clad in style as soon as they are uttered (stylistics can even be said to be present in silence given the importance of effective pauses in speeches). In other words, it is impossible to separate and devoid acts of persuasion from its style. Thirdly, stylistics may function as a framing effect that places a particular idea in a particular frame (see 5.1 for a discussion of framing). Finally, stylistics may provide additional information by invoking pragmatic enrichment, putting the persuadee in a particular mood, and connoting a myriad of poetic references. As such, some stylistics may increase the cognitive effort required to understand a particular message[168]. In this way, stylistics may be a tool to circumvent the epistemic vigilance, as additional cognitive effort may be needed to appreciate the content. Importantly, these are

[168] Think, for instance, of politicians who wish to hide certain policies by wrapping policy proposals or admissions in complex language that needs to be technically deciphered before being understood by laypeople (an example of this is Clinton's use of 'sexual relationship' when initially describing his relationship with Monica Lewinsky since he intended this term in a technical manner by which he in fact did not have a technical sexual relationship with the intern. However, this reading of the concept 'sexual relationship' had to e uncovered. .

speculations of the effect of style, and it remains to be tested and explored to see if these are valid assumptions[169].

4.5.2. Nonverbal communication

As already noted in 4.4, the body plays an integral part in communication and coordination and consequently it plays a part in persuasion. For instance, Pedersen (2012) note how the alignment of the bodies of doctors and nurses may hinder or further particular types of communicative acts, and the general distributed framework emphasises the importance of bodily contributions. Here, like with stylistics, rhythm, and sound, a few remarks concerning body language are warranted. The contribution of body language, appears to be concerned with alignment of communication (Atkinson, 1984; Argyle, 1988) and thus facilitates clarity of communication and supports the credibility of the persuader.

Argyle (1988) lists five main functions of nonverbal communication (thus, including body language, facial expressions etc.), namely expression of emotions, expression of interpersonal attitudes, rituals (such as greetings), self-representations of personality, and finally to accompany speech acts via gestures. The latter is especially salient in a persuasive situation in which, as Atkinson, 1984 notes, gestures may accompany the content of persuasive attempts physically (see e.g. the example of gestural accompaniment of Michael Foot, pp. 82-83). Atkinson further discusses the importance of relevant, clarifying, and magnifying gestures as a mean to increase the charisma of the speaker. As a communicative tool, however, gestures have to be used relevantly and in coherence with the spoken utterance in order to clarify the persuasive message. For instance, if an orator speaks of grandeur whilst accompanying his delivery by gesturing minimally with his hands, the effect may be of confusion rather than of clarification and emphasis. Furthermore, rhetoricians deal with the gestural meta-communicative space in which orators indicate gestural linguistic placeholders. For instance, if an orator states "I can sum up my policies in three concise points" whilst holding up only two fingers, the result may cause confusion rather than lucidity. Indeed,

[169] One way of testing these predictions that style can function as framing is to present the same content in different styles, with different nonverbal styles, and to alert people of the 'trick' to ascertain whether or not vigilance is alerted in a stronger manner. However, the exploration of the psychology of the persuasive potential of style goes beyond the scope of the present thesis, but remains a fascinating and hitherto little explored field in experimental psychology.

empirical data suggests that 'weird' body movements might affect the effectiveness of deception (Bond et al., 1992). The effects of the importance of body language, like stylistics, is an important factor in persuasion and should be studied empirically from the point of view of the present model and theoretical framework. However, this remains to be done in future research.

4.5.3. On persuasive language: defiance of expectations

So far, 4.5 considers the importance of style in persuasive communication and how expressions may convey presence (see 6.3 for a presentation of presence). Alongside these stylistic elements, Vatz (1998) describe how the persuader may create the persuasive situation, thus placing theoretical importance on the persuader's ability to steer the social context[170]. Ending the chapter on language in general and stylistics in particular, the following is briefly concerned with the notion of expectancy in persuasion. This is specifically concerned with the relevant expectations that the audience might have prior to a persuasive attempt. Often, the persuadee carries expectations of a particular type of act of persuasion, e.g. when watching a commercial, we expect that the company tries to sell us a particular product, when listening to a politician on the campaign trail, we expect that she will try to persuade us to vote for her, and so on. However, certain acts of persuasion arise unexpectedly when a situation is turned, a novel idea is introduced, or the mood of a persuasive situation is altered. A splendid example of this comes from *The Great Dictator* by Charlie Chaplin (as did the stylistic example previously). Throughout the film, the audience has laughed with Chaplin as he portrays the dictator and the barber, and the general mood of the film is comical. At the end of the film, following a case of mistaken identities, the Jewish barber who has been persecuted throughout the film, is set to give a speech as the dictator in front of the conquering army. Given the tone of the film hitherto, the audience might well expect a humorous finale. However, Chaplin defies expectations.

> I'm sorry, but I don't want to be an Emperor, that's not my business. I don't want to rule or conquer anyone. I should like to help everyone if possible, Jew, gentile, black man, white. We all want to help one another. Human beings are like that. We all want

[170] Although, as Benoit (1994) notice, the situation provides constraints on what is possible to say. So, this has to be taken into consideration.

> to live by each other's happiness, not by each other's misery. We don't want to hate and despise one another. In this world there is room for everyone and the good earth is rich and can provide for everyone. The way of life can be free and beautiful. But we have lost the way.
>
> Chaplin (1940)

The subsequent speech is a passionate plead to cease greed, malevolent machinations, and hate, which must have resonated powerfully in the context of the second world war and still remains relevant and poetically moving. The audience, however, is placed in a situation in which the previously negotiated social contract of humour is broken. This leaves the audience to relate to an entirely novel expression of sincerity and humanity.

From the perspective of the present theoretical framework, novelty and unexpected acts of persuasion may be explained by invoking the aim of the persuadee concerning vigilance towards misinformation. As fact-checking, consideration of the validity of reasoning and epistemic vigilance in general require cognitive effort, introducing a novel scenario for which the persuadee is unprepared may well prove an effective tool in persuasion as this confounds the ability to be epistemically vigilant. Like stylistics, then, the defiance of expectations might prove a valuable asset for persuaders. That is, persuasion exists in a constantly mediated and negotiated social and cultural situation in which persuader and persuadee have to coordinate and co-act to form and shape the persuasive situation. As discussed in 6.6, this entails that persuasion analysis benefit from descriptive approaches such as the ones found in many rhetorically critical methods (see Foss, 2004), and it moves language and especially the persuasiveness of communication into a less constrained spectrum, which has to be acknowledged from a perspective that seems difficult to formalise from a logical point, but has to be approached from a contextual and cultural perspective.

Summary The chapter brought forward a range of important points concerning the communicative acts between the persuader and the persuadee. Firstly, language cannot be reduced to logical connectors given the pragmatic inferences stemming from explicatures and free implicatures. As such, the chapter substantiates a general point concerning formal logic argue throughout the thesis, namely that formal logic is faced with serious difficulties when approximating and formalising reasoning

and also natural languages. Rather, the framework places communication inherently in a mediated and negotiated, cultural context in which humans make use of second-order languages in order to perform first-order linguistic acts. That is, communication in this framework is seen as something inherently coordinated, collaborative, and full-bodied in which the persuader is not simply transmitting a persuasive proposal to the persuadee, but has to communicate *with* the persuadee. If this collaborative effort is shunned, the act of persuasion may well be misunderstood or the persuadee may not engage with the persuader. From this perspective, then, language is a performative acts as mentioned in the early speech act theories, which happens in a coordinated perspective. The notion of coordination will be explored further in 5.2-5.3, both from a linguistic and a reasoning perspective. In other words, persuasion is inherently placed in the realm of the social (see 5.1). As mentioned, persuasion temporally reaches beyond the specific moment as the interlocutors make use of past experiences, knowledge, and so on to guide their priors and likelihood estimations, and central to many persuasive proposals is a strong awareness of the implications on future behaviour. This perspective qualifies the model proposed in 7.3. The theoretical framework points beyond the concrete situation, but the model formalises the process *in* that situation *given* the temporal, and socio-cultural constraints. Or as coined and presented in 6.4: a flash in a flux. Language, then, is an enriched, coordinated, inter-bodily and dynamic process, and the persuasive use and the interpretation of said communication should be seen in the light of the persuasive intentions on behalf of both interlocutors and the theoretical framework strongly suggests the incapability of reducing persuasive communication to a logically decodable code, but rather suggests an interactive and dynamic position. Furthermore, given the importance of style, rhythm, sound, and the potential persuasive effect of defying expectations, persuasion is inherently creative and productive. To navigate the complex social sphere, both as persuader and persuadee, is tricky given the amount of uncertain information and asymmetry in aims and knowledge, and the most successful persuaders are surely the ones who are innovate in thinking, style, and modes of delivery As such, the present framework agrees wholeheartedly with Aristotle's perspective that rhetoric is the *art* of persuasion. Indeed, in the view proposed here, science might help understand the 'tricks' of the persuader, but it does not replace the artistic and creative element of production. Thus,

science can improve out understanding of complex phenomena (for instance, how science has increased out understanding of art and the perception of drawing, see e.g. Chamberlain, 2013) in the same way that looking at persuasive artefacts from a rhetorical perspective might yield clues about how language processing and reasoning functions.

Chapter 5: Interaction

All our knowledge is the offspring of our perceptions

Leonardo Da Vinci

Any fool can make a rule, and any fool will mind it

Henry David Thoreau

So far, the components of the acronym in the SPIMP have been fairly obvious. The Subjective-Probabilistic (SP) element is described in the probabilistic, Bayesian approach to content strength and source credibility, which constitutes the foundation for how SPIMP provides a Model of Persuasion (MP). The present chapter explores the Interactive (I) component of the model and provides a communicative and reasoning context for the argument that humans influence one another when communicating, thinking, and reasoning about acts of persuasion. As Frankfurt puts it, "[a]s conscious beings, we exist only in response to other things, and we cannot know ourselves at all without knowing them" (2005, p. 66). In particular, interaction puts in perspective the conceptual appreciation of subjectivity since the probabilistic estimations of content strength and source credibility and the interpretation of the communicative acts, though personal and subjective, are not solipsistic, but socially influenced. The SPIMP specifically models and describes persuasion processing for verbal acts of persuasion between two and only two interlocutors (although, the model is potentially expandable to include more than one persuader, see fig. 13 in 5.1). Therefore, the interaction and its importance for reasoning and communication considered here is concerned with the type of interaction in which two interlocutors are faced with one another in a physical environment (i.e. not via digital media, via the telephone or similar types of communication). As such, the persuadee can necessarily interact and engage with the persuader in the persuasive situations explored here. Persuasion via the telephone, through digital or other means, brings with it a host of different ways of communicating, social conventions, and ways of managing the persuasive attempt (for instance, it is easier to blur one's identity online than when face-to-face with the persuadee). This is not to say that these instances of persuasion are not important, but it is necessary to limit the scope of the thesis. Thus, 'interactivity' is here understood as interaction between two and only two interlocutors who share a physical space and communicate verbally (gather than with, e.g. sign language)[171].

Chapters 2-4 considered various central elements to processing persuasion such that we have established the plausibility of a theory of persuasion relying on

[171] On a speculative basis, however, many of the central elements (such as probabilistic estimation of argument strength and source credibility) will remain similar in other types of persuasion, and the theoretical foundation presented throughout the thesis might thus provide a conceptual springboard to discuss these. However, to explore the psychology of other forms of persuasion is an issue for future research.

dynamic communication, the interpretation of the speaker in context, and the subjective, probabilistic estimations of content. Together, they suggest a tentative theoretical lens through which the complexity of the persuasive situation may be appreciated. In discussing these, however, it has collectively emerged that each of these aspects, subjective probabilistic estimations, source credibility, and language, exist in an interactive, coordinated context. So far, the concepts of interactivity and coordination have remained elusive in discussion despite figuring as an underlying assumption and activity running through the other concepts. This chapter remedies this by looking at the notions of interaction and coordination from the perspectives of joint action, common knowledge, and context in order to frame the theoretical contribution of the preceding concepts. Providing the theoretical context for appreciating these concepts in hindsight and further pointing towards an integrated theory of persuasion, the chapter presents and discusses recent findings from social psychology and coordination literature that have significant bearings on content strength, source credibility, and communication.

As evident, the SPIMP approach developed in the thesis is predominantly conceived as a cognitive psychological model. The focus of the theoretical discussion of the thesis is concerned with the persuasive situation between two people in which the act of persuasion is delivered via verbal (bodily) dynamics. This specific act of verbal persuasion is, however, firmly lodged in the social, contextual, and cultural interaction and immersion, and consequently this needs to be considered in order to flesh out a more in-depth theory of interpersonal spoken persuasion. In particular, the elements concerning content strength and language acts are shaped by the interaction as argued in 4.3-4.5. The chapter deals with this aspect of the theoretical foundation. Furthermore, in discussing this, I acknowledge the limitation of the persuasive situation under consideration since influence (i.e. change in behaviour) may happen for other reasons than spoken communication. For instance, recent findings in social psychology (5.1.1.) and behavioural economics (see 5.1.2) show the influence of group dynamics and changes in the choice architecture on beliefs and, especially, behaviour. A rich theory of persuasion must be able to connect the cognitive with the social aspects of psychology, and consequently the discussion in this chapter helps frame the theoretical contribution of the thesis by placing it in relation to the (equally important) social psychological findings. Broader sociological and cultural theories are relevant as well when examining

persuasion since these provide the frame for the subjective estimation of probabilistic content. Such broader aspects are, however, only considered very briefly in the thesis (in 6.2) because of its focus on spoken persuasive attempts between two people. As mentioned before (in 1.8) this focus reduces the impact of broader social and cultural perspectives. Therefore, even though these are still important, they fall outside the scope of the thesis.

Throughout the discussion in the thesis, I have frequently made reference to the social and contextual aspect of persuasive situations. Indeed, one of the most influential recent contributions to the psychology of persuasion, Cialdini's *Influence* (2007), stems from social psychology. Therefore, chapter 5 provides an interactive perspective and chapter 6 further expands the social perspective concerning how subjectivity is immersed in the contextual that points toward the role of social psychology in relation to the psychological frame work which will be fully presented in 7.2. as well as the SPIMP in 7.3.

The chapter falls in five sections. Firstly, 5.1 examines how the social psychological literature contributes to setting the context in relation to persuasive acts, potential behaviour change, and the SPIMP. This provides the foundation for subsequent discussions on the contextual importance of the interactions. Following this, 5.2 discusses how the main concepts of interactivity, namely joint action, common knowledge, and coordination, shape the communicative act of persuasion in terms of the persuasive aim and potential, but also bear important theoretical entailments for language and reasoning in general. Finally, 5.3 takes its point of departure in the interactive situation of the persuasive act in an attempt to explain how the social and interactive theories and concepts have an impact on the definition of persuasion as developed throughout the thesis.

5.1. Insights from social psychology

The way other people behave and the set-up of the environment change how humans approach and evaluate a situation. In order to appreciate the contribution of various findings from social psychology, it is useful to consider the theoretical position of the current model developed in the thesis. The SPIMP approach and the surrounding theoretical frameworks concerning source credibility, and content strength are

concerned with a concrete type of persuasion, namely verbal persuasive attempts between two and only two interlocutors.

A comprehensive model of persuasion has to take into consideration more than verbal utterances, more than just interpersonal persuasive acts, and wider social contexts. However, the focus of the thesis remains the verbal situation in which evidence is presented in an interpersonal setting. This choice of this limitation has been made because this initial formulation of the novel SPIMP approach will be more straightforward in a quite simple situation. Extending the SPIMP framework to include several persuaders is possible, but has clear empirical implications. The persuasive situation will be increasingly complex. This may for most parts be captured by the basic idea of the model, but some parts will be affected and have to be adapted[172].

The incidence with multiple persuaders is thus beyond the scope of the thesis. However, given the fact that the probabilistic estimations are taken to be subjective, the social and the interactive are highly important aspects of the current psychological approach, even in situations with only one persuader since the persuadee is still lodged in a social context (in which there may be other people aside from the persuader, but where no other persuader participates in the persuasive interaction). Indeed, the persuasion, with the definition presented in the thesis, further differs from argumentation and information theories in the way it acknowledges that the social situation is negotiated given the persuasive intention rather than restricting the persuasive potential to the linguistic and communicated content (as described in 1.6). In order to appreciate the social context of persuasion we therefore need to present insights from social psychology for three reasons. Firstly, social psychology has done immense work in describing the influence that other people and social constraints exert on a persuasive incident. Secondly, a richer psychological theory of persuasion needs both a cognitive and a social element. Indeed, the findings from much cognitive literature on reasoning argue the importance of the interactive, contextual, and social element, and as such social psychology becomes a fundamental lens through which to understand the contributions from the cognitive field. Thirdly, by appreciating the social, the concepts,

[172] One potential consequence of the increased complexity of multiple persuaders is an increase in cognitive load, as the persuadee now has to consider an increasingly complex situation. Therefore, we may predict that epistemic vigilance is further challenged in situations with high complexity since the persuadee has to keep in mind a greater range of potentially differing aims and objectives when multiple persuaders are involved.

theory, and the subsequent SPIMP model become clearer in terms of contextuality. Collectively, these considerations warrant a look at the social side from a persuasive point of view, and the present section is a snippet of a complex and vast field of literature to indicate some important contributions to a theory of persuasion. As evident from the illustration of how various disciplines relate the persuasion (1.1, fig. 2), the research from social psychology mainly stem from behavioural studies where changes in the social lead to changes in behaviour. As mentioned, this is influence and merely indicative of persuasion, but it remains an important leeway into the social influence *on* persuasion.

5.1.1. Cialdini's social psychological tools of persuasion

The distinctive lesson to learn from social psychology, in the present framework, is the fact that no action or emergence of belief is done in isolation[173]. As such, social psychology provides a lens through which the emergence of probabilistic estimations can understood as well as the background against which actions take place. Cialdini's *Influence* (2007) is one of the most prominent books on the social psychological aspects of persuasion. In the book, Cialdini goes through an impressive amount of social psychological data that suggest various ways in which humans are persuaded to change behaviour. In the end, he lists six main social psychological tools of persuasion, namely reciprocity, commitment and consistency, social proof, authority, liking, and scarcity. In the ensuing, I will very briefly present the ideas underlying reciprocity, scarcity, and authority since Cialdini's work reciprocity and scarcity contributes only marginally to the SPIMP framework and due to the fact that I have already dealt extensively with authority in chapter 3. Scarcity is concerned with the influential potential of the lack of resources such as time and goods, which will increase the likelihood of the persuadee doing what the persuader intends given a pressure of time. However, the persuasive situation considered in the thesis is concerned with changes in beliefs, which do not go on sale or expire after a certain period of time has passed. As such, scarcity is less important. The same goes for reciprocation, as this is concerned more with a social

[173] This can even be said to include actions taken in complete isolation due to the fact that others have influenced social conventions, modes of thinking, etc. throughout the life of the agent. As such, even solitary actions carry with them the trace of the social. However, here we are considering persuasion between two and only two interlocutors, and therefore the influence of the other is even more apparent.

contract than changes in beliefs. For these reasons, I will more in-depth discuses how the remaining tools of social proof, liking, and consistency have important implications for the SPIMP framework.

Commitment and consistency Cialdini's commitment and consistency concepts provide a social psychological perspective on the local-global consistency issue discussed in 2.7. Cialdini notes that humans have an inert tendency to strive for consistency within themselves and their actions and behaviour. Thus, if the persuader gets the persuadee to commit to a particular trajectory, the theory goes that it subsequently becomes easier to invoke more fundamental changes in behaviour on the same line as the initial commitment. That is, humans are thought to immerse themselves in the action of a particular type and stick to the self-image that this portrays (see Guadagno & Cialdini, 2010 for a review of findings), and commitment has even been suggested as a coping mechanism *against* persuasive attempts (Gopinath & Nyer, 2009). This notion of commitment and constancy harkens back to the local-global consistency issue. In the present framework of subjective probabilistic estimations on the spot in a complex flux of temporal influences (see 6.3-6.4 for a discussion of this), local consistency within actions become central as humans are taken to evaluate particular instances of persuasive attempts on the spot from previous experiences concerning what they believe they believe and what they recall having done previously in their lives ("oh yes, I am a socially conscientious person, so this policy appeals to me"). Cialdini's notion of consistency adds to the notion of consistency discussed in 2.7, as it is concerned not with belief consistency, but with consistency of action. One of the fundamental assumptions throughout the thesis is that humans are geared towards consistency such that their beliefs and desires are consistent with what they generally otherwise believe and desire. Note that this gearing towards entails a movement *towards* consistency such that most humans tend to be conflicted in some way (for instance, there can often be discrepancies between beliefs and desires, e.g. belief that crisps are bad for you, but a desire to eat some nonetheless). As such, the intentionality of humans (discussed in 6.1) is driven towards being consistent and entertaining beliefs that are consistent within themselves (first, as discussed in 2.7, on a local level, then only potentially on a more global scale). Cialdini's social psychological principle of consistency adds credence to this assumption in that it indicates a desire for consistency,

not only on the level of beliefs and desires, but also on the level of action[174]. Thus, the social psychological notion of consistency supports the notion discussed in 2.7 as a fundamental trait of human intentionality.

Social proof We take cues from one another when (consciously or unconsciously) deciding how to behave, what to believe, and on what to focus. The social proof of persuasion is concerned with the instance in which changes in behaviour occur simply because other people are acting in a particular way. For instance, Rao et al. (2001) provide evidence that people make use of social proof in deciding whether to initiate or abandon coverage of firms listed on the NASDAQ. Social proof is a tricky concept, malleable to cultural change. Thus, Cialdini et al. (1999) show that in more collectivist cultures (they compare the USA to Poland), social proofs are more effective. Further, social proofs are amendable given other factors. For instance, romantic desire can lead to the outcome that social proofs become 'counter-persuasive' (Griskevicious et al., 2009). The social proof can be seen as social psychology in pure form since it is concerned with the actions of others (as compared to commitment and consistency, which is concerned more with the desire to be or appear to others as consistent regarding ones own previous actions). However, the distinction between influence and persuasion is important here, as social proofs might yield different behaviour without necessarily changing the beliefs of the persuadee. For instance, imagine a person standing on an empty road at a red stoplight, waiting for permission to cross despite the fact that there are no cars. Then, another person crosses before the light turns green, and the person decides to follow suit and cross despite the fact that the belief concerning whether or not she would be run over has not been altered (i.e. believing that there are no cars on the road)[175]. In the SPIMP, a range of factors is thought to influence how beliefs emerge and are probabilistically estimated in the situation. Cialdini's principle of social proofs support the notion that beliefs are not solipsistic since social proofs provide indirect evidence that humans guide their perception of their world from the actions and behaviour of others. If beliefs were truly solipsistic, the behaviour of others would matter less (if it would matter at all). Thus, the principle is telling of the type of

[174] The notion of social contracts and expectations, however, might be a strong influencing factor in driving people's desires to appear consistent in their behaviour.
[175] Other beliefs, however, might have changed (such as the acceptability of jaywalking), but as a simplified example, the above illustrates the point that social proofs may yield behaviour change without change in beliefs.

subjectivity considered in the thesis since subjectivity can be taken to mean subjective to the person or subjective to the person as influenced by other factors. The thesis assumes the latter version of subjectivity (in line with Hood, 2012, and as discussed in 6.2), and Cialdini's principles of social proofs lend support to this assumption. As such, an exploration of social psychological evidence strengthens the framework of the SPIMP.

Liking Alongside the notion of authority, Cialdini (2007) pays importance to the aspect of liking as a persuasive tool. Liking refers to how enjoyable and likable someone is, and, according to findings in social psychology, liking is not confined merely to friends and family, but also strangers with whom we strike a connection. As such, it bears resemblance to the arête aspect of classical ethos. Notable, phronesis (expertise) and eunoia (trustworthiness) are captured in the formalisation of source credibility in 3.3. From an ELM and HSM perspective, the likeability would presumably feature as a peripheral cue as it is not central to the evidence provided by the persuader. In the present framework, however, the elements identified in the SPIMP approach (content strength and source credibility), extraneous influences such as social cues, likeability, and contextual influences on perception feature as modifying factors that shape and push the probabilistic estimation. Importantly, however, these are always present in the model. That is, despite the best effort to remain objective, whether the persuader is charming is thought to play a role in the perception of the persuasive attempt. However, this is gradient, as the persuadee may invest more cognitive effort into minimizing the influence of these factors (see 7.4 for a discussion of this). Liking provides an interesting perspective on the notion of trustworthiness (which was identified as a main element of source credibility in 3.3) and as such it points to the fact that the notion of trust is multifaceted and complex. Indeed, the elements of the SPIMP (content strength and source credibility, which is divided into trustworthiness and expertise) might be the central elements identified in developing an alternative theory and model of persuasion processing based on a probabilistic approach to human reasoning and communication, but Cialdini's principle of liking indicates that the discussion is not exhausted and concluded with the identification of these elements. Indeed, persuasion is a massively complex phenomenon that involves a range of issues not discussed here such as charisma, body language, coping mechanisms (although, this

is briefly discussed in 7.4), and so forth. Thus, the principle of liking indicates the fragmentation of the notion of trustworthiness such that it can be explored in more detail and qualified in a more precise manner. As such, liking points to future research and challenges for the SPIMP.

Authority As already dealt with throughout chapter 3, authority is an important factor in persuasion processing. This has been shown both by the ELM (Petty & Cacioppo, 1984b) and by the present framework (Harris et al., submitted). Further, the different types of authority presented in 3.3 (epistemic, administrative, and cultural) further nuances the influence of the general label of authority. The conceptual discussion and formal representation in 3.3 deals with how source credibility (and not of the ad verecundiam type) influences the perception of the evidence presented. Here, however, the literature on authority is concerned more with the social influence of authority rather than the argumentative. For instance, amongst other social psychological experiments, Cialdini (2007) cites the Milgram experiment (Milgram, 1963) to show the importance of authority in persuasion. Here, told to do so by lab coated experimenters, participants thought they delivered electrical currents of dangerously high voltage to a fellow participant (who was in fact collaborating with the experimenters). As such, the different manifestations of authority need to be taken into consideration when analysing the complexity of persuasive attempts.

Reciprocation Reciprocity is the notion that good deeds socially seem to mandate the response of other good deeds (and conversely, ill treatment warrants bad reactions). Cialdini (2007) mentions free samples in the supermarket as an example of behaviour change via reciprocity. Additionally, Fehr & Gächter (2000) provide empirical support in a common goods situation. Here, an increase of potential reciprocity leads to an increase in contributions to the common good. Likewise, when a disguised experimenter bought a participant an unrequested drink, the participant was more likely subsequently to buy raffle tickets from the disguised experimenter (Regan, 1971). Finally, reciprocity by proxy indicates where reciprocation from a benefactor provides value for a third party on behalf of the intended reciprocation target (Goldstein et al., 2011). From the principle of reciprocity, it seems clear that social norms play a crucial part on behaviour changes. That is, without necessarily uttering a phrase,

changes in behaviour may be achieved, which puts in perspective the focus of the spoken, interpersonal persuasive situation investigated in the thesis.

Scarcity Finally, Cialdini (2007) describes scarcity of resources and time as a persuasive tool.That is, if the persuadee imagines that a given opportunity (e.g. the right to vote for a particular candidate) is time-constrained and potentially limited in stock (such as clearance sales), this might spark changes in behaviour. Note, however, that the principle of scarcity refers to the subjective perception of scarcity rather than the actual scarcity. Thus, objectively there may be plenty of a particular resource, but if the opposite is experienced by the persuadee, it may still be thought of as a scarcity situation. For examples of scarcity, see Cialdini (2007).

Simon and Jones (2011, pp. 220-228) discuss some potential limitations to Cialdini's persuasion tools. Of particular interest here, the primary focus is on the tools available for the persuader such that he may induce a change in behaviour or the beliefs of the persuadee. Cialdini may neglect the complexity of the interaction and the possibility of defection. As discussed in 3.1, humans are equipped with epistemic vigilance. Cialdini's so-called 'click and whirr' approach indicates a deterministic appreciation of the social influences, which overstates the persuasive effect of the tools given the fact that humans are perfectly capable of refraining from opting for the same behaviour as their peers or avoiding reciprocating a kind gesture. The effect of the principles, in other words, should be modified (and indeed, Cialdini acknowledges the fact that humans can avoid these persuasive effects by discussing how at the end of each chapter and that the tools work better in some conditions than in others).

From the six empirically supported principles of persuasion posited by Cialdini (2007, see also Goldstein et al., 2009) it seems clear that a solipsistic approach to persuasion is inherently unwarranted. That is, classic models of communication and argumentation tend to assume the persuader and the persuadee as separate entities in the persuasive process, and that the persuasive attempt is transmitted by the persuader and then processed by the persuadee. However, from social psychology, we can gauge at the social influence in the on-the-spot construction of beliefs, perception, and attention, which shows interactivity in work: humans cannot be reduced to solipsistic processing engines, but have to be taken into consideration *via* the social and contextual. This social and interactive view subsequently provide an interesting theoretical background

for the later development of a theory of persuasion relying on subjective probabilistic estimations given that these subjective estimations become social and cultural rather than solipsistic.

Secondly, and as indicated further throughout this section, the evidence from Cialdini shows the range of changes in behaviour, which in turn helps qualify the contribution of the thesis. The focus of the thesis is concerned with interpersonal, verbal persuasive attempts. The thesis, however, has to acknowledge the importance of the social contribution in order to appreciate the processes that the persuadee undergoes given the fact that this social situation contributes in shaping her immediate beliefs, perceptions, and so on. In other words, it is entirely possible to obtain changes in behaviour and belief without uttering persuasive appeals verbally, but it is not possible to utter spoken, interpersonal persuasive attempts without the acknowledgement of the social, cultural, and contextual situation. In this way, by incorporating insights from social psychology, the contribution of the thesis is a cognitive model of persuasion processing in the social moment. That is, a model of a specific instance of persuasive attempts, which can be seen in connection with the principles of persuasion mentioned above.

