

**The London School of Economics and Political Science**

Cultural transmission and social communication:  
A cognition and culture approach to everyday metaphor  
about knowledge, learning, and understanding

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## Abstract

Cultural transmission theory and methods focus on the qualities of cultural artefacts (e.g. religious beliefs, supernatural ideas, folk stories) to understand how and why some spread and last better than others. This "epidemiological" approach is part of a broader project, cognition and culture, which seeks to understand links between mind and culture. Cognition and culture is concerned with universal, recurrent cultural phenomena, whose developmental acquisition and patterns of distribution and variation may be linked to innate mental competencies. Anthropologists, ethno- and cognitive linguists, and cognitive and developmental psychologists have established that metaphor exhibits exactly these characteristics—universality, cultural variation, and developmental acquisition patterns. Yet, the cultural transmission of metaphor has not been addressed in the cognition and culture literature. This thesis proposes a novel application of an epidemiological account of cultural transmission to small-scale, linguistic, cultural artefacts—everyday, sensorimotor metaphorical talk about knowledge, learning, and understanding. Serial reproduction tasks, experiments, interviews, and metaphor analysis were used in a mixed-methods approach to investigate the use and transmission of metaphorical language.

Three initial experimental studies, which aimed to investigate transmission advantages of metaphor, showed no statistically significant effects of metaphor on transmission fidelity of short stories across serial reproduction chains. Four further studies were conducted to follow up on these findings. Results of the first follow-up experiment, more sensitive to the agency of speakers in communicative exchange, indicated that metaphorical prompts to invent stories yielded more metaphors in the story endings and descriptions. Findings from experimental and conversation-based judgement tasks suggested that metaphorical language provided more inferential potential than non-metaphorical language to support assessments of the verbal material and inferences about the speaker. The final qualitative study revealed ways that metaphor is used to support social interaction and co-operation in more naturalistic conversation contexts. Overall, it was found that social and pragmatic aspects of communication, undetectable in traditional serial reproduction experiments, contribute significantly to the wide distribution, or "cultural success", of metaphor. An account of the cultural success of metaphor based in inferential processes that support social interaction is proposed. Reflections are offered on its theoretical and methodological implications for the epidemiological view of cultural transmission and its generalisability to different types of cultural artefacts.

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## Introduction

An epidemiological approach to understanding culture has developed over the past 30 years. It is part of a broader framework of cognition and culture, which aims to base explanations of culture in evolved mechanisms for perception, categorisation, and organisation of knowledge; and the cognitive processes involved in their creation and maintenance. Within this framework, the epidemiology of representations view is concerned with how and why cultural items (e.g. practices, objects, language) are distributed across populations. Work in the field of epidemiology of representations has contributed mainly to the understanding of "large-scale" culture that evokes "questions of anthropology" (Astuti, 2007), namely beliefs, practices and other cultural artefacts related to religion. Questions of smaller scale, everyday culture, however, have not been thoroughly addressed. A broad question is whether the theoretical framework and empirical framework used to study religious and supernatural beliefs are generalisable to other (more mundane) cultural artefacts. Does it follow the same patterns? Can we use the same conceptual tools to investigate it? The same methodological tools?

The present research investigates the cultural transmission of an everyday, "small-scale" cultural artefact, metaphorical language. Specifically, "everyday" metaphorical talk about knowledge, understanding, and learning will be studied. The aim is to apply an epidemiological account of cultural transmission to a cultural artefact heretofore not considered within this approach—in order to understand more about metaphor and to advance understanding on the contribution of social and pragmatic aspects of communication to accounts of cultural "success". This is an exploratory study of cultural transmission of metaphor. The focus is limited to typical metaphorical language used to talk about knowledge, learning, and understanding. What constitutes metaphor and metaphorical language is delimited and a systematic approach is taken to identify metaphorical that occurs in everyday spoken, non-edited language about understanding, learning, and knowledge. This study concerns metaphorical language in English only.

This research proposes a novel application of the existing theoretical framework and methodological approach to a new area of study, and offers an explanation for the cultural success of metaphor that is based in inferential processes that support social interaction. Findings contribute to the study of cultural transmission by calling for reflection on broadening the scope of the biases and the phases involved in cultural transmission. An explanation is proposed as to why serial reproduction tasks that can be successfully applied to some types of cultural artefacts may not have the same sensitivity to factors that affect transmission of small-scale, everyday cultural artefacts.

This thesis comprises eight chapters. Chapters 1 and 2 introduce an epidemiological view of cultural transmission and metaphor. Methodological considerations and the research design are detailed in chapter 3. Seven empirical studies are presented in chapters 4, 5, 6, and 7. A final discussion is proposed in chapter 8.

## Chapter 1 Cultural transmission and communication: a cognition and culture perspective

### 1.1 Introduction

This chapter presents cultural transmission, a naturalistic approach to culture that theorises how and why some cultural artefacts (e.g. religious beliefs, supernatural ideas, legends, but also objects, practices, language, etc.) circulate and persist better than others. The basic premise of an epidemiological view of culture is that some items enjoy cultural "success", inasmuch as they have a broad distribution, like a contagion. This success is said to be in large part a function of the content of the cultural artefact and how the qualities of the content contribute to its memorability, thus the likelihood of its being transmitted. For example, culturally successful myths, folk stories, legends, and religions feature ideas that are thought to violate intuitive expectations—talking animals, magical objects, ghosts. The counterintuitiveness of the content of these ideas is considered to help them be memorable when they are encountered and when they are talked about or recreated with others; it helps these ideas "stick".

In this account, the process of cultural transmission is fuelled by communication; specifically ostensive-inferential communication, where representations are alternately converted from a public, ostensive object (e.g., the utterance of "hello", a gesture, a story told about a magical object) to internal representations of that object informed by inferences. The epidemiology of representations view conceives of each of the conversions from a public state to an internal state (and *vice versa*) as a crucial moment where ideas may or may not survive transmission. Empirically, this transmission is often investigated using transmission chains where material is received by one person, and then passed on to others.

This approach to culture is rooted primarily in anthropology. Thus, its applications have tended to focus on cultural ideas and belief systems that are relevant to "questions of anthropology" such as "what happens after death?," "why, exactly, is

the world as it is?", "does ritual matter?" "what is going to happen next?" (Astuti, 2007). Responses to such questions often involve religion, creation stories, morality and other ideas that are maintained and debated within institutions—schools, places of worship, families—which exert normative influence, another determining factor in cultural success. The application of this understanding of cultural transmission to investigate more ordinary, everyday cultural items is less developed.

## **1.2 An epidemiological approach to culture - some basic principles**

An epidemiological approach to culture is a naturalistic perspective on culture concerned with the distribution of cultural artefacts or representations (e.g. religious beliefs, supernatural ideas, legends, but also objects, practices, and language) across a population. Some artefacts enjoy “cultural success” inasmuch as they are widespread (i.e. across individuals, groups of people, places, and time); that is, they enjoy a broad distribution and this distribution is long lasting. Cultural success is considered to be a function of the likelihood that the artefact is passed on from one member of the population to another, without excessive effort and more or less intact; and this success is linked to specific and universal aspects about how the human mind works.

The basic premise of this epidemiological view<sup>1</sup> of culture is that “the human mind is susceptible to cultural representations in the same way the human organism is susceptible to diseases (Sperber, 1985, p. 74).” Thus, just as a pathogen might spread and infect some individuals in a population, a cultural artefact circulates among a group and some members of the group will persist in maintaining the artefact (i.e. holding the belief, using the idea, retelling the story). The main line of inquiry in an epidemiological approach to culture is how and why some artefacts circulate and persist better than others - why do they “stick” - in an effort to define the explanatory factors that account for differential success of cultural objects. Whenever information is understood, taught, learned, recounted, or endorsed,

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<sup>1</sup> References to an epidemiological view of culture and "cultural epidemiology" in this text should not be confused with another current field of study called cultural epidemiology, which is an interdisciplinary collaboration between anthropologists and epidemiologists to understand “locally valid representations of illness and their distribution in cultural context” (Weiss, 2001, p. 5).



psychological constraints are hypothesised to influence human minds such that the information that fits these constraints will tend to become stable cultural artefacts.

At the centenary celebration of the birth of Malinowski<sup>2</sup> Sperber proposed that just as pathology relates to epidemiology; so does psychology, or more specifically “psychology of thought”, relate to epidemiology of representations whereby they “stand in a relationship of partial interpenetration and mutual relevance.” (Sperber, 1996, p. 59) While epidemiological principles and mathematical models (Cavalli-Sforza and Feldman, 1981; Cavalli-Sforza, Feldman, Chen, & Dornbusch, 1982) had been raised in loose comparison in discussions of cultural transmission, this explicit analogy signalled a novel proposition to link anthropology with psychology in terms of causal accounts of culture.

It should be noted that an epidemiological perspective, as part of a broader cognition and culture framework, is not the only cognition-related perspective on cultural transmission. Another account of how cultural items circulate across a population that incorporates a Darwinian view is the memetic view (Blackmore, 1999, 2008; Dawkins, 1989).

In this view, memes are considered discrete units or particles of cultural material that replicate themselves across a population (*e.g.* ideas, songs, gestures, fashions). Dawkins (1976) coined the term *meme* in an analogy between memetic replication of cultural items with genetic replication; “just as genes propagate themselves in the gene pool by leaping from body to body via sperms or eggs, so memes propagate themselves in the meme pool by leaping from brain to brain via a process which, in the broad sense, can be called imitation” (Dawkins 1976, p. 192). Further Blackmore (2008) maintains that rather than making a broad comparison between replication of culture and genetic replication, the claim that memes are an “example of another operating on the same fundamental mechanisms” as genes is explicit (p. 513). Main objections raised against such a view include the assumption

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<sup>2</sup> Malinowski Memorial Lecture at the London School of Economics and Political Science, 6 March 1984

of imitation without inference and of an asocial inertia of transmission that excludes factors of motivation or emotion (Atran, 2001; Bloch, 2005; Sperber, 2001). While the epidemiological view of culture places great importance on the characteristics of the cultural artefact in explanations of its distributions, the cultural artefact is not considered an agent in epidemiological processes, a fundamental difference in the two perspectives.

Before proceeding to a more in depth discussion of cultural transmission, we should first reflect on what is intended here by “culture”. In its most sparse epidemiological conception, culture can be considered a “distribution of representations within a population” (Morin, 2011, p.179). In this sense, there is a gradation of culture in terms of this distribution. As an idea that is more or less widespread among a group and more or less persistent across time, is considered “more or less cultural” (Sperber, 1985, p.74). As a starting point, it should also be made clear that while culture includes the “activities, values, and behavior of an individual...acquired through instruction or imitation” (Cavalli-Sforza et al., 1982, p.19), it refers also to the material results of cultural ideas, including “texts, tools, buildings, artwork”(Norenzayan and Atran, 2004, p. 149).

This basic understanding both orients this project and reveals how an epidemiological approach to culture and cultural transmission is nested within the broader area of cognition and culture. A cognition and culture perspective is concerned with systems of cultural facts and artefacts, on one hand. These cultural “items” include practices, beliefs, language, forms of expression, objects, and tools. They are dependent on the individuals and groups who create and use them, value them, and maintain and change them. Thus, the relations between cultural items and their users are one important aspect of cognition and culture. On the other hand, cognition and culture also seeks to understand mental mechanisms for forming and using categories and concepts, perceiving and attending to one’s surroundings, understanding the intentions and motivations of others, as these mechanisms relate to the creation and use of cultural items. The cognition and culture approach to psychology thus, can be considered a study of the links

between the cultural repertoire of a group and the cognitive capacities and predispositions that influence the nature and use of those cultural items. In turn, these cultural items influence mental processes and facilitate or contribute to cognitive functions. This aspect of the relation between cognition and culture is another important focus of the approach. In this sense, cognition and culture can be very broadly described as a study of the cognitive foundations of culture and the cultural foundations of cognition. (Hirschfeld and Gelman, 1994; Sperber, 1996).

Thus, while this understanding of culture described above may emphasise the set of cultural artefacts that exist among a group of individuals, rather than the group itself, it is clear that a cultural repertoire cannot be considered meaningfully in isolation from the population who create, use, and transform it. Further, an epidemiological approach prioritises the transformation and distribution—jointly, the transmission—of the artefacts over the study of the artefacts themselves. Nonetheless, one of the theoretical bases of explanations of cultural transmission is the nature of the artefact; specifically, its memorability.

### **1.3 Content biases and memorability, and other transmission biases**

In an epidemiological study of cultural transmission, the principal determinants of an artefact's cultural success are the qualities of its content, and how these contribute to its memorability. Memorability, as a fundamental constraint on the transmission and stability of cultural artefacts, is considered to be the most important among the factors that determine cultural success (Sperber, 1985; Norenzayan et al., 2006; Gregory and Barrett, 2009). Simply put, a cultural idea that cannot be remembered cannot be transmitted, and consequently will not be successful. Where any two cultural objects are both memorable, given equal relevance, the more memorable of the two will enjoy a transmission advantage resulting in broader, more long-lasting distribution—greater cultural success (Norenzayan et al., 2006; Sperber, 1996). This is of particular importance in non-literate societies. In such societies without formal learning institutions and primarily oral traditions, it is argued a specific "law of the epidemiology of representations" applies, such that "in an oral tradition, all cultural representations

are easily remembered ones; hard to remember representations are forgotten, or transformed into more easily remembered ones, before reaching a cultural level of distribution" (Sperber, 1985, p.86). Of course, what constitutes memorability and the qualities inherent to "more memorable" cultural artefacts is a matter of one of the principal debates of the epidemiological approach to culture. This debate will be explored further in this discussion of transmission biases.

Transmission biases are forces that impede or promote the transmission of a cultural artefact, favouring their acceptance and maintenance, or their rejection, hence ultimately their cultural success. They can be determinant in whether an innovation becomes a convention, the stability of a convention, or the replacement of a convention by a new norm. One type of transmission bias, content biases, emerges as a result of qualities of the content of cultural artefacts in interaction with human psychological processes. A very simple example is a (more or less conscious) value judgement: people find that a forged metal blade cuts better than a stone blade, requires less effort, and breaks less easily. Such a cost-benefit calculation could give rise to a bias for metal tools, resulting in a wide, stable distribution of metal axes (Henrich and McElreath, 2003). Other content biases arise from interaction between the cultural object and universal cognitive processes (of categorisation, perception, etc.) (Norenzayan and Atran, 2005; Richerson and Boyd, 2005). There are a number of theorised content biases: bias for stereotype-consistent information (Bangerter, 2000; Kashima, 2000 (gender stereotypes); Lyons and Kashima, 2003 (group stereotypes)), a bias for social information (Mesoudi, Whiten, & Dunbar, 2006), a bias for hierarchically structured information (Mesoudi and Whiten, 2004); even biases for certain types of graphic forms in writing and arithmetic systems that emerged through "neuronal recycling" (Dehaene, 2004, Dehaene and Cohen, 2007).

Perhaps the content bias that has enjoyed the most attention in the literature is bias for minimal counterintuitiveness (Barrett, 2000; Barrett and Nyhof, 2001; Boyer, 1994, 2000; Boyer and Ramble, 2001). The minimal-counterintuitiveness bias is a transmission advantage conferred to ideas that violate expectations that

are universally held about the world. These ontological expectations have to do with knowledge about categories of living beings, the nature and mechanics of objects and substances, behaviour of psychological agents, etc. Each of these domains is informed by knowledge, formulated in intuitive theories, which emerge during normal childhood development and have been argued to be guided by innate cognitive predispositions (Carey and Spelke, 1994). Domain-specific knowledge—“folk biology” (Hatano and Inagaki, 1994), “naïve physics” (Baillargeon, 2008), “folk psychology” (Gergely and Csibra, 2003)—is the basis for these expectations about creatures, objects, and people. Successful myths, folk stories, legends, and religions feature ideas are thought to violate these intuitive expectations; ideas like talking animals, magical objects, and ghosts. Minimal counterintuitiveness is thought to confer a mnemonic advantage because while the ontological violations make the idea more salient, more “attention-grabbing” (ghosts needn’t eat and can go through walls); the expectable features help maintain an otherwise unusual idea (ghosts live in houses, have faces and voices, and can get upset). Importantly, in order to be successful, cultural artefacts must be “optimally” counterintuitive: completely expectable ideas can go unnoticed; overly unusual ideas might be too difficult to remember (Boyer and Ramble, 2001).