5.1.2. Contextual influences on behaviour, estimations, and communication[176]

In persuasion studies, Cialdini (2007) remains the most influential book concerning specific tools of persuasion that aims at changes in behaviour (such as voting, buying a car, etc.). Alongside this concrete look at the social nature of persuasion, social psychology contributes with more general insights on social influence, group behaviour, and interactive dynamics and how these influence beliefs and behaviour. However, before venturing into the social and contextual, it is warranted to reiterate the difference between persuasion and influence since this distinction frames the evidence from social psychology in such a way that the evidence becomes indicative and supportive of rather than directly contributing to a theory of persuasion. Persuasion was defined as a strategic communicative act designed to change the beliefs of the persuadee and in a situation where both interlocutors acknowledge the persuasive intention. Note that this definition does not entail action. Influence, however, is broader, as it implies the

[176] I'd like to thank Robert Teszka who provided me with invaluable literature references throughout this section.

influence on behaviour. Indeed, the Cialdini book *Influence* (2007) is concerned with the social psychological factors that might lead to changes in behaviour rather than in beliefs.

[Nudging] can be viewed as a social psychological approach, which is even more focused on behaviour since it argues that the mere physical context might shape how humans behave and thus constitute the frame through which we perceive a given situation. A nudge is defined as "…any aspect of the choice architecture that alters people's behaviour in a predictable way without forbidding any options or significantly changing their economic incentives" (Thaler & Sunstein, 2008, p. 6). Choice architecture is the physical context in which a decision takes place. This could be a layout of a supermarket in which the costumer has to decide what to buy. That is, an alteration of the physical context that entails changes in actual behaviour without coercion. From the point of view of the definitions in this thesis, this does not constitute persuasion as such since there are no two interlocutors present, changes in beliefs are not necessary and the persuasive intention is not immediate. However, it *does* fall under the category of influence since it aims at changing people's behaviour rather than their beliefs per se. Nudges have been explored in a variety of functions such as honesty in self-reports depending on the timing of signing an ethical document (Shu et al., 2012), the use of financial incentive in weight-loss (Volpp et al., 2008), and it has been used to great effect by the Behavioural Insights Team in the British government. Johnson et al. (2012) further qualifies the contribution and understanding of nudging by dividing the effects of nudging into those structuring the choice task and those that describe the choice options. That is, the difference between the decision and the grounds leading to decision. Nudging indicates the importance of the context in which the decision is made. Following the general findings, it suggests that despite the fact there is no infringement on freedom of choice, significantly different behaviour is obtainable by altering the choice architecture.

Nudging indicates the importance of the make-up of the choice architecture as the subject behaves, i.e. the physical environment. Alongside these physical nudges, the choice background is important. Defaults presents a way of approaching the choice background, as they refer to "…what happens in the absence of choice" (Dinner et al., 2011, p. 1). Thus, in the absence of decision, defaults inform us

of the belief background already assumed by the persuadee. As argued in 7.4, persuasion processing is a complex social mechanism where the persuadee may invest more or less cognitive effort, which in turn will influence how critically she may approach the proposed beliefs. Defaults inform us of the effort necessary to change behaviour and support the claim that our perception of issues to some extent is based on the default position from which the issue is approached. For instance, whether or not someone chooses to donate his or her organs post-mortem largely depends on the legal default in society. That is, the difference between whether you have to actively say yes or actively say no to organ donation (Johnson & Goldstein, 2003, see also Goldstein et al., 2008; Johnson & Goldstein, 2012 for more recent explorations of the importance of default positions). In decision-making, the estimation of the worth of a particular product has also been shown to be relative given the particular point of departure and the range of choices possible (Stewart et al., 2006; Seymour & McClure, 2008; Stewart & Simpson, 2008). As such, the lens through which the persuasive attempt is presented might suggest (or even impose) upon the persuadee a frame (much in the same way that stylistics in 4.5 is mentioned as a potential framing effect). Thus, the social situation further provides a general framework for the persuasive attempt to unfold and be received. This calls into conceptual existence the complexity of persuasion since the framing effects might be traced both to the mode of presentation as well as the socio-cultural lens against which it emerges.

Branching over the evidence from nudging and contextual influences such as defaults and the relative point of departure, it seems warranted to argue that expected utility estimations are neither stable nor fixed, but rather that these are relative and depending on the interaction with others and the environment in which the choice and estimation occurs. For persuasion research, this is fascinating since it might be postulated that the subjective probabilistic estimation of the relative strength of an argument and the credibility of the source equally are affected by the physical context, the actions of others, and the defaults against which such estimations occur. In other words, it qualifies the subjective element of the reasoning approach underlying the SPIMP. Indeed, different linguistic frames might yield different outcomes in actions (for instance, loss versus gains, Tversky & Kahneman, 1981), and the framing effects on the outcome of choice have been replicated in a variety of contexts, e.g. early tuition

fees as fines or discount (Gätcher et al., 2009), support for economic policies framed as either employment or unemployment (Druckman (2001), and even in de-contextualised monetary games (de Martino et al., 2006).

The concept of framing is two-fold in the SPIMP framework in the sense that the application of the SPIMP might yield a potential explanation or account of framing as well as the fact that framing may inform persuasion processing and thus the elements central to the SPIMP. The theory of persuasion, as presented in the thesis, relies on a probabilistic approach to human reasoning and communication. Noticeably, the estimations are subjective (the focus of chapter 6 is the notion of subjectivity) and thus responsive to the perceptions of the individual. As indicated by a vast experimental literature in social psychology (some of which is referenced in the above), beliefs, decisions, and behaviour are influenced by the social (as well as the cultural). One potential way of accounting for the effects of framing is to look at how the subjective estimations might change when faced with different frames. That is, by employing a probabilistic framework such as the SPIMP as the foundation for the appreciation of framing, we might get a novel insight regarding the framing effects (indeed, this seems to be in line with McKenzie and colleagues, although this is speculative). On the other hand, framing informs the psychological framework of the SPIMP. As mentioned in 4.5, persuasive attempts can never be separated from or devoid of a stylistic choice. The same might be said for framing and the contextual. Persuasive attempts are never in a void, and always come in a socio-cultural context and in a particular frame. Indeed, by the very nature of communication needing cues such as verbal and nonverbal signals, communication is always framed and styled. As such, the framing of the persuasive attempt draws the remits of the manner by which the evidence can be processed and accessed[177]. As such, the notion of framing can shape the emergence and value of probabilistic estimations and thus directly influence the persuasiveness of an attempt. That is, the same content might be presented to the same persuadee in two different frames and styles, which will entail that the persuadee produces different probabilistic

[177] Naturally, the persuadee might reject the framing of the persuader by considering whether the frame and style is appropriate, but this concerns coping mechanisms and possibilities, which are discussed in 7.4. For now, the simpler version of framing in which the persuader predominantly frames the persuasive attempt is considered.

estimations on the spot, which, according to the SPIMP, should yield different posterior ratings of persuasiveness. In this way, framing directly informs persuasion processing.

The fact remains, despite this potential objection to the original study, that the framing of utterances pushes people, as is entirely expected from the point of view of pragmatic enrichments. Indeed, several researchers (especially McKenzie and colleagues) have studied framing effects in general (McKenzie & Nelson, 2003; McKenzie, 2004; Sher & McKenzie, 2006; 2008; Kareev & Trope, 2011; Kühberger & Gradl, 2013). This suggests the importance of linguistic phrasing as this will shape and influence the interpretation of the likelihood and strength of propositions and thus of spoken, interpersonal persuasion. Indeed, given the empirical support for the relativity of valuation from behavioural economics cited at the beginning of this sub-section, it seems plausible to assume that, given limitations on attention span and cognitive effort, humans may be swayed by the specific phrasing of persuasive attempts.

So far, the evidence indicates the influence of social and contextual cues to behaviour change. However, recent evidence on face-to-face dialogue and direct interaction in communicative situations argue that communication also functions as a joint process rather than as a classically conceived listener-speaker interlocution[178]. The considerations against the classic code-like model in 4.2 already outlined some linguistic problems concerning the transmission of mental states as the baseline for communication and persuasion. *If* the code-like model was correct, we should assume a more introvert communicative stance in which person A transmits a propositional belief and corresponding mental states to person B who decodes the message and mentalizes in order to gain a perspective on the interpretation necessary to elicit the meaning of the utterance. However, in face-to-face communication, interlocutors seem to make use of and be influenced by one another to a large extent; they take cues from the other to determine turn-taking, gaze direction, and general attention and focus (see e.g. Mundy & Newell, 2007; Bavelas & Gerwing, 2011; Holler & Wilkin, 2011; Innocenti et al., 2012; Richardson et al., 2012). That is, in order to make sense of the communicative situation, the listener makes use of physical cues such as gaze direction to navigate the conversation. In this way, the interlocution rests on a simpler, physical manifestation of

[178] The interactive perspective from the point of view of common ground and speech acts will be discussed further in 5.2 and 5.3.

conversation compared to a more complex mentalizing and metarepresentational aspect (see 5.2-5.3).

In this perspective, both the reasoning and the communicative stance are squarely directed at the interactive and the social such that the persuadee needs the persuader in order to make sense of her appreciation of the situation and vice versa. In other words, reasoning and communication can be thought to have evolved to cope with practical situations in which humans need to interact with others in order to process persuasive attempts. In a similar vein, Mercier & Landemore (2012, see also Mercier & Sperber, 2011) argue that deliberation functions best in social situations given the claim that reasoning primarily developed for arguing with others. That is, reasoning has developed as a social skill predominantly rather than as an introvert skill. The SPIMP framework of interaction in reasoning and communication supports this approach and takes persuasion to be a social and interactive situation par excellence since the interpersonal aspect cannot be reduced to the mental states of either interlocutor, but has to take the joint action and mutually mediated into account. This common ground and joint action perspective is explored further in 5.2 and 5.3 and serves as the basis for the existence of the subjective estimations of probabilistic content in the persuasive situation.

5.1.3. Lessons from (and potentially for) social psychology

When developing a theory of persuasion that takes seriously the notion of interactivity and socio-contextual influences, the findings reviewed in 5.1 yield some generally interesting insights[179]. The three main issues presented throughout the chapter have been the importance of the social other as illustrated by Cialdini's principles of influence, the importance of the contextual and the environment illustrated by nudging, and finally the importance of the manner by which the persuasive attempt is framed. Thus, the social, the contextual, and the framing collectively suggest that reasoning and communication are interactive (as defined in the beginning of the chapter) phenomena. Indeed, taken together, the empirical findings discussed in the above support the claim

[179] Note, however, that the findings cited here naturally merely are a sliver of a much larger discipline concerning social psychology and influences on humans that challenge the solipsistic point of view. A more detailed cognitive psychological theory of persuasion needs to take this complexity into account and build a bridge to the social and descriptive in terms of theory and analysis.

that the persuadee can never be construed as solipsistic in the persuasive incident. Rather, findings strongly suggest that beliefs, perception, and attention are all modulated by the doings of others, the make-up of the immediate environment, and the way the content is framed. Of particular interest for the reasoning account described in the thesis, these influences may be taken to affect our estimations of probabilities both in terms of the priors we believe as well as the likelihood of a given argument. As such, this indicates the importance of the contextual and cultural analyses when describing *specific* instances of persuasion. Furthermore, alongside the evidence from reasoning and language theory presented in the chapters 2 and 4, the current evidence puts additional pressure on logical accounts that rely on objective truth-conditional content in order to determine the quality of an argument. That is, formal logic is challenged as the normative foundation for a theory of persuasion on at least three separate levels, out of which the first two have been discussed previously. On an epistemic level, the empirical studies from Bayesian argumentation challenge the truth-conditional dichotomous assumptions. On a linguistic level, probabilistic, dynamic and pragmatic enriched accounts of communication challenge the notion that natural language may be expressed via logical connectors. Finally, the evidence from social psychology challenges the solipsism inherent in some logical accounts, since it suggests volatility and mutability of priors and likelihood estimations. As such, the current evidence lends further credence to the subjective and contextual assumptions from which the SPIMP approach is derived.

It is worth to note, however, that the social issues presented here do not rely on spoken persuasion as such, but on deeds, changes in context, social norms etc. This is a slightly different influence situation than the one presented in the thesis as the focus here is concerned with verbal acts of persuasion. This qualifies the contribution of the SPIMP approach, as this becomes a special instance of a wider range of potential influences on beliefs and behaviour. That is, the changes resulting from the interactive (social, contextual, and cultural) influences may happen in absentia from verbal persuasion, but verbal persuasion cannot happen in isolation from these interactive influences. Thus, the concrete instance of persuasion that is investigated and described in the thesis is a special case of a more general class of persuasion and influence.

Finally, a brief remark concerning coercion and persuasion seems in order as the boundaries between the two may become blurred by invoking these influences as many of them presumably work the best when the persuadee is not considering these (e.g. the influence of ad verecundiam is more effective if the persuadee does not consider the weakness of such arguments, see the discussion of ad verecundiam and its relation to the present framework in 3.3). Burke (1969) is adamant in defining persuasion as a phenomenon in which the persuadee is free to reject the particular proposal and thus is not coerced (i.e. forced). I wholeheartedly support this qualification of persuasion (indeed, Thaler & Sunstein seem to agree with some type of this notion as they present their suggestion of 'libertarian paternalism'[180]). If the persuadee is coerced, the change in behaviour or belief is not a result of an act of persuasion, but of coercion. For instance, handing over your wallet if being held up at gunpoint cannot be considered an act of persuasion. Therefore, the boundaries of coercion stemming from these social situations are interesting to consider. Naturally, whether or not the persuadee is coerced by a particular social instance has to be evaluated from case-to-case, but as a general remark the definition of persuasion presented here is such that a verbal attempt is an act of persuasion if and only if the persuadee can reject the proposed changes in beliefs. Indeed, coercion specifically involves change in behaviour without change in belief (e.g. by threatening someone with a gun in order to make them hand over money concretely involves the fact that the person being robbed does not believe it to be beneficial to hand over the money). As such, coercion might be seen as an opposing term to persuasion.

5.2. Joint action, common ground, and coordination[181]

The focus of the thesis is interpersonal persuasion between two interlocutors, and the interactivity in the SPIMP approach is concerned with the interaction between persuader and persuadee on a communicative and persuasive level. In other words, the focus of the thesis is on persuasion rather than influence. In order to move the theoretical picture further and discuss the interaction between persuader and persuadee (and not social and

[180]Defined as a society that "…preserves freedom of choice but that authorizes both private and public institutions to steer people in directions that will promote their welfare" (Thaler & Sunstein, 2003, p. 179; however, for criticism of the idea, see Mitchell, 2005)

[181] I am grateful to Giovanni Pezzulo for providing me with much needed literature for this section.

contextual influences in general), it is the *interpersonal* (as opposed to the interaction with the physical environment) interaction from a mechanistic point of view that may facilitate or impede a communicative foundation for the persuasive incident. This will provide a conceptual basis for a communicative stance that allows for higher-level cognitive mechanisms such as mentalizing, but which also relies on the physical interaction between the interlocutors. The following section, then, is based on the contributions from social psychology and focuses on joint action, common knowledge, and coordination as central conceptual aspects of describing interaction between persuader and persuadee in the act of persuasion[182]. It should be noted that interactivity between two persons with physical presence involves factors that are also important in other kinds of interactivity. For instance, visual, tonal, and gesture factors as mentioned below are also important in for example film acting where the audience (the 'persuadees') really cannot interact[183]. Thus, the factors mentioned below do not necessarily belong only to interpersonal interaction with physical presence.

5.2.1. Interacting in communication

5.1.2 briefly touched upon the contextual and interpersonal influence on the communication between persuader and persuadee. Adding to this, a range of research has been conducted in recent years to support the claim that, in some way, human communication relies on interactivity such that they make use of visual, tonal, and gestural cues to facilitate language production and perception (e.g. Holler & Wilkin, 2011). That is, communicative and linguistic conventions arise much quicker if the interlocutors have visual information and are able to engage with one another physically rather than purely linguistically. In addition, the conventions also solidify in a quicker manner when interaction is possible such that if the interlocutors are switched round (that is, if the interlocutor believes that she is in conversation with an interlocutor from her established communicative conventions, but in reality is conversing with someone using another set of conventions) during conversation, confusion arises such that the

[182] The remaining sections of the chapter, alongside the general literature cited throughout, takes inspiration in Madsen et al. (submitted) in order to develop the interactive framework and subsequently tie this to the act of interpersonal spoken persuasion.

[183] Furthermore, given the focus of face-to-face, verbal persuasion between two and only two interlocutors, persuasion and communication via media such as television, radio, the internet, etc. are less relevant instances since they are concerned with other types of communicative and persuasive acts. Thus, for the present purpose, interactivity is bound to a physical presence between the two interlocutors.

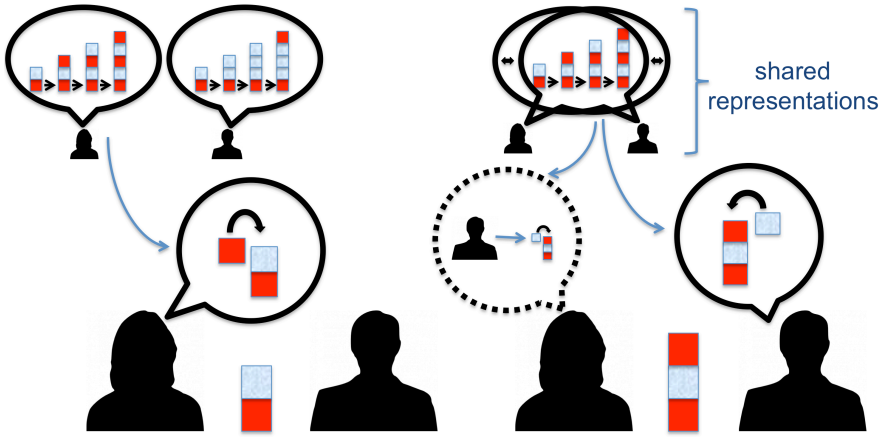
communicative conventions established might be cause of disruption (see e.g. Healey et al., 2007). Indeed, some researchers argue that interaction is an essential underpinning phenomenon, which is necessary for higher-level mechanisms such as pragmatic enrichment, mentalizing, metarepresentational content, grammar, and communication in general (Clark, 1996; Garrod & Pickering, 2004; Levinson, 2006; Mundy & Newell, 2007; Pickering & Garrod, 2007; Shafto & Goodman, 2008; Shafto et al., 2012; Madsen et al., submitted). This provides a psychological and mechanistic foundation for the linguistic components described by philosophers and linguists by lodging communication squarely in the physical interaction *in* the context. This reiterates the point that the act of persuasion cannot be reduced simply to the transmittal and passive reception of the persuasive, verbal utterance. Rather, communication, meaning, and persuasive reasoning exist in a complex dynamic and interactive sphere (incidentally, this is further supported by the empirical findings of the distributed language idea presented in 4.4), which relies on common ground, joint action, and coordination. Given the problems for a metarepresentational basis of communication outlined in 4.2.3, it seems necessary to explore alternative approaches.

Rather than grounding communication in the transmission of mental states, the present view assumes a physical and interactive basis, which relies on two mechanisms that facilitate coordination. First, the interactive grounding requires a class of mechanisms that automatically mimics and synchronises behaviour. This can be produced by motor resonance and mutual emulation (see e.g. Chartrand & Bargh, 1999)[184]. The common ground formation (also known as 'sharing' or 'alignment') is the second necessary mechanism. Common ground might be defined as "…the subset of cognitive variables that are assumed by both agents" (Madsen et al., submitted), which does not entail metarepresentations of the beliefs and intentional states of the other (that requires a 4th level metarepresentational content as shown by Sperber, 2000, see also 4.2.2), but rather it entails an approximation of what is known collectively (as such, the collective knowledge can be thought of as a kind of third party in communication). That is, rather than approaching the mental states of the other as primus foci, interlocutors

[184] This assumption is strengthened by the finding of mirror-neuron-like activity in humans (see e.g. Rizzolatti & Craighero, 2004; Mukamel et al., 2010)

approach what is shared and commonly known (fig. 13 illustrates the common ground stance, taken from fig. 3 in Madsen et al., submitted)[185].

Fig. 13: Sharing representations



The figure shows the difference between the situation on the left where the interlocutors infer metarepresentational content of one another and transmits beliefs and intentions via the linguistic content and the situation on the right where the interlocutors make use of commonly assumed knowledge to guide their perception of the act of communication.

The figure illustrates two different situations. On the left, the interlocutors act on the basis of different presuppositions for action, which makes it difficult for both to predict the actions and beliefs of the other. Conversely, on the right, shared representation and common ground facilitate that interlocutors might predict the behaviour of one another. Pickering & Garrod (2004) argue that automatic mechanisms similar to those responsible for synchronisation of behaviour (such as moving a table together) might produce the alignment phenomenon in common ground[186]. Madsen et al. (submitted) provide the example that co-actors might use similar syntactic expression or they might concretely align on a common belief communicatively, which subsequently becomes common ground (see also Pickering & Garrod, 2004; Sebanz et al., 2006; Pezullo, 2011). However, Clark (1996) notes that common ground might be created intentionally given specific strategies of forming such a phenomenon (e.g. feedback to the interlocutor, see also Pezzulo & Dindo, 2011). Pezullo (2011) describes such intentional

[185] The common knowledge and interactive approach favoured here still allows for misunderstanding since wrong approximations of the common knowledge would result in failed attempts of interpretation and communication.

[186] This notion of interaction also opens for the potential of persuasion via non-rational means where the persuader might elicit automatic mechanisms, which make them more likely to be convinced (one example of this could be the persuasive use of body language to signal confidence and expertise as common knowledge held of the speaker)

actions as "joint action optimization". Indeed, if the listener acknowledges that the interlocutor has a communicative stance, she learns more effectively (Csibra & Gergerly, 2007)[187]. As such, a mechanistic focus on common ground provides an alternative basis for communication in which high-level mechanisms such as mentalizing are less necessary, but still possible (given exertion of more cognitive effort).

As mentioned, common ground is also known as sharing of alignment. Given the dismissal of alignment as a fundamental aim of persuasion in 1.5, however, it might seem conceptually questionable to allow for alignment as the basis of communication. However, the alignment dismissed in 1.5 is conceptually different from the alignment proposed here since the alignment mentioned here is communicative and resides with the mutual intention whereas the former type of alignment is epistemic and resides with the individual intentions (persuader and persuadee). As mentioned in 1.3, three distinct persuasive intentions and aims are ascertainable. Firstly, the persuadee aims at optimizing her beliefs such that they are as probable and useful as possible. Secondly, the persuader aims at persuading the persuadee to believe the proposed belief, meaning that she assigns a likelihood ratio as high as possible to it. However, for persuasion to occur in the specific situation discussed in the thesis, both interlocutors need to acknowledge the persuasive intention of change of beliefs. That is, there is a conceptual difference between the aims of the persuadee, the persuader, and the mutual (as described in 1.3) In 1.5, the alignment dismissed was concerned with an epistemic transmission of beliefs from the persuader to the persuadee such that she increases her probabilistic estimation of what the persuader believes. This is dismissed given the fact that the persuader might wish to deceive. In other words, he wishes to propose a belief in the social sphere that he might not believe himself, but that he wants her to believe nonetheless (an example of this could be a politician trying to cover up a personal scandal before an election since this involves the persuader (politician) intending the persuadee (the voter) to have a low likelihood of whether or not the scandal is true *despite* the fact that he knows it to be true). In this way, as mentioned in 1.5, epistemic alignment cannot be a fundamental goal, although it may be an accidental goal in beneficial persuasive situations. Compared to the epistemic alignment, the alignment

[187] Note that in the specific act of persuasion processing discussed here, the recognition and acknowledgement of the persuasive intention is necessary.

and common ground presented here is communicative. In the persuasive situation, a mutual aim for both is for the persuader to be understood communicatively. From the point of view of the persuadee, she cannot evaluate the proposed beliefs if she does not understand what the persuader is proposing. That is, without an understanding of the communicated, there is no chance for reaping the benefits of the persuasive situation. The persuader also seeks understanding since he wishes to communicate to her his proposed belief. As such, communicative success is a fundamental mutual aim in any interpersonal, verbal persuasive setting. The specific *use* of communication, however, might differ since the individual aims differ. Thus, a deceptive persuader might wish for a certain interpretation of his communiqué. However, on a fundamental level, both are interested in aligning themselves in a communicative manner.

As mentioned, there are various strategies for creating and managing common ground including feedback, intentional strategies, and so forth. The fact that common grounds need clarification indicates that it is not immediately shared, but rather negotiated and constructed in the situation. Indeed, both interlocutors might entertain different ideas of what constitutes the common ground. From a linguistic perspective, if one interlocutor expects the persuasive attempt to take place in Danish and the other in English, a breakdown of the situation quickly occurs. Thus, both bring to the situation their respective expectations of relevance of common ground, which may then be clarified in a coordinated and interactive manner once the conversation begins. As with the probabilistic estimations feeding the SPIMP, the approach to what constitutes common ground depends on a variety of factors, including socio-economic and cultural background, personal experiences and memories, and so forth (as discussed in 7.1 when outlining the general psychological framework in which the act of persuasion takes place).

5.3. An interactive approach to persuasion processing

The influence of interactivity, as presented throughout the chapter, is manifold and each component discussed directly relates to an aspect of persuasion processing. That is, from a communicative, reasoning, and epistemological point of view, the social and contextual interaction with other humans influences how we manage these tasks. From this, the notion of subjectivity becomes more interesting. Indeed, from the perspective

of the present framework, the persuadee *does* indeed entertain her own, subjective probabilistic estimations of the value of content strength and source credibility. However, despite the fact that she constructs these estimations, the frame in which she functions is social, rather than solipsistic. The following will tie together the interactive notions concerning beliefs, communication, and how this affects persuasion processing.

Given the fact that the SPIMP provides a normative model for describing and approximating how the persuadee should estimate the persuasiveness of an act of persuasion given her probabilistic estimations of the strength of the content and the credibility of the source, a central finding of the literature review is concerned with the influence of social, interactive, and contextual factors on beliefs and behaviour.

The influence stems from the directedness of the intentionality in the situation and the presence of the evidence (on intentionality and presence, see 6.1 and 6.3 respectively). It seems that the influence of other humans is both profound and far-reaching in terms of the constructing of beliefs and the planning of behaviour. That is, the estimation of the content strength is probabilistic and subjective, but the subjectivity is lodged in the social rather than the solipsistic. This is a powerful reminder that the act of persuasion and our predictions of how the persuadee should react given a specific persuasive attempt can never be dislodged from the situation in which it occurs. From a cultural critical point, this is in no way novel, but traditional argumentation theory tends to look at the argument in isolation to test the validity of the conclusions. As already mentioned, this entails a different normativity than the one describing the psychological mechanisms involved when humans process arguments and acts of persuasion. Given this epistemic involvement, the distinction between argumentation theory and persuasion theory becomes even clearer, given that the former is concerned with the validity of certain chains of reasoning whereas the latter is concerned with the psychological mechanisms involved in the social, interactive, and immersed situation when processing said act of persuasion. That is, the aim of the descriptions is fundamentally different, which may account for some of the discrepancies between theories of argumentation and moral codes of argumentative conduct such as expressed in the pragma-dialectical approach (Eemeren & Grotendoorst, 2004) and the Bayesian argumentation approach, which investigates the psychology of reasoning (e.g. Oaksford & Hahn, 2006a; 2006b). On a fundamental level, then, the epistemic probabilistic

estimation of the likelihood of a proposed belief is inherently interactive and socially mandated, which shapes the conceptualisation of subjectivity, as it should be understood in the proposed model of persuasion processing.

Alongside the epistemic interactivity, communication is inherently interactive and is based on subjective assumptions and approximations of common ground rather than on metarepresentational estimations (Madsen et al., submitted). That is, rather than a transmission of mental states and propositionally expressible beliefs, the communicative stance taken in the thesis argues that interlocutors manage common ground and make use of conversational conventions that arise both from a 2nd order language perspective, but also conventions that might arise *in* the specific situation. As such, 1st order languaging (Thibault, 2011) relies on 2nd order conventions, assumptions of common ground, and coordination. In this view, the persuader addresses common ground assumptions and attempts to manipulate the conception of the epistemic *through* the communicative in a performative manner. As speech act theorists (Austin, 1961; Searle, 1969) rightly notice, communication is more than simply assertions, but also acts performatively. Of particular interest to the present focus, some empirical findings support the view that interaction and the use of the interactivity may function persuasively in the situation. For instance, Wells & Petty (1980) found that nodding whilst listening to persuasive message led to participants giving more positive feedback and attitudes towards the message as opposed to shaking sideways, and Chen et al (2010) report that subjects were more open to having a conversation (and thus potentially engage in a persuasive situation) as well as to rate the argument more favourably if the persuader express an interest in the interlocutor by asking a elaboration question. Finally, Rodriguez (2012) lend further support to the trend set out in these papers by arguing that it is easier to influence people if the persuader also shows qualities as a listener. For the SPIMP, Rodriguez' results are particularly interesting, as they indicate the integration of source credibility with the persuasiveness of the attempt (an integration not specified by the ELM and HSM, as these belong to two different systems, see O'Keefe, 2008 for a discussion on interaction in the ELM). On a general note, the assumption of communication as inherently performative and not simply as transmission (Searl, 1969) feature alongside the SPIMP, but does not directly relate to the central elements of content strength and source credibility, as these are concerned

with describing how the persuadee processes uncertain information from an uncertain source in a persuasive situation.

For persuasion processing, the interactive approach helps define the social situation in which the estimations that feed the SPIMP unfold. Rather than approaching belief construction as a solipsistic construction, reasoning, communication, and, as a consequence, persuasion are inherently social and interactive, which warrants the 'interactive' component in the SPIMP (as mentioned in the beginning of the chapter). From an epistemic perspective, evidence suggests that beliefs about the value of an object or the likelihood of an occurrence is shaped and influenced by the actions and thoughts of people around the persuadee. The social psychological evidence strongly suggests this to be the case, as numerous studies have shown the profound influence of others when individuals make choices and plan their behaviour. The subjective estimations inherently assumed in the Bayesian framework, then, should be considered in this light of social influence, which further suggests the importance of the general trajectory of belief development throughout the life of the individual (Hood, 2012). From a communicative perspective, persuasion is concerned with the mutual alignment of assumed and negotiated common ground rather than the concrete alignment of beliefs in an epistemic manner. As such, the present framework departs from the traditional assumption of beliefs transmitted from one mind to another and argues that persuasion is concerned with the social and the commonly assumed first, which in turn might affect changes in beliefs in the persuadee. Whether the change occurs depends on a range of factors such as the persuasive aptitude and strategies of the persuader, the coping mechanisms and epistemic vigilance of the persuadee, the level of cognitive effort asserted, and other such factors discussed in 7.4.

On a philosophical note, it is not clear how the persuadee interacts with the interactive and social milieu. The phenomenological tradition, however, lends a terminological hand in order to describe the intentional stance taken by the persuadee towards the persuasive situation. The subsequent chapter discusses this stance, including how the persuadee immerses herself in the social context, the notion of subjectivity, and the temporal influences on persuasion in terms of the development of beliefs, the epistemological aspects of persuasion, and the potential for behaviour.

Chapter 6: Immersing the subjective in the contextual

The body is our general medium for having a world

Maurice Merleau-Ponty

We must listen to poets

Gaston Bachelard

Conceptually, the thesis revolves around themes concerning beliefs, interaction, and the contextual and socio-cultural influence on the perception of persuasive attempts. Common to these themes is the fact that the interpretation and engagement with these elements stem from a subjective point of view in which the persuadee is immersed as a subject in the world. This is a complex relationship in many ways, for instance the dynamic relationship between persuader and persuadee unfolds over the time course of the persuasive attempt, as does the way in which the persuadee may make use of the context to drive her interpretations, her attention, and her beliefs[188]. In the framework presented here, the probabilistic estimations of content strength and source credibility are inherently subjective, interactive, and contextually influenced. Indeed, the thesis assumes that all information is subjectively approached and that no knowledge can be completely certain[189]. However, so far the concept of subjectivity and how the persuadee is immersed *within* the social and contextual has been explored relatively little. However, the tradition of phenomenological theory provides a rich tapestry of considerations concerning how humans engage with the world on a subjective level.

Subjective approaches to persuasion, communication, and reasoning are relatively novel and recent in British psychological research, as much previous work has tended to focus on the propositional character of utterances, the cognising and mentalizing to form impressions of the minds of others, the de-contextualised logical approach to reasoning and so forth. However, the phenomenological philosophical tradition offers in-depth discussion on some of the fundamental concepts regarding subjectivity. As such, by exploring the phenomenological concept of intentionality as well as related concepts from rhetoric and developments psychology such as presence and the temporal the purpose of the present chapter is to sketch the subjective immerses in the contextual since this is essential and central to the SPIMP framework.

[188] The notion that persuasion predominantly is concerned with beliefs is not entirely uncontroversial, as some argue for persuasion to extend beyond beliefs such that the concept also includes behaviour change (e.g. Cialdini, 2007, see 1.2 for a discussion why this might encompass more than persuasion to include influence of behaviour). Also, some models of persuasion have been generated as de-contextualised mathematical equations pertaining to optimal rational information updating (Kamenica & Gentzkow, 2009). However, most accounts of persuasion (including the ELM and the HSM) acknowledge the importance of context and beliefs.

[189] Gödel's incompleteness theorems show that this holds true even for well-formed and internally consistent systems such as mathematics.

Furthermore, the chapter as a whole argues for a conceptual connection between the phenomenological tradition and cognitive sciences[190].

The phenomenological position explores the human as it immerses and interacts with the world from a subjective, bodily position that takes an interpreting, rather than an objectifying stance such that the impressions given are subject to interpretation and uncertainty. This means that, in line with previous assumptions, information cannot be objectively ascertained, but rather that information is mediated *through* the world. As such, the general position is in line with the experimental and theoretical evidence and concepts discussed throughout the thesis. In a phenomenological position beliefs are not necessarily propositionally expressible. This is in line with the definition offered in 1.2 where beliefs *might* be expressed propositionally, but that these are not necessarily propositional fundamentally. Taking inspiration from Heidegger's *Dasein*, the development, management, and interactivity of subjective beliefs is approached from a similar approach as *Mitsein*, the subjectivising position *between* interlocutors in carving out utterances to further the persuasive situation. This will be explored at length in 6.3 and provides the conceptual background for the theoretical stance towards the complexity of the act of persuasion developed in the thesis.

The chapter thus focuses on several important philosophical aspects of the concepts and themes already presented previously. Specifically, the chapter explores the phenomenological tradition and its possible contribution to the concepts relevant for developing the SPIMP approach. Building primarily on Drummond (2007; 2008), Gallagher (see Gallagher & Varela, 2003), and Zahavi (2003; 2007), chapter 6.1 acknowledges the contributions of explanatory psychology as well as descriptive phenomenology. Based on these insights 6.2 revisits the concept of subjectivity as it is applied in the SPIMP approach such that the phenomenological notion of intentionality is used to further the conceptualisation of subjectivity. That is, the phenomenological qualifies and frames the psychological contribution. This will be discussed further in 7.3 when presenting the SPIMP model as a whole. The present chapter continues in 6.3 by relating intentionality to the rhetorical concept of presence to explore how the persuadee

[190] An actual exploration of the potential theoretical benefits concerning conceptual definitions and underlying assumptions is well beyond the scope of the present thesis and as such the general argument of connection is sketchy rather than followed through.

relates herself to persuasive attempts in a certain situational context. Finally 6.4 discusses how subjectivity is contextual and interactive, not only in a particular situation, but also in a temporal aspect. As a whole the chapter enriches the conceptualisation and understanding of how subjectivity as well as interactivity and context have an impact in the persuasive processes.

One caveat remains to be noted for the chapter. The phenomenological tradition invoked here is vast and incredibly complex with a multifaceted and intricate terminology concerning being-in-the-worldness, das Dasein, intersubjectivity, and the subject-object divide. Therefore, the chapter merely presents selected parts of the tradition that bears specific relevance to persuasion studies, and the chapter contributes to a much needed more in-depth discussion of phenomenology and the psychology of persuasion, which falls in line with recent contributions linking cognitive sciences and phenomenology (see e.g. Gallagher & Varela, 2003). Nonetheless, as mentioned earlier recent findings in psychology concerning reasoning, memory, perception and other important persuasion qualities indicate the importance of interactivity (as discussed in chapter 5) and context, which has been explored thoroughly in the phenomenological tradition. Thus, rather than an in-depth phenomenological investigation of the intersubjectivity of the act of persuasion, the main benefit resides in the development of a terminological apparatus that serves as a lens through which the psychological concept of persuasion may be developed.

6.1. The phenomenological tradition: immersing the subject[191]

As evident from the theoretical discussion throughout the thesis, the SPIMP approach largely relies on a subjective element. The subjectivity in the Bayesian perspective (as applied here[192]) can be taken to mean the opposed to objectivity. That is, the probabilistic estimation of the strength of a given statement can vary from person to person. However, the concept of subjectivity, understood in this way, deals with different matters than the notion of contextual immersion and that of the importance of

[191] I'd like to thank Prof. John Drummond and Cille Varslev for many inspiring talks about the topic. Without them, this section would have suffered significantly.

[192] That is, how the theorem is conceptualised in the SPIMP since the theorem itself is a mathematical representation of manipulation of probabilities and as such is not subjective in the personal sense whereas the difference in estimation of the likelihood of an event *is* personal and thus subjective. It is in the applied sense that I speak of the present Bayesian approach.

interactivity. Thus, from a reasoning perspective, the probabilistic estimations are subjectively driven; the credibility (trustworthiness and expertise) of the source is subjectively estimated; the interpretational processes and pragmatic enrichment involved in communication are largely subjective. It has further been noticed that this subjectivity is not a solipsistic mental effort in which the persuadee estimates the factors in absentia of influences from others. On the contrary, evidence from social psychology, nudging, communication studies, developmental studies, decision-making theory, as well as the interactivity studies already cited all substantiate the claim that our perception, attention, and thoughts are mandated to some degree by the contextual environment, our upbringing, and our socio-cultural background. This poses the theoretical complexity of describing the inner state in relation to the outer influences. Of particular relevance to the present discussion, the phenomenological tradition classically explores how human beings immerse themselves within their immediate context and perceptual surroundings. As mentioned in the above, this provides us with a terminological apparatus for qualifying the underlying assumptions of the SPIMP approach. Of particular interest for the present discussion, the noumena-phenomena distinction will be presented followed by discussions on persuasive intentionality, the inner-outer divide, and the propositional stance taken in the persuasive situation. Collectively, these provide a framework for bringing the general discussion forward since they provide a terminological scope for discussing the subjective nature and intentional directedness in the persuasive situation. Before going into these, a brief history of the phenomenological tradition is in order as this tradition seldom is invoked in psychological research.

Despite the fact that the initiation of phenomenology often is placed in the late 19th and early 20th century, Kant and Hegel[193] made important contributions on the description of mind and context, mainly on the concepts presented in this section such as noumena-phenomena (Kant) and the inner-outer distinction (Hegel). Husserl (see Smith & Smith, 1995) and Brentano continued the phenomenological tradition by describing the importance of subjective intentionality when the person immerses herself into the context. For Brentano, the perception of physical phenomena existed intentionally as acts of consciousness in which the subject direct her attention

[193] Especially in *The Critique of Pure Reason* (Kant, see Guyer, 1992) and *Phenomenology of Spirit* (Hegel, see Beiser, 1993)

intentionally toward the world (see Smith, 2011). From Brentano and Husserl, the Western phenomenological tradition emerged in which thinkers such as Heidegger (Zein und Seit, see Wrathall, 2013), Merleau-Ponty (2002), and Sartre (2003) develop on the concepts such as intentionality, being-in-the-worldness, and perception. Recent phenomenological research is particularly relevant for the present thesis, as these debate a more holistic approach to reasoning and perception by investigating phenomenological terminology as well as contributions from cognitive psychology and neuroscience (Zahavi, 2003; 2011; Gallagher & Zahavi, 2008, see 6.4) as well as discussing the theoretical differences and supplements of descriptive phenomenology and predictive psychology (see 6.6).

The Eastern contribution to the phenomenological tradition should not be omitted from this section. Indeed, given the holistic focus of many Eastern cultures including concepts such as the Hindu Om (ॐ), Chinese Ying and Yang (阴阳), as well as Taoist and Zennist philosophy, it is hardly surprising that a notion of a holistic and subjective being-in-the-world permeates some of these philosophical traditions. Most clearly, Kakuzo (1906) develops the Teaist stance to the sensory-bodily immersion in the world through the practice of drinking tea. That is, through the sensory perceptions and the placement of the subject in the world and tradition, the tea drinker is able to experience the phenomenal approach or approximate the noumenal. This consideration of immersion relies heavily on an awareness of cultural influences from past philosophies, and thus places the immersion of the self in a complex time-scale in which the present and lived moment (or as Enfield, 2011; 2013, presumably would call it: enchrony) blends with the past. This is similar to the persuasive situation in which the persuadee is immersed in the interaction with the persuader both momentarily, but also from a more complex trajectory of memories, cultural and linguistic influences, personal experiences and so forth.

Noumena-phenomena The Kantian (Guyer, 1992) distinction between noumena and phenomena is fundamental for immersing the persuadee in the context. Noumena is characterised as the properties the objects contain within themselves. For instance, the human voice is an immensely complex stimulus. A spectrogram, however, will reveal some of this complexity by a depiction of the use of a range of different Hz. This description, along other qualities, may be the noumena quality of the voice within

itself concerning the frequency of the pitch. Phenomena, on the other hand, are how human sensibility, understanding, and interpretation engages with the sensation and perception of a particular object. Invoking the same example, human beings are not able to pick up on the full range of these Hz properties. Thus, humans tend to be able to hear Hz from 12 Hz – 20 kHz. That is, our ears can only appreciate the phenomena of a particular range despite the fact that stimuli may have noumena qualities beyond human capability. From the distinction between phenomena and noumena, we may *understand* that there is a noumena world outside our bodies, but we do not have objective access to this world (which is in line with recent psychological experimental data that shows that judgements can be inaccurate, unstable, and malleable) as it has to be mediated through our senses, which limit and shape our perception of the experienced phenomenon. From the attention studies in 5.1 and the developmental studies in 6.2.2, this should hardly be surprising as we do not seem to simply process information about the world as they are, but rather as they are given to us by our contextual, socio-cultural, and interpersonal surroundings. The persuasive interaction between the persuader and the persuadee, then, is inherently phenomenal as the evidence is experienced and perceived through the lens of perception (i.e. how we estimate and perceive the proposed belief), intention (related to the persuasive intention described in chapter 1), and attention (which may be manipulated as described in 5.1).

Intentionality One of the most foundational concepts in phenomenology is intentionality, as developed by Husserl in *Logisches Untersuchen* (see Smith & Smith, 1995) in which intentionality is "…the directedness of experience toward things in the world, the property of consciousness that it is a consciousness of or about something" (Smith, 2011). As mentioned previously in the thesis and discussed further in 7.4, the level of consciousness and cognitive effort may vary, producing differences in the intentionality of the persuadee. For Husserl, our perception intends things such that the phenomena rather than the noumena are experienced via the intentionality directed towards them. Intentionality thus comes through thoughts, concepts, and ideas and may manifest in a variety of ways including, but not limited to, temporal and spatial awareness, awareness of one's own body and position in the world, and social interaction. Importantly, for intentionality, the persuadee is in dialogue *with* the world and not merely a passive recipient since humans intend towards the world. As already

discussed, the estimations of beliefs may be influenced by a range of factors such as cultural background, social context, interaction with the persuader and so forth. Given the intention towards the world, the intentionality described here, then, is modified in accordance with the cited research concerning contextual and cultural influences.

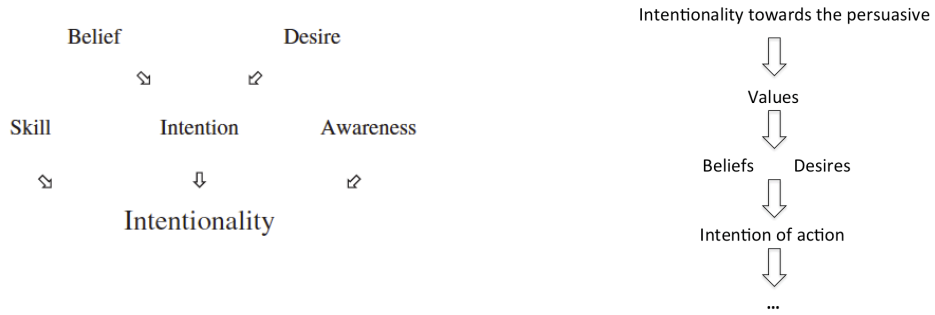
In the persuasive situation, the intention is one of mutual directedness towards the interaction such that the social act of persuasion includes the potential shift of beliefs in the persuadee and that the persuader may deploy strategic measurements in order to achieve his aim. As mentioned in 1.3, this is a necessary condition for persuasion to occur, as it is explored in the thesis. The intended directedness of the persuadee (that is, the manner by which the persuadee directs her persuasive intention), in other words, goes through the social and the interactive. This entails a dialogical intentionality in the persuasive situation. Firstly, the persuader and the persuadee mutually engage in a shared intention of an act of persuasion without which the interactions and psychological processes would not function in the way described in the thesis. This is the social intentionality, which transcends individuals in the situation and is mandated collectively between the interlocutors. Alongside this, both the persuadee and the persuader entertain intended stances toward the *situation* and the possible outcomes of this. As described in 1.4, the persuader is expected to strategically present both the evidence and himself in such a way that the persuadee adheres to the desired beliefs (which may or may not correspond with that the persuader *actually* believes) whilst the persuadee intends for the situation to bring about novel information such that she may update her beliefs if necessary. That is, she looks to potential new information, and, as mentioned, acts of persuasion in general have to yield a net gain for both interlocutors to keep the persuadee from simply opting out every time she recognises a persuasive intention (as noted by Sperber, 2001 and Mercier & Sperber, 2011, this general gain also holds true overall for communication and argumentation). The intentionality is thus split between and within interlocutors such that both the directedness intends both the personal and the mutual. The discrepancy and dialogue between intentionality points to and elaborates upon the discussion of alignment. In 1.5, I noted that the persuasive situation mandates differences in alignment such that a certain communicative and intentional alignment is necessary, but that the aim of persuasion is not necessarily alignment of mental states. With the distinction between

mutual and personal intentionality, this difference in alignment becomes clearer as the mutual and communicative intentionality mandates alignment whereas the personal intentionality does not.

The directedness of the personal persuadee intentionality towards the phenomenal experience of the persuasive situation entails consequences for her attention. The persuadee, in the present framework, is directed towards vigilance against misinformation at the same time that she aims at updating potentially flawed beliefs. The attention, however, may be manipulated (as pointed out previously) causing disablement in intentionality in terms of the personal goals of the persuadee. In other words, the enabling factors (context, etc.) that we use to disambiguate and drive our intention-toward the phenomenal proposed belief may be turned against us and function in a disabling manner. That is, the arms race described by Sperber (2001) may well function such that skilled persuaders may employ cognitive overload or misdirection, which turns the attention of the persuadee towards his personal aim. Conversely, a critically minded persuadee may equally be skilled in discovering such persuasive ploys (for a discussion on coping mechanisms, see 7.4).

Given the fact that intentionality as a concept has been employed in a range of different manner (including psychology), it is essential to briefly compare the present use with the otherwise prevalent use in psychology. Malle and colleagues (Malle & Knobe, 1997; Guglielmo & Malle, 2010; Malle & Holbrook, 2012) explore intentionality as a function of a range of underlying cognitive phenomena (illustrated in 14a). In particular, their concept of intentionality relies on underlying beliefs and desires, which feed into an intention. For instance, the desire to eat an ice cream cone coupled with a range of beliefs concerning where to buy an ice cream, what it will taste like, etc. feeds into the intention of eating an ice cream. Given skills of fulfilling the intention and an awareness of how to do so, the overall intentionality (and plan of action) might come to fruition. In this view, then, intentionality is a psychological end-product of underlying cognitive mechanisms that provide the foundation for action planning and behaviour. The authors have tested the model empirically and found this conceptualisation to be prevalent in intention judgements (e.g. Knobe, 2003).

Fig. 14a A Model of the folk concept of intentionality **14b:The present placement of intentionality**



The figures show the difference between intentionality as used by Malle and colleagues and in the present framework

The two figures indicate the different use of intentionality between the present use (as an aboutness or directedness towards the world) and how it is frequently used in psychology (as a specific intention to get or do something, e.g. 'intention to get a coffee'). The way intentionality is understood in the thesis is Husserlian since it is concerned with fundamental traits of being concerning humans' directedness towards the world through personal perception. In Malle's folk psychological representation (14a), intentionality is the end-product of a range of cognitive processes such as beliefs, desires, and intentions. In this way, intentionality is the outcome of a process. In the present framework, however, intentionality is the underlying directedness towards the social and the contextual situation in which the persuadee is immersed. This directedness is intimately linked with vague aims regarding the situation (which is why persuasive intentionality as described in 1.3 is connected, for instance, to an aim of consistency). In this way, there are significant differences between the two concepts of intentionality as well as a difference between intentionality and intention (where the intention of action, in the present sense, is the potential outcome where behaviour change *might* occur). It is worth stressing that the intentionality of the persuadee is rooted in past experiences, cultural practices, etc., but that some of the key aims are thought to be similar (such as the aim of consistency within beliefs and the aim for the most believable beliefs). The concept of intentionality, in the present form, comes from Husserl (Smith & Smith, 1995). As mentioned in the introduction to the chapter, a general argument of the thesis is for the potentially beneficial connection between phenomenological concepts and psychology in order to discuss and inform underlying assumptions and concepts such as the self, intentionality, and immersion in the context.

In this way, the phenomenological literature lends a lens through which subjectivity can be conceptualised[194].

Thus, 'intentionality' in the Husserlian sense differs significantly from Malle and colleagues' use of the term (the present approach and placement of intentionality in relation to the present framework is coarsely illustrated in 14b, see Jacob, 2012 for a discussion of the intentionality concept from a phenomenological tradition)[195]. Here, intentionality refers to a general approach-to the world and a directedness of being. In the present framework, then, intentionality refers to the underlying directedness of the humans involved in the persuasive interaction. For the persuadee, persuasive intentionality is concerned with the general aims of the situation including, but not limited to, epistemic vigilance, relevance expectancies, and optimization of beliefs. Thus, the term 'intentionality', rather than the vernacular folk psychological way (as in 'I intended to buy a car'), it is used in a manner that denotes the general stance the persuadee entertains when directed towards a situation, in this particular instance a persuasive situation. That is, a mode of being and engaging with the social situation.

Intentionality in the present use, then, is a fundamental aspect of how humans approach the persuasive situation, and it is geared towards beneficial aims such as optimization of relevance, acquiring as probable beliefs as possible, and epistemic vigilance. Compared with the output description of intentionality in the folk psychological manner (fig. 14a), this places intentionality as a foundational directedness towards the social rather than as a product of desires and beliefs. That is, intentionality resides before beliefs and desires, as shown in fig. 14b. This fundamental conceptualisation of intentionality as a directedness of being-with the context also highlights the difference between intentionality and attention such that the latter is the specific cognitive focus of the persuadee whereas the former is a more fundamental approach-to the situation. Thus, attention and awareness might be easily manipulated

[194] This illustrates the potential benefit of the link between traditions via subjectivity as an example. However, to link the traditions more intimately is beyond the scope of the thesis, as it would require a substantial review of literature (see Gallagher & Varela, 2003 for an argument of the potential benefits of exploring phenomena via phenomenology *and* cognitive sciences)

[195] Note that 'values' are placed before 'beliefs' and 'desires'. This is due to the assumption that underlying values (such as valuing human life) is more fundamental than beliefs. On the conceptualisation of beliefs offered in 1.2, fig. 3, however, values might be conceptualised as beliefs that are held very strongly and are more necessary than beliefs concerning for instance specific political policies. This philosophical discussion, however, is outside the scope of the thesis.

(as seen in social psychological literature), but intentionality as a stance is taken to be fundamental. The persuasive intentions (1.3) should be understood from the perspective of this definition.

Inner-outer distinction Central to the discussions in the thesis, the probabilistic estimations of content strength and source credibility are influenced by external factors such as cultural background, the physical context, and the interactions with the interlocutor. These may enable (or potentially disable) the intentionality of the attention as mentioned in the above, and they call into question the Cartesian dualism in which the mind, body, and environment are sharply divided. Ryle (1949) addresses this issue by labelling the Cartesian divide as a 'category mistake'. For Ryle, the separation of the mind from the body that performs actions is nonsensical since in order to perform an act skilfully, the subject needs bodily expertise alongside the mental capacity to appreciate the actions. Thus, mental states cannot be separated from the physical coil in which they are embroiled. This reminisces Hegel (Beiser, 1992, for a discussion on Hegel and language, see Varslev, 2012), Wittgenstein (2001), and Searle's (1969) notion that communication inherently is a performed activity that does not preside simply in the inner states of a person. This bears theoretical consequences for the definition of the subjective belief as discussed in 6.2.3.

Propositional stance Lastly, the propositional stance of the persuasive incidence further complicates the epistemic stance the interlocutors have to entertain since these are not limited to assertive statements, but also includes predictions and counterfactuals[196]. In the act of persuasion, the persuader indicates, not to the state of the world, but to the *claimed* state of the world *as well as* the world-of-may-be (hypothetical) and potential counterfactual states. This propositional stance thus points in three directions from an uncertain foundation. These are readily present in many acts of persuasion such as Obama's (2013b) speech on gun control. For instance, Obama mentions that "…more than 70 percent of the National Rifle Association's members according to one survey" support background checks for gun purchases, which is an assertive statement. He proposes that "…if America worked harder to keep guns out of the hands of dangerous people, there would be fewer atrocities like the one that occurred in Newtown", thus indicating that a possible counterfactual scenario might

[196] See Simons & Jones (2011) for a presentation of speech acts commonly found in acts of persuasion

have prevented or limited the incidence in Newtown. Simultaneously as being a speculative counterfactual statement, the previous quote also functions predictively as a measurement of the effectiveness of legislation in the future.

In this way, the persuadee changes her relationship to the states in which the intentional stance engages dialogically between an epistemic and ontological state. However, findings indicate that reasoning with counterfactuals may be approximated probabilistically as well (McCoy et al., 2012). Temporally, the propositional stance points in different directions as well as the counterfactual is concerned with how things might have been, the assertive statements with how things presently are, and the predictive with how things might turn out (see 6.5 for a discussion on temporal nature of persuasion processing). Before turning the attention to how the phenomenological literature might inform the definition and description of the act of persuasion, a few remarks should be made to clarify what I meant by a phenomenological stance.

6.1.1. Talking phenomenology

In order to immerse the subject in the world, it is important to clarify the difference between differing accounts of phenomenology. One is Husserlian (Smith & Smith, 1995, but see also Zahavi, 2007) involving intentionality as presented in the above where the subject reflectively may approach the phenomenon. The other developed by Dennett (1991; 1993; 2003) relies on the distinction between heterophenomenology and autophenomenology. Dennett's development of these concepts stems from his critical assessment of classical phenomenology, which he describes as introspective mental gymnastics (Zahavi, 2007) such that it inherently lacks a stringent and reproducible methodology of enquiry. Compared with this, Dennett's proposal is taken to be neutral, theoretical, and based on principles of explorations in cognitive sciences. In order to avoid speculative analysis, Dennett argues that subjects' reports of their conscious experiences are the primary data. That is, "the reports *are* the *data*, they are not reports *of* data" (Dennett, 1993, p. 51). In other words, to avoid spurious speculations, the data should entail approximations about the conscious experiences of the subject *from* the reports of consciousness. This approach, it is thought, strives for neutrality since the investigator approaches the *reported*, rather than the potentially intrinsic and intentional. Cluster criticism (Foss, 2004, chapter 4) is an example of such analysis.

Here, the rhetorical critic defines the key terms of an act of persuasion and describes the cluster of terms associated with the key terms. The method, it is thought, is an attempt to reveal the worldview of the persuader and to provide a foundation from which the critic may analyse and evaluate. The present thesis assumes, like Dennett, that the reported evidence *is* the data and not representations *of* data. That is, when the persuader provides a cue for the persuadee in the form of evidence, the persuadee approaches the evidence rather than a report *of* the evidence. As such, the probabilistic estimations discussed in 2.3-2.4 are concerned with the estimations of the data, not of representations of the data. So far, then, Dennett's position is in line with the present conceptualisation of beliefs and reports of data. However, Dennett's argument that this goes against classical phenomenology might not be entirely convincing (as discussed below). Whether or not Dennett's argument concerning classical phenomenology is correct or not (the latter argued by Zahavi, 2007), the notion that the reports *are* the data is assumed in the thesis, and the following brief argument against Dennett by Zahavi should be seen in the light of this overall agreement with Dennett's position regarding the nature of the reports of the data.

Dennett's heterophenomenological position is confronted with potential problems when considering psychological and persuasive literature (for a good philosophical assessment of the method, see Zahavi, 2007). For one thing, it does not distinguish between liars and truth tellers. Dennett acknowledges this noting that the analytical method does not distinguish whether a subject is a liar, a zombie, a computer, a dressed-up parrot, or a real conscious being (Dennett, 1991, p. 91). From a psychological point of view, whether the persuader is either of these, however, makes a big difference in terms of the potential relations between the interlocutors. Furthermore, Dennett's proposal seems similar to conventional Conversational Analysis (CA, Sidnell & Stivers, 2012), which largely ignores pragmatic enrichments, body language, and the interactions between interlocutors and focuses on the spoken words exclusively. As noted by proponents of distributed language (e.g. Cowley, 2011; Pedersen, 2012; Steffensen, 2013) the communicative stance between humans is more complex than the words conveyed. Indeed, classical phenomenological literature makes use of a spectrum of the manner by which phenomena is given for the subject that goes beyond linguistic reports (Zahavi, 2007, p. 31). Therefore, it seems needlessly reductionistic to focus on

the reports made by subjects. Thirdly, as Zahavi (2007) points out, the heterophenomenological framework relies on a theory-theory of mind (see 3.2), which may not be intuitively accepted considering the potential limitations of mentalizing and propositional theory of mind as discussed previously. Fourthly, the neutrality of the heterophenomenological stance may be questioned as analysts bring with them a host of assumptions that may influence the interpretations. Finally, it misses the point brought up in classical phenomenological literature, namely that the experience of phenomena is inherently immersed, dialogical, and interactive whereas the analysis of the report of someone largely is one-directional. Given the literature on the interactivity of communication and the influence of social factors on reasoning and reports, it seems unlikely that a CA would offer profound insight into the phenomenal experiences of the subject. As a consequence, the phenomenological stance adopted here to qualify and describe the psychological notion of subjectivity and the process the persuadee goes through is largely taken from classical phenomenology such that the subject is immersed, interactive, and intentionally directed towards the social in a dialogical stance with the world. However, to reiterate, Dennett's notion that the reports of the data *are* the data rather than representations of data is assumed.