Another aspect of transmission advantage conferred by minimal counterintuitiveness is inferential richness. Minimal counterintuitive (MCI) cultural artefacts are by their nature (mostly, but) less than fully understandable. Thus they generate inferences, or “relevant mysteries” (Sperber, 1996, p. 73). In addition, because they are in large part compliant with established cognitive templates and have only minimal unexpected features, they generate inferences using relatively little cognitive effort. In relevance theory terms (Sperber and Wilson, 1995), they are both attention-getting and allow for further inference using relatively little cognitive effort. The extent to which a representation allows or facilitates the generation of ideas, images, thoughts, or memories is its inferential potential (Boyer, 2001; Gregory and Barrett, 2009). Inferential potential can pertain to producing many inferences or a broad range of inferences. For instance, cultural items that have a broad range of variation may enjoy greater cultural success (e.g. a

text whose content can be interpreted many different ways by many different people) possibly due to a bias for ambiguity (Kitcher, 2003). Cultural items whose inferential potential generates inferences that then influence or inform subsequent action (*e.g.* a decision or another inference) are said to be "actionable". Generally speaking, the more a cultural artefact is useful to inform inferences or actions, the more likely it is to be retained in a cultural set of representations (Gervais, Willard, Norenzayan, & Henrich, 2011).

Neither views nor empirical evidence to support a minimal counterintuitiveness bias are straightforward, however. Norenzayan and Atran (2005) and Norenzayan and colleagues (2006) found some mnemonic advantage of MCI items, but only those embedded in narratives, not in simple lists of items. Gonce and colleagues (2006) suggest that the mnemonic advantage of counterintuitiveness is context-dependent in recall tasks (Gonce, Upal, Slone, & Tweney, 2006). Upal (2010) goes further to propose a context-based account of MCI bias whereby it is not the nature of the concepts but the context in which these supernatural ideas occur, which allow the hearer/perceiver to make sense of the idea. Counterintuitiveness tends to "wear off" over time, and ideas with "enhanced CI" then obtain transmission advantages. In addition to discrepant accounts of mnemonic advantages conferred by minimal counterintuitiveness, there are also, perhaps more fundamental questions of what is "intuitive" and to whom (Bloch, 2005).

Other factors that influence the adoption or reproduction of cultural artefacts are linked to the environment where the objects and potential users exist, rather than the qualities of the objects themselves. These context biases are more closely associated with work of evolutionary psychologists and anthropologists, which often makes use of population-scale models of cultural change and cultural transmission based in mathematical principals of population genetics (Boyd and Richerson, 1985; Cavalli-Sforza and Feldman, 1981; Henrich and McElreath, 2003). When there is a choice of cultural variants and the choice is difficult, it is argued that forces of natural selection favour relying on imitating other people (Boyd and Richerson, 1985, 1995). For example, context biases (or indirect biases) can be

based on the characteristics of the producer or user of a cultural artefact and will affect the degree to which others subsequently reproduce or use it (Henrich and McElreath, 2003). Perhaps more simply, a conformity (or conformist) bias involves reproducing artefacts or behaviours that are the most frequently encountered (Boyd and Richerson, 2005; Henrich and McElreath, 2003).

In explanations of learning, imitating, and transmitting cultural items that are based on evolutionary "fitness", context biases are thought to have, in some cases, more explanatory power than content biases. Content biases, such as the bias for minimal counterintuitiveness, have less purchase in quantitative models of cultural dynamics, as they are considered "accidental by-products" of evolved minds (Henrich and McElreath, 2003). In addition, it is argued that for some types of artefacts, an account of cultural transmission that prioritises its content may be incomplete. For example, Gervais and Henrich (2010) point out that according to a solely content-based understanding of transmission biases, Zeus and "god" both satisfy the requirements of "successful god candidates," while Santa Claus does not (See Barrett, 2008.) (Gervais and Henrich, 2010, p. 387). However, understanding how and why there is belief in or commitment to them, they argue, depends on context biases. Commitment to a representation or a belief may be linked with judgements of others' commitment to the belief. One mechanism that relates specifically to this type of judgement involves attending to credibility enhancing displays, or CREDs, in making decisions about which representations of beliefs to accept (Henrich, 2009). In assessing a cultural model (a speaker, for instance) and a belief they claim to hold, a listener will use not only what the speaker says, but also any actions or "costly" behaviour he performs (*e.g.* fasting for religious reasons) to gauge the speaker's commitment to the claimed belief (Henrich, 2009).

Factors related to the context of cultural transmission are not limited to evolutionary approaches, though. One such factor is the "fit" between the artefact and its environment, or its "idea habitat", that is the various information or "cues" that contribute to the relevancy of the object (Berger and Heath, 2005). Cues in a

habitat permit (or oblige) more overt consideration, repetition, or communication about certain ideas. For example, given two beliefs about supernatural entities, 'witches make potions' and 'trolls are stupid', it is hypothesised that witches' potion-making skills would enjoy greater cultural success than trolls' stupidity thanks in part to an idea habitat that is richer in witch-related representations (films, television series, Halloween decor and practices, in literature and in history, etc.)(Berger and Heath, 2005, p.198). Perhaps less directly related to questions of cultural transmission *per se*, factors thought to influence the diffusion of innovations—specifically the "innovativeness" of adopters—are interesting inasmuch as "early adopters" of a technology can be considered a type of cultural model. Early adopters of innovations are characterised as more empathetic, more socially well connected, and as having a higher social status than late adopters (Rogers, 1983). Such qualities, or the perception of such qualities in a cultural model, can be relevant to others' decision to adopt the innovation or cultural item, thus in turn its distribution.

#### **1.4 Grain and chains**

One of the questions that emerges from an epidemiological approach to cultural transmission is that of how to consider the granularity of culture. In understanding culture in terms of transmission and distribution of cultural items, we are obliged to make decisions on what constitutes an "item" (or object, artefact, idea, representation, etc.), a decision on where to "slice" culture. Indeed, in the literature this has been a point of disagreement. This is important in cultural transmission, given the question of whether the process of reproduction (in a serial reproduction task, for example) changes the item. It depends on the "grain" at which the item is identified. Another question of grain relates to how much of any given quality favoured by a transmission bias is optimal. For instance, Norenzayan and colleagues (2006) point out that the characters in culturally successful folktales are, for the most part ordinary people and that the counterintuitive characters are quite rare, urging the question: why don't MCI characters and ideas dominate such stories, if they are the most memorable? They suggest that cognitive optimality—



achieving an “ideal” degree of minimal counterintuitiveness—might function not only at the level of the cultural item, but also at the level of the narrative (Norenzayan et al., 2006). Indeed, this could be expected given empirical work to suggest a hierarchical organisation of propositions and series of propositions, “micro-structures” by “macro-operators” that shape the gist of information (Kintsch and van Dijk, 1975, 1978). Support for such processes can be found in empirical work testing for structural schemata used in understanding and recalling stories (Mandler and Johnson, 1977) and more recently in experiments testing for a hierarchical transmission bias (Mesoudi 2005; Mesoudi and Whiten, 2004).

The question of grain becomes more apparent as theoretical notions are translated into empirical methods to test cultural transmission. Recent critiques of serial reproduction experiments point out that while they allow for investigation of the “encode-and-retrieve” phase of cultural transmission (during which one receives a story, or other cultural item, and then reproduces it), they exclude important aspects of transmission that occur immediately before and afterwards (Eriksson and Coultas, 2014; Stubbersfield, Tehrani, and Flynn, 2014). Traditional, linear serial reproduction tasks, it is argued, can be used to investigate transmission biases only with respect to how cultural material interacts with memory. They do not investigate processes that occur in decisions on which types of items are preferable to receive, nor during the receiver's decisions on whether the item will be passed on. In this sense, the experimental paradigm is said to ignore the “choose-to-receive” phase and the “choose-to-transmit” phase of cultural transmission (Eriksson and Coultas, 2014). In a “four-stroke engine” model of potential stages of transmission where biases might take effect, Enfield (2014) enumerates “exposure” to the cultural item, “representation” of the item mentally into (necessarily) and existing set of representations or knowledge, “reproduction” of the item from a private representation to a public one, and “material” where the item is perceived in an external, physical context (Enfield, 2014, p. 201).

The nature of the inferential chain is also debated. Morin (2011) has suggested that “real world” cultural transmission and diffusion do not resemble linear

transmission chains, and further, questions the soundness of the assumption that high fidelity transmission should necessarily correlate with cultural success (or presuming a link between low fidelity and low success). Whereas even relatively high-fidelity transmission in experimental reproduction would still lead to large cumulative errors, real world cultural traditions survive despite considerable distortion and variation (Morin, 2011).

### **1.5 Areas of application**

With historical roots in a French sociological tradition (*e.g.* the work of Tarde on imitation, Durkheim and Mauss), and a more recent basis in anthropology, applications of an epidemiological approach to cultural transmission have tended to focus on cultural ideas and belief systems that are relevant to "questions of anthropology" (Astuti, 2007) "what happens after death?," "why, exactly, is the world as it is?," "does ritual matter?" "what is going to happen next?". Responses to such questions often involve religion, creation stories, morality as well as cultural ideas that are debated by institutions and yield normative influences. The study of systems of religious beliefs and practices has been the subject of most cultural epidemiological work. The application of this understanding of cultural transmission more ordinary, everyday cultural items, however, is less developed.

### **1.6 Communication: an inferential model**

In this account, the process of cultural transmission is fuelled by communication; specifically ostensive-inferential communication. Because of the crucial role of communication processes in the process of cultural transmission, it is important to specify certain fundamental qualities of communication. Communication should be considered as a complex "inferential game" where goals and intentions are the motivations for speakers' utterances (Fiedler, 2007). Listeners actively and continuously infer meanings based on these utterances, and construct and revise their own models of speakers' intentions. These inferential cycles take place in a constantly shifting, dialectic context. The hearer and speaker continually exchange roles and evaluate context and input. With each new inference, interlocutors re-

calibrate for new information, changing their relation to each other and to the social context in which they are performing (Franks and Green, 2011). This is in stark contrast with code-based models of communication whereby a speaker encodes her intended meaning, utters the corresponding words, which are received by a hearer who, in turn, decodes the message to recuperate its original meaning, as though passed tidily through a "conduit" (Reddy, 1993).

The theoretical basis of an inferential account of communication finds origins in Grice's work on implicature, founded on the expression and recognition of intentions as the basis of communication (Grice, 1975) rather than semiotic process as part of a code model. This work was further developed by Sperber and Wilson (1995), in their model of ostensive-inferential communication. In relevance-theoretic terms, in making an utterance (or some ostensive gesture, utterance, or use of a code – a public production), a speaker provides evidence of his or her intention to convey a particular meaning. The hearer, based on this ostensive evidence, infers intentions and intended meanings, to the degree that the process of inference is not excessively costly in terms of effort and in the prospect that the outcome will be relevant to his or her current knowledge in the given context. Determining the communicative intentions (or indeed, any type of intention) of another necessarily requires an awareness of the existence of others' mental states. This "theory of mind" is a prerequisite not only for inferential communication. It is the very basis of the uniquely human potential for cultural learning and the creation and use of cultural artefacts and social institutions to the understanding of one's self and of others as intentional beings (Tomasello, Kruger, and Ratner, 1993).

Thus, having considered the role of communication in cultural transmission, and the inferential nature of communication itself, it becomes clear that just as replication of the content of mental representations from one person to another is not a plausible explanation for communication, nor can it be for cultural transmission. Indeed, cultural representations—artefacts, gestures, language, etc.—are not transmitted and acquired by simple replication. In the same way that a code model of communication does not account for the inferential nature of communication, it

would be over simplistic to explain the distribution of a cultural item across a population by virtue of members of the population replicating or imitating representations in successive generations. For instance, explaining that a child acquires and later masters Italian because her family and the community all speak Italian – that she has simply replicated the Italian language from its use by those around her – is unsatisfactory. The transmission of culture (e.g. the acquisition of a language) involves inferential processes. People attend to relevant behavioural “cultural cues”, infer the intentions and goals behind the behaviour, build concepts and practices on the basis of their inferences (Sperber, 1996). In this way, across iterations and reiterations of representations along causal chains, representations are “transformed” by inferential processes (Henrich and Boyd, 2002). Representations that are the most repeatedly communicated, and minimally transformed over the multiple iterations are said to stabilise. That is, they achieve “cultural success”, and will ultimately belong to the culture (Sperber, 1990).

This approach considers culture as a set of representations shared by a group, and that for any group of people, there are mental representations in individual minds, and a shared environment with public representations of the members of the group (e.g. artefacts, buildings, gestures, talk, songs, novels, websites, etc.) (Boyer, 1994; Sperber, 1996). It is theorised that mental representations are among the causes of these public productions, and that public representations are among the causes of mental representations. For instance, A makes a public representation (e.g. a gesture, a verbal utterance). B observes the public representation, and then forms a mental representation of it. Subsequently, B makes a public representation that resembles the one made by A, which is perceived by C. C, in turn forms a mental representation, and later produces a similar production, etc. This production could be a salute, the utterance of “bonjour”, a marble bust of J.S. Bach, or any of an endless array of cultural artefacts. In this way, representations exist in a constant process of transformation between mental representations and public productions, alternating in complex causal chains, in a process of cultural transmission (Sperber, 1996).

On this view, cultural transmission is the process by which these representations are alternately converted from public representation to mental representation to public representation, etc. in causally linked chains; and “the smallest ordinary such causal chain is an act of successful communication” (Sperber, 1996, p. 99). Communication is the process that fuels the transmission chain, thus creating similarity in the content of representations in the minds of interlocutors during a transmission chain. Other important aspects about communication and inference will be discussed in chapter 2.

## **1.7 Conclusion**

The epidemiological view of cultural transmission theorises how and why some cultural artefacts (e.g. religious beliefs, supernatural ideas, legends, but also objects, practices, language, etc.) circulate and persist better than others, primarily as a function of their content—how well it “fits” with evolved cognitive capacities for perception, categorisation, and organising knowledge. In this account, communication is the “motor” of transmission.

## Chapter 2 Metaphor and communication

### 2.1 Introduction

Metaphor and its public manifestation, everyday metaphorical language, have been the object of centuries of scholarly attention. Both "outward-facing" and "inward-facing" aspects of metaphor are considered in this chapter. On one hand, metaphor has important pragmatic functions that effect change "outwardly"; for example, its persuasive effects, pedagogical applications, and role in shaping understanding of complex scientific, political, and social issues. On the other hand, metaphor also functions "inwardly". One prominent theoretical approach, conceptual metaphor theory, considers metaphor as universal, patterned, and stable conventions of conceptual thought. Other views of metaphor and cognition consider metaphor to be involved in structure mapping, concept formation, analogical thinking processes, and a basis for reasoning. These outward and inward functions of metaphor are not solely an individual matter, but also have a basis in joint action.

Communication will also be revisited in this chapter. Following on from the previous chapter, it is argued that not only should communication be understood as an inference-based process, but as an inferential process of social interaction. Everyday conversation is presented as a coordinated, joint activity that relies on the establishment and maintenance of shared knowledge—common ground. Coordination of joint action, common ground, pragmatics, and other social aspects of communication, it is suggested, may contribute to the understanding the ubiquity and role of metaphor in everyday talk.

The consideration of language use as a form of social interaction on one hand, and the universality and ubiquity of metaphor on the other, give rise to interesting questions of how social and pragmatic aspects of communication might contribute to an account of the cultural success of metaphor. This chapter concludes with a proposal for a novel application of an epidemiological account of cultural

transmission to small-scale, cultural artefacts—everyday metaphorical language about knowledge, learning, and understanding.

## 2.2 What is metaphor?

Metaphor literature is far reaching, across disciplines and across centuries. In order to discuss and conduct empirical research about metaphor, a workable definition is needed. However, given the scope of metaphor scholarship, this is not a straightforward task. Most simply, metaphor can be considered as a conceptualisation or description of one thing in terms of another. In the Aristotelian tradition metaphor is “the application of a noun which properly applies to something else” (Poetics. 21: 57b. (Trans.) M. Heath, 1996, p. 34). In this sense, qualities or characteristics are carried or borne (*-phora*) from one thing to another *meta-* (with, between) (Oxford English Dictionary, 1979) or “carry something across” or “transfer” as etymologically suggested (Wolff & Gentner, 2011). Beyond this baseline understanding of metaphor, three important themes can be developed: metaphor as structure, metaphor as language, and metaphor in intention.