6.1.2. Approaching the phenomenal subject

From the terminological review of phenomenological literature, some concrete terms emerge to qualify the notion of subjectivity as it is understood in the thesis, and consequently how it underlies the SPIMP approach. Firstly, the notion of phenomenology is understood as an intentional interaction between the persuadee, the persuader and the enabling circumstances. The intentionality is directed towards the persuasive situation such that three different types might be described, namely the mutual and the intentionality of the persuader and the persuadee[197]. This difference in the intentional stance may account for the fact that the persuasive situation at one time seeks alignment (on an interactive and mutual level) *and* does not entail alignment (on an individual level). Neither interlocutor may reap the benefits of the individual level,

[197] Note that the intentionality considered here (and illustrated in 14b) is thought to be a fundamental directedness towards consistency and believability of beliefs. Indeed, it precedes beliefs and desires. Since both beliefs and desires can be unconscious (see discussion of this in chapter 1), intentionality need not be conscious. Rather, intentionality is the fundamental directedness of being towards and with the world, underlying beliefs and desires.

however, unless both engage with the mutual intentional directedness towards the persuasive situation. As such, intentionality throws conceptual light on the how the persuasive situation may simultaneously point towards alignment as well as disagreement since the interlocutors engage with one another from their individual perspectives (such that epistemic alignment is no necessary ain), but also how interlocutors need to engage with one another mutually (such that communication alignment *is* an aim). In this complex social situation, the intentional stance is epistemic. Further, the interactivity described in chapter 5 in combination with the influence of socio-cultural factors blur the distinction between inner and outer states such that the belief cannot be said to be a stable proposition in the mind of either interlocutor, but rather a culturally influenced, socially mediated, and epistemologically negotiated construct. This further puts pressure on classical models in which a code-like transition of mental states is assumed as the basis of argumentation and persuasion given the performative and shared nature of communication and persuasion. In sum, the phenomenological terminology helps frame the notion of subjectivity and beliefs, which will be explored further in the next section.

6.2. Subjectivity of beliefs revisited

From the empirical and theoretical literature reviewed and discussed throughout the thesis, the assumption has been made that humans are intentionally directed at the act of persuasion from a subjective point of view. In order to further qualify the description of the psychological mechanisms involved in processing persuasion and in order to terminologically conceptualise the belief of the persuadee in the situation, we need to briefly look at developmental and social elements as central factors in understanding why two equally intelligent individuals might differ in their estimations of likelihood and in the conclusions they draw from acts of persuasion.

6.2.1. Developing beliefs and perception

The SPIMP approach describes the central elements of the reasoning process humans go through when confronted with an act of persuasion. This description, importantly, is an approximation of what happens *in* the moment. In the SPIMP approach, this is modelled from a subjective probabilistic point of view. However, the ontogenesis of these beliefs

is in no way trivial. As discussed in greater detail in 6.4, any act of persuasion relies on temporal elements that reach beyond the moment in which the interlocutors engage. That is, the epistemological and ontological probabilistic truth-conditionals point into the future as well as being lodged in the present. In order to gain a perspective on the subjective approximation of these probabilistic estimations, however, we may turn to development evidence to show the importance of external factors such as interaction, cultural, and context.

Humans are inherently social creatures. Resembling the Greek concept of mimesis, new-borns are directed towards imitation of the adults in their immediate surroundings. For instance, infants imitate adults by mimicking when the adult sticks the tongue out (Meltzoff & Moore, 1977; Meltzoff et al., 2009), a trait also observed in our simian cousins, the rhesus macaques (Ferrari et al., 2006). Children have a remarkable ability to comprehend physical actions. In Gergely et al. (2002), a researcher would activate a switch with her head. If her arms were free, the child imitated the researcher and used its head to light the switch, but if the researcher's hands were tied, the child happily made use of its own arms to activate the switch. This portrays a bodily and interactive sensitivity present in children in their appreciation of others and indicates a foundation from collaboration regarding our understanding of immediate surroundings. The imitation, though, is socially initiated such that babies do not tend to imitate adults who do not smile and get the baby's attention at the beginning. Fascinatingly, this need to imitate others may be reproduced using robots as long as these robots take an active interest (i.e. looking at the infants) before producing the actions. If the robots look at the infant, it may imitate the robot, but if the robot does not gaze at the infant, the robot's actions are largely ignored (Itakura et al., 2008, see also Hood, 2012, chapter 2).

The instantiation of specific emotional cues may vary from culture to culture. However, Ekman following Darwin (2007) posits that some emotions at least to *an extent* are innate, basic, and humanly universal (Ekman et al., 1969, Ekman & Friesen, 1971, Scherer et al., 2001; Sauter et al., 2009, 2010). Happiness is one of these identified by Ekman and colleagues. Not only do babies imitate the adults around them, they also actively seek quality social contact in form of smiling (Fries et al., 2005) and eye gaze (Hoehl & Striano, 2009; 2010) in order to develop their appreciation for

emotions and manage social situations (Kraut & Johnston, 1979). Indeed, as Hood (2012, p. 28) observes: "Brain development requires more than mere exposure", we also need the social interaction with other humans.

The make-up of the environment of the upbringing, then, has direct implications of cognitive skills and perceptual abilities later in life as it literally affects how we can see and consequently process the world. For instance, children need stimuli from their immediate surroundings and interactions in order to process differences between faces. Thus, children who grow up in a mono-ethnic environment will have difficulty distinguishing between faces from a different ethnicity (Hood 2012, pp. 27-28). In other words, poor stimuli in childhood directly influence the actual perceptual skills later in life. If these perceptual skills are taken to form the frame for subjective estimations, we should expect differences in probabilistic estimations if two people with different environmental upbringings are confronted with the same stimulus. Taken together, the need for interaction in form of eye contact, smiling, and gesturing further puts pressure on the sharp distinction between inner and outer states of being since the development of our understanding of the physical and mental environment depends so heavily on others and the immediate surroundings. That is, we seem unable to frame our internal mental life without the intended immersion in the external world as perceived phenomenologically. Further, the subjective probabilistic estimations underlying the SPIMP approach should be understood from the premise of such a precarious development of loose beliefs such that the estimations are grounded in and sprung from the developmental backdrop.

Mirror neurons have recently been suggested as a neural basis from which imitation and the drive towards the social has emerged (Fadiga et al., 1995; Rizzolatti & Craighero, 2004; Iacobini & Dapretto, 2006, see also Gallagher & Zahavi, 2008 for a philosophical discussion of the relationship between mirror neuron hypothesis and classical phenomenology). Mirror neurons are defined as a neural response "…discharged both when the monkey does a particular action and when it observes another individual (human or monkey) doing a similar action" (Rizzolatti & Craighero, 2004). That is, the process mirrors what neurologically would have happened if the human were to perform said action. The neurons were first observed in monkeys (e.g. Ferrari et al., 2005, Palagi et al., 2009 and Paukner et al., 2009), and a few single cell

recordings have been conducted in humans (e.g. Mukamel et al., 2010). Proponents of the hypothesis argue that the activity is the basis for emulation and understanding action (such that the system understands an action by experiencing it). Given the scarcity of single cell recordings in humans, it is debatable how translatable mirror neurons are to humans (see e.g. Skipper et al., 2007 and Dick et al., 2009 for competing accounts of gestures). However, mirror-*like* activity, which produces action understanding (Kohler et al., 2002; Montgomery et al., 2007) and which may be involved in understanding and predicting the actions of others (Ramnani & Miall, 2004), does seem to exist in humans. Thus, mirror neurons provide a tentative approach to how human beings experience action and how, to a certain degree, humans embody action mentally (see e.g. Frith, 2007; Frith & Frith, 2006; Gallese, 2000, 2001, 2003, 2007; Gallese & Goldman, 1998). That is, reasoning faculties can be said to make use of interactive, perceptual, and potentially mirrored experiential cues from their immediate surroundings in order to make sense of a given situation and of the evidence and information they encounter.

In sum, branching across studies in psychological development (e.g. Hood, 2012), choice blindness (Hall et al., 2010), interactivity (see 5.1), and mirror neurons (Rizzolatti & Craighero, 2004, see also chapter 3), studies strongly suggest that humans make use of others as well as our own bodily reactions in order to direct perception, comprehend the environment, and reason. Put more strongly, humans *need* others in order to function optimally in terms of reasoning, communication, and epistemic insights. A review of solitary confinement studies supports this trend by showing that most inmates suffered adverse consequences in some form when isolated (Smith, 2006). This has direct bearings on how we might conceptualise the subjectivity of the probabilistic estimation in the act of persuasion. In other words, as Zahavi (2007, p. 32) puts it, lending conceptual support from Merleau-Ponty (2002)

> "According to the findings of phenomenology, the world of experience, the phenomenal field, is not some "inner world," nor is the phenomenon a "state of consciousness" or a "mental fact" the experience of which requires a special act of introspection. Rather, we should realize that consciousness is not something that is visible to one person only, and invisible to everybody else. Consciousness is not something exclusively inner, something cut off from the body and the surrounding world, as if the life of the mind could remain precisely the same even if it had no bodily and linguistic expressions. Gestures, expressions, and actions are more than

> brute external data whose psychological meaning is to be sought elsewhere, namely in some superimposed inner experience; rather the intentional behavior constitutes a whole charged with meaning[198]„

This shapes the appreciation of the manner by which the persuadee is intentionally directed (both in terms of the persuasive intention and the mutual intention of interaction) since the boundary between the inner and the outer becomes blurred. That is, the directedness, though individual, is also social and interactive. As such, the phenomenological stance is in line with the developmental and belief literature invoked in the thesis that argues for a contextual and social manifestation of the subjective estimation of probabilistic content concerning source credibility and content strength.

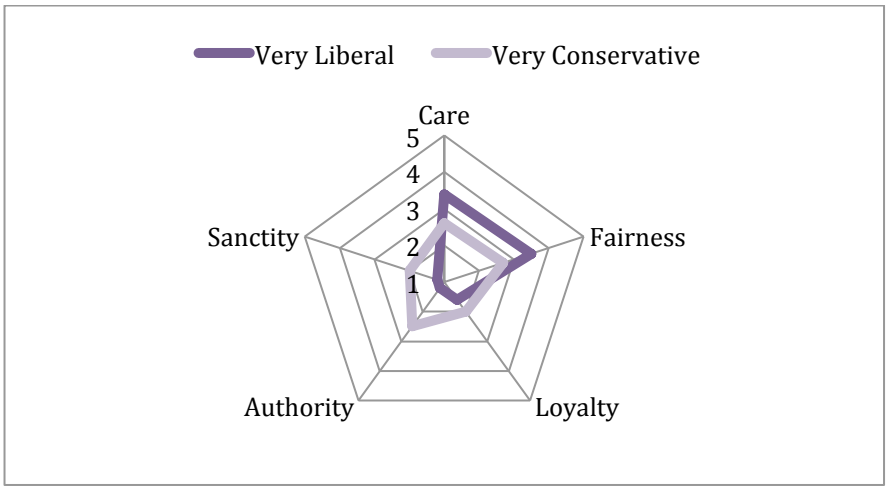
6.2.2. The subjective belief in the persuasive incident

The developmental trajectory leading to the potential of perceptive estimations play an important conceptual part in discussing how the SPIMP approach form a Bayesian is informed, and sheds light on the normativity and predictions of the model. In psychology, it is well established that humans tend to conform to preconceived beliefs, thus exhibiting a confirmation bias (see Haidt, 2012, chapter 4). As Mercier & Sperber (2011) describe, "Skilled arguers… are not after the truth but after arguments supporting their views" (p. 57). This is perhaps not surprising as changing beliefs entail cognitive restructuring, consideration, and potential changes in habitual behaviour. If we, as previously, assume that humans are finite beings with limited cognitive energy they may employ, changes and restructuring comes with a mental cost. As a consequence of this, we should expect people to be static first and dynamic only when necessary. Drawing analogously on Newton's law of motion, it requires force to move an object, which in this case is the belief of the persuadee. However, refraining from updating might also come at a cost as described in the aims of the interlocutors. The cognitive assumption in the thesis, therefore, is that humans will be preserving as a baseline, that they strive for updating whenever beneficial, but that they will exert as little cognitive effort in doing so as possible.

[198] It is unclear what Zahavi means by 'meaning' in the framework. Indeed, in the same way that phenomenology arguably could enrich cognitive sciences, models from cognitive sciences (such as the Bayesian approach to reasoning) could enrich the phenomenological literature.

In this lethargic cognitive view, the background becomes pivotal as this provides the canvas on which the persuasive situation may unfold. The lethargic subjective estimations of the probabilities of a given proposition take the background habitual response as a baseline. Studies from political psychology conform to this view. Haidt (2012) argues that humans not only process evidence from a reasoning perspective, but also from a moral perspective. The present view agrees with the findings that conservative Americans have a different worldview, outlook, and consequently reasoning field than liberal Americans, but rather than conceptualising reasoning and moral background as two separate entities, the present framework argues that the moral upbringing (like other background influences) provide the lens through which the initial subjective estimation might arise[199]. Testing 1000s of subjects, Haidt and colleagues describe the moral lens of Americans and provide a compelling argument for the fact that humans approach the same piece of evidence radically different depending on their initial outlook (see fig. 15; Graham et al., 2009, see also Haidt, 2012, pp. 170-176 for an extension of the model to include 'liberty'). Importantly, the description of the moral tapestry of the subjects is given on gradient scales of how essential a given element is to the particular person.

Fig. 15: Radar diagram of moral differences between liberals and conservatives[200]



[199] This is a subtle distinction, and the relationship between reasoning and the background of the persuadee should be investigated more thoroughly to gain a more in-depth understanding of the probabilistic estimations.

[200] Note that the figure is an approximation of the data presented in Graham et al. (2009) and Haidt (2012) rather than a re-production, as the radar diagram offers an easy visual illustration of the moral differences. Note also that the notion of 'authority' is understood differently than in the present framework. In Graham et al (2009) it is closer to the cultural authority as discussed in chapter 3.

From the model developed by Haidt and colleagues (the Moral Foundations Questionnaire, MFQ), the great differences in the desirability of certain policies and acts of persuasion become less opaque as the people evaluate the propositions from different mind-sets. The MFQ provides a good theoretical background for the Bayesian assumption that two humans who arrive at different conclusions and may still *both* be rational given their differences in estimation, perception, and evaluation. Indeed, the incommensurability hypothesis mentioned previously argues similarly that different ideas may not be directly comparable. Returning to logical enquiries, this puts further strain on a logicist account of reasoning since it becomes opaque how to determine between moral backgrounds, incommensurable values etc. in the *specific* act of persuasion as these rely on baseline assumptions and worldviews typically not expressed in the situation[201]. In other words, in the concrete evaluation of an act of persuasion our beliefs are lethargically drawn from our sense of belonging and how we have done in the past (Haidt, 2012, p. 251). This assumption is drawn from developmental literature (e.g. from Haidt, but also Hood, 2012), which argues the importance of the trajectory of belief throughout the life of the individual such that this particular frame of reference makes possible the manner by which the individual can conceptualise his or her surroundings. As such, the probabilistic estimations of beliefs not only depend on the immediate situation, but on a complex interaction between belonging, immediate beliefs, and the act of doing (illustrated in fig. 16).

Fig. 16: Aspects of beliefs

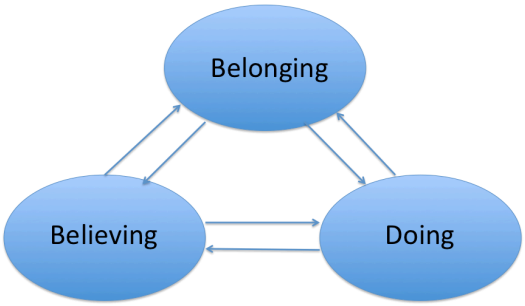


Figure 16 illustrates the relational nature of beliefs regarding the act of doing and belonging to something

[201] For instance, despite allusions to fairness and care, it is not often that policies are debated on the grounds from which they sprung, but rather they are discussed as they are presented. In other words, much persuasion takes place in the realm of conclusions *post* assumptions rather than fundamental discussions *about* assumptions (for good reason as well as constant deliberation concerning the founding principles would turn every politician and arguer into a philosopher, which might cause some practical problems in the day-to-day business)

The elements in the figure portray the complex nature of the ontogenesis and management of beliefs. As already mentioned in 1.2, beliefs have different qualities regarding strength, necessity, and consciousness of belief, all of which exist on a continuous, rather than dichotomous scale. Alongside the different qualities of beliefs, 5.1 presented empirical and theoretical reasons to assume that beliefs are social, contextual, and cultural rather than solipsistic. That is, no belief is formed in isolation, and when beliefs are called into question in the social sphere (such as is the case with persuasive attempts), the framing and contextuality of the manner by which they emerge influence how the persuadee thinks of the beliefs. So far, then, beliefs have been identified as complex entities with at least three qualities and as entities that emerge socially, contextually, and interactively in phenomenal a dialogue with the world and the other interlocutor[202]. The illustration in fig. 16 adds another layer to the complexity of the emergence of beliefs. The figure argues that beliefs are not merely mental entities, but that they are intrinsically tied to the act of doing and the sense of belonging in a bi-directional manner. In figure 14b, beliefs and desires are presented as foundational for the intention (and carrying out) of action. However, the action can influence the other way as well (although in a qualitatively different way since beliefs and actions are different phenomena). Consider, for instance, someone experiences computer problems. He has no belief as to how to solve the problem and consequently, he messes around with his computer (given a belief that something might fortuitously turn up). If he solves the problem in this way, his beliefs might be altered regarding the function of computers given his *actions* and as such, actions has influenced his beliefs. I take the sense of belonging mentioned by Haidt (2012) to be an instantiation of the importance of the socio-cultural background coupled with personal experiences. As such, the notion of belonging is in line with previously discussed influenced on beliefs from surroundings. However, similarly to the bi-directional influence on the act of doing, beliefs can both influence how humans think of their socio-cultural surroundings, but as previously shown, the socio-cultural exert an influence on the emergence of beliefs. The figure, then, shows the different aspects of influence on beliefs and how beliefs are not solipsistic in their emergence, nor merely influenced by the mental, as the act of doing and the sense of belonging might influence beliefs as well.

[202] I mention one interlocutor here because the focus of the thesis is persuasion between two and only two interlocutors (the persuader and the persuadee).

6.2.3. Defining beliefs and subjectivity in acts of persuasion[203]

From the phenomenological terminology, the developmental evidence, and the socio-contextual influences on our perception, we may now approach a more precise definition of beliefs, as the concept is understood in the SPIMP approach. Firstly, rather than a stable catalogue stemming from a kernel of self, the approach assumes that humans manage and make up a belief online when required to do so by the situation. That is, *in* the persuasive situation, beliefs are called into existence ontogenetically in a constructed manner. It seems empirically and theoretically warranted to assume that humans approximate their beliefs as they go along in their lives without a core self from which they retrieve these beliefs. This does not, however, exclude consistency that make the individual seem stable in her beliefs. Due to the fact that we remember what we did in similar or comparable situations, we may fully expect that the subject is consistent with prior actions[204]. If this hypothesis of beliefs and the self is true, we should expect serious changes in personality when memories are degraded due to illness or old age, and indeed findings seem to support this notion.

Mirroring Joyce's description of appreciation of the aesthetic, the approach to the proposed belief in the persuasive situation may be thought of in a similar fashion. Joyce writes "…the synthesis of immediate perception is followed by the analysis of apprehension" (1996; pp. 241-242). That is, the persuadee is presented with immediate sensory and cognitive stimuli, which may be fragmented and appreciated (e.g. the content strength of the evidence, the credibility of the source etc.), but this array of stimuli is only processed via synthesis and integration, which makes up the complexity of the manner by which the persuadee approaches the persuasive incident. This entails that "the whole can always dominate the part" (Kakuzo, 1906, p. 27) such that single elements may be identified and investigated in vacuum from the phenomenal, but the persuasive situation is first and foremost a whole-bodied and contextual phenomenon. This points to the contribution of the thesis as discussed in 6.5. In this way, rather than walking around with a fixed set of beliefs, the subjects shape and construct their local beliefs as they move in the world. This on-the-spot creation of the belief in the situation

[203] I want to emphasise that the definition offered is not conclusive and is not meant to substitute definitions of beliefs in other theories. The definition is merely a theoretical consideration how 'belief' should be understood in the framework of the SPIMP approach.

[204] This stance may be described as a situation in which the subject would, consciously or unconsciously, think 'I'm the type of person who would…' and act and think accordingly.

is predominantly local rather than global. Given the potential of incommensurability, this is not theoretically surprising as a given person may entertain mutually contradictory beliefs on a global level, whereas the primary aim of the persuadee in the act of persuasion is consistency on a local level[205]. This consistency is a driving factor for the intentionality and aims of the persuadee when processing the act of persuasion, namely to update potentially flawed beliefs and thus be able to act more efficiently in the future. The directedness of the intentionality in the act of persuasion is divided amongst the aims of the persuader and the persuadee as well as the mutual intentional stance of engaging in an act of persuasion. The latter is crucial since the persuasive incidence could not function in the same way epistemologically, ontogenetically, and communicatively without the common engagement. This, too, highlights the inherent importance of the interacted and the social in persuasion.

Alongside the social lodging of beliefs, the potential propositional character of the persuasive belief is complex and multi-facetted. Firstly, the propositional stance is not restricted to assertive statements. Consider the following

13) We should adopt policy X

13a) [I believe] we should adopt policy X

13b) [I desire that you believe] we should adopt policy X

In this case, 14a is epistemic as it refers to the concrete mental states as the presently exist for the persuader. However, 13b clearly does not express the mental state of the persuader in the same assertive manner. Rather, 13b is ontogenetic and indicative towards potential rather than a report of present state and mental states. As such, the propositionality of the act of persuasion cannot be limited to assertions, but has to take into account a broader range of truth-conditional potentials. Common to these, however, is that the SPIMP approach conceptualises all these potentials as uncertain and probabilistic, even factual assertions as information may conflict with the assertions (e.g. culturally held truisms such as the heliocentric worldview is so likely that in practice, we can take it for granted, but such assertions can still be overturned by novel evidence and new investigations[206]). Further, although a belief is propositionally

[205] That is, the belief is local, but it is drawn from a whole-body position in the interactive context. In other words, 'local' refers to the probabilistic estimation and drive towards consistency on the level of beliefs rather than to the manner by which the belief manifests itself *in* the situation.

[206] Indeed, the hallmark of science and scholarly pursuit compared to religious pursuits is the acknowledgement that *all* beliefs are negotiable in light of new evidence.

expressible, it remains an open question whether beliefs *cognitively* are propositions, or whether these are simply constructs called into existence when we contemplate the world and are asked about our opinions on certain topics. Finally, the local-global distinction is strengthened by the existence of incommensurability. Incommensurable beliefs are incompatible and the conclusions drawn from the premises of these may be contradictory. In a globally consistent system, such inconsistencies should be eradicated. However, in a local system that constructs entities on the fly, global contradictions are unproblematic since there is no stable catalogue of the self. In this way, incommensurability does not pose a theoretical conundrum for the definition offered here.

As stressed in this and preceding chapters, persuasion, reasoning, and communication are inherently social phenomena. As such, the belief is developed temporally throughout the life of the individual from a social, cultural, and interactive stance, but it is also idiosyncratic in the sense that the individual holds the belief in the specific instance. As Kakuzo (1906) points out, "our particular idiosyncrasies dictate the mode of our perceptions" (p. 50), which I take to resemble the phenomenological notion of intentionality that is individual, but socially and interactively influenced and guided. The development and management of these idiosyncrasies, then, is inherently social in such a way that they may be manipulated (as in the case of choice blindness, Hall et al., 2010). In this case, the manipulation alters our directed intentionality such that our attention and consequently our presence and perception is shifted.

In general, beliefs are an immensely important psychological ability since without these, we would not be able to retain information, learn from experience, and pass on knowledge to future generations as well as other traits important for the individual *and* the communal. In this way, beliefs are central to our capabilities as human beings and as social animals. However, the SPIMP approach fully acknowledges that changes in *behaviour* (action) depends on more than changes in beliefs (persuasion). As mentioned in chapter 1, persuasion does not have to translate into action. Indeed, given the incommensurability, the social influences, potential motivations to *not* act, and other factors, a richer account is needed to describe what drives people to act rather than to believe. The present framework, then, presents a piece of the kaleidoscopic discussion by investigating how changes in the belief system

occurs psychologically, but does not constitute a theory of change in behaviour. Furthermore, as a baseline assumption, the belief system is lethargic and conservative in the way that it takes cognitive effort to replace, update, and subsequently act differently than what is habitually done previously. Therefore, the persuader has to *move* the persuadee and provide reasons and evidence for this movement. Otherwise, the persuadee remains static in her preconceived belief system. The persuasive interaction can thus result in three outcomes. One, no belief change (which is the definition of an unsuccessful persuasive attempt), two, belief change, but no action change (which is the definition of a successful persuasive attempt, but not an *un*successful attempt of influence), and finally three, belief change *and* action change (which is the definition of successful influence, but goes beyond the persuasive, as action change might be obtained through other means, e.g. changing the choice architecture, Thaler & Sunstein, 2008).

Given the immediacy and online nature of the construction of beliefs from a social and interactive point of view, the directedness of our attention, and consequently the remits of our perception, what becomes pivotal to the act of processing persuasion. In modern rhetorical theory, Perelman & Olbrecth-Tyteca's *New Rhetoric* (1969) discusses the persuasive importance of the presence of the persuasive. By exploring the concept of presence, the important concept of attention can be further expanded. In the SPIMP framework, attention is central to coping mechanisms, and given the importance of presence in attention, the concept helps construct the theoretical framework surrounding the SPIMP.

6.3. Presence

As already noticed previously, cognitive effort and attention are finite and from a phenomenological perspective, they are intentionally directed towards the persuasive situation. That is, in the event of a persuasive attempt the intentionality of the persuadee is directed towards the situation in a manner that fits with her general aims as identified previously, namely belief updating and consistency such that her beliefs might be as relevant and probable as possible since this facilitates the potential for better and more beneficial action. From this intentional point of view, the persuadee is in charge of the directedness of her attention, perception and reasoning faculties. In other words, the

persuadee directs the intentionality. However, as Sperber (2000) notes, public representations, and hereby acts of persuasion, may be "…more or less attention-grabbing…" such that the acts of persuasion and the gestural and communicative appeals made of the persuader may direct our attention and thus refocus the persuadee's intentionality. That is, the agency of directedness of intentionality is called into question where the persuader may also exert communicative power over the situation and focus her intentionality and thus the attention. From a rhetorical perspective, this raises the issue of agency in the rhetorical situation (cf. Benoit, 1994; Bitzer, 1998; Vatz, 1998). That is, the situation somewhat constrains the persuader's ability to direct intentionality, but he also enjoys active and strategic agency. However, it should be noted that the agency and the constraints on agency is not limited to the persuader. Rather, the persuadee also has agency to direct her intentionality to better fit her aims. This mirrors the communicative arms race described by Sperber (2000).

Evidence to support the hypothesis of intentionality shift comes from varied findings from communication and reasoning literature. The aforementioned interaction in communication from the common ground (see 4.3-4.5 as well as 5.2) indicated the necessity of the joint roles of interlocutors in acts of interpersonal persuasion. That is, as mentioned, the communicative act is not one-directional, but rather synergetic. Further, choice blindness (Hall et al., 2010) provides a strong indication for the malleability of beliefs and supports the notion that we construct and make up our convictions on-the-spot rather than refer to a catalogue of a stable self. This assumption is support by a range of studies that show the importance of framing (e.g. McKenzie, 2004). If humans were able to circumvent and go beyond the specific direction of attention, framing should be less effective. However, from experimental work, we know that framing is a consistent and powerful force. That is, throughout the thesis it is assumed that humans are finite beings with limited cognitive potential. Therefore, given the vast amount of information that humans *could* pay attention to, there has to be a selection process in which some information takes to the foreground of the attention whilst other information is largely ignored (such as ignoring a range of potential input when concentrating at a lecture). Therefore, the framing of the limited attention makes a potential difference in how we process information, potentially how we subjectively estimate the likelihood of the information, and how we subsequently evaluate the

persuasiveness of the information. Presence plays a central role here, as the concept is concerned with the manner by which something takes presence and beckons the attention of the received. As such, the persuader might try to infuse certain persuasive elements with a higher presence such that it receives higher attention. Combined with the effects reported in the framing studies, this indicates the strategic potential of the persuader and shines a light towards the struggle between persuader and persuadee in terms of aims, strategies, and coping mechanisms. That is, the persuasive can be framed in a particular manner, but it can also be endowed with a particular presence to make the persuadee pay more attention to one part of the persuasive attempt. In sum, the persuader may direct the persuadee's intentionality and consequently attention and perception such that she approaches the evidence in a manner better suited for the strategic potential of the presentation of evidence in favour of the persuader. That is, given the direction of presence and cognitive attention, this may persuasively entail that the persuadee does not engage with other pertinent aspects of the belief in hand, despite the fact that these might be relevant for critically evaluating the act of persuasion. The persuadee, however, may also resist the directedness suggested, which creates tension between the interlocutors. The directedness of the attention, in other words, is a meta-argumentative battleground for the interlocutors since it transcends the actual evidence by competing for the lens and focus through which the act of persuasion is constituted.

The preceding sections highlight the importance of the intersubjective relation as well as the phenomenal immersion in the contextual as a fundamental aspect of how humans engage and deal with an act of persuasion. It seems theoretically clear, then, that the intentionality is directed, and that humans have a limited cognitive performance capability where the attention of the subject plays an important role in terms of her perceptions and beliefs. Extending the conceptual discussion from this and initiating modern rhetorical theory (alongside Kenneth Burke), Perelman and Olbrechts-Tyteca (1969) describe the importance of presence in persuasion. Presence is the sense by which something appears in the foreground whilst other things do not. For instance, in an argumentative situation, an interlocutor can create presence by invoking certain topics. This is highly connected to strategic choices. For instance, much political rhetoric is concerned with bringing topics to the foreground that would be beneficial for your preferred candidate whilst being detrimental for the opponent. That is, by shaping

the communicative frame, the estimation of a particular claim may change given the fact that it is placed at the foreground rather than in the back.

The persuasiveness of a statement, then, is multi-layered. At the basic processing level (which is described by the SPIMP), the persuadee evaluates the act of persuasion from subjective probabilistic estimations concerning source credibility and content strength. These estimations, however, are necessarily subjective and influenced by a range of factors such as contextual factors, socio-cultural background, emotion states, and so forth. That is, the same argument may be estimated and consequently evaluated differently by the same person depending on fluctuating circumstances *in* the situation. The subjectivity of the nature of processing, then, influences the evaluation of source credibility and content strength. However, subjectivity is also influenced by the directedness of intentionality and – by extrapolation – attention. The persuasive intentionality is directed towards the persuasive situation from the perspective of the persuadee, and this influences the scope of the perception and subsequently beliefs potentially invoked and constructed in the situation. The persuader, however, may manipulate the directedness of intentionality by creating a sense of presence (or, as Sperber, 2000, describes is 'attention-grabbing'). This is a different layer that provides the screen against which the SPIMP approach can describe and predict the reaction to the persuasiveness. As such, any act of persuasion, given its strategic nature, is essentially multi-layered in that the basic level is influenced by immediate factors *as well as* the directedness of the intentionality. The phenomenological terminology thus helps to account for an inherently complex interaction between the interlocutors, and presence thus becomes a central element of persuasion processing due to the fact that it represents manipulations of the directedness of intentionality as well as strategic designs of effective communication.

The concepts of presence and directedness of intentionality might also provide a theoretical element in accounting for the reasoning paradox seemingly invoked by persuasion (Madsen & Chater, in prep.) since it shows that persuasion goes beyond mere information transmission, but also includes the strategic (and the epistemically vigilant). Indeed, if we assume the role of persuadee and persuader are interchangeable given the fact that sometimes we persuade and other times we are at the sticky end of an act of persuasion, both interlocutors should know the praxis of the

strategic attempts. From a pure reasoning perspective, given the uncertain nature of the information in persuasive attempts as well as the discrepancy between aims, the persuadee should readily opt to refrain from engaging in persuasive situations. However, given the fact that pure rejection also entails that one's beliefs are never updated in other situations than what oneself can derive, I follow Sperber (2000) in claiming that changes in beliefs from persuasion has to be more than a zero-sum game. It has to be overall beneficial enough to warrant the risk of manipulation and deception. That is, persuaders might succeed in directing intentionality such that the framing of the social situation becomes more beneficial to their aims whereas a critical listener might be aware of such attempts. In this way, intentionality provides the meta-frame for the specific attempt and functions as the screen against which the evaluation occurs. I discuss coping and the strategy of the social situation in more detail in 7.4.

6.4. The temporal: a flash in a flux[207]

An important modelling limitation to the SPIMP approach is that the model describes the process of evaluating an act of persuasion *in* the moment. That is, given the subjectively estimated priors and likelihood ratios in the persuasion situation, the model provides concrete predictions as to how the persuadee should respond to the proposed beliefs, and how she reasonably should update her beliefs despite the fact that the attempts are from uncertain evidence from an uncertain source. In other words, the model describes a short temporal window, here called a 'flash' in a very time-bound perspective. Indeed, given the subjective nature of probabilistic estimations, the same persuasive attempt might be processed differently by the same persuadee in another moment given other emotion states and a different directedness of intentionality (as mentioned in the section on presence). In this way, the persuadee makes up her mind *in* the moment. However, humans are generally pretty stable in their beliefs and actions (people who have a high probabilistic estimation of one belief one day and a very different one the next would be considered inconsistent, e.g. a strong belief in the heliocentric worldview one day and a strong belief in a geocentric the next). This stability may be described as a catalogue of stable beliefs that make up the internal

[207] Papers from a special issue of Cybernetics & Human Knowledge coming out (edited by Stephen Cowley and myself) influence the section, see Madsen (submitted)

belief system of an individual. However, as argued previously – and more extensively in Hood (2012) – the fact that humans are stable does not entail that there is a stable self from which this is drawn. Rather, our personal experiences and memories (constructed, false, and true), the socio-economic background, our upbringing, and so forth provide a framework through which our intentionality and thus attention and perception may be directed. In other words, the habitual and the recalled become central to stability, which presents itself as a stable self. Given the importance of development, socio-cultural background, and memory, the temporal aspect becomes central to how the flash of the SPIMP fits in with a temporally more extended flux of a lifetime leading up to the evaluation of a particular persuasive attempt described by the model. Alongside the stability and management of beliefs, the epistemic qualities of temporal aspects are significant in influencing and complicating how persuadees approach the proposed belief. By introducing a temporal focus as a framework for the model, the theoretical picture becomes dynamic and relational, which provides part of the background for the development and management of priors and likelihood estimations.

In the concrete persuasive situation, then, we can expect a host of variables to intervene such that the frame of belief reference is set, not by the persuader nor by the persuadee, but by a developmental and fluctuating trajectory in which both interlocutors are immersed. This does not entail, however, that there is no scope for influencing the persuasive setting. Indeed, the notion of presence presented in 6.3 is only possible insofar that it is possible for the persuader to manage the situation by bringing chosen elements of his argument to the foreground. However, this active steering cannot be seen in isolation from the more complex psychological and socio-cultural background that permeates the situation for both. As Benoit (1994) rightly observes, the persuader has *some* but not complete agency since the situation also warrants responses and provides a frame within which the persuasive event might take place. The persuadee, however, is directed towards her intentional stance expressed in the aims of the persuadee as well as the mutual aims. She does so in a way that best fulfils her present and future aims (obtaining as probable beliefs as possible). Enfield (2011) describes this as an enchronic movement, which is defined as a "…forward-feeding temporal, causal-conditional trajectory of relevance relations… (p. 287, see also Enfield & Sidnell, in press).

The contribution of the SPIMP is seen in the light of this developmental and fluctuating frame. In the estimation of content strength and source credibility, given by the subjective estimations tied with the psychological framework, the SPIMP normatively describes how persuasive a given act of persuasion should be to the persuadee. That is, a flash of an estimation in a continuous socio-cultural flux of events. As such, the present framework provides a initial sketch of a temporal psychological outline against which the SPIMP can describe and predict how the persuadee processes persuasive attempts.

Alongside the socio-economic, cultural, and developmental aspects of the temporal influences on the common knowledge and beliefs, which outlines the communicative interaction and provides the frame for the belief construction, the temporal aspects also bear influence on the epistemic qualities under consideration in the persuasive incident[208]. Indeed, the psychological and communicative framework of the persuasive incident is influenced by events that lead up to the event in question. This past influence is both personal and meta-personal since the influences are comprised of personal experiences and memories, but also of influences that reaches beyond the lifetime of the persuadee such as the development of communicative conventions, ways of presenting arguments and persuasive appeals, socio-cultural aspects concerning codes of conducts, and so forth. Alongside the influence of the past, persuasion is staunchly looking ahead. If we assume that changes in beliefs *may* influence changes in behaviour (e.g. learning that smoking causes cancer *might* persuade some smokers to quit), the single persuasive event has potential ramifications and implication for the persuadee in terms of how she can act and her potential future belief framework. As mentioned in chapter 1, persuasion comes with risk of deception, which warrants the inclusion of epistemic vigilance toward misinformation. As a consequence of this, the temporal influences tentatively described previously showcase the complexity of the immersion of the persuadee in the persuasive event where p, present, and future play an important role. Given this temporal stance, the directedness of the intentional stance

[208] In order to further explore the temporal and socio-cultural influences on the emergence of beliefs as well as how these are managed *in* the persuasive situation, it is necessary to impose order onto these variables to describe how they relate to one another and how they can be factored out and tested empirically. However, such an exploration of the temporal is beyond the scope of the thesis, as it deals with the processing of uncertain information from an uncertain source in a persuasive situation between two and only two people.

from the persaudee's perspective is concerned with an epistemically more complex situation than the evaluation of assertion and factual statements since the epistemic quality not only involves assertions, but also counterfactuals, the persuader's reports about himself, and predictions of future outcomes. This epistemic situation further puts pressure on the formal logicist account if it is tied to a truth-conditionally dichotomous estimation rather than a gradient and subjective probabilistic estimation, which may readily capture the various epistemic manifestations.

Branching over the theoretical considerations from the present chapter, the position of the persuadee and the intricacies of the persuasive situation become clearer. Intentionality is central to how the persuadee approaches the act of persuasion since this describes an intentional stance towards the optimisation of beliefs such that she might ascertain as probable and relevant beliefs as possible. This intentional stance, however, is lodged within the social and interactive context of the communicative sphere in which both interlocutors try to optimise their own position. From the point of view of the persuader, this is concerned with strategic choices on how to make the evidence as probable as possible for the persuadee, how to create presence of relevant information, and how to frame the persuasive situation. The persuadee, on the other hand, intends to scrutinise the proposed belief from an epistemically vigilant positions such that she minimises deception. As discussed in 7.4, this *potentially* combative relationship (because the persuasive relationship can also be beneficial and mutually helpful) is akin to the argumentative arms race described in Sperber (2000), such that strategies might develop to persuade and to direct the intentionality of the persuadee and vigilant strategies and coping mechanisms might develop to uncover and critically relate to such persuasive schemes. The success of each interlocutor, however, relies on a complex relation between socio-economic cultural upbringing, the intelligence of both, the level of cognitive effort invested in either creating or evaluating the act, and so forth.

As such, the proposed belief resides in a multifaceted social sphere. As understood in the present framework, the belief is constructed and managed in the specific flash of a moment in a fluctuating and continuous temporal path. It is not necessarily propositional in nature, although it may certainly be expressed as such. Beliefs, however, are malleable and subjected to influences from outside the persuadee. The psychological framework described in 7.2, the immediate interaction with the

persuader and the contextual as presented in 5.1, and the developmental aspect all contribute to outline how the belief might be managed in the situation. Indeed, as shown by the MFQ, humans develop their concept of morals from a social rather than a solipsistic perspective. *Given* this background the persuadee subjectively estimates the probabilistic likelihood of content strength and source credibility, which in turn is described normatively in the SPIMP.

PART III

INTEGRATION OF CORE SPIMP MODEL & PSYCHOLOGICAL FRAMEWORK

Chapter 7: On persuasion processing via the SPIMP: Psychological framework, core model, and integrated approach

Hence to fight and conquer in all your battles is not supreme excellence; supreme excellence consists in breaking the enemy's resistance without fighting

Sun Tzu

At the end of reasons comes persuasion

Ludwig Wittgenstein

The preceding chapters presented elements of an integrated model of persuasion, specifically the core elements of content strength and source credibility. These elements aim to describe and provide a basis for quantitatively to approximate the cognitive process through which the persuadee undergoes when faced with a persuasive attempt. However, it is important to note that the elements in and of themselves do not constitute a theory of persuasion. As shown alongside the presentation of each element, important psychological details would be amiss if the model was hoisted to account for persuasion without the theoretical inclusion of other elements such as communication, emotion states, and cultural theory. Reasoning theories cannot account for the persuasive process without invoking interactivity, communication, common ground, intentionality and so forth nor can any of the other elements stand alone. That is, in an integrated and holistic theory and model of persuasion processing, each element contributes a central tenant of persuasion processing. This chapter draws together the arguments of the preceding chapters and binds them together in a first attempt to formulate a novel integrated approach to persuasion[209].

The chapter summarises the main theoretical, empirical, and analytical arguments drawn throughout the thesis (7.1). This offers initially a psychological framework (7.2), which represents the fundamental theoretical background for the SPIMP core model, which is presented next (7.3). These sections embody the main novel contributions of the thesis in combination with 7.4 in which the integrated SPIMP approach is developed including a discussion of how the persuadee might cope with acts of persuasion, assuming there is a discrepancy between humans in terms of their abilities to assert epistemic vigilance and avoid deception and manipulation. Finally, 7.5 briefly considers the main differences between the integrated SPIMP model and previous influential models of persuasion.

7.1. A brief reiteration of arguments and findings

The arguments and findings summarised below are extrapolated from the literature reviews, conceptual discussions, and empirical findings cited and carried out throughout the thesis. Overall, the arguments and findings are presented as either challenging or

[209] Again, it should be stressed that the current theory and model of persuasion is a prolegomena at best. That is, the thesis does not convey a finalised chapter on a theory of persuasion, but presents a speck of the complexity necessary for a more profound conceptualisation of persuasion and, ultimately, influence.

supportive depending on whether they challenge previous models (such as the ELM and the HSM) or contribute to shaping the current model (SPIMP). That is, challenging findings are concerned with theoretical and empirical evidence that cast doubt on or challenge assumptions and analyses of previous models of persuasion. The challenging findings are especially concerned with the plausibility of a logicist approach for describing the psychology of persuasion processing as well as some concrete challenges for the previous models (e.g. concerning specification of reasoning principle, how integration does or does not happen between systems). In other words, challenging findings represent the theoretical arguments for the need for developing a novel model of persuasion processing. Compared to challenging this, the supportive arguments and findings actively contribute to the SPIMP approach proposed in this thesis. These present a theoretical foundation for modelling how humans deal with uncertain information from an uncertain source in a potentially antagonistic situation where the persuadee on the one hand needs epistemic vigilance, but on the other hand cannot simply dismiss persuasive attempts given their potential benefits. That is, the supportive arguments and findings represent notions contributing to the validation of the underlying assumptions of the SPIMP approach.

Challenging findings The challenging findings revolve around the empirical and theoretical challenge to logicist approaches (such as the criticism in Oaksford & Chater, 1991). From an argumentative perspective, Bayesian reasoning has made great strides in showing the descriptive and predictive limitations of formal logicist models of reasoning. In their seminal work on logical fallacies, Oaksford, Hahn and colleagues (see 2.4.3 for references) have shown support for the notion that subjects conform to a gradient scalar reasoning approximated by a Bayesian framework rather than the structural evaluation derived from logical predictions. This calls into question the theoretical framework of truth-preserving logic (i.e. reasoning from certainty) to deal with practical reasoning concerning uncertain information from uncertain sources. These findings have been supported both in terms of content strength (e.g. Harris et al., 2012) and source credibility (e.g. Harris et al., submitted), thus encompassing the two central elements of the SPIMP core model (see 7.3). Communicatively, logicist approaches are further challenged by work on probabilistic models of language acquisition and use (e.g. Hsu & Chater, 2010), the need for others to facilitate effective

communication (e.g. Garrod & Pickering, 2004; Healey et al., 2007), as well as the identification of the importance of context and others from a distributed point of view (e.g. Cowley, 2010). Collectively, the studies on language suggest that communication is formed and managed between individuals where common knowledge is constructed, managed, and negotiated rather than a classical transmission of mental states and thoughts. This view on communication is difficult to reconcile with a logicist account that focuses on the linguistic content. That is, both from a reasoning and a communicative perspective, logicist accounts is challenged in terms of dealing with the lose structures of uncertain evidence and fragmented, collaborative, and subjective interpretive processes of communication.

Alongside the general case against a logicist perspective on persuasion processing (for a more in-depth discussion on the case, see Oaksford & Chater, 2007), the thesis presents some inherent limitations with previous models of persuasion processing from a psychological point of view, namely the ELM and the HSM. The main problems for both of the previous models are concerned with conceptual precision, predictive power derived from normative stances, and the potential integration of systems (see O'Keefe, 2008 for an exploration of the ELM, whilst the same argument holds mutatis mutandis for the HSM. Concerning the conceptual precision, it is not immediately clear from the description of the two models how the normative stance in system 1 is to be defined (see 1.7 for a presentation of dual-process systems). It would seem that the models rely on a formal logicist approach to reasoning (despite the inherent limitations to such an approach as pointed out earlier). Indeed, if the models *do* rely on the normative stance of formal logic, it opens them up to a host of potential challenges concerning the applicability of such a stance. Further, a seeming reliance on formal logic brings with it a range of challenges mentioned in the above.

Further, without a clearly defined normative stance, normative predictions for how the persuadee should react to a given persuasive attempt become less clear (other than general predictions on the direction of various cues, e.g. that evidence processed via system 1 should be more solid that persuasion obtained via system 2, for a discussion of predictive potential, see the comparison of the ELM, the HSM, and the SPIMP in 7.5). The predictive contribution the ELM and the HSM is indicative of belief direction (that is, how it should be treated depending on whether it is processed in

system 1 or 2) rather than quantitatively predictive in terms of management of uncertain evidence in an uncertain situation (as is the SPIMP). The limitation of the SPIMP, however, comes from the fact that subjective probabilistic estimations cannot be directly measured and as such, the input in the model comes from either eliciting estimations from the persuadee (as in Harris et al., 2012; submitted) or from guesstimating estimations and fitting them with the model. In the former, self-reports cannot be thought of as entirely reliable, and the latter relies on guesstimations rather than observations or measurements. In this way, the SPIMP *does* provide a normative account of how persuasive a given act of persuasion should be (given subjective probabilistic estimations), but it offers no clean way of providing the data from which the predictions are made. Thus, the normative stance towards persuasiveness is theoretical and holds true in the model, but it remains an open question how the model is applied and how initial data can be extracted (if at all possible).

O'Keefe (2008) rightly points out that the ELM (his argument may be raised against the HSM as well, mutatis mutandis) suffers from the description of the potential integration and interaction between the two modes of thinking (system 1 and system 2). If there *is* integration, it calls into question whether the two modules in fact are separate and distinct or whether they are aspects of a more complex and integrated reasoning mechanism through which persuasion is processed. O'Keefe additionally points to the fact that some elements (such as beauty) may be considered a cue for system 1 in one case and system 2 in another. In other words, cues seem to be malleable to different labels given different situations, a description which further calls into question the rigour of the conceptual precision as mentioned previously. This conceptual plasticity, however, indicates that the distinction of relevance and importance is largely circumstantial and contextual rather than cognitive and categorical. As such, it raises the important question whether the development of a model that encompasses the elements in a uni-modal description should? be obtained since this conceptually would entail greater stability in the description of the model and less malleability and changeability of concepts. This leaves the two models with an apparent paradox. If there *is* interaction between systems, it would certainly indicate that two sub-systems were present, but it would also indicate also that an integrated theory would be needed to account for the cognitive mechanisms of managing both

systems in interaction. As O'Keefe (2008) argues, the ELM does not provide an adequate account of how the systems interact. The SPIMP, however, describes how source credibility and content strength might interact in the same system. This, though, remains to be explored further. If there is *no* interaction, however, the ELM and the HSM need to account for the seeming interaction between source credibility and content strength reported in Harris et al (submitted). It may well be that a reply may be phrased for this, and both models need to account for such interaction in order to retain theoretical validity and purpose. In sum, both the ELM and the HSM may be challenged on fundamental assumptions concerning the conceptual definitions, the normative issue, predictive power, and integration. The development of the SPIMP approach is an attempt to present a model of persuasion processing that takes (at least some of) these problems into account.

Supportive theoretical and empirical findings The challenging findings of the thesis help in two fundamental ways. Firstly, they indicate the potential problems with previous accounts, which in turn informs the areas of modelling that need to be addressed (e.g. conceptual clarity and integration as well as predictive potential) and secondly, they set the general scene for a the later theoretical presentation of the current proposal. Amalgamating the theoretical framework, the underlying psychological assumptions feeding the SPIMP may be grouped into four categories: scope of cognition, the framework for cognition, and modifying influences (internal and external), which will be expanded upon in 7.2.1 (the four categories are illustrated in table 7 below). The scope of cognition refers to the directedness of intentionality and the presence of the particular act of persuasion. As discussed in 6.1, humans are intentionally directed towards the persuasive attempt in a manner reflected by the general aims of the persuadee[210]. That is, humans need directed intentionality in order to acknowledge the existence of the act of persuasion. This scope can be manipulated (likewise the sense of presence, see 6.3). The framework of cognition refers to the background of the persuadee that informs how she develops her priors and likelihood

[210] Note that the general aims of the persuadee concerning consistency and believable beliefs (see 1.3) are not specifically tied to phenomenological assumptions, but the notion of intentionality is enriched by the phenomenological discussion. Note also the distinction between having an intention of action is conceptually different from the more fundamental notion of intentionality (see fig. 15b).

estimations[211]. Temporally, the framework extends beyond the specific situation in that it reflects the socio-economic and cultural upbringing, the memories, and the personal experiences of the persuadee. The developmental studies cited in the thesis support the notion that beliefs inherently are constructed and managed throughout the life of the individual. These influences are social par excellence, which has led researchers like Hood (2012) to suggest that there is no such thing as a stable self containing a firm catalogue of beliefs The framework of cognition thus informs the persuadee of her beliefs when she constructs her estimations in the social situation of the persuasive incident whilst the scope of cognition shapes the directedness of intentionality and presence and consequently focuses the lens through which the act of persuasion is perceived. Finally, the internal (e.g. emotion states) and external influences (e.g. the physical context) might potentially modify the probabilistic estimations of the strength of the content and credibility of the source. Taken together, it is clear that the subjective element of the SPIMP does not refer to a solipsistic subjective estimation, but rather a socio-culturally, interactively, and developmentally shaped subjective estimation that is further influenced by immediate internal and external factors. In other words, the conceptualisation of persuasion in the present model cannot be accounted for without the engagement of the other in an inherently interactive manner. Finally, as discussed in chapters 4-5, the communicative stance adopted in the thesis is in line with the probabilistic and interactive approaches rather than the mental state transmission approaches.

A novel model and its analytical implications Alongside the theoretical and empirical findings that make up the conceptual framework of the present theory, the main novel contribution of the thesis is the development of a model of persuasion processing that responds to the issues raised by the challenging findings. Drawing on Bayesian reasoning and the interactivity of communication from common ground, the model is labelled as The Subjective-Probabilistic Interactive Model of Persuasion (SPIMP). The model is discussed in more detail in 7.3, so for now a few general remarks will suffice. Firstly, the normative stance in the model is predictive given the priors and likelihood ratios. From a Bayesian perspective, then, SPIMP provides clear predictions concerning the persuasiveness of an act of persuasion. As such, the

[211] The development of priors and the transition from prior to posterior remain interesting points of discussion for proponents of Bayesian reasoning, as these issues are by no way trivial.

normative stance is clearly defined, and the normative predictions follow mathematically. Secondly, SPIMP integrates elements considered to belong to different systems, namely content strength (belonging to system 1 reasoning in the ELM and the HSM) and source credibility (belonging to system 2). The findings from Harris et al. (submitted, see also 3.3) support this conceptual integration since source credibility (usually considered a peripheral cue) integrates with content strength (usually considered a central cue). The ELM and the HSM need to theoretically account for the potential integration of the two systems in order to account for results such as these.

The focus of the thesis is concerned with the theory and model development and little with analysis. However, from an analytical perspective, the subjectivity and interactivity of the SPIMP approach has the greatest implications, as these show the theoretical boundaries of potential analyses. Specifically, these concepts show that, from a psychological point of view, it makes little sense to look at the persuasive artefact in absentia from the context and interaction in which it is produced. Speech analyses may well provide interesting perspectives on argumentative traits and structures, but a holistic description of the psychology of persuasion needs to take into account the receiver's subjective probabilistic estimations as well as the interactive relationship between the interlocutors. Subjectivity and interactivity can account for why it is that one size does not fit all since the techniques might invoke unpleasant connotations and thus low probabilistic estimations concerning content strength and source credibility given a particular persuadee's personal, experiential, and cultural background. Analytically, then, the SPIMP approach strongly suggests that understanding of the background and characteristics of the audience and the interaction is needed in order to provide a more in-depth analysis of persuasion. This type of theoretical background for SPIMP is sketched in 7.2.

7.2. SPIMP: The psychological framework

In establishing a theory of persuasion, the present section initially discusses the psychological framework for the theory. The subsequent sections consider conflicting aims in persuasion processes, the fluctuating temporal nature of persuasion, and the communicative stance as being coordinated and distributed. The integration of these

theoretical approaches makes up the psychological and theoretical foundation for the estimations that feed into the SPIMP model to be presented in 7.3

7.2.1. The elements of the psychological framework

The development of the SPIMP builds on the psychological framework briefly mentioned in 7.1 and illustrated in table 7. The four categories are not meant to be independent. For instance, the directedness of intentionality influences attention, and nudging might create presence whilst the emotion states might influence how we make use of memories. The specific relationship between the elements is an area yet to be explored and presents a fascinating challenge in order to create a more well-defined and thorough holistic theory of persuasion. In other words, the distinction is sketchy rather than definite.

Table 7: The psychological framework

Internal influences	External influences	Scope of cognition	Framework for cognition
- Emotion states - Level of cognitive effort	- Physical context (nudge) - Attention - Behaviour of others - Social psychological influences in general	- Directedness of intentionality - Presence	- Socio-economic background - Cultural background - Memories - Personal experiences

The table illustrates the theoretical background against which the central elements of the SPIMP core model should be considered. As such, the table points to a broader conceptual discussion regarding the complex nature of persuasion processing, which reaches into the socio-cultural, the emotional, and the contextual.

The following discusses the relationship between the elements in order to provide a theoretical picture of how the foundation for persuasion processing is understood in the current approach. One of the essential theoretical entailments of the underlying outline is that the SPIMP is appropriate only given descriptive analyses of influencing elements. Otherwise, the subjectivity of the model (which is an absolutely inherent assumption) makes little sense. In this way, the current approach relies *both* on qualitative and descriptive analyses and critical assessments as well as on quantitative and normative predictions from the model. The qualitative, psychological framework, in a manner of speaking, feeds the nodes of the quantitative predictions in the SPIMP

(including the limitations of eliciting the probabilistic estimations as discussed previously in 7.1).

Framework for cognition

The framework for cognition denotes the general frame of reference that is developed through the life of the persuadee[212]. That is, throughout her life, her beliefs have been shaped, modified and moulded by a number of factors, all of which contribute to the potential range of thoughts and reactions possible for her in the concrete situation where she evaluates the act of persuasion. As described in Hood (2012), the development of the belief is dependent on a variety of factors including our socio-economic and cultural background, our personal experiences, the stimuli to which we are exposed, and our memories. In terms of memory, rather than metaphorically construing the phenomenon as a film that may be engaged internally, Randall (2007) argues that we should more accurately describe memories as a compost heap in a state of constant reorganisation (see also, Hood, 2012, pp. 59-61). In other words, rather than imagining memories as something that may be recalled in front of the inner screen, memories are inherently constructed and restructured according to whatever situation the human is in. This view is supported by the false memories (see Hood, 2012, pp. 58-60). Throughout her life, then, the persuadee has been in numerous socio-economic and cultural situations in which she has experienced certain stimuli. Collectively, these experiences (that may be debated with others such as friends and family and reconsidered later on) shape her general transient belief system in a habitual manner such that she refers to what she has learned and experienced throughout her life in novel situations. Developmentally and cognitively, such a strategy would additionally be efficient since she refrains from reconsidering her entire conception of the world-of-affairs with each new situation because doing so would require an enormous cognitive load and would thus be cognitively inefficient and wasteful.

This developmental aspect provides the general frame through which a novel situation is initially approached since she relies on past experiences, memories of similar situations, and her general knowledge of the world-of-affairs. This frame, importantly, is subjective, but it is formed in a deeply social and interactive manner, as

[212] Note that 'developed' here refers not exclusively to development during childhood, but rather to the general trajectory throughout the life of the persuadee.

she has interacted with other humans and her surrounding world in order to ascertain this frame. The frame is the platform from which the persuadee approaches the persuasive situation in which the scope of cognition and internal/external modifying factors influence her priors and likelihood estimates.

Scope of cognition

The scope of cognition refers to the intentional stance as well as the presence of the attempt in question. Intentionality, understood from the Husserlian perspective, refers to a mode of approaching the givenness of the world-of-affairs. From the perspective of persuasion theory as it is conceptualised here, intentionality is tied up with the general aims of the persuadee as well as the social contract of the persuasive situation (forgetting about the aims of the persuader for a moment). For the persuadee, the intentional stance is towards coherence and avoidance of deception such that in the future she can act in accordance with more probable beliefs. Further, given the fact that human cognition is finite, different aspects of a persuasive situation can obtain different presence, or foreground. For instance, in the 2013 council elections, Ukip may have gained support from the fact that criticism of the European Central Bank and the potential immigration from Rumania and Bulgaria were topics of discussion. Had the issue of immigration and the UK's belonging to the EU had less presence in the council elections, the results might have been different. Presence accounts for the fierce competition between persuaders to frame the debate and set the topic of discussion. Collectively, the framework for and scope of cognition sets the scene for how the persuadee may interact with the interlocutor and with the persuasive content and consequently set the frame for the subsequent evaluation.

External influences

The act of persuasion, however, is characterised by two important modifying factors, namely the fact that the persuader may be strategic, and the fact that external factors such as social cues and the behaviour of others shape how we think *in* the situation. That is, given the general framework and scope, our beliefs may be manipulated, e.g. if the persuader invokes presence of certain aspects of the persuasive attempt or manipulates the directedness of her intentionality. Indeed, the richness of evidence from

various social psychological studies cited throughout the thesis (not to mention the vast amount of additional literature I did not review in this thesis, see e.g. 5.1) increasingly support the claim that beliefs arise in a socially mediated and interactive manner where humans take cues from others in order to form their beliefs about the given situation. Similarly, the current approach acknowledges this interactive influence by others such that the probabilistic estimations should always be seen in the modifying light of the social and contextual. The evidence from social psychology (e.g. Cialdini, 2007) and nudging theory (Sunstein & Thaler, 2008) lend credence to the social influence in the persuasive situation (see 5.1).

Internal influences

Alongside the external modifying factors, the prior probabilities and the likelihood ratios may be influenced by internal factors, namely emotion states (tentatively understood here as fear, anger, joy, and other such emotion states) the level of cognitive effort asserted when evaluating the act of persuasion[213]. Despite the fact that emotional appeals, especially throughout the history of persuasion theories, especially pathos and ethos, have entertained a prominent role (in which the use of emotions were either applauded such as Aristotelian rhetoric or deplored in Descartes), they have been discussed very little in recent literature. Despite going beyond the scope of the thesis, emotions are thought to be an important factor in persuasion processing since they influence the way probabilistic estimations are made. Rather than being featured as an element in the model, however, emotion states are thought of as highly influential modifying factors on probabilistic estimations[214]. For instance, if the persuadee is angry, she might be more critical towards the likelihood of a proposed belief towards which she would have been sceptical even in a better mood. In other words, in the psychological framework of the thesis, emotion states (in whatever way they are culturally manifested and expressed) modify the estimations *in* the situation that these

[213] As shall be argued later, the level of cognitive effort provides a conceptual account for the data supporting the ELM and the HSM

[214] As mentioned in the concluding remarks, the role of emotions in the psychology of persuasion and probabilistic reasoning is a very interesting field of future studies.

estimations are constructed and developed. As such, the persuasiveness of pathos becomes clearer in re appeals dominated more by evidence-based reasoning[215].