Metaphor can be considered as a pattern- or structure-generating device that can establish order between experiences and understandings. Johnson (1987) describes a “mode of understanding by which we project patterns from one domain of experience in order to structure another domain of a different kind” (p. xiv-xv). There is the source domain (or base or vehicle)—often with physical, sensorimotor, or otherwise “concrete” attributes. There is also the target domain (or topic or tenor)—the more “abstract” domain and that which is being spoken of. For instance in the oft-cited example of *love is a journey*, the target domain of *love* is understood, informed, and structured by the qualities of the source domain of *journeys*. Debates around this metaphorical structuring and its implications are discussed in detail later in the chapter.

Metaphor is also a matter of expression in language. Linguistic metaphor is the “application of a word or expression that properly belongs to one context to

express meaning in a different context because of some real or implied similarity in the referents involved" (Anderson, 1964, p.53)(See also Bywater, 1909). This application has been likened to a tool, particularly in the field of rhetoric, "a device for seeing something in terms of something else," that can be proactively, skilfully applied (Burke, 1945, p.503). A distinction can be drawn between metaphorical language and structural or conceptual metaphors described above. Metaphorical expressions are the "words or other linguistic expressions that come from the language or terminology of the more concrete conceptual domain" are the evidence for the existence of the underlying conceptual metaphors (Kövecses, 2002, p. 4).

Others still place metaphoricality neither in a "deep-level" conceptualisation, nor in the "surface-level" observable language, but in the intentions, motivations, and interactions of the users of metaphor. Fraser (1993) considers that the speaker's intention of whether her utterance should be understood literally or not is determines what is a metaphor, insisting that a sentence cannot in fact "contain" a metaphor as "sentences surely do not have intentions" (p. 333). Metaphor has been considered a special kind of invitation from a speaker to a hearer (Cohen, 1978). Partaking in metaphor can, it is claimed, be a source of pleasure through arousal caused by the juxtaposition of abstract and concrete and the subsequent "conceptual resolution" (Berlyne, 1960, cited in Pavio and Walsh, 1993), or simply the pleasure or delight in discovery (Aristotle, 1991).

Indeed, metaphor involves all of these three aspects; conceptual knowledge, linguistic expression, and the interactions of language users. This project is concerned with metaphoricality in all three of these senses: cognition, culture, and social aspects. An understanding how and why metaphor is used will inform understanding of all three of these areas.

### **2.3 Metaphorical language as a cultural artefact**

From folk stories to highly coded verbal practices and institutions (e.g. prayers, legal proceeding, coronations), language is among the most apparent and observable of



all cultural artefacts. It is at once a means for making public cultural representations and culture itself—where culture is the set of “shared understandings that people hold and that are sometimes, but not always realized, stored, and transmitted in their language” (Quinn, 1991, p. 57). Tomasello observes the nature of language as an intimate interlacing of social interaction and human cognition, “natural language is a symbolically embodied social institution that arose historically from previously existing social-communicative activities” (Tomasello, 1999, p. 94). The social action of using language creates the means to capture multitudes of interpretations and construals that accumulate and remain in a culture. Acquiring and adopting the use of the symbolic artefacts of language is a social process by which children internalise these cultural construals (Tomasello, 1999). In this sense, language forms and variants, including metaphor, are cultural artefacts.

Metaphorical language is ubiquitous (Kövecses 2002, 2005; Lakoff and Johnson, 1980, 2003). It is pervasive throughout carefully crafted, edited language as well as in impromptu, unrehearsed language; in language used and preserved in writing—poetry, prose, song, scientific work, personal correspondence—and more ephemeral, spoken language use, debates, teaching, therapy, and everyday talk (Gibbs, 2008; Lakoff and Johnson, 1980, 2003). An attempt to “compute the density of metaphors” used in televised political debates in the U.S. in 1985, reckons the use of metaphor one metaphor per 25-30 words (Graesser, Mio, and Millis, 1989, p.143); others estimate about five uses of metaphor per minute of speech during interviews, conversations, and therapy sessions (Pollio, Barlow, Fine, and Pollio, 1977). Of course, operationalising, identifying, and counting metaphor are not straightforward (see chapter 3). The genre of communication has been found to make a significant difference in the degree of metaphorical language used. In one study, academic texts were found to have the highest rate of metaphor use, at 18.6% of all lexical units, compared to news (16.4%), fiction (11.8%)(Steen, Dorst, Hermann et al., 2010). In the most general sense, though, in epidemiological terms described in chapter 1, metaphor can be considered culturally successful.

In considering metaphor as a cultural artefact that enjoys a degree of cultural success, the rationale for taking a cognition and culture approach should be specified. From a cognition and culture perspective, the cultural phenomena of interest are those that have a putatively universal foundation, all the while exhibiting cultural variation (Norenzayan and Heine, 2005; Norenzayan et al., 2006). In addition, categories of cultural items that have a basis in evolved cognitive universals are often characterised by a patterns of acquisition in early childhood development, *before* the full use of the cultural artefact is enabled (Carey and Spelke, 1994). Metaphor, as a cultural artefact, exhibits these three dimensions. In the following section, the universality and cultural variation of metaphor are described, as are studies of acquisition of means for analogical and metaphorical reasoning in young children.

### **2.3.1 Universality**

The use of metaphorical language is considered universal (Kövecses 2002, 2005; Lakoff and Johnson, 1980, 2003; Pinker, 1995). Primary metaphors are those metaphors that are thought to pertain to “basic patterns of perception and experience” (Grady, 2005, p. 194). These metaphors are considered a fundamental, even “inescapable” set of knowledge (e.g. UNFEELING IS COLD, “her heart is stone cold”; MORE IS UP, “complaints have skyrocketed”; FUNCTIONAL IS ERECT, “the network is down”) (Lakoff and Johnson, 1980, 2003). They are recurrent across populations and geographical areas (Kövecses 2002, 2005; Lakoff and Johnson, 1980, 2003).

Basic physical and sensorimotor experiences have been posited as the basis for these primary metaphors. For example, Fauconnier and Turner (2002) suggest that ANGER IS HEAT, which gives rise to metaphorical language such as “she was burning with rage”, is based on a physical, causal relationship between experiencing anger and feeling warm. Ethnolinguistic evidence from Chinese, English, Hungarian, Japanese, Polish, Wolof, and Zulu supports a claim for universality of primary metaphors including primary metaphors HAPPINESS IS UP, HAPPINESS IS LIGHT and ANGER IS A PRESSURIZED FLUID OR GAS IN A CONTAINER (which underlie typical

metaphorical language like "She woke up on top of the world today" or "He's about to blow his top")(Kövecses, 2005).

In a study that pre-dates any work on conceptual metaphor, Asch (1958) formulated questions around the use of "dual terms" used to describe the properties of both things and people (*e.g.* warm, hard, straight). He studied Old Testament Hebrew, Homeric Greek, Chinese, Thai, Malayalam, Hausa, and Burmese to investigate the universality of dual terms and to understand whether "historically independent languages employ the same morphemes to designate physical and psychological properties? If so, do languages belonging to different families also agree in the detailed couplings they make? (Asch, 1958, p.89)." He found that across his, admittedly small, sample, that not only were the same kinds of terms used, but that they were used in the same way. For example "sweet" was used across all languages not simply for positive traits, but for positive and "soothing" ones. He found divergences with terms like sharp (*e.g.* sharp lips in Chinese and Hausa indicate fluency or glibness) but broad agreement with terms like straight and crooked, hot and cold. From this early study, a wide-scale, systematic pattern was proposed for how judgements and descriptions of psychological states were based on knowledge of others, which is "mediated by the physical energies that leave them and reach us" (Asch, 1958, p. 91). Asch (1958) concluded that it is should not be surprising that the terms should be "so often 'physicalistic' "(p. 91).

### **2.3.2 Cultural variation**

Universality of a trait does not, of course, preclude variation among the manifestations of the trait. In fact, it is argued that the interaction of evolved domain-specific modules with their current domains, in fact, a view of cognition and culture that accepts the existence of evolved domain-specific modules (*i.e.* universal and specialised processing devices evolved to handle specific types of information) would predicate a degree of cultural variation. Cultural variation, it is claimed, arises from the differences in the proper domain, the kinds of information problems that the module evolved to address, and the actual domain, the information problems in the modern world, and the interaction of the domain-specific module with the

range of possible actual domains (Sperber and Hirschfeld, 2004). As it pertains to metaphor, it may be that most of the primary contents are universal (the primary metaphors described above) and the variants in and across groups are expectable divergences.

Questions of cultural variation across languages involve the degree to which the range of source domains are constant (e.g. the target "love" can be conceptualised by source domains of JOURNEYS, BATTLES, or GAMES) and the extent to which the scope of target domains vary (e.g. the source domain of JOURNEY could be associated with the targets including learning, marriage, career, etc.) (Kövecses, 2005). Kövecses (2005) argues that where despite the availability of a set of source domains to conceptualise any given target, cross-cultural variation is exhibited in "preferential conceptualisation," which is based on the collective experience and knowledge (geographical, historical, political, etc.) of a language group. For example, where as American conceptualised life in terms of a "precious possession" or a "game" (e.g. something to be valued, admired, and taken care of at the risk of losing it, to be played the right way) Hungarians more typically used metaphorical language related to "war, struggle" or "compromise" (e.g. having to fight, its being exhausting, having to give things up and accept the situation)(Kövecses, 2005, pp. 84-85).

Where source-target pairings were consistent across languages, more local factors influence variation. For instance, where in both English and Chinese, politics are conceptualised in terms of sport, American English metaphorical language often refers to American football and baseball whereas Chinese language metaphors more often refer to table tennis, volleyball, or football (Yu, 1998). Variation can also be found in how languages exploit specificities of source domains. Metaphorical language about time involves a spatial source domain (e.g. looking forward to the party next week, being behind schedule, being ahead of one's time)(Boroditsky, 2001; Clark, 1973; Traugott, 1978). While in English, spatial metaphors for time typically refer to horizontal movement, Chinese speaker use both horizontal and vertical spatial axes to talk about time (Boroditsky, 2000, 2001;

Chun, 1997; Scott, 1989; Yu, 1999). Thus where use of metaphor and metaphorical domains exhibit universality, the metaphorical expressions that are observable vary importantly, depending in part on cultural and linguistic knowledge and practices (Norenzayan and Heine, 2005).

From a cognition and culture perspective, widespread cultural artefacts for which claims of universality are founded, and where there is observed, systematic cultural variation are of great interest. The questions of how cognitive mechanisms influence cultural manifestations, and how cultural patterns can influence cognition are at the very heart of this approach. These findings already warrant an investigation of whether a representational epidemiology approach to recurrence and transmission can be applied to metaphors. One further aspect of metaphor that motivates investigation from a cognition and culture perspective is how patterns of developmental acquisition of analogical reasoning, as an innate cognitive capacity, may shed light on universality of metaphor (Gentner and Jeziorski, 1993). The work of developmental psychologists to understand acquisition of metaphorical reasoning suggests a “pre-cultural” capacity for producing and understanding metaphorical language (i.e. precocious acquisition of analogical skills, prior to sufficient language exposure and language development to produce metaphorical language) (Asch, and Nerlove, 1960; Gardner, Kircher, Winner, and Perkins, 1975; Gentner 1983, 1988; Winner, Rosentiel and Gardner, 1976). Tomasello (1999) considers the developmental emergence of abstract and metaphorical language to be “especially interesting cognitively since they are based both on learning of culturally conventional linguistic structures and on children’s individual cognitive skills of categorization and schema formation, which derive in the final analysis, from their biological inheritance as individual primates” (Tomasello, 1999, p. 157).

Given these considerations of the universality of metaphor and the ubiquity of metaphorical language—its cultural success—together with the role of communication in cultural transmission described in the last chapter, an interesting question already begins to emerge as to whether the cultural success of metaphor

can be investigated using a cultural transmission approach. The functions of metaphor, both in terms of an “inward-facing” conceptual tool and “outward-facing” everyday metaphorical language are described in the next section, to understand how these functions might contribute to explaining the cultural success of metaphor.

## **2.4 Functions of metaphor**

Metaphor has both "outward-facing" and "inward-facing" aspects. On one hand, metaphor has important pragmatic functions that effect change "outwardly"; these relate to persuasion, teaching, and shaping explanations of the complexities of the social and scientific world. On the other hand, metaphor also functions "inwardly"; metaphor is a tool for thinking, a mechanism to structure conceptual features, a means to make sense of the unfamiliar, to “interpret the world” (Mühlhäusler, 1995, p. 281). These aspects are reviewed below with a view to casting light on explanations for the ubiquity of metaphor.

### **2.4.1 "Outward" functions**

Since the earliest studies of metaphor, it has been associated with rhetorical power—a power of persuasion. The findings from an extensive meta-analysis of dozens of empirical studies on metaphor from 1980s and 1990s suggest that, overall, metaphorical language is more persuasive than literal language (Sopory and Dillard, 2002a, 2002b). More recent, smaller-scale studies, specific to areas including decision-making, politics, marketing draw the same general conclusion (Hartman, 2012). However, the role of metaphor in persuasion is not a straightforward one.

#### **Persuasion**

In their meta-analysis, Sopory and Dillard (2002b) draw the conclusion that one instance of metaphorical language is more persuasive than multiple occurrences. Thus, there may be a threshold after which persuasive effects fail. Metaphorical language that occurs early in message or utterance is more persuasive than

metaphor used elsewhere; and novel metaphorical language is more persuasive than common metaphorical language. All else being equal, metaphorical language heard aloud has a greater persuasive effect than the same language read on paper. Metaphorical language is more persuasive to listeners who are more knowledgeable about the target of the metaphor, compared to those who are less familiar. (Sopory and Dillard, 2002b). The mastery of metaphor in the rhetorical literature has been considered "a sign of genius" (Aristotle, *On Poetics*, Trans. M Heath, 1996). Empirical evidence supports this notion; metaphorical language is associated with judgements of greater credibility and persuasion, but only when the speaker had low credibility to begin with. (Sopory and Dillard, 2002b). Thus the persuasive effects of metaphor are a function of the metaphorical language, certainly - how much, when it occurs in the message, the mode in which it is presented, etc. But importantly, it also depends on the disposition of the hearer, her background knowledge and the relevance of the message to her; and on the qualities, perceived or actual, of the speaker.

### **Pedagogy**

Teaching has been likened to a form of persuasion (Woods and Demarath 2010); and just as metaphor effects change outwardly through persuasion, it can also support pedagogical processes. Far from simply a practical matter of using models or catch phrases, it has been posited that metaphor can have an important pedagogic impact, that "metaphor, or something very much like it, is what renders possible and intelligible the acquisition of new knowledge" (Petrie and Oshlag, 1993, p. 582). Metaphor can be a tool in teaching that supports making the unfamiliar familiar with the capacity "to transfer learning and understanding from what is known to what is less well-known and to do so in a very vivid manner" (Ortony, 1977, p.53). Empirical support for these claims is mixed.

In a study of the impact of metaphorical language in HIV/AIDS educational materials for secondary students in South Africa, participants who recognised metaphor (as an explanation that referred to something similar to them in a way that made the immune system concrete and easy to picture) judged texts that presented the

human immune system as an army, or a fire brigade were judged significantly more understandable, attractive, and persuasive. However, across the entire sample, there were no significant effects of metaphor on comprehension, attractiveness, or persuasiveness of the text did not find the metaphor material (Jansen et al., 2010).

A study to test the effect of metaphors in teaching videos to explain the concept of randomisation to low-income women living in the rural United States was conducted to enable potential clinical trial participants to understand how trial groups were formed so that they could give informed consent to participate. Krieger, Parrot, and Nussbaum (2011) found that teaching material using culturally derived metaphors (e.g. sex of a baby) helped participants understand chance and randomisation and lead to increased intentions to participate in a clinical trial, compared to other metaphor (e.g. "flip of a coin") or no metaphor.

Metaphors are considered important in education because "they allow the transfer of coherent chunks of characteristics - perceptual, cognitive, emotional and experiential - from a vehicle which is known to a topic which is less so. In so doing they circumvent the problem of specifying one by one each of the often unnameable and innumerable characteristics; they avoid discretizing the perceived continuity of experience and are thus closer to experience and consequently more vivid and memorable" (Ortony, 1977, p.53). This "memorableness of metaphor" is not without its potential problems in the context of pedagogy, though; because metaphors only suggest associations, there is a potential for misinterpretation (Petrie and Oshlag, 1993, p. 581). On one hand, memorability would be beneficial for learning (as it would be for cultural transmission, as discussed in the previous chapter). Metaphorical language raises the possibility for conceptual links, but does not define them, which in Ortony's view confers vividness and memorability. But there is also the risk of misinterpreting or failing to identify the intended meaning among the "innumerable characteristics."

Empirical evidence suggests that in some cases metaphorical language makes material more attractive and understandable, hence improves pedagogical



outcomes of comprehension and retention. We can extrapolate from these results in pedagogical contexts a general tendency for metaphor to be more memorable across transmission chains. Hence it may be an influential factor in transmission in serial reproduction tasks.

### **Framing and understanding complexities**

Metaphors can have a profound effect on the ways people understand and reason about important social and political issues, by creating a particular frame of reference. In this sense, they are “interpretive tools” that are critical in determining analysis of and solution to important social problems; thus, rigour should be exercised in creating policy-related metaphors (Schön, 1993, p. 139). For instance, metaphorical framing of crime (crime as a virus, crime as a predator) was found to shape thinking about potential solutions to address the problem. Connectionist textual analysis of experimental data showed that when crime was presented as a virus (“infecting” and “plaguing” the community) participants more often proposed social measures, such as community education and improving welfare, as a solution. When crime was presented in predator metaphors (“wild beast...lurking”), solutions centred on capturing and jailing criminals and hiring more police officers (Thibodeau, McClelland, and Boroditsky, 2008).

Metaphor is commonplace in scientific explanations; it is an important means to understand and communicate scientific theories and their implications for everyday life (Bicchieri, 1988). Sometimes metaphor is so well integrated into scientific explanations that a clear delineation between a supposed metaphor and the science itself is difficult to find (e.g. twisted ladders of DNA). It can be argued that metaphor in science is a special case, whereby metaphor is constitutive of theory itself (Boyd, 1993). In contrast to "conceptually open-ended" literary metaphor (e.g. "Juliet is the sun") where broad associations between the target and the source are proposed and common knowledge of both used to infer the nature of the association, Boyd argues that theory-constitutive scientific metaphors are uniquely "inductively open-ended" (e.g. cognitive science brain-computer metaphors: thinking as "information processing"; information is "encoded, indexed"

in a "memory store" by "labelling"; "subroutines" affect "memory storage capacities" and "information retrieval procedures")(Boyd, 1993, p. 486). In this case the receiver is invited to consider the conceptual features that link the target and the source, including those features that are not entirely explained, may not have a name, or perhaps have not yet been discovered. In this way, scientific metaphors supply a lexicon to discuss phenomena where previously, none existed; they are an "irreplaceable part of the linguistic machinery of a scientific theory" (Boyd, 1993, p. 486). As with literary and everyday metaphor, users would likely not be able to specify every relevant conceptual similarity, but it is this conceptual open-endedness that helps encourage theory-building and scientific discovery. This discovery can be characterised as a "process by which originally metaphorical descriptions are subsequently shown, by 'ontological experiment' to constitute accurate factual accounts of how nature works" (Harré, 1961, cited in Mühlhäusler, 1995, p. 281).

Metaphor, thus, is integral to how scientists interact and communicate with lay audiences. In a study comparing conventional and novel metaphors in corpus of scientific abstracts about immunology, it was found that conventional metaphors (e.g. virus as and aggressor) typically reinforced established "community knowledge" and introduced basic concepts. Novel metaphors (e.g. infections as sleeping monsters), however, were found to appeal more to a general readership, by evoking affect and folk knowledge (Hidalgo-Downing and Kraljevic-Mujic, 2009). Lay interpretations of science also rely on metaphor. Metaphor has also closely linked with social representations and processes of objectification; for example, how analogies between experiences of gender roles in day-to-day life shape understand of human gametes during conception (Bangertter, 2000; Wagner, Elejabarrieta, and Lahnsteiner, 1995).

#### **2.4.2 "Inward" functions**

The "inward-facing" functions of metaphor are related to metaphor as a tool for thinking, a means to structure or map knowledge to support the formation and elaboration of concepts (Gentner, 1983, 1988). Asch (1958) pointed out that in

describing psychological characteristics or actions, we often use terms that refer to qualities or actions of things (e.g. warm, hard, sweet). In a remarkably prescient piece of work, he questioned the conceptual basis of these “dual-function terms” and sought to “account for the specific joining of given physical and psychological experiences” (Asch, 1958, pp. 91-92). Perceived, intrinsic similarities (e.g. between sweet foods and sweet voices) which are then consciously associated, were discounted as a viable basis, in part by a type of poverty of stimulus argument, whereby the physical component or characteristic most often cannot be located in the psychological setting. Instead, Asch opts for the possibility of “associative interpretation” or “association by contiguity”. Dual terms (or source and target domains of metaphor, in modern terms), Asch suggests, come together not only because of sensory qualities, but also based on common properties related to function and interaction. Inwardly, then, metaphor is in part “a consequence of stable associative connections established between dissimilar physical and psychological conditions that regularly share some stimulus properties” (p. 92). This line of questioning would be the starting point for conceptual metaphor theory, some 20 years later.

*Metaphors We Live By* (Lakoff and Johnson, 2003) marked an important turn in cognitive linguistics and metaphor scholarship more generally in making a broad claim that all thought processes were largely metaphorical. Conceptual metaphor theory (CMT) holds that “the human conceptual system is metaphorically structured and defined” (Lakoff and Johnson, 2003, p. 6) and that features of concrete concepts are mapped onto more abstract concepts. According to CMT, these cross-domain mappings are captured in “conceptual metaphors,” fixed sets of associations between features of one domain and features of another.

According to this view, metaphorical expressions are the outward manifestations of a conceptual system that is itself metaphorical, where features of concrete concepts are mapped onto abstract concepts. For instance, in talking about understanding, English speakers might use expressions like “I see what you’re saying,” “it’s different from my point of view,” “I haven’t quite got the whole

picture" which map features of the source domain, SEEING, onto the target domain, UNDERSTANDING. This mapping, or set of correspondences between two domains, forms a conceptual metaphor, in this case UNDERSTANDING IS SEEING. These instances of metaphorical language express the target domain, understanding, in terms of features of the source domain, seeing. In this way metaphorical concepts are based on "experiential gestalts... ways of organizing experiences into structured wholes" which emerge from experience (Lakoff and Johnson, 2003, p. 81). In the example above, UNDERSTANDING IS SEEING, some aspects of the sensorimotor source domain SEEING are imposed upon the gestalt for UNDERSTANDING. For instance, aids for vision are aids to understanding (e.g. "can you shed some light on this issue?")(Lakoff, Espenson, and Schwartz, 1991). In this view, linguistic metaphorical expressions (i.e. "how we talk") are manifestations of conceptual metaphors (i.e. "how we think").

Notions of time have been a favourite subject of study in research on language and thought, particularly with respect to expressions in which temporal events are conceived as stationary relative to a moving observer (moving-ego) and expressions in which temporal events are considered to move relative to a stationary observer (moving-time) (Bennett, 1975; Boroditsky, 2000; Casasanto and Boroditsky, 2008; Clark 1973; McTaggart, 1908). In short, people talk metaphorically in terms of movement and perception because they think metaphorically in terms of movement and perception. The strongest claim is that people cannot conceptualise abstract domains, like love, without thinking in terms of concrete domains, like journeys (Murphy, 1996).

According to CMT, the cross-domain mappings that comprise conceptual metaphors can be traced to experiential bases that come from perceptual or physical experiences that inform the understanding of abstract concepts. The claim is that the concepts in target domains like ANGER, BAD, GOOD, etc. are structured by concepts in source domains, HEAT, DOWN, UP, respectively, and that this is possible because people have had actual physical experiences of temperature or vertical space that then inform their abstract concepts (Kövecses, 2002). Perceived

similarities, either directly observed or induced by another (ontological) metaphor can also serve as the experiential bases of metaphor (Kövecses, p. 71). How the mapping of features across domains might take place has been linked with embodied cognition. It is argued that experiences with the concrete source domain (e.g. physical, sensorial, motor experiences) necessarily precede metaphorically elaborated abstract target domains of experience (Gibbs, 2006). Sensorial and motor processes generate image schemas—non-propositional, internally structured representations at the level of bodily perception—which can then be metaphorically extended to understand abstract concepts (Gibbs, 2006).

Both the "outward-facing" and "inward-facing" aspects of metaphor are important to understanding the potential for cultural success of metaphor. These perlocutionary effects of metaphor—consequences of making an utterance on the opinions, beliefs, or actions—can be a basis for understanding why metaphor is pervasive in language use (Austin, 1962). For instance, (in epidemiological terms described in chapter 1) where a language variant is more persuasive than another, and understood to be more persuasive by language users, in some contexts, we could expect such a variant to enjoy a wider distribution than its less persuasive counterpart. People might generally prefer to receive and transmit messages that are more clear, or more vivid. Outward-facing perlocutionary effects of metaphorical language are complex and far-reaching, and their number potentially limitless (Sadock, 1974). Metaphor is also instrumental to abstract thought and conceptualisation. Of course, these outward and inward functions of metaphor do not exist in isolation from one another (although the literature is most often divided as if they were). Nor are these functions a solely individual matter. Conceptual metaphors and metaphorically organised views of the world are shared, tested, debated, accepted, and rejected in everyday communication, in part, via metaphorical language. Thus metaphor must also have a basis in social interaction. The following section addresses the issues of social interaction through the use of language, and particularly metaphorical language.

## 2.5 Communication: social interaction, common ground, and metaphor

In chapter 1, it was argued that communication cannot meaningfully be understood as a simple transfer of encoded information, relayed back and forth between interlocutors. Instead, interlocutors actively and continuously infer meanings based on the utterances they hear (and other types of behaviour they perceive). The same inferential mechanisms that support micro-processes of producing and understanding utterances also inform broader issues of social communication and social interaction.

Everyday conversation, a very typical type of social interaction, requires coordination. On an "organisational" level, there must be a coordination of alternate speaking and listening, or turn taking (Sacks, Schegloff, and Jefferson, 1974). At a "higher level", interlocutors must also coordinate meanings—those intended by speakers and those understood by hearers—throughout their interaction; this requires establishing what both interlocutors mutually know (Clark, 1996, p. 325, quotes in the original). This mutual knowledge (and mutual beliefs and suppositions) forms their common ground (Clark, 1985, 1996; Clark and Carlson, 1981). In a conversation, the process of grounding—"establishing the mutual belief that the addressees have understood, well enough for current purposes, what the speakers meant" helps ensure that the exchange goes smoothly (Clark, 1996, p. 330). That is, in a typical case, the intended meanings and the received meanings concur sufficiently well and the exchange follows a logical, conversational sequence, following Gricean principles of co-operation and rationality<sup>3</sup> (Grice, 1975).

Where speakers enjoy ample common ground, they are less bound to referential specificity. For example, in a request from one office-mate to another, where they share one dictionary, "Hand me the dictionary, please" would likely suffice to

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<sup>3</sup>"Our talk exchanges do not normally consist of a succession of disconnected remarks, and would not be rational if they did. They are, characteristically, to some degree at least, cooperative efforts." (Grice, 1975, p. 45).

achieve the speaker's goal, thanks to their shared knowledge (and the knowledge that the knowledge is shared). In some circumstances, "Give me that" would do. Were the speaker to ask a friend to go to her office and retrieve the dictionary, she might have to specify which dictionary, the colour of the cover, which shelf, perhaps which office. In a word, "the more common ground we share, the less constrained we are in communication"; common ground "licenses" a broader set of possibilities of communication (Enfield, 2006, p. 401). Common ground needn't rely on a long, shared history, however. With each utterance, a contribution is made to all interlocutors' common ground. In this way it accumulates at every turn during a conversation (Clark and Carlson, 1982; Clark and Schaefer, 1989; Gadzar, 1979; Stalnaker, 1978).

This dynamic of cumulative common ground is an interesting one. Enfield (2006) suggests that processes of inference and grounding are linked in a "strategic pursuit of common ground" whereby during a social interaction, we are driven to look for or attend to common ground, which in turn facilitates the social interaction. During this "grounding for inferring", interlocutors seek a basis to infer "sharedness of knowledge" that they can, in turn, use in to interact (Enfield, 2006, p. 405). This "strategic pursuit" together with the ways in which common ground "licenses" greater possibilities for communication can be considered in a virtuous cycle within a talk exchange. For instance, based on common ground at  $t_1$ , a speaker makes an utterance. The utterance contributes to building further common ground. On perceiving some basis to infer a greater common ground at  $t_2$ , the speaker can avail of a greater range of possible utterances (e.g. an utterance with less referential specificity, as in the example above). In this virtuous circle, as common ground increases, so does the range of possible utterances or behaviours that suffice to achieve the speaker's goals.

Of course this evidence or basis to infer common ground can take many forms. Common ground could be inferred from belonging to the same cultural or language-speaking group (Enfield, 2006). Common ground could be inferred from perceived affiliation signalled by mimicry of gestures, postures, or facial expressions

(Chartrand and Bargh, 1999) Inferences of common ground can, of course, be based in language use—matching style, accent, speed, etc. (Niederhoffer and Pennebaker, 2002). One account of linguistic alignment proposes an "automatic" mechanism for syntactic and lexical matching which contributes to an accrual of "implicit common ground"(Pickering and Garrod, 2004, 2006).

Some suggest that metaphor may be one such basis to infer common ground. Graf (2011) proposes that using metaphor is a "sociocommunicative practice". Where conceptualising "inwardly" using a metaphor may be a more or less individual act, using metaphorical language in an utterance before an audience is a form of joint action (Clark, 1996) which requires, shared knowledge, norms, and conventions (Graf, 2011). The use of metaphorical language in everyday can also be a means of "cultivating intimacy" (Cohen, 1978). Cohen (1978) suggests that in using metaphorical language, a "speaker 1. issues a kind of concealed invitation; 2. the hearer expends a special effort to accept the invitation; and 3. this transaction constitutes the acknowledgment of a community" (p. 8). The joint act of producing and receiving a metaphorical utterance has even been likened to "perform[ing] an identical dance step" (Booth, 1978, p. 54).

Common ground is an integral factor in supporting social communication, not an asocial relay of encoded information, but communication as a coordinated joint activity and a process of social interaction. For the present study, incorporating an understanding of common ground, joint action, common ground, pragmatics, and other social aspects of communication, it is suggested, may contribute to the understanding the ubiquity and role of metaphor in everyday talk.

## **2.6 Proposal for a novel approach to studying metaphor**

This chapter has proposed a consideration of metaphor and its public manifestation, metaphorical language, as cultural artefacts. Anthropologists, ethno- and cognitive linguists, and cognitive and developmental psychologists have established that metaphor exhibits precisely those characteristics that would warrant a cultural epidemiological investigation: universality, cultural variation, and



developmental acquisition patterns. Yet, the cultural transmission of metaphor has not been addressed in the cognition and culture literature. This thesis proposes a novel application of an epidemiological account of cultural transmission to small-scale, linguistic, cultural artefacts—everyday, sensorimotor metaphorical talk about knowledge, learning, and understanding. Such a study would contribute to the understanding of metaphor on one hand, but more broadly could advance understanding on the contribution of social and pragmatic aspects of communication to accounts of cultural "success".

Both outward-facing and inward-facing aspects of metaphor described in the literature have been considered. For the most part, these bodies of literature do not particularly overlap. Yet, these outwardly and inwardly functions are interrelated. The outward and inward aspects of the function of metaphor are sometimes not only interrelated, but intertwined. Indeed they may be intertwined to such an extent that the distinction becomes blurred, if not, in some cases, false. A study of metaphor that adopts an ostensive-inferential view of communication, characterised by cascades of alternating mental- and public representations (see 1.6), allows for consideration of the inwardly- and outwardly-oriented aspects of metaphor together.

## **2.7 Conclusion**

Metaphor and its public manifestation, everyday metaphorical language, are a ubiquitous forms of culture. Both outward- and inward-facing functions of metaphor involve inference to draw associations between the abstract and concrete domains that figure in a typical metaphor. Inferential processes are also at the centre of communication and social interaction. A greater understanding of metaphor in the context of communication and social interaction is called for.

### **Chapter 3 Cultural transmission of metaphor: a mixed methods approach**

Following the review of key theoretical themes in the cultural transmission literature and in metaphor scholarship presented in the first two chapters, this chapter begins with methodological considerations in these two areas of study. The predominant experimental paradigm used to investigate cultural transmission—serial reproduction—is presented. Then, issues relevant to the empirical study of metaphor are considered; and a preliminary study to build a corpus of naturalistic metaphorical language as a basis for developing various research instruments is described.