In sum, the mechanisms underpinning the process of evaluating an act of persuasion are multi-facetted and complex. The backdrop of probabilistic estimations is the socio-economic and cultural upbringing as well as the persuadee's personal experiences and the memories. When *in* the persuasive situation, both interlocutors attempt to steer the directedness of intentionality towards the attempt in such a manner that is most befitting to the persuasive aims of each. A skilled persuader may manipulate the intentionality and presence, which in turns shapes the scope and lens through which the persuadee can think, whereas a skilled persuadee may investigate the proposed beliefs in a more coherent and critical manner. In situ, the probabilistic estimations are social and influenced both by external and internal factors, which colour the perception of her beliefs. The persuadee, in other words, is inherently subjective, but not solipsistic, instead relying upon habitual thinking, contextual cues, and the behaviour of others to inform her reactions and estimations of proposed beliefs. As Hood (2012) states, "it may feel like you have reached your decision in the open courtroom of your mind but, in fact, most of the important stuff has been going on behind closed doors" (p. 114). As clear from the various evidence cited throughout the thesis concerning the influences on beliefs from development, cultural background, etc., the thesis supports this view that the grounds have been prepared for an evaluation made in 'the open courtroom of your mind'. That is, it is assumed that much of the framework for the estimation of content strength and source credibility is implicit and unconscious. These implicit elements might be called into question and become conscious, but for most of the time, the persuadee's approach to various contextual cues is implicit and unconscious. The psychological framework described in the above is exactly a description of this process behind open doors, whereas the SPIMP represents the final evaluation made *from* these pre-deliberative processes and *in* the specific situation. Importantly, none of the elements mentioned here are taken to be atomistic and self-contained. For instance, the manner by which a physical nudge might be

[215] Note, however, that the distinction between logos, ethos, and pathos is theoretical, not practical. Indeed, in real-life arguments, most arguments (except perhaps mathematical proofs) tend to include each element in a more or less prominent manner. The interaction is captured in the psychological framework since emotion states influence the perception of probabilistic estimations and thus affect reasoning in general.

effective is closely tied with the cultural context in which it appears. Even emotion states are contextual. For instance, the perception of pain (Vlaev et al., 2009; Kurniawan et al., 2010) and the perception of emotions of others (Barrett et al., 2011) are contextually modified. Thus, the elements in the general psychological framework may be divided into categories for the sake of simplicity and to provide an overview, but they are taken to be integrated and mutually influential in facilitating the backdrop against which the persuasive attempt is evaluated.

The local-global consistency issue is a notable assumption of the SPIMP. Given the assumption that humans are cognitively finite beings localised in the situation, it is assumed that humans' first approach a proposed belief from a local perspective before (if ever) considering the global perspectives. The concept of presence further supports this assumption. If humans considered beliefs globally, presence should matter little, as the system would consider the proposed belief in re the entire system. However, presence specifically denotes the cognitive worth and persuasive potential of the attentional foreground, that is the frame and focus of a finite cognitive mechanism directed towards the local first and the global second. The consistency issue, then, resides on a gradient and continuous scale in which local consistency is considered first, then closely associated beliefs, and finally more fundamental and global consistency. The local focus, then, depends on the directedness of the intentional stance and the presence of evidence. Given manipulation of these, the attention of the persuadee may be directed in a manner that fits with the persuader's aim.

From this theoretical vantage point, the main elements of the SPIMP become conceptually clearer. Firstly, reasoning in persuasion evaluation is taken to be probabilistic rather than logicist. This is entirely in line with much recent research in decision-making theory (such as Oaksford & Chater, 2007; Tenenbaum et al., 2011). Given the immediate influences on the estimation of probabilities (e.g. the developmental framework of beliefs, cultural aspects, and internal/external modifying influences), these are inherently subjective. However, the subjective-probabilistic approach is not taken to be solipsistic. Rather, the strong plausibility that communication is coordinated and interactive as well as the external influences on reasoning, the estimations are inherently interactive, as they are formed *in* the social and

given sense-saturated coordination. In this manner, the theory underlying the current model of persuasion is innately subjective, probabilistic *and* interactive.

7.2.2. The conflicting aims of persuasion and temporal aspects

The preceding describes the complex environment in which acts of persuasion take place. The antagonistic nature of persuasion further complicates the picture, as the aims of interlocutors may differ significantly. Indeed, as it has emerged throughout the discussion in the thesis, persuasion represents a delicate and rather complex social situation in which various psychological and phenomenal mechanisms may pull the persuadee in different directions at the same time. Given the fact that the position of persuader and persuadee is interchangeable across time, both interlocutors are thought to have insight into the general aims and objectives the other.

As described in chapter 1, a persuasive situation entails three distinct intentions tied to the different aims of the interlocutors, namely the intention of the persuadee, the persuader, and the mutual intention. The persuadee is directed towards the evaluation such that she updates or maintains her beliefs in a manner that is most suited to her future actions in the way of optimization, not maximization. That is, given the fact that evaluation of beliefs requires cognitive effort (more or less depending on the amount of investment), the aim is to increase internal coherence and obtain beliefs that are as probable as possible. In terms of the beliefs, the truth-conditional assumption of the current approach remains that certain truth cannot be obtained in a dichotomous manner, but rather in a gradient probabilistic way. Practically, some beliefs may approach 1 (such as zealously religious humans who have absolutely no doubt that their particular religious beliefs are correct), but in general most beliefs are found on intermediate steps between 0 and 1. The persuader aims to alter the persuadee's beliefs in a manner that best fits with his intention. That is, the persuader does not necessarily aim for adherence or belief alignment, but may wish to persuade the persuadee of a belief that he himself may not believe (this, for instance, is the case of deceptive persuasion). In order to engage in a social contract in which the persuader and the persuadee tacitly both acknowledge an act of persuasion, the mutual aim of the situation involves comprehension of the communicated belief. Even in deceptive instances, he has to make sure that she understands him in a desirable manner (consider, for instance,

Clinton's handling of the Lewinsky case in which he need the audience to understand him in order for the deceptive use of 'sexual relationship' to be successful, see Clinton, 1998a; 1998b; 1998c). Persuasion, however, has to be beneficial for both interlocutors (as mentioned in the case of communication in general, see Sperber, 2000). If this was not the case, the persuadee should opt out of the persuasive situation every time she perceived someone was trying to alter her beliefs, both beneficially and deceptively. Clearly, this is not the case, as most humans engage with others even when they recognise that the interlocutor tries to alter their beliefs (for instance, teachers, politicians, sales people, good friends arguing, and so forth all constitute situations where the persuadee happily lingers round).

As Mercier & Sperber (2011) argue, reasoning functions best argumentatively. To this could be added that reasoning functions best socially and interactively. This claim readily supports the underlying assumption of the directedness of the persuadee's intentionality since she will engage with the persuasive attempt argumentatively (i.e. by evaluating the evidence presented) in order to reason and evaluate the persuasiveness (i.e. how much she believes the proposed belief). Argumentation, as pointed out previously, however, is not synonymous with persuasion, as the latter involves a broader range of phenomena (described as the psychological framework). From this argumentative and intentional stance, the persuadee is epistemically vigilant, meaning that she shuns away from deception and attempts to avoid less probable beliefs. The contested nature of persuasion, however, entails an antagonistic relationship between the interlocutors given their difference in aims. Therefore, the persuader may well attempt to manipulate the directedness of the persuadee's intentionality and to create presence for elements that facilitate persuasion more than other elements of the situation. The persuadee, in the other hand, remains epistemically vigilant and invokes critical reasoning to evaluate the persuasiveness of a proposed belief (see 7.4).

As discussed in 6.4, persuasion occurs in an interesting temporal frame, both developmentally and epistemologically. Despite the assumption that beliefs are constructed and managed within a relatively brief period of time in the persuasive situation and is managed enchronically towards her general aim; the frame for how she constructs the given belief clearly reaches beyond the specific situation and points

towards habitual thinking, the socio-economic and cultural background, and her personal experiences and memories. For the persuadee, then, what leads up to the incident sets the scene of her evaluation. Alongside the personal development and trajectory, the cultural and linguistic development (communicatively in shape of 2nd order language, see Thibault, 2011) reaches temporally beyond the instance of the situation in which conventions of language and arguments are used *in* the situation. The temporal flux further reaches beyond the scope of the confined situation given the fact that much persuasion is concerned with future actions. Consequently, the truth-conditional probabilistic estimation is concerned with predictions rather than with assertions of whether or not something already existing is or is not likely. The future aspect of persuasion also enters given the assumption that changes in beliefs may lead to changes in behaviour. Thus, the persuadee is (consciously or unconsciously) aware of the fact that the given situation might bear entailments for her future selves. The flash of evaluation approximated by the SPIMP, then, describes how she manages the evaluation of the persuasiveness *in* the given enchronic temporal state, which nonetheless simultaneously points backwards and forward (although in different ways). The temporal nature of the development and management of beliefs in the persuasive setting is a fascinating topic only indicated in the thesis, and this should be explored on a more fundamental level in future research given the ontological and epistemic importance of this in the specific situation.

7.2.3 A coordinated, distributed communicative stance

So far, the theoretical picture provided describes the temporal and developmental aspects underlying the manner by which the persuadee might approach the evaluation, the factors influencing the persuadee *in* the specific conflicted situation, and the epistemic complexity of the proposed beliefs. Given the fact that the focus of the thesis is spoken persuasion between two interlocutors, the verbal and nonverbal conveyance of the proposed beliefs becomes central to the general conceptual background.

Rather than assuming a theory of communication in which mental states are transmitted between interlocutors, the current approach assumes interlocutors manage common ground in an interactive manner such that the persuader addresses and attempts to manipulate the common knowledge rather than transmit his mental states

and beliefs. This places the communicative contribution outside the mind of the persuader and the proposed beliefs become inherently social, collaborative, and joint. This does not entail, however, that the mentalizing interpretation mental states of the persuader are irrelevant for processing persuasion. However, such considerations are considered higher cognitive mechanisms. That is, the persuadee need not consider the mental states on a fundamental level to approach the communicated belief, but rather engages with the common knowledge.

The communicative stance adopted in the thesis is based on theories of language that agree with the essential assumptions of the SPIMP. Firstly, the approach assumes that humans are socially constructed and constituted rather than a catalogue of stable beliefs and mental states. That is, given the assumption that humans constitute their beliefs in the situation (strongly influenced by habitual thinking, the socio-economic cultural background, and the personal experiences and memories), communication is taken to be interactive and socially constituted par excellence. Secondly, language is approximated by subjective interpretations in which the raw linguistic material is enriched pragmatically depending on the persuasive situation and the amount of cognitive effort invested in processing the proposed belief. Thirdly, communication is inherently interactive and interpersonally influenced (as shown in Pedersen, 2012). That is, it exists between interlocutors rather than the code-like approach (see fig. 10 in 4.1) in which belief A is transmitted and decoded by the listener. In the present approach, the persuadee actively engages with the communicative act. Note, though, that the main contribution of the thesis is the description of the psychological outline as well as the development of the SPIMP approach, which is informed by the outline in 7.2. Thus, the SPIMP and the theoretical framework do not *necessarily* conform to the present description of communication. If other theories of communication should be proposed, however, it is theoretically necessary that these agree with the some of the underlying assumptions concerning subjectivity, probabilistic reasoning, and interactivity since these are fundamental to the SPIMP approach.

I have conveyed the complexity and integrated nature of the act of persuasion and how the persuadee can approach and evaluate the attempt. The psychological and communicative frameworks invoked are inherently social and assume

a human subject whose beliefs are mouldable by the immediate context and a situation in which the interlocutors are interactively coordinated in order to manage the complex social situation of the act of persuasion. In this complex situation mediated and influenced by a number of factors, the persuadee eventually has to evaluate the perceived strength of the fact of persuasion. The SPIMP core model, described in 7.3, attempts to approximate this *given* the psychological framework presented in this section.

7.3. SPIMP: The core model

7.2. outlined the theoretical foundation and psychological framework for the current model (SPIMP, see table 7 in the above). The core model of SPIMP is a Causal Bayes Network (CBN, see 3.4) model that integrates the probabilistic estimations of two central elements, namely content strength and source credibility, in order to quantitatively approximate how persuasive a given act of persuasion is *given* the persuadee's subjective priors and likelihood estimations, the development of which are described in the psychological framework and the theory of persuasion outlined in 7.2.

7.3.1. Content strength

The first element of the SPIMP core model is content strength. It denotes the persuadee's subjective estimation of the validity of a proposed belief. In accordance with probabilistic reasoning theories, the estimation is between 0 and 1 rather than the dichotomous distinction of 0 or 1. From a reasoning perspective, the normative stance taken differs significantly from logicist accounts given the fact that the probabilistic estimations are gradient rather than dichotomous, that estimations are subjective and mouldable rather than objective, and that the focus of normativity is concerned with whether or not the subject is conforms to the predictions given by the priors and likelihood estimations rather than whether or not she follows mathematically defined structural rules. The latter is the main analytical difference since fallacies (such as the ad hominem, the slippery slope, etc.) in formal logic are considered bad argumentation that should be discarded. Compared to this, the Bayesian focus on content argues that humans firstly approach the likelihood of the evidence and that the technical presentation of the evidence may play a role, but does not form a definitive estimation.

For instance, within a slippery slope structure, some arguments may be more persuasive than others given the likelihood of the argument (e.g. the difference between arguing that allowing gay marriage might lead to marriage between humans and other animals such as cats and sheep versus arguing that introducing voluntary identification cards might lead to mandatory identification cards. Here, the latter is a more likely outcome than the former). That is, logical fallacies are not discarded par excellence, but are considered another manifestation of argumentation. Formally, the probabilistic approach relies on Bayes' theorem.

$$P(h \mid e) = \frac{P(h)P(e \mid h)}{P(e)}$$

The above is the basic Bayes' theorem, which can be expanded with the likelihood ratio (as described in detail in 2.4). The following equation describes the normative approximation of how the persuadee relates to content strength.

$$P(H \mid e) = \frac{P(H)P(e \mid H)}{P(H)P(e \mid H) + P(\neg H)P(e \mid \neg H)}$$

As presented in 2.4, the equation describes the probabilistic calculus from the priors and likelihood ratios to posterior rating of content strength. Thus, given a low prior, but a high likelihood ratio, the subsequent posterior rating should increase and vice versa.

7.3.2 Source credibility

Alongside content strength, source credibility is the second element of the SPIMP core model. As described in 3.3 and argued in detail in Harris et al. (submitted), source credibility depends on trustworthiness (i.e. how truthful is the source?) and expertise (i.e. how knowledgeable is the source?). In the framework, expertise is a limited notion of expertise, namely epistemic authority as opposed to administrative and cultural authority. Epistemic authority denotes an expert who has relevant knowledge pertaining to the question in hand. This could be a GP providing information on medicine. The relevance of expertise is shown by the fact that an investment banker (also an expert) providing information on medicine is not considered an epistemic authority in the field of medicine. Thus, the expert has to have expertise in the specific area rather than being an expert in any area. Compared to this, the administrative authority is a person who has authority, but administrative rather than epistemic. An example of this is a policeman

who enforces the law without necessarily having expert knowledge of legal matters. Rather, citizens are supposed to adhere to the policeman not from a position of knowledge, but from a position of a social contract, which endows the policeman with certain authority. Finally, cultural authority denotes a person who has obtained importance in the social world without possessing neither epistemic nor administrative authority. An example of this could be Paris Hilton who might propagate ideas without having expert knowledge on the topic (such as nutrition and diets) or a socially and legally mandated power to exert authority on such matters. The distinction between epistemic, administrative, and cultural authorities ensures that the reliance on trustworthiness and expertise does not describe an ad verecundiam fallacy. Ad verecundiam, in the present framework, is taken to be an extraneous variable (on par with charisma and attractiveness) rather than an element of the SPIMP.

As noted in Hahn et al. (2009) and Harris et al. (submitted), the mathematical effects of both expertise and trustworthiness can be described in a one single likelihood ratio of $P(H_{rep}|evidence)$ where Hrep represents subjectively perceived persuasiveness of the proposed belief given the content strength evidence and the source credibility. That is, given the subjective probabilistic estimations concerning the two central elements, the model describes and quantitatively predicts how the persuadee *should* relate to the persuasiveness of the attempt. Formally, $P(H_{rep}|H)$ can be obtained by marginalizing out the conditional probabilities that depend on the evidence. This makes use of the formula for marginalization and the chain rule for joint probabilities and entails the following formula

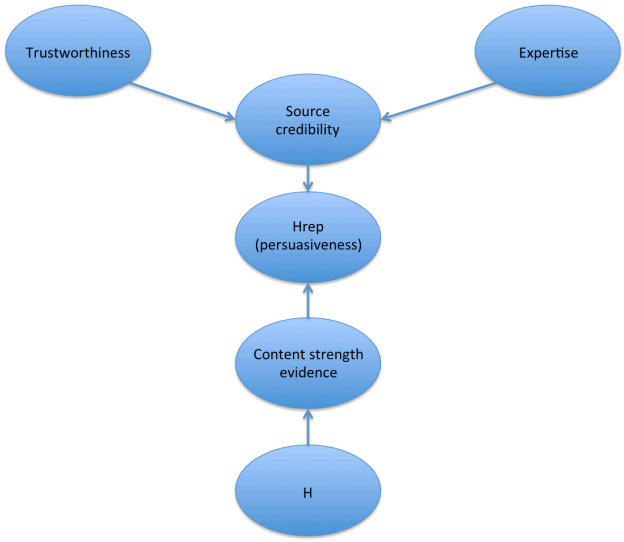
$$P(H_{rep} \mid H) = \frac{P(H_{rep}, H)}{P(H)} = \frac{\sum_{evidence} P(H_{rep}, evidence, H)}{P(H)} = \frac{\sum_{evidence} P(H_{rep} \mid evidence, H) P(evidence \mid H) P(H)}{P(H)}$$

7.3.3 The core model

Collectively, content strength evidence and source credibility make up the central elements of persuasion processing and present a concrete model that differs from the ELM and the HSM in terms of predictions and assumptions (see 7.5). The SPIMP can be illustrated as a Causal Bayes' Network (CBN, Pearl, 2000). Fig. 17 is an illustration of such a network in which the elements are described in relation to the proposed belief. In the figure, persuasiveness (the H_{rep}) represents how persuasive a given persuasive

attempt normatively should be given probabilistic estimations concerning content strength and source credibility. That is, it portrays the persuasiveness of a verbal persuasive attempt uttered verbally by the persuader. As mentioned in 6.1.1, the act of communication *is* the data (as discussed in chapters 4 and 5, this data is multifaceted, as the act of communication includes the linguistic content, pragmatic inferences). That is, it is not a representation of data, but the data itself[216].

Fig. 17: The SPIMP Core Model



A Causal Bayesian Network representation of the SPIMP core model and the relations between elements

It is important to note that the SPIMP assumes independence between content strength and source credibility. That is, the content strength of the evidence (e.g. 'this flat is in a very good area') is independent from the credibility of the source of the message (e.g. a real estate agent or a friend looking at the flat). The assumption of independence in the model entails that the model does not cover all instances of persuasion. For instance, if the persuader produces reports about himself (e.g. 'I am a very good driver because I passed my driver's license'), it might be difficult to maintain the assumption that the content strength is independent from the source credibility. For such situations a model should be developed in which there is a possibility for dependency between source credibility and content strength. The current model, however, assumes independence

[216] In other words, as the basic level the data does not represent a mental state or thought, which is transmitted from one individual to another. In this way, the persuasiveness is not concerned with thought transmission, but rather than the manner by which uncertain data provided by an uncertain source is processed in a situation in which the persuadee is aware of the fact that the persuader might be dishonest or deceptive.

and further studies are needed to further develop the model illustrated in fig. 17 so that it might apply to persuasive cases where there may to be dependency between content strength and source credibility or to tell if another model needs to be developed to account for those cases of persuasion.

The model depicted in fig. 17 conforms to Bayesian probabilistic calculus presented in 2.4. From this, specific quantitative predictions can be calculated given the priors and likelihood estimations of content strength and source credibility such that H_{rep} = persuasiveness, S = evidence strength, and C = source credibility[217] . The mathematical equation approximating the persuasiveness is

$$H_{rep} = \frac{sc}{sc+(1-s)(1-c)}$$

Thus, in an instance where the subjective estimations are S = 0,8 and C = 0,4 then

$$H_{rep} = \frac{0{,}8*0{,}4}{0{,}8*0{,}4+\big((1-0{,}8)*(1-0{,}4)\big)} = 0.73$$

This indicates the persuasiveness of the proposed belief from an amalgamation of source credibility and content strength, which, with the prior estimation, yields quantitative predictions that are directly empirically testable, in the same way that is the case for the Bayesian approach to argumentation developed by Oaksford, Hahn, Harris and colleagues (see 2.4). That is, the SPIMP provides a clearer prediction for the persuasiveness of an attempt compared to the ELM and the HSM (see 7.5) *given* the knowledge of the presuadee's priors and likelihood estimations of content strength and source credibility. Importantly, the CBN and, more specifically, the mathematical extrapolations from probabilistic calculus provide the specific testable content of the SPIMP. Applying the model makes it possible to manipulate source trustworthiness and expertise as well as the evidence content and thus test whether there are any effects on the persuasiveness in relation to specific persuadees.

7.4 SPIMP: The integrated approach

As mentioned throughout the thesis, SPIMP is a limited contribution to a more complex theory of persuasion. The theoretical background outlined in 7.2 provides a richer conceptual appreciation of the process of persuasion evaluation. That is, the quantitative predictions and approximations described in the SPIMP core model (in 7.3) only make

[217] Note that these likelihood estimations are treated as probabilistic estimations in the Bayesian way (described in 2.4)

epistemological sense in light of a larger psychological framework, which informs the priors and the likelihood ratio. As mentioned in chapter 6, the SPIMP is a description of a speck of a larger kaleidoscope such that the qualitative and descriptive (cultural analyses, the development of the beliefs, etc.) sets the framework for the evaluation described in the SPIMP. Fig. 18 depicts the integrated psychological and modelling approach to persuasion in which the SPIMP core model is embedded in the psychological framework described in 7.2.

Fig. 18: The SPIMP approach

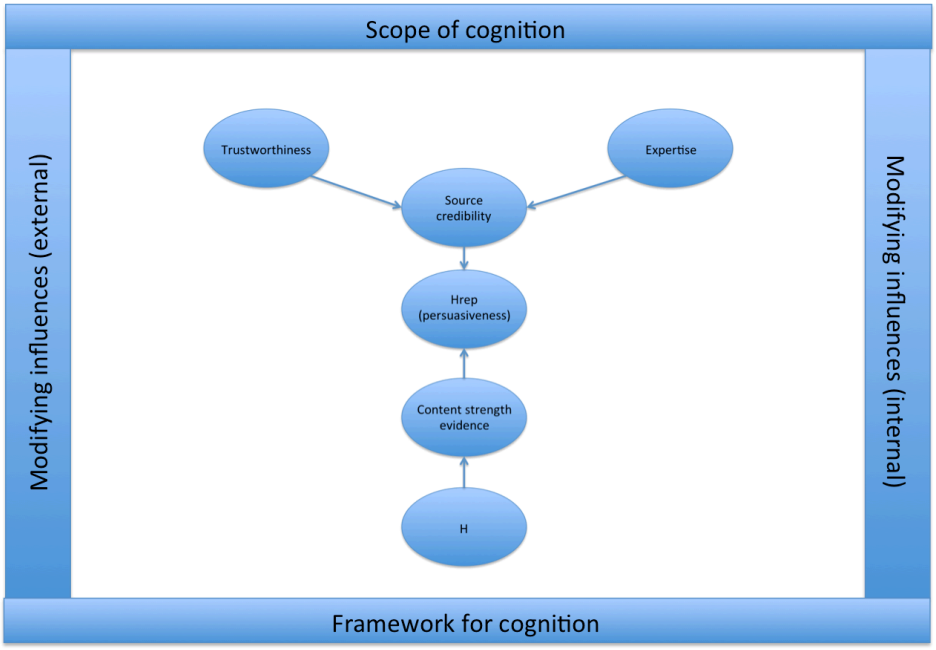


Illustration of the conceptual relationship between the SPIMP core model and the psychological framework

Fig. 18 is thus a simple illustration of the complex interaction between the central elements of the core model (content strength and source credibility from 7.3.1) and the theoretical apparatus assumed to frame the model (presented in 7.2) in the sense that these psychological factors influence how the persuadee perceives source credibility and content strength and thus how subjective probabilistic estimations can emerge in the persuasive situation in interaction with the socio-cultural context. As such, the figure illustrates the difference between the SPIMP as a core model (the central elements described in chapters 2-3) and the SPIMP approach (that includes the broader theoretical and psychological framework). For this reason, the SPIMP core model resides *within* the conceptual context of the larger psychological picture.

The SPIMP approach (that is, both the core model as well as the psychological framework described in 7.2) provides a novel contribution to the conceptualisation of persuasion processing. However, as will become clear in the following, there are some inherent issues that need to be addressed and clarified in future research. Among the issues to be clarified in the future I will focus on two issues pertaining to the application of the model. These issues are related to the conceptual relationship between the elements of the core model as well as the potential cultural differences, which might yield different weighting to specific elements. Taken together, these two issues indicate the importance of conceptually qualifying the model and the potential of different weighting in practical applications of the model. In 7.4.3 I will discuss another issue with clear implication for the applicability of the approach, namely how persuadees with different characteristics may be able to cope with persuasive attempts.

7.4.1. *Relative importance of elements in core model*

Mathematically, the two elements of the SPIMP are equally weighted. Thus, content strength and source credibility are considered equally important in eliciting the posterior rating for the persuasiveness of an act of persuasion. However, considering the elements qualitatively, not mathematically, the relation may not be so straightforward. For instance, source credibility is divided into trustworthiness and expertise. However, trustworthiness may entail different epistemic and analytical consequences compared to the expertise of the source. Consider the elements in turn. Content strength denotes the subjective estimation of the strength of a proposed belief. That is, content strength may be stronger or weaker depending on the subjective estimations of the persuadee. Epistemic expertise, then, describes how likely it is that the source has relevant knowledge on the topic in hand. For instance, the relevant expertise of a rock singer and a GP will be different in discussing medical advice. Trustworthiness denotes how likely the persuader is to lie or actively deceive the persuadee. When considering low instances of trustworthiness, it becomes clear that this element holds a special position from an epistemic perspective.

Consider the following. If trustworthiness borderlines 0, the rest of the elements (no matter how highly they are estimated to be) take on a radically different

epistemic light since the information presented is untrustworthy as compared to non-experts where the information might be trusted, but might not be correct. Considering epistemic vigilance as a central element of persuasion processing, this is an important qualitative difference in how the content strength subsequently is evaluated. Indeed, if the persuader is deemed untrustworthy, we should expect that he would have to produce evidence that is very strong or present himself as a leading expert within the relevant field. This is the case of the classic con man. A deceptive person would presumably try to persuade by presenting as strong a case as possible. Furthermore, if he is not bound by conveying what he believes, but can resort to deception (i.e. low trustworthiness) it would not be out of the question to infer that he makes up evidence. In other words, the compelling content strength of the presented evidence as well as the expertise become shallow if the persuadee does not trust that he is speaking from an honest and trustworthy position. In comparison, consider the situation in which expertise borderlines 0, but trustworthiness and content strength are high. Given similar estimations, the posterior rating should mathematically be the same as the case of low trustworthiness as, mutatis mutandis, since low expertise should influence the overall persuasiveness in a similar way as low trustworthiness. However, qualitatively, the epistemic entailments of a non-expert is not the same as a non-trustworthy person as the former can still be trusted to convey what he believes whereas the latter cannot[218]. In general, the difference in epistemic consequences for the two aspects of source credibility suggests a potential qualitative difference that should be investigated in more detail

7.4.2. The impact of cultural differences

Whereas the relative importance of the separate elements portrays differences in epistemic entailments, it is worth reiterating that the elements of the SPIMP are equally weighted, which may cause analytical problems for cultural reasoning. As frequently noted, cultural differences influence the manner in which we think about evidence, source credibility, and about descriptions of ourselves (see e.g. Pornpitakpan & Francis,

[218] Naturally, this depends on the conceptualisation of 'trust'. If trust = 0 denotes a deceptive persuader, the problem with the conceptual relations arise. If trust = 0, however, denotes someone who is a random truth-teller, the relational issues become different. In any case, the epistemic entailments of a untrustworthy persuader is difference from the epistemic consequences of a non-expert.

2001; Hornikx & Hoeken, 2007; Hornikx, 2011; Hood, 2012, pp. 154-159). The empirical evidence cited throughout the thesis has largely, but not exclusively, relied on subjects from Western cultures such as Europe, North America, and Australia. Given the fact that cultural differences have been explored in a range of topics, it would be folly to argue for the universality of the SPIMP in its present form. Nonetheless, issues like the probability of the content, and expertise of the source, and the trustworthiness of the source would seem to be elements that necessarily have to be featured in a model of persuasion regardless of the culture. *How* these elements manifest, and what the internal relationship and weighting of these elements is, however, is another matter. Thus, the current approach claims the universal *existence* of the elements in any act of persuasion processing, but the approach does not claim the universal *instantiation* of the elements. In other words, the former is fixed and necessarily involved, whereas the latter is transcendental and culturally mouldable. This is in logical continuation of the framework in which the SPIMP model is embedded as illustrated in figure 17. Culture will have an impact on framework for as well as scope of cognition, and also internal and external influences will differ across cultures.