Finally, an overview of the empirical project and how it developed is offered. A multi-faceted approach, involving both qualitative and quantitative methods, is proposed to investigate cultural transmission and the role of social and pragmatic aspects of communicative interaction in the cultural success of metaphor. Qualitative data collection and analysis were used to investigate metaphor in naturalistic talk about learning experiences. Systematic procedures for defining, identifying, and coding metaphorical language helped ensure consistency in the qualitative data set. Experimental and quantitative methods allowed for observation of processes of cultural transmission under controlled conditions. The implementation of serial reproduction experiments and metaphor identification procedure are described in this chapter, as are their strengths and limitations as research tools. Reflections on the challenges and benefits of a) taking a mixed method approach and b) conducting research online are offered.

### **3.1 Introduction**

The first chapter presented key theoretical themes in a cognition and culture approach to understanding cultural success, and an epidemiological perspective on how cultural artefacts can be transmitted among individuals and across groups. The second chapter reviewed metaphor scholarship related to psychology, psycholinguistics, and pragmatics, and argued that metaphor can be understood to be a cultural artefact. A foundation for a novel approach to join the ideas from these fields and to consider the cultural transmission of metaphor is proposed at the end of chapter 2. Of course, such an approach must take into account important methodological considerations proper to both of these fields. This is particularly important, as these two lines of inquiry have not heretofore been combined in one study, to the best of the author's knowledge.

In this chapter the methodological traditions proper to the study of cultural transmission and to the study of metaphor, and the implications of their empirical practices are considered. The predominant experimental paradigm used to investigate cultural transmission, serial reproduction, is presented. Then, issues relevant to the empirical study of metaphor are considered; and a preliminary study to build a corpus of naturalistic metaphorical language as a basis for developing various research instruments is described.

Finally, an overview of the empirical project and how it developed over the duration of the research is offered. A multi-faceted approach, involving both qualitative and quantitative methods, is proposed to investigate cultural transmission and the role of social and pragmatic aspects of communicative interaction in the cultural success of metaphor.

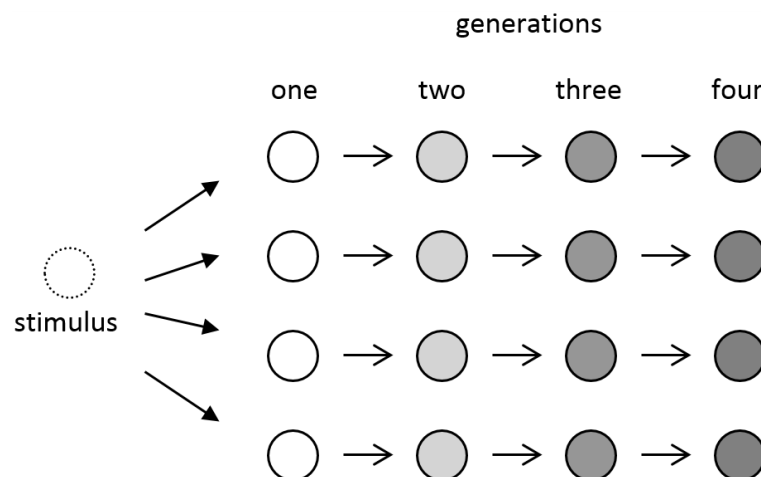
## 3.2 Overview of methods

### 3.2.1 Methodological Considerations: cultural transmission and metaphor

#### An experimental approach to cultural transmission—serial reproduction

Serial reproduction is an experimental approach to understanding cultural transmission whereby a stimulus is presented to an individual, who reproduces it for another, who in turn reproduces it for another, continuing in such a series in a transmission chain. Transmission chains in a serial reproduction task are schematised below in figure 3.1.

**Figure 3.1: Schema of transmission chains in a serial reproduction task (adapted from Mesoudi and Whiten, 2008)**



The stimulus can be verbal, transmitted orally or in writing. It can also be an image, gesture, or other type of behaviour (Kashima and Yeung, 2010). The transmission can take place directly with subjects meeting face-to-face, or via a recorded means (text, video, etc.). Serial reproduction tasks are a means to simulate and observe cultural dynamics, “the formation, maintenance, and transformation of culture over time” in a controlled, experimental environment (Kashima and Yeung, 2010, p. 56). They are useful for observing which types of information are retained and which are not across successive steps in a transmission chain, as well as the rate of information loss. They are also a means to observe the degree of fidelity with

which the stimulus is transmitted, and the nature of transformations it may undergo over time.

As explained in chapter 1, the notion of cultural success crucially depends on selective representation, retention, and transmission of cultural facts. The biases and transformations to which representations are subjected in the process of transmission across individuals constrain their content and form more broadly, as a cultural artefact. Thus, by examining transmission of certain types of cultural artefacts, one can gain invaluable insight into which types of representations enjoy greater transmission success and what types of transformations they undergo. This insight in turn contributes to explanations of differential cultural success across different types of cultural items. When cultural transmission is observed under experimental conditions, it becomes possible to investigate which variables confer transmission advantages, in comparison to others. Serial reproduction tasks, or transmission chain studies, allow for just such observation.

### **Applications of experimental serial reproduction**

It is important to note, though, that serial reproduction tasks have been applied to the study of cultural transmission with a clear cognition and culture orientation relatively recently. Historically, serial reproduction tasks are most often associated with Bartlett's work on memory (Bartlett, 1967). Using serial reproduction to study the recall of folk stories, Bartlett observed that as a story was told and re-told across a transmission chain, though the gist of the narrative remained, elements of the original stimulus were omitted. Bartlett's analysis also focused on how storytellers made sense of the narrative through rationalisation, or creating their own links within the story and lines of reasoning, as well the transformation of details across generations of the transmission chains. Bartlett's application of serial reproduction tasks is considered one of the foundations of the understanding of memory and cultural dynamics and an influential contribution to cultural psychology (Rosa, 2000; Saito, 2000; Wagoner, 2013). These early serial reproduction tasks are not, however, without their critiques. These studies are characterised by a rather "informal" experimental procedure (Kintsch, 1995). For

instance, in the “War of the ghosts” study, Bartlett (1967) reports that “Reproductions were effected after a filled interval of 15-30 minutes” (p. 119), though he does not specify what the participants were doing nor the reason for a variation of up to two-fold in waiting time. Gauld and Stephenson (1967) point out that instructions given to participants - whether they are told explicitly to remember exactly and not invent material - have a significant impact on the outcome of this type of task. Greater methodological rigour is to be found in later serial reproduction task-based studies.

The 1940s and 50s would see the use of serial reproduction tasks in studies of a variety of social psychology research. Allport and Postman (1947) used a serial reproduction task involving an image of an altercation on train, as a means to study transmission and evolution of rumour. In an interesting methodological variant, participants were asked to reproduce verbal descriptions of the image in a lecture hall where the entire attendance (except the participant) could see the image being described. The authors note that successive generations are reproduced “until the last subject has repeated the story he has heard, and taken his seat (usually amidst laughter) to compare his final version with the original on the screen” (Allport and Postman, 1947, p. 67). This application of the method would become a classic work in the study of rumour, stereotypes, and in witness recall, although some critique has been levelled at loose interpretations of the original work (Treadway and McCloskey, 1987).

Alper and Korchin (1952) investigated sex differences in recall and transmission with a task that involved transmission of a letter about the challenges that exist in co-educational students given certain gender-specific attributes. In men-only and female-only transmission chains while there was no difference in transmission of neutral items (neither favourable nor unfavourable to men or women), it was found that men retained more ‘pro-male’, ‘pro-female’, and ‘anti-female’ material than women, while women retained more ‘anti-male’ propositions than men. Also, reproductions across transmission chains of female participants were more “distorted” and “exaggerated” - rendering anti-female propositions, even more

derogatory than those in the original stimulus (Alper and Korchin, 1952, p. 36). They interpreted this “self-abusive tendency” on the part of female participants to be indicative of their feeling more threatened by the content of the story and the maintenance of a cultural female-inferiority stereotype. Cultural differences in transmission among social scientists from France, UK, Italy, Netherlands, Sweden, and United States were the focus of Talland’s 1956 serial reproduction study. It was observed that items that were affectively neutral (i.e. not involving conflict or competition) and items of greater interest to participants underwent the least distortion in transmission. Also, the “easiest and most concrete texts” enjoyed greatest rates of recall (Talland, 1956, p. 80).

Another major area where serial reproduction task has facilitated important contributions to theoretical understanding is in the field of social representations. Parallels have been drawn between Bartlett’s formulation of social conventionalisation and Moscovici’s work on social representations (Bangerter and Lehmann, 1997; Saito, 1996). Theoretical links were drawn in an analysis of the transmission of Zen principles and practices in the UK and other countries (Saito, 1996). These theoretical links were borne out empirically with the application of serial reproduction tasks to investigate lay understandings of biological processes involved in conception (Bangerter, 2000; Bangerter and Lehmann, 1997). A theoretical framework combining social representations with work on rumour orients a variant of a communication chain study on how scientific information can change as it spreads, particularly as a function of the attitudes of those communicating (Green and Clémence, 2008). Gender representations and stereotypes are investigated using serial reproduction tasks, namely how consistency with existing stereotypes offers a bias for transmission - how stereotype-consistent material is transmitted with higher fidelity than stereotype-inconsistent material (Kashima, 2000). Marfaing and Tafani (2011) investigate the effect of gender stereotype consistency and attribution of blame and how blame evolves across (single-sex) transmission chains. Both men and women showed in-group favouritism. But while men placed less blame on the man in a story about an extra-marital affair - regardless of whether the couple was stereotypical; women

placed more blame on the non-stereotypical woman (i.e. a female engineer married to a male nurse, who moved to a different city to pursue her career) than on a stereotypical woman in the same circumstances (i.e. female nurse, whose engineer husband moves for his career). For both sexes, this in-group favouritism increased as the transmission chain progressed.

More recently, serial reproduction tasks have been fruitfully applied to the investigation of transmission biases. Evidence to support the existence of biases for counter-intuitive ideas (Barrett and Nyhof, 2001), hierarchically structured information (Mesoudi and Whiten, 2004), social information (Mesoudi, Whiten, and Dunbar, 2006) has emerged from serial reproduction studies.

Clearly, research using serial reproduction tasks has advanced understanding in several areas - social representations, rumour, stereotypes, etc. Its application has gone far beyond memory studies; it has developed into a method to observe content and process in the dynamics of the transmission, transformation, and evolution of culture (Bangerter, 2000; Kashima and Yeung, 2010; Mesoudi, 2007). Experimental serial reproduction allows for fine-grained investigation of an element of cultural dynamics that McIntyre and colleagues liken to processes of "microgenesis of culture" (McIntyre, Lyons, Clark, and Kashima, 2004) identified in the social representations theoretical tradition (Duveen and Lloyd, 1990).

### **Analytical foci in designing and using serial reproduction tasks**

Analytical emphases can vary in the design of serial reproduction tasks and the analysis of their results, depending on the theoretical interests and orientations of the research. For instance, researchers can choose to focus on the reproductions of information generated by participants and types of transformation it undergoes. This was the focus of Bartlett's work (1932) and others (Allport and Postman, 1947; Bangerter, 2000; Bangerter and Lehmann, 1997; Kashima 2000; Saito, 1996). In this case, a single stimulus is used, and the types of transformations or differential rates of change are analysed. For example, in their study of a bias for social information Mesoudi and colleagues (2006) used a single stimulus containing different types of



information (gossip and non-gossip), and analysed different rates of transmission for each type. Other studies place emphasis on the participants themselves and how particular attributes (sex, age, attitudes, etc.) might effect transmission. For instance, Alper and Korchin (1952) and Marfaing and Tafani (2011) were interested in, among other factors, the role of sex/gender in cultural transmission and used single-sex transmission chains. Of course, many studies are designed to investigate combined effects of various attributes of the producers, characteristics of the stimuli, and other factors on cultural transmission.

Other variants of serial reproduction allow for greater focus on particular broader areas of cultural transmission. For example, group methods use more than one participant at each generation and can shed light on interaction in reproduction. For example, Wagoner and Gillespie (2014) had pairs of participants jointly discuss and recall a story in a variation on the classic "War of the Ghosts" task to explore sociocultural mediators of recall. The replacement method, where some participants in groups are replaced or moved to different chains, is useful to study group learning or cumulative cultural evolution, as well as innovation (Mesoudi and Whiten, 2008).

Another approach to the design of serial reproduction involves manipulating the stimuli into various conditions, then randomly assigning participants to a condition in a linear transmission chain. This approach was used by Eriksson and Kimmo's (2014) study of the transmission of urban legends, where levels of disgust were manipulated in experimental stimuli (experiment 1). This approach, where the original story to be transmitted is manipulated, is adopted in the three serial reproduction tasks in the present study.

### **Operationalisation of the method for the current project**

In this project, transmission chains of four generations were used. In the previous serial reproduction task studies literature, four participants have been judged to constitute an optimum chain length, and transmission effects have been successfully demonstrated (Bangerter, 2000; Mesoudi and Whiten, 2004; Mesoudi

et al., 2006). Such chains are long enough to capture cumulative effects of cultural transmission, yet short enough to be practical in terms of recruiting participants and conducting analysis. Linear transmission chains were selected, as they are the most straightforward and "traditional" of the serial reproduction chain variants. (Had studies 1-3 yielded different results, other variations of the method could have been explored. See part 3.3.2 Overview of the present study.)

Each chain of four participants will be treated as an independent unit of analysis (rather than each participant). The reproductions of second, third and fourth generation participants is constrained by each previous generation's reproduction; anything omitted in one generation unavailable to subsequent generations. In this sense, the reproductions of each participant within a single chain are not independent of one another.

Transmission was measured in terms of recall quantity—the number of words and the number of propositions recalled at each generation, and recall quality—the number of correctly recalled propositions (compared to the propositions contained in the original material). These two measures of transmission success have been used in past studies (Mesoudi et al., 2006). More specific details of the design, materials, procedure, and analysis for each of the serial reproduction task studies are given in chapter 4.

### **Limitations of experimental serial reproduction**

Serial reproduction tasks are a powerful means to simulate processes of "symbolically mediated culture-mind interplay" over time and across individuals in a controlled setting (McIntyre et al., 2004, p. 227). The experimental paradigm is not, however, without its weaknesses. It is subject to idiosyncratic distortions (Allport and Postman, 1945), particularly those that occur in the early generations of the chain. Perhaps more importantly, questions have been raised as to how representative experimental serial reproduction is of real world cultural dynamics (Morin, 2011). As with other models of cultural dynamics and diffusion, experimental serial reproduction provides a schematised model of cultural

transmission, possibly at the expense of a more detailed investigation of important contextual factors (e.g. rates of contact, individual characteristics and sensitivities, speed of change of cultural item) (Kitcher, 2003).

### **3.2.2 Methodological considerations in the study of metaphor**

#### **Approaching metaphor qualitatively**

Data collection methods in metaphor scholarship generally fall into three categories: introspection, observation, and manipulation (Steen, 1997). Introspection involves a researcher observing his or her own language use or intuitions about language use, and using these observations directly in the consideration of questions about metaphor. Introspective methods have been used extensively (and possibly exclusively) in the development of theories of metaphor (Lakoff and Johnson, 1980, 1999, 2003; Kövecses, 2002, 2005) and for the purposes of experimental research, using introspectively generated metaphor as stimuli (Gibbs, 1996). Introspective methods for both theoretical and experimental applications have been most prominent in CMT literature.

Observation methods focus on language generated by people other than the researcher in “naturally-occurring” communication (e.g. recordings or transcripts of conversations, therapy sessions, private or published texts, speeches, etc.). This method is often employed in critical analyses of metaphors that arise in dialogue and other verbal data about public interest issues including science and technology, health and healthcare, geopolitics, education, minority group interests. Implementation of observation methods explores natural language, but generally does not make, nor does it seek to make, generalisable, predictive claims about metaphor use.

Manipulation involves collecting verbal data in a setting that is more or less artificial, observing subject who are explicitly instructed to produce language about one item in terms of another. For example, Flor and Hadar (2005) presented participants with pairs of words (e.g. truth and butterfly) and asked them to

generate metaphorical expressions that describe how the words are related. Manipulative methods are useful to explore possible ranges of novel metaphor, metaphorical expressions that are atypical in everyday language (Deignan, 2008). They have also been applied in studies of creativity and marketing and consumer opinion (Steen, 1997).

In a study that concerns the cultural success of metaphor, it is important to consider metaphorical language variants that are widespread in the culture. Thus naturalistic data are required.

### **Metaphor Identification Procedure**

On one hand it is recognised that introspective methods of metaphor generation – creating examples of metaphor based on one’s own intuitions – is not entirely satisfactory in research that makes any generalisable claim about metaphors. On the other hand, coding decisions about metaphorical usage in texts are rife with difficulties. At a practical level, there is variability in intuitions about what constitutes a metaphor, both for an individual coder, as well as among coders. Operationalisation and criteria for determining metaphors can also vary according to the theoretical orientation of the research. For instance, research motivated by considerations of grammar as symbolic structures might have a metaphor identification method that emphasises semiotics, or even stylistics. CMT theorists would be compelled to seek source domains and target domains in identifying metaphors. Figurative language specialists or discourse theorists would have still other areas of focus and means of analysis (Steen, 2007). In response to these challenges, a group of metaphor scholars<sup>4</sup> from a range of theoretical backgrounds sought to create a flexible, reliable tool for the systematic identification of

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<sup>4</sup> Peter Crisp, Ray Gibbs, Alan Cienki, Graham Low, Gerard Steen, Lynne Cameron, Elena Semino, Joe Grady, Alice Deignan, and Zoltan Kövecses; acronymously called "Pragglejaz".

metaphors. The procedure involves, first reading and understanding the text and determining the lexical units of the text (individual words or groups of words). The stepwise decision-making procedure proposed by Pragglejaz (2007) and used in this analysis is presented below.

1. For word/group of words, the contextual meaning must be established, “how it applies to an entity, relation, or attribute in the situation evoked by the text” (Pragglejaz, 2007)
2. For each word/group of words, determine if there is a “more basic contemporary meaning in other contexts than the one in the given context” (Pragglejaz, 2007). For this step, the Oxford English Dictionary (on-line edition) was used.
3. If a more basic or more current meaning is found, decide “whether the contextual meaning contrasts with the basic meaning but can be understood in comparison with it” (Pragglejaz, 2007)
4. If yes, the word / group of words should be considered metaphorical.

The Pragglejaz Metaphor Identification Procedure advocates employing a team of identifiers, who work together, consulting on points of variance. In these cases, the coding team can confer on exactly which step in the procedure for which precise word / group of words generated the disagreement.

### **3.3 Research design**

This section presents the overall design of the project. First, a preliminary qualitative study is presented. This interview study generated data—metaphorical language in everyday talk about learning experience—that were used to develop a framework that would inform the various research instruments used throughout the project. An overview of the project is given in the second part where each of

the seven main studies is briefly described. Finally, reflections on validity and quality are offered in the last section.

### **3.3.1 A preliminary study: Gathering naturally-occurring metaphorical language**

#### **Overview**

This initial qualitative study sought to obtain a sample of metaphorical language used by students in their talk about knowledge, learning, and understanding. As discussed in the previous section, introspective data—data that is generated by the researcher alone—can be problematic. In this study, it was crucial that the metaphorical language used in experimental stimuli reflected the metaphorical artefacts that were widespread in naturalistic talk about knowledge, learning, and understanding. Interviewees were asked to describe various aspects of their learning experience in order to collect a set of metaphorical language. These data were subsequently analysed and then organised into a systematic sample. The aim of this preliminary study was to generate a framework of naturalistic data on which to base the design of the research instruments used throughout the project.

#### **Participants**

The sample of interviewees comprised 29 LSE post-graduate students (17 females, 12 males) between 22-28 years old. An initial group of 107 students volunteered by responding to an e-mail sent to various LSE departments and completed a short online questionnaire, indicating basic demographic information, English language proficiency, and scheduling availability. The main criterion for this convenience sample was recent experience as a student. Participants were selected from among volunteers who indicated native- or very proficient English language mastery to achieve a sample of students from variety of departments and a balance of male and female interviewees. No exclusion criteria were applied with respect to age, sex, native language or country of origin. The resulting sample included 12 English speakers from the Bahamas, Canada, Ireland, Kuwait, the United Kingdom, and the

United States and 17 non-native speakers from China, Estonia, France, Greece and Indonesia.

## **Method**

### **Data collection**

The interviews took place on the premises of the LSE. Each participant was welcomed and presented with information about the study and their participation. Each participant read and signed the consent form prior to the start of the interview (appendix 3.A. Participant information and consent form). The interviews lasted between 20-35 minutes. Participants were paid £5 GBP in exchange for their time.

Two research instruments were used to facilitate the interview. First, participants were asked to complete a short questionnaire as part of online questionnaire used to gather demographic data and schedule interviews. Students were asked to rate their agreement with the following statements on a 5-point scale:

- 1. I complete my academic reading and other preparation for lectures and seminars on time.*
- 2. Studying at LSE is stressful.*
- 3. I am able to cope with study-related stress well.*
- 4. I understand my assignments and other academic work well.*
- 5. I feel like I am learning.*

These questionnaire data were not analysed. Rather, each participant's responses were used during the interview to prompt descriptions. In addition to the questionnaire data, an interview topic guide was used. The topic guide was constructed to elicit descriptions of a variety of aspects of interviewees' learning experiences. Attention was given to avoid introducing metaphorical language or imagistic language on the part of the interviewer, both in the questions and

prompts, so as not to influence the metaphors that might be generated in the responses. (appendix 3.B. Preliminary study: interview topic guide)

In terms of the methodological approaches to metaphor data described in the previous section, this study combined observation with aspects of manipulation. In the most formal terms, research of natural talk would require using a purely observational method of individuals talking, with no detectable intervention by the researcher concerning communicative context or subject matter. For practical reasons, observation of talk naturalistic to this degree was not feasible. For the purpose of this study, it was important to try to discover metaphorical language used to talk about learning experiences in naturalistic talk. At the same time, the discussion required some direction by the interviewer in terms of the subject matter of the discussion. In this sense, it was not an entirely naturalistic context; the interviewees did not know the interviewer and the context may have seemed unfamiliar to participants.

### **Data analysis**

Unlike most interviews, the objective here was not to discover students' views, attitudes, or values related to the topic of the interview. Rather, the interviews were designed to generate descriptive talk for the purpose of discovering metaphorical language. The analysis of the interview data was directly informed by this purpose. The interviews were audio-recorded and transcribed (appendix 3.C. Preliminary study, interview transcripts). While all the non-native English speakers had indicated having a "very proficient" level of mastery on the pre-interview, online questionnaire, data from five non-native English speakers were excluded for reasons of poor comprehension and expression.

In the first round of data analysis, words and groups of words generally pertaining to knowledge and learning were identified. The segments included talk about the formal content of their courses, scholars theories, and ideas their own and their peers. The data also contained descriptions of processes and interaction with this



"knowledge," how it was presented, the ways in which student engage, or not, with it.

Second, the metaphor identification procedure (described further in the previous section) was applied to the segments about knowledge and learning. Following the established procedure (Pragglejaz, 2007), words or groups of words whose meaning in the context of the data was judged to be different from the "basic" meanings in the reference (Oxford English Dictionary, online version) (i.e. definitions not marked "*figurative*", definitions given among the first three entries) were identified. The initial identification of metaphorical text was done by the researcher alone. A sample of approximately one-third of the coded text was given to two independent coders. The coders were both native speakers of English, both are educated to postgraduate degree level, but neither is specialised in the study of metaphor nor psychology. The detailed procedure was explained to each coder, and each coder had access to the same reference dictionary.

The coded samples were collected and the variances in coding among all three sets of coded data were analysed. There were three principal areas of ambiguity. These were phrasal or prepositional verbs (such as "take on, "set up", "to be done in"); "etymological" metaphors or one-word formulations (such as "impress", "circumvent", "workload"); and fixed, conventional expressions (such as "I had that under my belt"). It was decided a conservative stance should be taken and that language in these categories where consistent inter-coder variances arose should not be categorised as metaphorical. Other disagreements were resolved in further discussion. Finally, expressions unanimously marked as metaphorical were retained. Following these revision of and agreement on the procedure, the remainder of the sample was re-coded accordingly.

The next step of the analysis was to code the metaphorical language. In the first instance, an attempt was made to categorise the metaphorical language based on qualities related to how the interview data related to the "basic patterns of perception and experience" (Grady, 2007, p. 194). These patterns of embodiment

are considered by conceptual metaphor theorists to inform a theoretical set of universal "primary metaphors". Thus, primary metaphors and their derivatives about knowledge (listed in the Master Metaphor List (Lakoff et al., 1991)) were the basis of further coding. These primary knowledge metaphors include, for example DIFFICULT SUBJECTS ARE ADVERSARIES ("Understanding/Learning is gaining physical control over the material"), IDEAS ARE FOOD ("Thinking is preparing food by chewing), IDEAS ARE PERCEPTIONS ("Aids to gaining awareness are aids to vision") (Lakoff et al., 1991, pp. 83-84). The metaphorical language segments identified and the categories formulated as described above appear in appendix 3.D.

This coding resulted in a long descriptive list of metaphorical language. It did not, however, yield a clear characterisation of sensorimotor information used in metaphorical language that could be used systematically to develop experimental stimuli. It was decided, finally, to use the classification of human perceptual systems proposed by Gibson (1966) to organise and code the kinds of embodied information can be evoked in metaphorical language. A coding frame was been developed to enable the application of a consistent, clearly defined set of sensorimotor qualities to the data.

A basic description of the sensory systems and the motor systems, as described by Gibson (1966) is presented below, in Table 3.1.

**Table 3.1: Sensorimotor coding frame based on definitions of perceptual systems (Gibson, 1966)**

Sensory systems	Motor systems
<p>Basic orienting system</p> <p>Located primarily in the organs of the inner ear, the basic orienting system is involved in balance, gravity, acceleration, deceleration (e.g. the beginning and ends of body movements). This system provides an overarching frame of reference for all the other systems.</p>	<p>Postural system</p> <p>The postural system involves motor adjustments that preserve equilibrium (with relation to one's position and gravity).</p>

<b>Sensory systems</b>	<b>Motor systems</b>
<p><b>Haptic system</b> The haptic system involves receptors present everywhere in the body, particularly in the skin. This system senses information about the adjacent environment, which can include detecting temperature, recognising edges or surfaces of objects.</p>	<p><b>Orienting investigating system</b> The orienting investigating system involves motion that orients to features of the environment (other than gravity) (e.g. turning, pointing, fixating, adjusting head, eyes, mouth, hands, or other organs to seek external sensory stimulus).</p>
<p><b>Auditory system</b> The auditory system, involving the hearing functions of the middle and outer ear, responds to vibrations. It is both proprioceptive and exteroceptive (i.e. one hears one's self and the outside world).</p>	<p><b>Locomotor system</b> The locomotor system is engaged in changing places or positions in the environment (approaching, pursuing, avoiding, escaping, etc.).</p>
<p><b>Taste-smell system</b> The taste-smell system detects both chemical and mechanical information about the volatility, solubility, chemical composition, and physical consistency of the environment.</p>	<p><b>Appetitive system</b> The appetitive system involves taking from or giving to the environment (breathing, eating, drinking, eliminating, etc.).</p>
<p><b>Visual system</b> The visual system detects interaction between environment and light – unlike the other systems, can function at great distances.</p>	<p><b>Performatory system</b> The performatory system involves movements that alter the environment (typically in ways that benefit the organism) including displacing things, building, using tools, engaging in hand-to-hand combat, experiencing weight or heft.</p>

This detailed categorisation of sensory and motor systems was used to describe the various categories of sensorimotor information evoked or implicitly referred to in the metaphorical expressions found in the data. Coding was not limited to only one characteristic per metaphorical language segment. Many were coded with a combination of types of sensorimotor information. This could be expected the sensory and motor systems on which the coding is based are thought to overlap or work combinatorially (Gibson, 1966).

The most frequently occurring characteristics attributed to knowledge/learning involved knowledge as a solid, a liquid, something internalised/externalised, as discovered in the initial coding. Knowledge was also described in terms of a space or an array of objects in a space. Knowledge, expressed in terms of solid objects,

involved the haptic system as well as the performatory system in many cases. Internalisation and externalisation directly involved the appetitive system. Interestingly, there was no example of taste-smell system-related information. Descriptions of space are related clearly with locomotion and often with performatory systems and orienting-investigating.

This coding frame was adopted in order to enable the application of a consistent, clearly defined set of sensorimotor qualities to the data. It is important to note, though, that it does not set out to reflect actual neural simulations of sensorimotor processes; nor is there a claim that the Gibsonian view of perceptual systems is the most suitable means to analyse embodiment or metaphor. It does, nonetheless, allow for a detailed and systematic analysis of a set of sensorimotor aspects expressed and evoked in metaphorical language for this study.

## **Findings**

The final outcome of the data analysis was a framework, a set of metaphorical language segments that characterise the interview data set, both in terms of the kinds of sensory and motor perceptual information that was evoked in the language, its "sensorimotor modality" and in terms of the approximate frequency of occurrence of the various modalities in the data. To identify perceived equivalencies between non-metaphorical language and possible metaphorical variants, a sample of 25 native English speakers were given a set of non-metaphorical sentences and possible metaphorical equivalents, which appeared in the data, and were asked to indicate which metaphorical language items were the "best match" (appendix 3.E. "Best match" task).

The resulting set of non-metaphorical and metaphorical language variants, together with their sensorimotor modalities are listed in Table 3.2.

**Table 3.2: Metaphorical language about knowledge, learning, and understanding and sensorimotor modalities.**

<b>non-metaphorical language</b>	<b>metaphorical language</b>	<b>sensorimotor modality</b>
analyse/understand	untangle	haptic/performatory
consider	dig into	haptic/performatory
understand	get a grip	haptic/performatory
understand	grasp	haptic/performatory
complex	heavy	performatory
deliberate (something)	bounce (something) around	performatory
understand	be on top of	locomotor/postural, orientation
(get) help	(get) direction	locomotor, orientation
learns/concentrates	follows	locomotor
consider in different ways	look from different angles	visual/investigating
learn	digest	appetitive

## **Discussion**

This selection of metaphorical artefacts listed in Table 3.2 was derived from a systematic analysis of the interview data and is representative of those data. There is no claim, though, that all talk about knowledge, learning, and understanding follows this pattern of metaphor use. These variants were used to develop the experimental stimuli in studies 1-5 and the interview topic guides and prompts in studies 6 and 7. These preliminary data and analysis were sought to achieve a naturalistic set of data, to the extent possible. The identification procedure is quite detailed and time-consuming, and requires lengthy discussion and resolution of variances. It was considered preferable, nonetheless, to generate a list of metaphors introspectively.

### **3.3.2 Overview of the present study**

In this section, the research questions and each of the seven studies will be presented. An overview of the entire project will be given, as will an account of the development of the project, the orientation and re-orientation of inquiry.

The two main questions addressed in this thesis are

*Does the use of metaphorical language about knowledge, learning, and understanding in a story have an effect on its transmission?*

*Given the role of communication in cultural transmission, what are social and pragmatic aspects of communicative interaction that can help account for the cultural success of metaphors?*

However, standing alone, these two questions do not reflect the research *process* particularly well. Thus, this process, and the more specific questions that arose during the research are described here.

### **Phase one (studies 1, 2, and 3)**

The initial stages of research were of a deductive nature. An understanding of the literature on cultural transmission and the chiefly experimental work in the area informed the decision to use the "standard" tool—the serial reproduction task.

Experimental serial reproduction has been applied in identifying and testing transmission biases (e.g. minimal counter-intuitiveness, hierarchical structure, social information, etc.). The epidemiological approach theorises a clear link between a theoretical transmission bias and empirical transmission fidelity, and further theorises a link between high-fidelity experimental transmission and a more generalisable cultural success. Thus, in this spirit, this approach was applied to questions about a new cultural artefact, metaphor. The question that informed this first phase of research was

*Does the use of metaphorical language about knowledge, learning, and understanding in a story have an effect on its transmission?*

Indeed, this question might have been the first in a series of questions about what types of metaphor conferred what degrees of transmission advantage? What differences could be found in metaphorical language that used different types of sensorimotor information? Whether different levels of conventionality or novelty in metaphors exhibit or confer different levels of transmission fidelity? Do

characteristics of the receivers (e.g. age, sex) have an effect on transmission advantages? However, it was necessary to begin with investigating the fundamental aspect of whether metaphor had an effect on transmission, first. From there, experimental results drove a systematic revision and refinement of the experimental design itself. Three further sub-questions were formulated.

*Does the use of metaphorical language in a simple story have an effect on its transmission?*

*Does the use of metaphorical language in a story that contains uncertainty and risk have an effect on its transmission?*

*Does the use of metaphorical language in a story at different hierarchical levels have an effect on its transmission?*

The results of three serial reproduction experiments necessitated reconsideration of both the theoretical understanding and the methodological approach to explaining the cultural success of metaphor.