One potential way of solving this analytically is to introduce weighted probabilistic models (see Harris et al., submitted) to capture the formalisation of the cultural differences. Thus, the above element relationships may be probabilistically weighted such that[219]

$$H_{repWi} = \frac{\sum wixi}{\sum wi}$$

where w denotes the relative weight invested in the variable, x (here, the elements of the SPIMP). The indices in the equation mean the subscript. The brief equation expresses the potential that the SPIMP might be instantiated differently across cultures such that some elements might get differently weighted (for instance, one might expect a difference in weighting of the importance of authority from people of religious conviction as compared to people of a scientific conviction since the former involves a greater belief in authority whereas the latter, at least ideally, involves a greater belief in the evidence provided). The specific influence of cultural difference and its influence on the probabilistic weighting of the central elements (content strength and source

[219] Note that $\sum_w$ is assumed to equal 1

credibility) currently remains hypothetical. In order to empirically test the hypothesis, the same experimental design should be employed across cultures to explore whether differences in importance of elements emerge. That is, a particular cultural background might adhere more to the credibility and authority of the source rather than to the specific content. As such, the model needs to be able to account for such differences. An example of this follows the same estimations as in the above where S = 0,8 and C = 0,4. These estimations, however, can be weighed such that that relative importance of S = 0,3 and C=0,7 respectively such that

$$H_{repW} = \frac{(0{,}8*0{,}3)+(0{,}4*0{,}7)}{0{,}3+0{,}7} = 0{,}52$$

The weighting of the different elements naturally relies on an in-depth analysis of cultural differences such that empirical tests need to be carried out in order to ascertain any detailed notion of the cultural weighting. Indeed, one of the fertile areas of future research is concerned with the analytical application of the SPIMP outside of the occidental and Western culture[220]. That is, in order to alleviate the occidental bias in the present description, empirical research in places like Japan, Burundi, and other countries is needed. Such investigations would further highlight the malleability of cultural praxis concerning what constitutes a persuasive argument.

In sum, the SPIMP provides a quantitatively predictive and qualitatively defined model of persuasion processing that relies on a complex and integrated psychological framework. The main elements of the model are content strength and source credibility, both of which are approached from a probabilistic rather than a logicist perspective. That is, the persuadee is thought to estimate and evaluate the content and the source rather than the structural formation of the act of persuasion. Inherently, the probabilistic estimations are subjective and intentionally directed towards the proposed belief. There are modifying factors, however, to consider. Two have already been discussed, namely the relative importance of the elements of the model and their respective epistemic entailments and the potential of different weightings from cultural differences. One of the main theoretical benefits of the model

[220] The notion of 'Western' culture itself, however, is questionable, as there are significant differences between the various countries that fall under the traditional occidental label (see e.g. Hornikx, 2011 for the difference between Dutch and French subjects). Within countries, differences might occur as well. For instance academic reviews are ideally characterised by their focus on the content of the argument rather than the source that puts forth the argument (although, in praxis, this ideal is not always fulfilled).

is that, given an eliciting of priors from the complex psychological background, the model is predictive of how persuasive a given attempt should be. This prediction is concrete and directly empirically testable. Given differences, however, in cultural and individuals, how the persuadee may cope with and evaluate acts of persuasion can differ, as discussed in 7.4.

7.4.3. Coping with persuasive attempts

As mentioned in chapter 3, Friestad and Wright (1994) present the reader with a string of developmental studies, detailing the development of children's ability to cope with increasingly complex social phenomena as they grow mentally more competent and become more aware of deception strategies (Peskin, 1992) and the causal processes involved in situations where communications influence behaviour (Chapman et al., 1990). However, as humans grow older, no clear evidence exists as to describe how we concretely make use of persuasion knowledge at different ages (Boush et al., 1994). From the subjective perspective developed in the thesis, this is hardly surprising that differences exist if we take into account differences in upbringing, mental capabilities, education and so on described in the psychological framework in 7.1[221]. In general, there are differences between humans in terms of how well they reason critically (for an excellent discussion of potential reasons for this discrepancy, see Stanovich & West, 2000; Oaksford & Sellen, 2000; Oberauer, 2000; Over & Evans, 2000 for suggestions from dual-processing as well as integrated models of cognition) as well as make use of working memory (Raghubar et al., 2010). The reason for individual differences is well beyond the scope of the thesis, but it may be hypothesised that the difference is potentially affected by differences in intelligence, the individual's upbringing, working memory, her previous encounters (in this case with acts of persuasion and different persuasive strategies), and her education. Indeed, critical thinking is a skill that needs to be developed. For instance, explicit (as opposed to imbedded) instructions greatly improve critical thinking in adolescent subjects (Marin & Halpern, 2011), and various methods such as the visual assistance of argument maps further critical thinking

[221] Please note that the following discussion is informed by a literature in developmental psychology, but that the particular hypothesis concerning persuasion learning presented is not. However, the discussion follows naturally from the literature cited throughout the thesis, links up with the overall theoretical conclusions as well as the model, but that this should be tested empirically in the future (see 7.6).

(Twardy, 2003). Learning literature, then, supports the notion that critical thinking is developed (more or less successfully) through education. Indeed, it is entirely possible that a greater understanding of the psychology of persuasion processing and argumentation from uncertain evidence might yield insights into how to further and strengthen courses in critical thinking from an educational perspective. This, however, is an area for future research to explore.

Given the multitude of potential influences on the individual's potential for critical reasoning, it follows naturally that we should expect differences in different persuadees' abilities to cope with acts of persuasion. Indeed, the SPIMP approach posits that the persuadee makes use of probabilistic estimations concerning content strength and source credibility in order to inform her overall evaluation of the persuasiveness of the attempt, which may differ according to the individual. Regardless of whether or not the persuadee is able to critically assess the act of persuasion, she still relies on the elements described in the SPIMP. However, the framework also stipulates that the estimations depend on the broad psychological outline from 7.1 *and* that the persuasive incident is influenced by the fact that there are differences in aims between the persuader and the persuadee. Indeed, given the difference in power and epistemic access as discussed in chapter 1, a skilled persuader might attempt to create presence and direct the intentionality of the persuadee in a manner that is fitting with his aims. As Peskin (1992) shows, the awareness of deceptive methods and strategies for coping with these methods increase as we grow older. We might say that humans become increasingly apt at exerting epistemic vigilance (Sperber et al., 2010). In this way, there is a combative relation between the interlocutors given their difference in aims, much in the same way as described by Sperber (2000). This combative relationship indicates an interesting theoretical notion concerning fallacies, coping mechanisms, and heuristics.

From the evidence in the Friedstad & Wright (1994) review, it seems clear that humans increasingly, but not in parallel development, become better at exerting epistemic vigilance and coping with persuasive strategies. We might argue that this development depends on a number of factors such as personal experiences, individual cognitive differences in capability, socio-cultural upbringing etc. (see 7.2). That is, critical thinking is not an innate ability, but rather taught, maintained, and practiced throughout life. Such a cultural and social stance towards coping mechanisms is

supported by the developmental evidence in Hood (2012), which indicates the importance of others in developing thinking and a notion of the self in general. Critical thinking and coping mechanisms, like all cognitive functions, come with a cost. To consider complex arguments can be laborious, and consequently we should expect coping strategies to develop over time. One hypothesis could be that the existence of different heuristics (see e.g. Gigerener & Gassmaier, 2011) is an expression of a variety of cognitive mechanisms that are developed and maintained such that the human needs not invest the same amount of energy in processing the given situation. Indeed, as such heuristics are experienced-based techniques that reduce the amount of energy needed to process a situation, but which maintain the benefit from experience. For instance, students trained in philosophy of argumentation and logical reasoning might well be quick to identify formal structural fallacies and to reject these par excellence and without considering the content in greater detail. Such a heuristic, however, needs experience, learning, and maintenance in order to continuously function and function well. The development of the coping strategies, however, is inherently social, educational, and developmental. Indeed, the fact that a number of specific heuristics have been identified in experimental studies (such as anchoring and adjustment, availability, scarcity heuristics, etc.) is an indication that these are strategies that have developed to cope with particular cognitive tasks and challenges rather than an account of system of cognition where heuristics are the foundational aspect. That is, in the present framework, heuristics are seen as learnable coping mechanisms rather than as a fundamental cognitive system.

If coping mechanisms require cognitive effort, and heuristics (understood as learnable strategies in re coping) reduce the effort given experience in dealing with similar acts of persuasion in the past, we should also expect a general effect of level of cognitive effort, as it is indeed shown in the ELM and HSM studies. As mentioned previously, by asserting high or low motivation in assessing an act of persuasion, it is hardly surprising that subjects react differently to different persuasive strategies and cues (such as reasoning versus the attractiveness of the persuader). However, the claim here remains that despite the fact that these differences have been found in the extremes (high versus low motivation), this does not entail dichotomy, but rather end-points on a gradient scale of motivation and ability. Indeed, as mentioned in chapter 3, Sperber et

al. (2010) argue, "…if you happen to hear a comment on the radio about a competition in some sport you neither know nor care about, you are unlikely to invest any extra energy in deciding whether or not to believe what you hear" (p. 362). That is, the amount of epistemic vigilance asserted is concerned with the relevance and importance of the information.

If this stance is taken, it sheds light on the complexity of coping mechanisms since coping will be concerned with a multi-facetted range of variables including education, socio-economic and cultural background, intelligence, relevance and importance of information, heuristic strategies developed from experience and learning, and level of cognitive effort. The effort of the persuadee as well as the success of certain persuasive strategies has to be seen in this broader light in order to make sense in a social and critical perspective. As such, similarly to the argumentative arms race described in Sperber (2000), we should expect a strategic arms race between persuaders and persuadees with the development of different strategies on both sides to circumvent (persuader) or sharpen (persuadee) epistemic vigilance, both of which (especially the circumventing aspect) requires novel thinking *as well as* developed coping strategies. As such, both persuasion processing and persuasion production are inherently creative processes where nonetheless the learning of coping strategies expressed in the form of heuristic strategies are central to lower the cognitive effort required to obtain the maximal benefit in the given situation. That is, in coping strategies there is a constant give and take between cognitive expenditures and novel thinking in the one hand and the development of strategies (that may later be exploited if they become clichéd) in the other.

7.5. The SPIMP approach compared with other models of persuasion

Both the social psychological studies on the influence of others on behaviour and beliefs (e.g. Cialdini, 2007; Sunstein & Thaler, 2008) as well as the Persuasion Knowledge model (PKM, Friedstad & Wright, 1994, 1995) are descriptions of aspects of what shapes the persuasive incident socially and how subjects can cope with persuasive attempts. Both are valuable and necessary contributions to a richer understanding of persuasion as a human phenomenon. In terms of the present approach, both the social psychological outline and the coping mechanism in the PKM are

supplementary models and theories. Given the psychological framework described in 7.1, social psychological studies describe aspects concerned with the context in which the persuadee is immersed and which may direct the intentionality and shape her immediate probabilistic belief estimations. Thus, social psychology is a necessary element of describing the persuasive context and, in particular, to provide descriptions of other forms of behaviour-inducing mechanisms. As recognised previously, persuasion needs not entail difference in behaviour, and there is a conceptual difference between persuasion and influence. Social psychology thus is instrumental in providing the psychological background. The PKM deals with how people cope with persuasive attempts given more knowledge about the strategy, source etc. Coping mechanisms may readily be integrated into the current model. For instance, the persuadee's background knowledge as well as her level of cognitive effort may have an impact on how she estimates content strength and source credibility. PKM, then, can be considered a modifying and supplementary model since it specifically deals with how subjects make use of greater knowledge of persuasive strategies. That is, the PKM and the social psychological studies aim at different aspects of the persuasion processing process. In terms of comparability, the SPIMP is closer to the ELM and the HSM, as these are also cognitive models that describe and approximate how humans deal with processing persuasive attempts in terms of the uncertain evidence, the source credibility, and the extraneous variables. The differences between the SPIMP and previous models (especially the ELM and the HSM) described in table 1 (reinserted below) in the introduction are clearer following the discussion of the theoretical and empirical evidence throughout the thesis. These are concerned with the principles of reasoning assumed, the type of normativity, how source credibility is regarded, and the role of emotional content and other extraneous variables.

Table 1: Comparisons with ELM and HSM (from introduction)

	Dual-process	Principle of reasoning	Role of emotional content	Normativity	Source credibility
ELM	✔	Seems to rely on formal logic	Peripheral cue	Seems to rely on formal logic	Peripheral cue
HSM	✔	Seems to rely on formal logic	Heuristic	Seems to rely on formal logic	Heuristic
SPIMP	✗	Subjective probabilistic estimations (Bayesian)	Integrated modifying factor	Predictive given subjective probability estimations	Central element of persuasion processing

As evident from table 1, a major distinction between the SPIMP and the ELM and HSM is whether or not the models are dual-process oriented or integrated. This distinction is mainly grounded in the general psychological framework described in 7.1. Evidence from studies about source credibility indicates that subjects seem to integrate the information about the source and content in the same process rather than dealing with source credibility in a different manner (see Hahn et al., 2009; Harris et al., submitted). In addition, support is found for the claim that extraneous variables always influence the persuasion processing, but that the influence of such variables may be less given more cognitive effort and coping strategies. Thus, Petty & Cacioppo (1984b) find differences between low, moderate, and high motivation and ability, suggesting that the moderate level functions as an intermediate level between the two extremes, which in turn lends credence to the hypothesis that the process may be gradient rather than distinct. The gradient issue in the SPIMP approach remains to be tested more systematically, though. An issue for further research in the ELM and the HSM is to define the integration of peripheral and central cues (O'Keefe, 2008) since it is not immediately clear whether the two processes are additive, interactive, or otherwise connected. This is a conceptual issue for the previous models that needs to be addressed.

The normative stance

On a concrete theoretical level, the SPIMP departs from the ELM and the HSM in terms of the principle of reasoning and the normative stance. The ELM and HSM do not

explore the reasoning principle in greater detail, but from reading the comments concerning the type of reasoning indicated, it seems safe to assume that the models refer to formal logic as the basis of reasoning and critical thinking. The logicist framework has been criticised in terms of its relevance as an approximation of psychological processes in general (e.g. Oaksford & Chater, 1991; 2007, but see chapter 2 as well) and argumentation in particular (Oaksford & Hahn, 2006a; 2006b; 2007a; 2007b). Compared with this principle of reasoning invoked in the ELM and HSM, the current model assumes a gradient, probabilistic principle of reasoning in which the estimations are subjectively driven. The reasoning difference points to the disparity in normative stances. Whereas logicist frameworks tend to focus on whether or not structural rules are obeyed, the probabilistic perspective normatively describes what people should do *given* their subjective estimations. As mentioned in the introduction, this is a normative difference between the desirable and the approximating. Both accounts are necessary in the broader sense since the former provides a set of normative guidelines against which performance can be measured, whereas the latter provides a normative prediction for how people psychologically do. In this sense, the pragma-dialectical rules of argumentation (Eemeren & Grotendorst, 2004) are important and very valid comments on the desirability of proper argumentation, but they do not constitute a psychological theory of argumentation, exactly because the normative framework is desirable in terms of structural issues and codes of conduct (which intrinsically bear a moral stance) rather than descriptive in terms of psychological processes (which does not).

Source credibility

Source credibility is another major distinction between the models. In the SPIMP source credibility (formalised via expertise and trustworthiness) is a central and integrated element of persuasion processing, whereas the ELM and HSM consider source distinct from evaluation of content and structure. Indeed, as Hahn et al (2009) note, "persuasion researchers have typically considered these factors [the convincingness of an argument and source credibility] as alternatives that are indicative of two separate cognitive routes to persuasion" (p. 359). That is, source credibility is not dismissed in the previous models, but rather is supposed to be processed via a different cognitive mechanism. The evidence from Hahn et al (2009) and Harris et al. (submitted), however, strongly

suggests that subjects integrate source credibility with the evidence on a gradient and continuous scale that may be approximated by a Bayesian approach. This harkens back to the distinction between dual-process and integrated perspectives of persuasion as well as the issue of normativity. In the ELM and the HSM, reasoning is seen as disparate and distinct from the peripheral cues, which take a different role. In the integrated SPIMP approach, however, the peripheral cues are processed via the same probabilistic mechanisms in which some (e.g. charisma of the persuader) are considered modifying factors in the situation whereas source credibility is directly integrated in the model. The separation of reasoning from other cognitive functions may stem from a normative perspective of the cleanliness of logic versus the alleged messy qualities of emotions and other cues not immediately integrated in a normative framework developed from formal logic. Given the reliance on uncertain, probabilistic reasoning, though, the present framework need not adopt such as normative stance (as already discussed in the introduction and throughout the thesis).

Dual-processing and single-processing accounts

Empirical data from the ELM and the HSM reliably show that humans respond differently to a persuasive attempt if they invest different amount of cognitive effort in processing the attempt. Given that the current core model is a single-process account of persuasion, the results of the previous models need to be accounted for. Indeed, as convincingly shown by the numerous studies concerning the ELM and the HSM, there is indeed an evaluation difference between what variables dominate and how firmly the persuasive attempts take hold (the central route yields the most permanent changes compared to the peripheral). In order to posit a novel model of persuasion processing, the SPIMP has to be able to account for the fact that dual-processing accounts (ELM and HSM) find significant differences when conditioning subjects to pay either great of less great attention to an act of persuasion. Indeed, both dual-processing accounts convincingly argue that given greater awareness and focus, different evaluations occur. Interestingly, Petty & Cacioppo (1984b) find three different patterns of evaluations depending on whether motivation and ability is high, moderate, or low. Specifically, when subjects were low in motivation and ability, they did not distinguish between strong and weak arguments, whereas the highly motivated clearly distinguished. The

moderately motivated did not differ much on their agreement with negative cues, but conformed to high motivated on positive cues. The interesting aspect of the 1984b study is the fact that an intermediate step between high and low could be identified with clear differences in agreement compared to both high and low. This is a challenge rather than support for a distinct dual-processing model since a clear dual-process would involve only two processes.

Compared with this, the present approach assumes a continuous level of cognitive effort that would expect intermediate and gradient findings. That is, testing the outer extremes of cognitive effort (high and low), the results should indeed show two very different evaluations of the persuasiveness of an argument whereas intermediate levels of cognitive effort should produce intermediate evaluations. From a hypothetical perspective, differences in cognitive effort should have a variety of entailments in cognitive effect and critical thinking. Firstly, as shown in the studies of the ELM and HSM, higher cognitive effort and motivation should decrease the importance of extraneous variables such as the charisma of the persuader. Secondly, high cognitive effort should allow for more complex considerations to occur such as mentalizing and increased consistency (both local and global). Furthermore, high effort should allow for conceptual extrapolation and cross-comparisons. The central assumption, then, is that the ELM and HSM test the extremes of effort and motivation, which yield different evaluations. Compared with this, the current approach assumes that extraneous variables such as charisma always play a part, but that the influence of these can be decreased given more critical thinking and higher cognitive effort. The exact influence of extraneous variables should be investigated in more detail. However, the evidence from the peripheral routes in the ELM and the HSM seem to indicate differences in the weighting of cues. The difference between the SPIMP and the two previous models, in this specific regard, is the fact that extraneous variables are conceptualised as elements always present rather than elements of a separate system. Naturally, investing more effort comes at a cost since it is laborious. However, as discussed in 7.4, it is conceivable that humans can learn to cope with persuasive attempts by developing strategies when they are confronted with acts of persuasion. Thus, given training and education, the persuadee should spend less energy performing

the same critical evaluation compared to when she first encountered a particular persuasive strategy.

The 1960 US presidential election provides compelling anecdotal evidence in support of the claim that supposedly peripheral cues always play some role, which can assert stronger or weaker influence depending on the level of cognitive effort. In order for this example to have any validity, it is necessary to assume that listeners of the debate on radio and viewers on television on average exerted the same amount of cognitive effort in processing the persuasive attempts such that viewers assign cues to either central or peripheral. Secondly, it is necessary to assume that viewers and listeners had a relatively high motivation to consider the debates. In the light of the cold war, the on-going Vietnam War, and other perilous issues at stake, it seems likely to assume that listeners and viewers were motivated to listen to the debates[222]. However, a poll conducted after the debate showed a discrepancy between the television audience and radio listeners where the former predominantly believed Kennedy won the debate whilst the latter believed Nixon to be the victor. The main cause of the difference is traditionally assigned to the fact that Nixon looked pale and sweaty compared to the tanned and handsomer Kennedy, i.e. a difference in visual charisma. If viewers had high motivation, the peripheral cue of Kennedy's handsomeness should matter little, which would contradict the predictions of the ELM and HSM. If, however, we viewers had low motivation, the poll does indeed follow the predictions of the models. Thus, whether or not the predictions are met depends on whether viewers were motivated to consider the presidential election debate (that they themselves had tuned in to watch) or not. In any case, the current approach assumes that peripheral cues such as the handsomeness of the persuader always plays some role in that it is a factor in the general context. The influence of such factors, however, may be reduced by a higher cognitive effort and greater critical abilities. Nonetheless, the SPIMP approach assumes that the charisma of the speaker will assert *some* influence even when the persuadee invests heavily in considering the persuasive attempt. In this way, the SPIMP provides an account that seamlessly incorporates charisma as an important factor in a integrated cognitive system in which cues might be differently weighted depending on cognitive effort, capability, potential of critical thinking etc., but

[222] Note that the disagreement between the two sets of listeners has been questioned (Vancil & Pendell, 1987). The contribution of the example, therefore, is anecdotal rather than firm.

where the cues nonetheless are present even when exerting a significant amount of effort. This departs from the underlying assumptions of the ELM and HSM.

Predictive potential

Prediction for persuasion processing is a tricky issue for all models given the socio-cultural, contextual, and reasoning-related complexities. Indeed, no current model enjoys high predictive power of persuasion as a multifaceted phenomenon. Indeed, given the complexity identified throughout the thesis in terms of influences on the two central elements of the SPIMP core model (content strength and source credibility) such as socio-cultural factors, actions of others, emotions, the contextual environment and so forth, it seems unlikely that any model would reliably be able to predict persuasion with great accuracy. That being said, the SPIMP differs from the ELM and the HSM in two central ways, namely in terms of predictions given the principles of reasoning and in terms of a dual-process compared with a single-process approach. In terms of the first issue, the ELM and the HSM seem to rely on formal logic as a principle of rationality and reasoning in persuasion processing. Given the focus on structural validity, the predictions from formal logical models would be concerned with the validity of the argument such that invalid arguments would be unpersuasive (given their structural insufficiency) whereas logically sound arguments should be persuasive. Thus, from the dichotomous truth-values of the statements, the ELM and the HSM should predict the persuadee to adhere to logical rules *if* the persuadee exerts greater cognitive effort such that she processes the attempt via the central route. For the peripheral route, however, neither the ELM nor the HSM are very concrete in terms of predictions. Conversely, the SPIMP relies on a Bayesian approach to reasoning (as discussed in 2.4). As mentioned in the previous presentation of the approach, this focuses the normative predictions on the subjective perception of the likelihood and strength of the content and the credibility of the source in an integrated manner (as indicated on the figure of the model, see 7.3). As such, given the knowledge of the subjective estimations, the SPIMP provides clear predictions as to the persuasiveness of the statement given the strength of the content and the credibility of the source. However, as discussed later in the section, a major limitation to this approach stems from the fact that we do not have a direct and reliable route to elicit these estimations, but rather have to rely on self-reports or guesstimations.

Situations in which the persuadee holds extreme beliefs provide a concrete example in which the ELM and the HSM predict different persuasiveness than the SPIMP[223]. An extreme belief could be political, which means that the person has invested a high degree of likelihood and strength to the validity of the belief. Furthermore, the example considered here is concerned with extreme beliefs that are very necessary to the persuadee (necessity was identified an element of beliefs in 1.2, figure 3). Such a belief could be a strong political or religious belief. Presumably, beliefs that are strongly held and appear central to the persuadee can be thought to be central and important to the individual. If we assume that the belief is important for the persuadee, we might reasonably assume that acts of persuasion concerning the extreme belief would receive equal importance for the persuadee, and consequently, in the ELM and the HSM, the persuadee should process any evidence via the central route, as this is the route activated when the persuadee pays great attention to the persuasive attempt. If this holds true, persuadee who hold extreme and necessary beliefs should respond more logically to evidence regarding these beliefs since evidence should be processed centrally. However, this does not seem to be in agreement with observations from political and religious discussions. Rather, extreme proponents seem to disregard evidence even when this evidence seems valid and logical in order to maintain their original belief (probably due to the fact that changes in very necessary beliefs yield greater ripple effects). As such, the ELM and the HSM intuitively seem to struggle in accounting for evidence from extreme beliefs that are centrally and necessarily held. In the other hand, the SPIMP approach does not offer the same assumption of central processing. Here, the subjective estimations of conflicting evidence might simply be attributed as not very believable (or the source as not very credible) since the SPIMP does not assume that the persuadee proceeds down a significantly different cognitive route when the issue in question is important to them. Thus, the predictions from extreme beliefs held as necessary beliefs differ from the ELM/HSM and the SPIMP. This provides a fertile ground for further testing the models against one another.

[223] In this context, 'extreme' does not refer to the content of the belief, but rather than to strength by which a belief is believed (for instance, I have an strong belief in Newton's mathematical description of the theory of gravitational pull even though such a theory, content-wise, cannot be considered extreme). This definition regarding extremity of belief in a given belief is important for developing the example.

Emotional content

Finally, from a theoretical perspective yet to be explored empirically, emotional content is an integrated part of the reasoning process as an internal modifying factor in the current model[224]. That is, given a particular emotion state, it is expected that the probabilistic estimations of a proposed belief differ such that the same person might yield different estimations depending on the mood. This, however, is readily integrated in the reasoning process, as different probabilistic estimations simply should yield different outcomes in the evaluation of the persuasiveness of an act of persuasion. As mentioned in the concluding remarks, the role of emotional content in reasoning and decision-making in general, and persuasion processing in particular, remains an open issue to be explored further empirically (for instance, by inducing emotion states such as anger or fear in participants and elicit their probabilistic estimations concerning different topics). Indeed, the Bayesian perspective on argumentation and reasoning has yet to develop a strong theoretical appendix in order to qualify emotion in reasoning. The link between emotion and reasoning has been suggested strongly in recent years by a string of findings that indicate that reasoning and emotions are not separate, but rather integrated (see e.g. Damasio, 2005).

In sum, there are conceptual assumption differences between the SPIMP approach and previous psychological models of persuasion processing, namely the ELM and the HSM. The normative stances seem disparate in terms of structural logical assessments versus probabilistic reasoning, the role of emotion plays an integrated role in the SPIMP, and source credibility, and extraneous variables are integrated rather than separated as in a dual-process perspective. The SPIMP, then, offers a novel alternative, empirically testable model to persuasion research.

In conclusion, the SPIMP approach offers an alternative to previous models of persuasion processing. The model quantitatively predicts how persuasive a given act of persuasion should be given the occurrence of the psychological framework as outlined in 7.1. In this way, the theoretical and modelling approach is quantitative, but heavily reliant on qualitative descriptions of aspects such as cultural and upbringing. In other words, in order to qualify and provide detailed accounts of the elements inherent in the model as well as the psychological background, an in-depth analysis is

[224] Note that some rhetoricians have been sceptical towards the idea of empirically testing emotional appeals in persuasion (e.g. Gross, 2006) due to fears of simplification.

required. The model, however, may function on a more general level as an approximation of the persuasiveness. The reliance on the contextual, the cultural, and the qualitative acknowledges the fact that persuasion inherently is a creative process in which the persuader and the persuadee both attempt to gain maximal benefit from a socially difficult situation in which one person strategically (and potentially maliciously) intends to change the beliefs of the other. As such, the theoretical framework described throughout the thesis wholeheartedly agrees with Aristotle when he bequeaths rhetoric as the *art* of persuasion[225]. That is, neither the persuader nor the persuadee may safely rely on previous strategies, since the other might develop ways of seeing through or circumventing said strategy. Given the development of communicative technologies and the fact that the role of persuader and persuadee is not fixed, but rather interchangeable, this continuous arms race remains fluctuating and fascinating. Nonetheless, given this background, the SPIMP provides a concrete model for describing the normative processes underlying persuasion processing when faced with uncertain evidence from an uncertain source in an uncertain situation.

[225] Obviously, Aristotle meant this as a craft *and* a creative element since the Greek phrase is *techne*.

Concluding remarks

The thesis has brought together a range of theoretical, conceptual, and empirical considerations and findings in order to present an integrated approach for how to understand and describe the processes the persuadee undergoes psychologically when she is confronted with an act of persuasion. As frequently mentioned throughout the thesis, the present approach is a prolegomena at best in that it does present a novel model for understanding persuasion processing, but it also invokes a string of interconnected theories and points of view that need to be developed much further in order to have a more stringent and coherent base. As such, the thesis represents a beginning of a research program in need of development, theoretically, conceptually, and empirically.

The concluding remarks round off the thesis with a reiteration of the contributions of the thesis, supplemented with some thoughts on potential future research directly entailed from where the thesis left off, and some closing remarks.

Main contributions of the thesis

The contributions of the thesis reach into theoretical and analytical discussions and have already been presented in the introduction of the thesis. However, as this is the end of the thesis, it serves well to put in perspective the principal contributions in light of the discussions throughout. The thesis discussed the theoretical assumptions underlying previous models of persuasion (the ELM and the HSM) in order to ascertain the benefits and limitations of these. A discussion of these models as well as auxiliary literature from psychology, rhetoric, marketing and so forth show that they contain unidentified reasoning elements, and that there is a potential interaction of heuristic and reasoning elements. Further, the development of probabilistic reasoning models in recent years indicates the need for a novel model that incorporates the recent findings from social and cognitive psychology as well as communication studies. Table 2 (from the introduction) describes the main contributions of the thesis in general. 1 and 2 spring from the general literature review and discussion whereas 3 sums up the literatures into an integrated SPIMP approach.

Table 2: main contributions of the thesis

Main contributions of the thesis
1) Providing a critical assessment of the theoretical foundation of previous psychological models of persuasion 2) A discussion of elements necessarily and frequently associated with persuasion in order to facilitate a clear definition of the phenomenon 3) The development of a concrete model: The Subjective-Probabilistic Interactive Model of Persuasion (SPIMP) and the benefits and limitations of this

The main novel contribution of the thesis is undoubtedly the development of a concrete model for describing how humans process acts of persuasion, namely the Subjective-Probabilistic Interactive model of Persuasion (SPIMP). In a response to the development of a Bayesian normative framework for reasoning from uncertainty, the model fundamentally explores persuasion from a perspective of uncertain evidence from an uncertain source. In doing so, SPIMP differs significantly in terms of underlying assumptions and concrete predictions compared with previous models of persuasion processing such as the Elaboration Likelihood Model (ELM) and the Heuristic-Systematic Model (HSM). The theoretical differences in terms of reasoning are at least three-fold. Firstly, neither the ELM nor the HSM describe the normative accounts of reasoning inherent in their models. Compared with this, the SPIMP approach offers a concrete normative standard, which is empirically testable and that entails concrete predictions such that given their priors, persuadees should respond in a predictable manner in terms of how they reason about the evidence provided in the act of persuasion. Secondly, the reasoning account offered in the current model integrates source credibility and content strength such that these both influence the predicted outcome in the model. This moves the model from a dual-processing to a single-processing account of persuasion. Finally, the current model posits the importance of interactivity and dynamic relations between the interlocutors. Understood in this way, the subjective probabilistic estimations are inherently constructed and mouldable. This allows for a different normative account than the one found in truth-preserving frameworks such as formal logic (which, from reading the accounts, seems to be the normative standard invoked in the ELM and the HSM). Whereas the normative account in formal logic is concerned with describing flawed reasoning from a structural point,

the normative stance in the present model is concerned with a content-driven normativity in which it is perfectly reasonable that humans entertain different and potentially incommensurable beliefs. The normative predictions are concerned with how they manage these such that *from* their subjective estimations, the SPIMP describes how they should evaluate the persuasiveness of an act of persuasion. Whether or not their respective priors and probabilistic estimations are valid or reasonable is an entirely different question.

With regard to the conceptual strengths of the model, the elements have been empirically tested, the underlying assumptions have been explored from a range of disciplines, which hopefully minimizes the risk of internal questionable assumptions, and the model provides clear empirically testable predictions given knowledge of priors and the likelihood ratio[226]. In other words, the SPIMP approach differs significantly from the ELM and the HSM in the underlying assumptions concerning reasoning and normativity. Given such differences in predictions, further tests to determine the theoretical validity of SPIMP, ELM, and HSM should be manageable, and as indicated later on in this section, this seems to be a fruitful area for future research.

Six directions for future research

As repeatedly mentioned throughout the thesis, the approach to persuasion presented is but a prolegomena given the amount of relevant topics not covered. On a general level, the approach requires more detailed formalisation such that the mathematics of the core model becomes clearer and more precise in terms of predictions. Furthermore, the integration of the central elements identified in the core model and the psychological framework described in 7.2 needs to be clearer. Finally, given the challenge of eliciting relevant probabilities (as discussed in 7.1), experimental tests are required to further the field of persuasion research in general so that a reliable and valid method might be developed. These future research endeavours follow directly from the discussions throughout the thesis. In addition, the thesis has briefly touched upon other issues that

[226] As mentioned in 7.1, the normative prediction of the model is practically marred by the fact that we cannot access people's subjective probabilistic estimations unproblematically. Indeed, in order to elicit these estimations, at present we need to rely on self-reports or guesstimations (neither of which are reliable). Consequently, the model is predictive, but the input needed in order to make predictions are incredible elusive – indeed, this is a predicament of persuasion theory given the present definition of persuasion as changes in beliefs rather than measurable changes in behaviour (see 1.2).

need to be explored much more in depth in future research on persuasion. In the following I will discuss six important issues that demand examination in future research in order to qualify even more the SPIMP approach presented in the thesis. These are concerned with the influence of emotion states on subjective probabilistic estimations, the link from beliefs to behaviour, how communicative styles function persuasively, the temporal aspect of persuasion, the link from model to analysis, and finally strategies of coping with and producing acts of persuasion.

1. Emotional influence on probabilistic estimations

As far back as Ancient Greece, Aristotle (1995a) noticed the importance of emotional appeals in persuasion. Indeed, source credibility (ethos) is described as a long-lasting and mild emotional appeal whereas the short-lived and inflamed emotional appeal is labelled as pathos, and recent research attempts to integrate emotional appeals in political psychology (e.g. Shermer, 2006; Westen, 2007). Currently, emotional appeals are poorly integrated theoretically and model-wise in the SPIMP. Indeed, given the classical rhetorical triad of logos, ethos, and pathos, the model accounts for the two former (in form of content strength and source credibility), but neglects the latter. The question then becomes how emotional appeals may be integrated in the theoretical framework.

One direction in which recent investigations have gone is to explore the connection between emotional states and subjective probabilistic estimations. Harris et al (2009) point to the fact that the potential cost of being wrong about a negative outcome is higher than being wrong about a positive (e.g. believing that you won't win the lottery versus believing that you will get a tax return), which consequently skews the probabilistic estimations of the likelihood of these events happening (see also Harris & Hahn, 2011). Extending the theoretical picture, Vosgerau (2010) argues that subjective estimations of probabilities might be skewed due to arousal (negative or positive), which may occur in connection with emotions such as anger of happiness.

If the framework presented in works on emotional states is to be taken seriously, it suggests that emotions may function as a modifying factor on probabilistic estimations. Intuitively, this seems to make sense, as humans tend to be less well disposed towards acts of persuasion when they are angry as compared to situations in

which they are happy. Given the ancient identification of persuasive appeals, the model containing content strength and source credibility should thus be able to integrate emotion states as a direct and influential factor in how humans construct their subjective probabilistic estimations in particular situation. Indeed, one of the assumptions underlying the present framework is that humans do not have a stable catalogue of pre-set beliefs, but rather a changeable and local approximation *in* the situation. If this is true, changes in emotion states should have the potential to vary these estimations given their capricious nature. The effect may be direct (for instance influencing the subjective probabilistic estimation, independently of the credibility of the speaker or the strength of the content), or it may be modifying (for instance by influencing the positive or negative evaluation of content strength) or it may be mediating (for instance, be a medium through which the trustworthiness of the speaker is filtered so that the latter increases or decreases due to the emotional state of the persuadee).

A greater insight into the connection between emotion states and probabilistic estimations of the likelihood of present and future states might further provide an important insight into some psychological disorders in which emotional states are inflated such as depression and manic disorders. Indeed, some tentative evidence for the linkage already exists, as evidence suggests that patients with depression suffer from impaired decision-making (Martin-Soelch, 2009) both in static and dynamic environments (Cella et al., 2010). Evidence from pathological studies, much in the same way as lesion studies in neuroscience, provides fascinating insight into the workings of reasoning and cognition in healthy humans. In other words, alongside an interest in the influence of emotion states in persuasion processing, subjective probabilistic reasoning might contribute to the understanding of the effects of some mental illnesses.

2. The link from belief to behaviour

The route from belief to behaviour is in no way straightforward. Whilst taking part in his life, we see in *Ulysses* (particularly in the 'Sirens' section) that Bloom may entertain certain beliefs about Boylan and Molly, but that he is incapable of acting upon them for a variety of reasons. Given the definition of persuasion as changes in beliefs via mutual acknowledged intentionality, reflection in behaviour change provides a good, but not

necessary gauge at the success of persuasion. In other words, an act of persuasion might conceivably be successful in changing the beliefs of the persuadee, but no different act is following. That is, we might end up labelling successful acts of persuasion as unsuccessful if we apply the paradigm of behaviour change. To further complicate the picture, changes in behaviour need not be a result of changes in beliefs. As testified by the numerous references social psychology throughout the thesis (e.g. Cialdini, 2007; Sunstein & Thaler, 2008), behaviour may be brought forth in a number of ways[227]. This fact points to the difference between persuasion (changes in beliefs) and influence (changes in behaviour). Despite the fact that there is no necessary link, *some* link between beliefs and behaviour naturally does exist since humans try to act in accordance with their beliefs about the world *in general* (e.g. crossing the street when there are no cars because you believe it would be a calamity to be hit by a car).

As a consequence of this tenuous link, future research should look more in detail into how and when beliefs are transformed into behaviour and when they are not. A profound understanding of the relationship between persuasion and influence would also facilitate complex social analyses of campaign rhetoric, sales techniques (as mentioned frequently in Cialdini, 2007), and other interesting cases of social phenomena in which persuasion and influence are involved and intertwined with one another.

3. Strategies for coping with acts of persuasion and cohabitation

Haidt (2012) convincingly argues that people might disagree, not because they refuse to engage in political debate with others, but simply because their moral point of departure is so different from their interlocutor. In the present framework, the discrepancy is easily integrated, as the subjective likelihood estimations of content and source credibility is expected to vary, which fundamentally alters the outcomes and conclusions drawn from the same piece of evidence. Furthermore, the communicative connotations are also expected to differ from person to person given their cultural and social upbringing, what they are used to believe, and so forth. For instance, a speech given by Prime Minister David Cameron might yield entirely different conclusions from

[227] Note that I do not include coercion in this list, as coercion holds different mechanisms in which free choice is eliminated. Thus, the subject is neither moved socially nor persuasively, but forcefully.

different persuadees who evaluate the speech and the persuasiveness of the arguments from entirely disparate points of view.

As mentioned in 7.4, it is entirely conceivable that different coping strategies develop to respond to different persuasive strategies. Given time and experience, these strategies might well become more automatic and thus resemble heuristics and base-line strategies of coping. A greater insight into the coping mechanisms would not only yield interest insight into the management of beliefs and the psychological aims of the persuadee, but would also shed light on the production of acts of persuasion. The automatisms, however, might also overshoot so that the persuadee automatically ignores of disbelieves an act of persuasion in situations where belief changes might actually produce beneficial results. A recent example of this is the political divide of the USA, which has seen more partisan attitudes develop in the last few decades (Haidt, 2012). Alongside a greater conceptual acumen, then, an understanding of how humans cope with and potentially reject acts of persuasion might provide a leeway into understanding partisan and fundamentalist rejection of persuasive attempts in situations where an open mind would be more beneficial for all involved. That is, situations where epistemic vigilance has gone beyond the boundaries of the socially desirable.

4. Operationalization and extension of the SPIMP core model

As emphasised throughout the thesis, the SPIMP approach provides a speck of a more complex kaleidoscopic view on persuasion, as alternative analyses are essential in order to gain a more critical awareness and look on different acts of persuasion. For instance, various forms of cultural analyses, rhetorical criticism, and so forth provide critical insight that the SPIMP model cannot respond to given the fact that the scope of the various contributions is significantly different. If, as mentioned in the second suggestion concerning the link between persuasion and influence, the SPIMP approach is to be expanded to point towards critical analyses, a significant amount of conceptual and experimental work is needed. Because it should be made abundantly clear that the SPIMP approach in its current form is *not* a critically analytical tool, but rather a psychological approximation of the processes the persuadee undergoes when evaluating an act of persuasion. However, given the potential caustic nature of persuasive attempts

in which manipulation is obtained, it would be analytically fascinating to extend the use of the model to a more critical point. The question becomes whether it would be theoretically and analytically viable to sharpen rhetorical critical methods by invoking the insights gained from a psychological SPIMP description? In other words, the weight to rhetorical feminist criticism (see e.g. Foss, 2004, chapter 6), for example, might be sharpened if scholars could describe an approximation of perceived probabilistic estimations following rhetorical praxis on a more fundamental level that points to the psychological processes of evaluation, as this would yield interesting critical insight into the persuasiveness of a particular artefact. From such analyses, a more warranted critical assertion and discussion could follow – an assertion, which might be subject to experimental enquiry to further substantiate descriptive and qualitative methods. However, to operationalize the SPIMP core model into particular analytical methods would require a conceptual discussion on each method in re how the underlying assumptions of the present model would relate to the assumptions inherent in the particular analytical method.

Alongside the issue of applying the model to critical analyses of persuasive attempts and how the model relates to prevalent methods of analyses such as rhetorical criticism (Foss, 2004), the extension of the model to cover multiple persuaders is a fascinating issue. In real-life persuasion, the persuadee is often faced with more than one persuader (for instance, in a political debate between party leaders, there will be at least two persuaders and often many more). In this way, to describe the complexity of multiple persuaders, the model needs to be extended. However, as shown in Harris et al. (submitted), the Causal Bayesian Network illustrated in fig. 19 might be extendable to include more than one source (i.e. more than one persuader). Fig. 19 illustrates how the model might be extended to capture the competitive persuasive potential of having multiple persuaders. Here, S2 and S3 indicate two other persuaders (note that these should also be endowed with nodes for trustworthiness and expertise, but for visual simplicity, these have not been added). The extension of the model to include multiple persuaders needs conceptual clarity in terms of formalisation as well as further empirical testing (such as the one in Harris et al., submitted). However, from the model, it is clear that the SPIMP might potentially account for cases with multiple persuaders.

Fig. 19: Complex Bayesian network of multiple persuaders

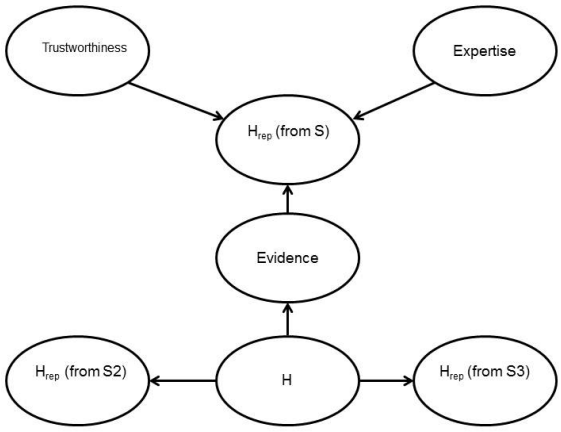


Illustration of a Causal Bayesian Network including multiple persuaders

5. The temporal influence on persuasion processing

Going beyond a naïve impression of time, Einstein humorously remarked 'put your hand on a stove for a minute, and it seems like an hour; Sit with a pretty girl for an hour, and it seems like a minute. *That's* relativity". We perceive time relatively, and the influence of development, memory, and time is an incredibly complex issue, not only for persuasion studies, but for all studies involving humans and social interactions since it affects relevant aspects such as epistemological potentials, our ability to perceive the present, and so forth. Some temporal aspects of persuasive attempts were briefly discussed in 6.4, but a more in-depth discussion of time and persuasion is necessary for a fundamental grounding of the influence of the latter on a conceptual basis[228].

The main area of interest in re temporal aspects in persuasion for further exploration is two-fold. Firstly, a general empirical and theoretical interest in the influence of memory, past experiences, and individual socio-cultural development aims at exploring a central aspect of the foundation of probabilistic theories of reasoning, namely how priors are constructed and managed throughout a life and the influence they exert on the particular situation. This focus is influenced by research that indicates the influence of development, for instance in terms of moral foundations (Haidt, 2012). In order to have a richer probabilistic theory of reasoning, this is a conceptual bridge that needs to be crossed. Secondly, the temporal aspects of persuasion are of conceptual interest from an ontological and epistemological perspective since truth-conditional

[228] Given the fact that all events unfold in time, 'temporal' might not be a good term. However, for the time being, it will suffice.

probabilities are not given exclusively as assertive statements, but rather as predictive claims. The fact that much persuasion is concerned with future events lends a critical temporal lens to how humans might evaluate persuasive attempts, as much is concerned not with assertions or with counter-factuals, but with predictives. The former two (assertions and counter-factuals) have been the focus of most reasoning research (e.g. Zultan et al., 2012), whilst the latter has been explored in less detail. Collectively, then, the temporal aspects of persuasion are of vital significance to develop a holistic theory of processing.

6. Influence of style and culture

Finally, as noted in the section on presence (6.3), stylistics and the adornment of communication is a central aspect of the effectiveness of acts of persuasion. The stylistic manner by which the persuader expresses his proposed belief communicatively may invoke the presence of the argument, which in turn directs the intentionality of the attention. Given the subjectivity of beliefs via the givenness of the perceived, a change in intentionality entails that the persuadee may arrive at very different probabilistic estimations compared to situations in which her persuasive intentionality was directed in a different manner. In this way, stylistics becomes much more than communicative adornment; it becomes the lens through which the argument is perceived and processed. In this way, stylistics functions cognitively in a similar way as framing effects. However, the link between style and reasoning is in no way trivial and is in need of methodological exploration in order to ascertain the role of style in persuasive attempts on a psychological scale (as stylistics have already been investigated thoroughly in literature studies, rhetorical elocutio, and so on).

An element of style is concerned with the cultural environment in which it occurs. Throughout the history of Western oratory, different oratorical and stylistic ideals have permeated (for instance, the difference between the brevity of Lincoln's rhetoric as compared to the adornment of the elocutionists of 18th century Britain). In the approach developed here, the socio-cultural background, and consequently cultural expectations, is central to how an act of persuasion is received. Dissimilar receptions of different stylistics due to varying cultural expectations and norms are a concrete example of a more general concern in re the theory and model presented in the thesis.

The conceptual background for the SPIMP approach is largely derived from empirical and theoretical investigations carried out in Europe, Australia, New Zealand, Canada, and the USA. That is, the subjects in the various experimental data are predominantly (although not exclusively) from Western cultural backgrounds. Therefore, the approach might reasonably be labelled a Western rather than a universal theory and model of persuasion. It would be arrogant to assume the model holds for other cultures without testing the model thoroughly outside the Western cultural boundaries. For instance, the use and reverence of authority might differ in different cultural settings (Hofstede, 1983). If this is true, source credibility and content strength should be differently weighted probabilistically – and perhaps also differently conceptualized - if the SPIMP approach is to be applied to Japanese subjects. I would like to be very clear, then, that the theory and model developed in the thesis is constrained by this empirical and conceptual limitation.

Final remarks

In sum, the SPIMP approach sets out a prolegomena and a theoretical framework for understanding and describing the psychological mechanisms underlying persuasion processing. However, the approach suffers inherently from theoretical gaps to be explored in the future. Future direction 1 mentioned above is focussed on an conceptual expansion of the SPIMP approach by investigating the role of emotion states in persuasion, directions 2-4 are concerned with extending the approach into critical analyses, direction 5 indicates the need for further discussions on memory, development, and the temporal aspect, and finally direction 6 is concerned with the communicative and innovative quality of persuasion. Collectively, these elements point to several research questions where the approach might be tested, challenged, and improved upon. However, the general framework for a novel appreciation of persuasion is described in the thesis and as such, the thesis points towards additional research. In this way, the literature review and discussion carried out throughout the thesis functions as a platform from which more in-depth investigations, analyses, and models might spring. Alongside the issues presented here, a conceptual development to sharpen the theoretical distinctions and connections is warranted to further improve upon the SPIMP. Furthermore, it would be immensely interesting to apply the SPIMP approach

to real life cases of persuasion to gauge the analytical and descriptive potential of the model.

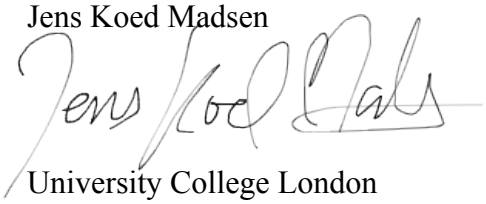
Persuasion is omnipresent in society and between humans. In particular, in a democratic state where direct and explicit coercion is the exception rather than the rule, we have to engage with one another in endlessly novel ways in order to manoeuvre the complexity of the social, the known, and the unknown. Persuasion is a profoundly beautiful expression of human ingenuity, trust, and sociality. If human beings did not possess these fundamental character traits, persuasion, and society, would be impossible. Further, persuasion is constantly evolving. In the same way that a literary cliché might get tired, so can a manner of persuasion live its life before it gets so commonplace that most audiences would be naturally vigilant towards it. As a direct consequence of this, persuasion is inherently creative, moving, and innovative. This playfulness should not be neglected in our appreciation of the persuasive act. As Kakuzo (1906) says, "We classify too much and enjoy too little" (pp. 51-52). If there is a clarion call of the thesis, it is that acts of persuasion can possess great power, but also fantastic beauty and aesthetic appeal, and that we should avoid tedious reductionist analyses of political speeches and advertisement simply because they fit in one single preconceived theoretical or analytical box. We must never get so bogged down in the technical descriptions of a persuasive incident that we forget the playful aspects, the subtle, and the contextually mandated. For this reason, we have to look beyond any one discipline in order to gain a richer understanding of any particular act of persuasion in any detailed way.

The thesis presents a theoretical and analytical account as well as a concrete model of persuasion (SPIMP), which offer a kaleidoscopic fragment of a more complex picture. The same act of persuasion can, and should, be analysed from a myriad of perspectives that may draw different conclusions depending on their particular point of departure. What more, the kaleidoscopic picture is constantly moving given developments in society. We should constantly evaluate and re-evaluate certain acts of persuasion given newfound ideals, modes of criticism etc., which in turn sheds novel and interesting light on dusty speeches. This is why we need a marriage between different forms of analyses when investigating a persuasive incident. As argued in this thesis we need for instance rhetorical criticism, cultural studies, descriptive

phenomenology as well as social and cognitive psychology in order to gain a more in-depth idea of a particular act of persuasion as it would be folly to believe that one approach could deplete and account for the complexity of the persuasive.

To quote the ancient Roman orators, 'Dixi'

Jens Koed Madsen



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London, 25/9/2013

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There is no wealth like knowledge, no poverty like ignorance

Ali Ibn Abi-Talib

I cannot live without books

Thomas Jefferson

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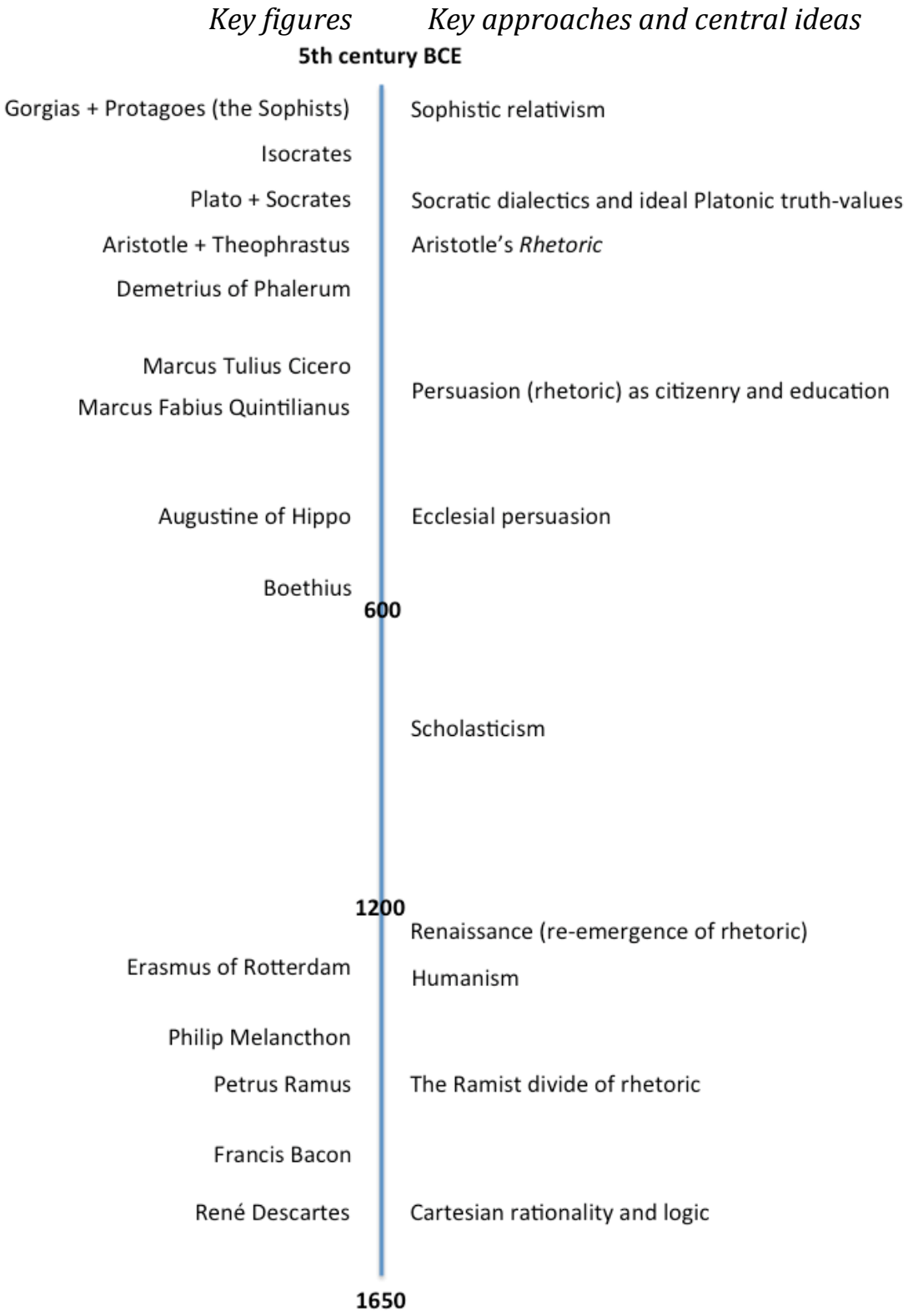
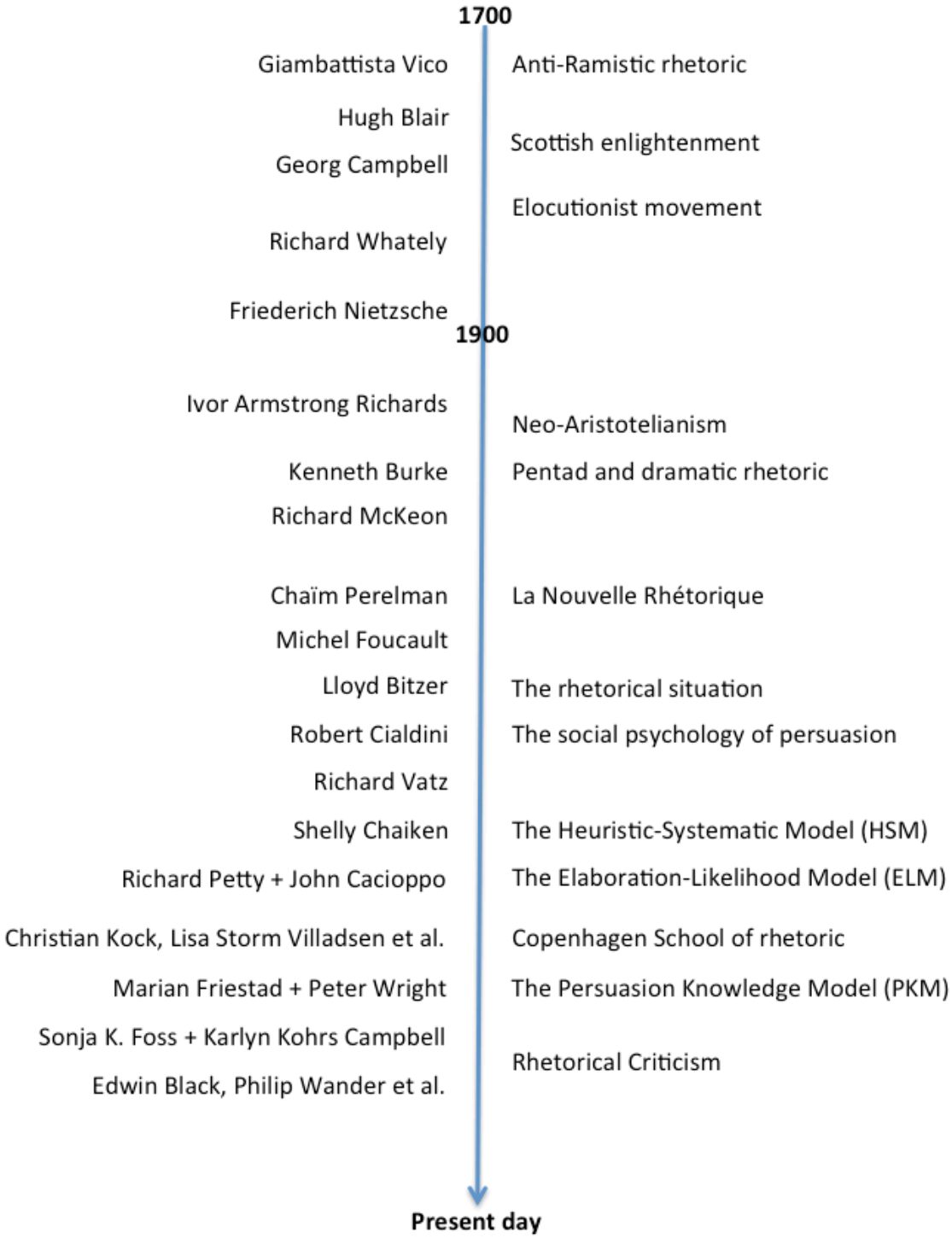
Appendix 1: Key figures and approaches to persuasion throughout history




1700
Giambattista Vico
Anti-Ramistic rhetoric
Hugh Blair
Georg Campbell
Scottish enlightenment
Elocutionist movement
Richard Whately
Friederich Nietzsche
1900
Ivor Armstrong Richards
Neo-Aristotelianism
Kenneth Burke
Pentad and dramatic rhetoric
Richard McKeon
Chaïm Perelman
La Nouvelle Rhétorique
Michel Foucault
Lloyd Bitzer
The rhetorical situation
Robert Cialdini
The social psychology of persuasion
Richard Vatz
Shelly Chaiken
The Heuristic-Systematic Model (HSM)
Richard Petty + John Cacioppo
The Elaboration-Likelihood Model (ELM)
Christian Kock, Lisa Storm Villadsen et al.
Copenhagen School of rhetoric
Marian Friestad + Peter Wright
The Persuasion Knowledge Model (PKM)
Sonja K. Foss + Karlyn Kohrs Campbell
Rhetorical Criticism
Edwin Black, Philip Wander et al.
Present day