### **Phase two (studies 4, 5, 6, and 7)**

After the first three studies, a new question arose:

*What accounts for the cultural success of metaphor, in light of the results of the findings that metaphor has no effect in experimental serial reproduction?*

With this, the research had entered its second phase, characterised by a more inductive approach. The second research question came to the fore,

*Given the role of communication in cultural transmission, what are social and pragmatic aspects of communicative interaction that can help account for the cultural success of metaphors?*

This change in the orientation of the inquiry called for changes in the methodological approach as well. At this point, an inductive approach supported by mixed methods was adopted. Studies 4 and 5 were both experimental. In study 4, both quantitative and qualitative data were of equal importance in the design and

the outcome. The results of study 5 prioritised the quantitative data; but the analysis of the qualitative data provided important insight to help interpret the quantitative findings. Studies 6 and 7 were qualitative, interview studies that sought to discover aspects of metaphor that would emerge only in more a naturalistic communicative context. As in the first phase of research, more specific sub-questions were formulated.

*Given more naturalistic speaker agency, does metaphor have an effect on the likelihood to transmit a story?*

*Given more naturalistic speaker agency, does metaphor have an effect on the content of the story itself?*

*Does metaphorical language have an effect on judgements in an experimental setting?*

*How does metaphorical language inform judgements generated in naturalistic talk?*

*What patterns emerge in the use of metaphorical language in naturalistic talk? More specifically how is metaphorical language matched by interviewees and used jointly?*

*What communicative functions does metaphorical language serve in naturalistic talk?*

With this understanding of the overall progression of the research across two distinct phases, the studies are listed below.

### **Preliminary empirical work**

The preliminary phase of empirical work, described in the previous section, included interviews, metaphor identification procedure, and metaphor analysis. The main outcome of this work was a systematic basis for the development of experimental stimuli and other research instruments throughout the project.



### **Studies 1-3. Metaphor in serial reproduction**

Three serial reproduction studies were carried out in the first phase of empirical work. These studies were designed to test the effect of metaphor on cultural transmission of stories. The main finding of these studies was that metaphorical language conferred no transmission advantage. This directly informed the undertaking of the second phase of research.

### **Study 4. Speaker agency: investigating the effect of metaphor on production and decisions to transmit**

This experimental study investigated the effect of metaphor on the stories that participants themselves generated and their decisions to pass along these stories. More naturalistic conditions of speaker agency were sought; participants created their own story and expressed their intention of transmitting it. The main outcome of this study was the result that metaphorical language prompts yielded significantly more metaphorical language use in stories. This result informed the analysis of study 7.

### **Study 5. Inferential potential: text and speaker judgement task**

The aim of this experimental study was to discover whether metaphorical language had an effect on judgements about both the stimulus text and a hypothetical producer of the text, the speaker. The main outcome of this study was a significantly different judgement about the speaker, as a function of his use of metaphorical language. This result directly informed the undertaking and design of study 6.

### **Study 6. Inferential potential: text comparison interviews**

In the conversation-based study, participants were asked to read and compare two texts. The aim was to investigate how metaphorical language supports judgements and inferences generated in naturalistic talk. This study demonstrated the inferential potential of metaphor and how it can be the basis of inference about the

speaker, his relation to the audience, and the context of their interaction. This finding informed the undertaking and analysis of study 7.

### **Study 7. Metaphorical language use in naturalistic talk**

Interviews were conducted to identify patterns and communicative functions of metaphorical language use in naturalistic talk. The study yielded a detailed view of how metaphorical language is matched and introduced in a conversation and the communicative function it can serve.

The studies and the chapters in which they are presented are indicated in Table 3.3. Research questions are presented in Table 3.4.

**Table 3.3: An overview of the thesis: studies and their purpose, by chapter**

<b>chapter</b>	<b>study</b>	<b>purpose</b>
three	PRELIMINARY WORK	
	metaphor elicitation interviews (n = 29)	To observe and analyse use of metaphorical language in talk about knowledge, learning, and understanding to inform systematic and consistent development of experimental stimuli and other research instruments based on patterns of naturalistic language use.
four	PHASE ONE	
	<b>STUDY 1</b> serial reproduction task 1 (n=88, 22 chains)	To test the effect of metaphorical language on the transmission of a simple narrative about a student's experience at university.
	<b>STUDY 2</b> serial reproduction task 2 (n=92, 23 chains)	To test the effect of metaphorical language on the transmission of a narrative involving a scientific development and a potential health hazard to the general public.
	<b>STUDY 3</b> serial reproduction task 3 (n=120, 30 chains)	To test the effect of metaphorical language at different hierarchical levels of a narrative about a student's learning experience.

chapter	study	purpose
five	PHASE TWO	
	<b>STUDY 4</b> speaker agency experiment (n=100)	To investigate the effect of metaphor (metaphorical prompts) on stories participants generate and their choices to transmit their stories (...to test the effect of metaphor in the choose-to-transmit phase of cultural transmission).
six	<b>STUDY 5</b> perlocutionary effects experiment (n=105)	To investigate the effect of metaphor on judgements about verbal material and about the producer of verbal material.
	<b>STUDY 6</b> perlocutionary effects conversation-based study (n=8)	To explore in detail the justifications for and reasoning behind participants' judgements of verbal material and its producers and how these judgement differ based on the use of metaphorical language in the material.
seven	<b>STUDY 7</b> interview study (n=8)	To elore and understand how metaphor is used in nlistic talk exes as a means to facilitate social interaction through co-ordinating interaction, establishing common ground, etc.

**Table 3.4: Research questions**

<p><b>Does the use of metaphorical language in a story have an effect on its transmission?</b></p> <p>Does the use of metaphorical language in a simple story have an effect on its transmission?</p> <p>Does the use of metaphorical language in a story that contains uncertainty and risk have an effect on its transmission?</p> <p>Does the use of metaphorical language in a story at different hierarchical levels have an effect on its transmission?</p>
<p><b>Given the role of communication in cultural transmission, what are social and pragmatic aspects of communicative interaction that can help account for the cultural success of metaphor?</b></p> <p>Given more naturalistic speaker agency, does metaphor have an effect on the likelihood to transmit a story?</p> <p>Given more naturalistic speaker agency, does metaphor have an effect on the content of the story itself?</p> <p>Does metaphorical language have an effect on judgements in an experimental setting?</p> <p>How does metaphorical language inform judgements generated in naturalistic talk?</p> <p>What patterns emerge in the use of metaphorical language in naturalistic talk? More specifically how is metaphorical language matched by interviewees and used jointly?</p> <p>What communicative functions does metaphorical language serve in naturalistic talk?</p>

### **3.3.3 Reflections on validity and quality**

#### **Challenges and benefits of mixed methods**

The research design adopted for this project combined qualitative and quantitative approaches to both data collection and data analysis. A mixed methods approach was considered generally because of its potential to allow of cross-validation of findings (Bergman, 2012). Specific decisions on the design were based, for the most part on the nature of the various research questions. There are specific challenges to mixing methods from different research traditions, and using methods from one tradition for a purpose outside that tradition. For example, introspective methods are common in some areas of metaphor research. This is where the researcher generates metaphorical language or texts for research tools on his own (Steen, 2007). While this may be an acceptable practice in literary or humanities studies, this is not suitable for a study that requires a sample of language that is widespread in the culture. Likewise, quantifying and coding metaphor in a manner that is suitable for experimental use is challenging. The Pragglejazz (20 metaphor identification procedure used throughout this project is systematic in its approach and provides a useful framework for working stepwise through a corpus to determine what is and what is not metaphorical language. However, the very nature of metaphorical language and interpretation is complicates the identification: what are idiomatic expressions, should they be included, is the metaphor 'dead', is it a metaphor any more. Judgements vary and the procedure requires much time and collective effort in reconciling variances and establishing and interpreting rules. Nonetheless, while it is an imperfect system, it provides a very useful framework. In some cases, it was required develop custom-purpose methods, like the "metaphor elicitation interview" used in study 7. Interviewing for the purpose of analysing metaphors varies from the traditional interview methods. No doubt that any future endeavours to take a more "social approach" to cultural transmission will encounter their own difficulties in this respect.

#### **Considerations related to online research**

Experiments in this study were conducted online. Online data collection is favoured

in large part because it is a practical solution to recruit participants at a relatively low cost. There are also advantages inherent to running experiments online, for instance a wider participant pool and lower likelihood of experimenter effects (Reips, 2000).

Amazon MTurk, an online labour system, was used to recruit participants for studies 2, 3, 4, and 5. The chief advantage of MTurk is the facility to collect data relatively quickly, at a low cost. There have been concerns about the quality of data and the nature of paid participation. Recent studies have found lower rates of attention and higher likelihood of using the Internet to find answers; but also find that the use of screening questions help address these problems (Goodman, Cryder, and Cheema, 2012).

### **3.4 Conclusion**

This chapter has proposed a research project, informed both by traditions of metaphor scholarship and by the methods used in an epidemiological approach to culture, that undertakes a novel line of inquiry, guided by these questions, does the use of metaphorical language in a story have an effect on its transmission? Given the role of communication in cultural transmission, what are social and pragmatic aspects of communicative interaction that can help account for the cultural success of metaphor?

## Chapter 4 Metaphor in serial reproduction

Three serial reproduction task studies, conducted to test the effect of metaphor on cultural transmission, are presented in this chapter. The first study featured a story about a student's initial experience of studying at university. Participants in the second study read and reproduced a story about a scientific discovery about a new strain of flu virus. The third study presented a story about how students learn.

In the first study, the stimulus was a story about an individual student and it involved no risk. The second study featured a story about a scientific development and a potential health risk to the population at large. For both studies, stimuli were presented in two conditions: with non-metaphorical content only and with some metaphorical content. The third serial reproduction task used a text about learning and was designed to discover the effect of metaphor used at different hierarchical levels of narrative on cultural transmission.

Transmission fidelity was measured in terms of transmission quantity and transmission quality, consistent with general practice in analysing serial reproduction tasks (Kashima and Yeung, 2010; Mesoudi, 2007; Mesoudi and Whiten, 2008). The working hypothesis was that there would be a difference in transmission in quantity and quality between the metaphorical and non-metaphorical conditions. While the past metaphor literature is not explicit about transmission of metaphor, the preliminary prediction based on past findings was that material using metaphorical language would be transmitted with greater fidelity than material with no metaphor. This hypothesis and preliminary prediction were not supported by these three studies. Metaphorical language, used in the narrative content and at the structural level of the story, had no statistically significant effect on the fidelity of transmission across a reproduction chain.

## 4.1 Introduction

Theoretical premises of culture and its transmission were presented in chapter 1. Chief among these was the proposal for content biases, those characteristics of cultural items that render them more attention-getting and more memorable, hence more likely to stabilise as part of a system of meaning (Sperber, 1985; Barrett and Nyhof, 2001; Norenzayan et al., 2006). The understanding of communication as inferentially driven chains of alternation between public and mental representations is also fundamental to the cognition and culture/epidemiological approach to cultural transmission (Sperber, 1985; Sperber and Wilson, 1995). Serial reproduction tasks are a means to operationalise this theoretical understanding of both culture and communication in order to examine the dynamics of cultural transmission empirically (McIntyre et al., 2004; Mesoudi and Whiten, 2008; Kashima and Yeung, 2010).

This project concerns the dynamics of cultural transmission of a specific type of cultural artefact, metaphor. Metaphor has important functions both in terms of pragmatics and with respect to conceptualisation and understanding abstract, novel, or complex ideas, as reviewed in chapter 2. While metaphor is pervasive in oral and written language use the basis and mechanisms of its cultural success have yet to be examined systematically from a cognition and culture perspective. While transmission biases of metaphor have not been investigated formally, previous work has established the role of metaphor in persuasion (Moran, 1996; Sopory and Dillard, 2002), education (Petrie and Oshlag, 1993; Sticht, 1993), and how metaphor can frame social issues (Ortony, 1979; Lakoff, 2002). This provides some basis to expect that metaphor may well have an effect on cultural transmission. We could expect that, all else being equal, a story told with metaphorical language would be transmitted differently than the very same story recounted without metaphorical language.

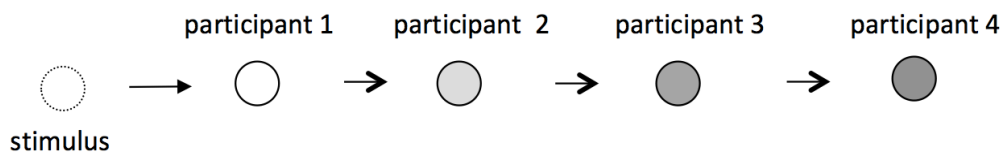
The three studies presented here tested the effect of metaphor on cultural transmission of everyday narratives. For all three studies, the metaphoricality of the stimuli was manipulated and passed along transmission chains of four

generations. The question that guided this empirical work was, in light of findings of past metaphor research, how does metaphorical language fare in processes of cultural transmission? Specifically, **does the use of metaphorical language have an effect on the transmission of the story?**

## 4.2 Study one

In the first study, a linear serial reproduction task was used. Experimental serial reproduction is an approach to testing cultural transmission whereby a stimulus is presented to an individual, who reproduces it for another, who in turn reproduces it for another, continuing in such a series in a transmission chain, as illustrated in figure 4.1. (See chapter 3 for a more detailed discussion of experimental serial reproduction.)

**Figure 4.1: Schema of a linear serial reproduction chain**



### 4.2.1 Experiment overview

In this online experiment, participants ( $n = 88$ ) took part in a linear serial reproduction task. The stimulus was short, simple story, presented in writing. Participants were asked to read, then reproduce the story. In this independent design, the independent variable was the metaphoricality of stimulus text: with metaphorical language and without metaphorical language. The dependent variable was transmission fidelity, defined in terms of transmission quantity (how many words were used at each reproduction) and transmission quality (how many of the stories' propositions remained at each reproduction). Each chain comprised four participants, or four transmission "generations". The aim of the study was to test whether metaphorical language used in a story had an effect on transmission of the story.



#### **4.2.2 Participants**

As the physical co-presence of participants across generations was not required, data collection was conducted online using a convenience sample of participants recruited from internet-based online psychological research directories (Social Psychology Network, Online Psychology Research UK). Native speakers of English were recruited as volunteers to participate in the serial reproduction task. A total of 103 participants (73 females, 30 males) took part in the experiment. Data from 15 participants were excluded because of the quality of their participation. Of the remaining 88 participants (65 females, 23 males), aged between 18 and 59, 51% of the sample identified themselves as British, 31% American, 11% Canadian, 3% Australian, 2% New Zealander, and 1% Indian.

#### **4.2.3 Materials**

The study appeared online as a study on the “Ways and means of storytelling”. The experimental stimulus was a short story about a student’s experience at university. It was developed in two conditions: with metaphorical language and without metaphorical language. The story comprised 16 sentences. Six of the 16 sentences were identical (without metaphor) in both versions of the story. The other ten sentences expressed the same meaning, using metaphorical language in one condition (162 words), without metaphorical language (155 words) in the other. The two versions of the story are shown in Table 4.1. The choice of metaphorical language used in the stimuli is based on the outcome of the preliminary work to identify and generally describe naturalistic metaphorical language about knowledge, learning, and understanding. The corpus of naturalistic metaphorical language was generated during interviews with students about their learning experience. The data were coded for the type of sensorimotor information used in the metaphorical language, its “sensorimotor modality”. The metaphorical language that appears in the metaphorical condition of the experimental stimuli is based on the language and the sensorimotor modalities that were found in the analysis of the naturalistic data. (For more detailed information on this preliminary work, see chapter 3.)

**Table 4.1: Experimental stimuli, study 1**

	<i>non-metaphorical condition (155 words)</i>	<i>metaphorical condition (162 words)</i>
1	Bob had always been a good student.	Bob had always been a good student.
2	When he was 18, he went to university.	When he was 18, he went to university.
3	At first he had great difficulty and did not understand his lectures and classes.	At first he had great difficulty and did not grasp his lectures and classes.
4	The reading assignments were very long and complex.	The reading assignments were very long and heavy.
5	He felt quite discouraged.	He felt quite discouraged.
6	Nonetheless, he continued to study hard.	Nonetheless, he continued to study hard.
7	He concentrated very carefully in his classes and lectures.	He followed very carefully in his classes and lectures.
8	He considered the various theories and concepts over and over to understand them better.	He dug into the various theories and concepts over and over to untangle them better.
9	He began to work together with others.	He began to work together with others.
10	He deliberated ideas and questions with classmates.	He bounced around ideas and questions with classmates.
11	This helped him consider the theories in different ways.	This helped him look at the theories from different angles.
12	He asked his teachers for help.	He asked his teachers for direction.
13	Gradually, he began to understand the theories and ideas that were discussed in his classes.	Gradually, he began to get a grip of the theories and ideas that were handled in his classes.
14	By the end of the course, he thought that he had really learned the various theories.	By the end of the course, he thought that he had really digested the various theories.
15	He believed that he had really understood the work.	He believed that he was really on top of the work.
16	He was a bit nervous about taking the exam, but he was confident about it...	He was a bit nervous about taking the exam, but he was confident about it...

The simple narrative presented a typical experience of a university student. It was composed following principles of story structure, including an introduction, initiating event, initial response, attempt, consequences, resolution/conclusion, and end state (Kintsch, 1974; Mandler and Johnson, 1977). The difference in word count between the two conditions was kept at a minimum to allow for comparison; there is only a small difference (7 words, 4%) in the length of the stories. Equivalent meanings of metaphorical and non-metaphorical sentences were judged independently, using a selection of possible metaphors found in the preliminary stage of empirical work (see section 3.3.1). Metaphorical language was selected for the stimulus based on the sensorimotor modalities of the metaphorical language that emerged in the preliminary stage of empirical work (see section 3.3.1). Elements of the stimulus that were manipulated in non-metaphorical and metaphorical language conditions and their corresponding sensorimotor modalities are listed in Table 4.2. The choices of language and sensorimotor modality was guided by the results of analysis of naturalistic metaphor data done in preliminary stages of the project

**Table 4.2: Language variants and sensorimotor modalities used in stimuli, study 1**

<b>section of text</b>	<b>non-metaphorical language</b>	<b>metaphorical language</b>	<b>sensorimotor modality</b>
3	understand	grasp	haptic/performatory
4	complex	heavy	performatory
7	concentrate	follow	locomotor
8	consider	dig into	haptic/performatory
8	understand	untangle	haptic/performatory
10	deliberate	bounce around	performatory
11	consider in different ways	look from different angles	visual/investigating
12	(get) help	(get) direction	locomotor, orientation
13	understand	get a grip	haptic/performatory
14	learn	digest	appetitive
15	understand	be on top of	locomotor/postural, orientation

#### **4.2.4 Procedure**

The experiment was housed at the LSE social psychology online laboratory, which was accessed from one of two online psychology research directories (Social Psychology Network at [www.socialpsychology.org/expts.htm](http://www.socialpsychology.org/expts.htm) and Online Psychology Research UK at [www.onlinepsychresearch.co.uk](http://www.onlinepsychresearch.co.uk)). Participants were informed that their study was about how people tell stories and were presented with information about the nature of what they would be asked to do and the right to withdraw from the study, potential risks and benefits of taking part in the study, and contact information of the researcher. They were asked to indicate their understanding and their consent to participate by ticking a box and continuing to the next page (see appendix 4.A. Consent form). Demographic information was collected on the second page - gender, age group, and nationality.

Participants in the first generation of a transmission chain were randomly allocated into one of the two experimental conditions. When the participant completed the task, the researcher received and reviewed each participant's data to ensure satisfactory participation. After this moderation, the version of the story was "released" into the transmission chain to become the stimulus for the next participant. Pending moderation of data, participants were allocated the next available position in a chain. For example, the first participant was randomly assigned to the first position of a chain. Once the participant completed the task, and her data were moderated, the next position in that chain would become available. In the case where a participant logged in to the online study before the pending submission was moderated, a new chain would be initiated. This participant would be allocated the first position of this new chain. As such, at times, several chains in both conditions, were open and ran concurrently.

Depending on the condition and the position in the chain, a text appeared on the screen. Participants in the first position received the stimulus; others received the moderated and verified submission of the previous participant in the chain. Participants were instructed to read the text twice, and to take as much time as they wished to read. After completing the reading task, participants were

presented with a non-verbal task that involved moving and rotating shapes to re-create a silhouette (i.e. tangram task). They were given an opportunity to practice and familiarise themselves with the controls, and then performed the tangram task under timed conditions for two minutes. Upon completion of the non-verbal task, they were asked to reproduce the story they had read earlier, according to the following instructions: “Please write the story you read earlier, as well as you can remember it. Please write as if you were telling to story to someone. Take as much time as you wish to write the story.”

Measures to minimise potential drawbacks of online data collection were taken. Multiple submissions were avoided by allowing only one submission per IP address. In addition, the “back” function was disabled to help ensure that participants genuinely recalled material. Once the participant finished reading and moved on the distractor task, it became impossible to view the original text using the “back” button. In addition, at the final stage of the experiment, participants were asked whether they used any type of memory aid (e.g. note-taking, or printing the stimulus).

Because any given participant’s written reproduction directly became the stimulus for another participant in the following generation, it was important to ensure the quality of each submission. Before inclusion in the transmission chain, each submission was examined carefully by the researcher to help ensure that the task was genuinely undertaken and that the submission was clear. This moderation was conducted for every participant’s submission. Of the 103 participants who completed the experiment, 15 were excluded on the basis of these quality control measures. Three participants gave no response when prompted to reproduce the text; three reported using a memory aid (e.g. notes or “copy and paste”); and four participants’ responses featured major typographic and spelling errors. Finally, five participants were excluded because they used direct address in their responses (e.g. “Tom [I think I forgot his name] went to university...”, “...I made up that last part”, “...sorry, but I don’t know any more”).

#### **4.2.5 Results**

Twenty-two transmission chains (11 non-metaphorical, 11 metaphorical) of four generations each, were completed. Data were analysed using a mixed-design analysis of variance (ANOVA) to assess the impact of metaphoricality on transmission quantity (number of words produced) and transmission quality (number of propositions correctly produced) along the four generations of the transmission chain. In the two-way mixed ANOVA, the between-subject factor was metaphoricality (metaphorical, non-metaphorical) and the within-subjects factor was generation of the transmission chain (4 levels). While different participants completed the task at each generation, generation is considered a within-subject factor because of the dependencies created by the design of the transmission chain (i.e. the fourth generation participant's reproduction is dependent on the version produced by the third generation participant; the third generation participant's reproduction is dependent on the version produced by the second generation participant, etc.)(Kashima and Yeung, 2010). Thus, the chain is treated as a unit of analysis, and not the story produced by each individual participant (Mesoudi, Whiten, and Dunbar, 2006).

##### **Transmission quantity**

Transmission quantity, measured in terms of number of words reproduced at each generation, was analysed with a 2 x 4 mixed model ANOVA with metaphoricality (two levels, with and without metaphorical language) as a between-participant factor and generation (or position within the transmission chain) as a within-participants factor (four levels, generations 1-4). In addition, all first-generation reproductions were compared with the stimulus texts using planned *t*-tests. Mean word count values at each generation, by condition, are shown in Table 4.3.

**Table 4.3: Mean word count values at each generation, study 1**

	generation			
	1	2	3	4
condition				
NMET (n = 11)	88.36	55.45	44.64	33.36
MET (n = 11)	84.55	58.64	46.73	32.00

The 2 x 4 mixed model ANOVA revealed a significant main effect of transmission generation on word count ( $F(3, 60) = 45.021, p < .001, \eta_p^2 = .69$ ). (Mauchly's test indicated that the assumption of sphericity had been violated ( $\chi^2(5) = 12.84, p = .025$ ), therefore degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ( $\epsilon = .67$ ); and Greenhouse-Geisser corrected significance levels are reported.) The effect size (partial *eta* squared reported above) suggests that 69% of the variance in transmission quantity is attributable to generation, a relatively large effect. Specifically, contrasts revealed that on average, second generation reproductions contained significantly fewer words than first generation reproductions,  $F(1, 20) = 29, p < .001, \eta_p^2 = .59$ . Contrasts also revealed that third generation reproductions contained significantly fewer words than those in the second generation,  $F(1, 20) = 9.12, p = .007, \eta_p^2 = .31$ . Finally, contrasts revealed that the fourth generation word count was significantly lower than the third generation word count,  $F(1, 20) = 13.25, p = .002, \eta_p^2 = .34$ . Again, by convention, these effect sizes are considered large (Cohen, 1988). The *t*-test also revealed a significant difference in word count between the stimulus text and the first generation, ( $t(21) = 11.81, p < .001, r = .93$ ). The effect size estimate indicates that the difference in word count found between the stimulus and the first generation reproduction represents a large, and therefore substantial effect. These results confirmed decreasing transmission quantity at each generation of linear serial

reproduction (detailed in Table 4.4), as to be expected for this serial transmission chain design (Mesoudi and Whiten, 2004).

**Table 4.4: Mean word count by transmission generation, study 1**

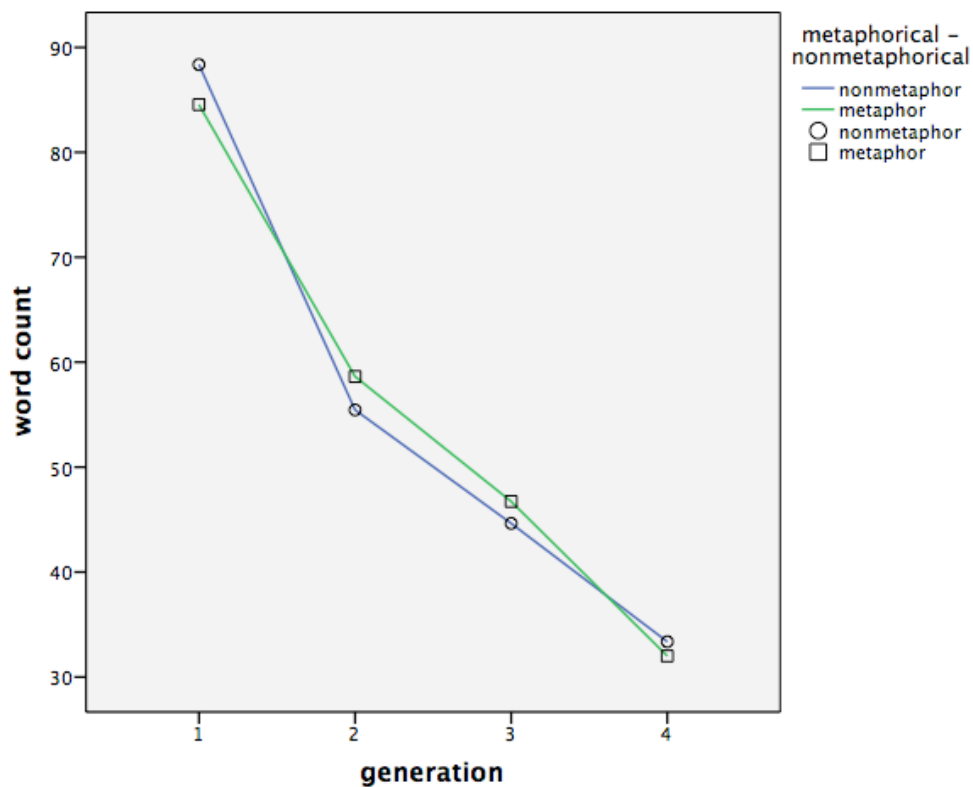
word count	generation				
	0 (stimulus)	1	2	3	4
<i>M</i>	158.50	86.45*	57.05*	45.68*	32.68*
<i>SD</i>	-	28.61	22.58	30.90	18.15

\*Mean word count values are significantly smaller than mean word count at preceding generation (at  $p < .001$ ).

Results of the ANOVA indicate that the effect of the use of metaphorical language in stories on transmission quantity was non-significant,  $F(1, 20) = .00$ ,  $p = .998$ ,  $\eta_p^2 = .000$ . This indicates that regardless of the generation of reproduction, word counts in the metaphorical language condition were not significantly different to word counts in the condition without metaphorical language. The generation x metaphor interaction was also non-significant,  $F(3, 60) = .22$ ,  $p = .804$ ,  $\eta_p^2 = .01$ , indicating that metaphor language had no significant effect on the transmission quantity of stories in the serial reproduction task. This result is shown in figure 4.2.



**Figure 4.2: Mean number of words produced at each generation of serial transmission, by condition, study 1**



### **Transmission quality**

Transmission quality was measured in terms of the number of propositions correctly retained across the transmission chain. A proposition analysis was conducted. Propositions are the basic units of meaning in a narrative, including individual arguments (actors and objects of sentences), predicators (verbs and other words that specify relationships among arguments), and qualifiers (Kintsch, 1974). It has been found that independently of the word count, the number of propositions in a sentence determined reading time (Kintsch and Keenan, 1973) and that stories are recalled by propositional structure, rather than by sentence structure or individual words (Bransford and Franks, 1971). In addition, since there was a very slight difference in word count between the two story conditions, but the propositions of the two versions of the story were identical, a comparison by mean proposition count can be considered to be more accurate than a word count

analysis. Indeed, the propositional analysis approach has been adopted in recent work involving serial reproduction tasks (Mesoudi et al., 2006; Mesoudi and Whiten, 2004).

Arguments, predicators, and qualifiers were coded in the stimulus and attributed a corresponding value. For example, the first sentence of the story, “Bob had always been a good student,” comprises five propositions: the predicate IS, the arguments male/BOB and student, and the qualifiers good and always. Each proposition was assigned a value - predicates and main arguments = 1, subordinate arguments = 0.25- 0.5, qualifiers 0.10 – 0.5, etc. - and values were calculated for each participant’s story. For example, the first sentence has a propositional value of 3.75, composed of predicate: ‘IS’ (1.0), arguments ‘male/Bob’ and ‘student’ (1.0 each) and qualifiers ‘good’ (0.5) and ‘always’ (0.25). The total propositional value of the stimulus was 64.35. The detailed propositional coding frame can be found in appendix 4.B.

Each of the 88 reproductions of the story was coded and the propositional value was calculated. A verbatim reproduction of text was not required to be coded as present in the reproduction. Rather, the presence of a proposition with appropriate content, which could be expressed in different ways, was sufficient. For example, “he”, “Bob”, “the boy”, the guy” all sufficed to satisfy the argument in the first sentence. To assess reliability, two independent coders coded four reproductions each.

Transmission quality, measured in terms of number of propositions correctly reproduced at each generation, was analysed with a 2 x 4 mixed model ANOVA with metaphoricality (two levels, with and without metaphorical language) as a between-participant factor and reproductive generation as a within-participants factor (four levels, generations 1-4). In addition, all first-generation reproductions were compared with the stimulus texts using planned *t*-tests. Mean proposition count values at each generation, by condition, are shown in Table 4.5.

**Table 4.5: Mean propositional count values at each generation, study 1**

	generation			
	1	2	3	4
condition				
NMET (n=11)	34.38	22.67	20.76	16.01
MET (n=11)	34.29	24.19	19.58	15.25

A two-way mixed model ANOVA was conducted to test the effect of metaphorical language on transmission quality. Mauchly's test indicated that the assumption of sphericity had been violated ( $\chi^2(5) = 13.48, p = .019$ ), therefore degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ( $\epsilon = .68$ ) and Greenhouse-Geisser corrected significance levels are reported. Again, ANOVA results indicated a main effect of generation on proposition count,  $F(3, 60) = 34.38, p < .001, \eta_p^2 = .63$ . The effect size,  $\eta_p^2 = .63$ , suggests that 63% of the variance in transmission quality is attributable to generation, a relatively large effect. Specifically, contrasts revealed that second generation reproductions contained significantly fewer propositions than first generation reproductions,  $F(1, 20) = 27.26, p < .001, \eta_p^2 = .58$ . Contrasts also revealed that third generation reproductions contained significantly fewer propositions than those in the second generation,  $F(1, 20) = 6, p = .024, \eta_p^2 = .23$ . Finally, contrasts revealed that the fourth generation propositional count was significantly lower than the third generation propositional count,  $F(1, 20) = 9.48, p = .006, \eta_p^2 = .32$ . Again, by convention, these effect sizes are considered large (Cohen, 1988). Also, *t*-test results revealed a significant difference in word count between the stimulus text and the first generation, ( $t(21) = 13.69, p < .001, r = .95$ ). The effect size estimate,  $r = .95$ , indicates that the difference in proposition count found between the stimulus and the first generation reproduction represents a large, and therefore substantial effect. Similarly to transmission quantity, these results confirmed decreasing transmission quantity at each generation of linear serial reproduction (detailed in Table 4.6), which is typical of experimental serial reproduction tasks.

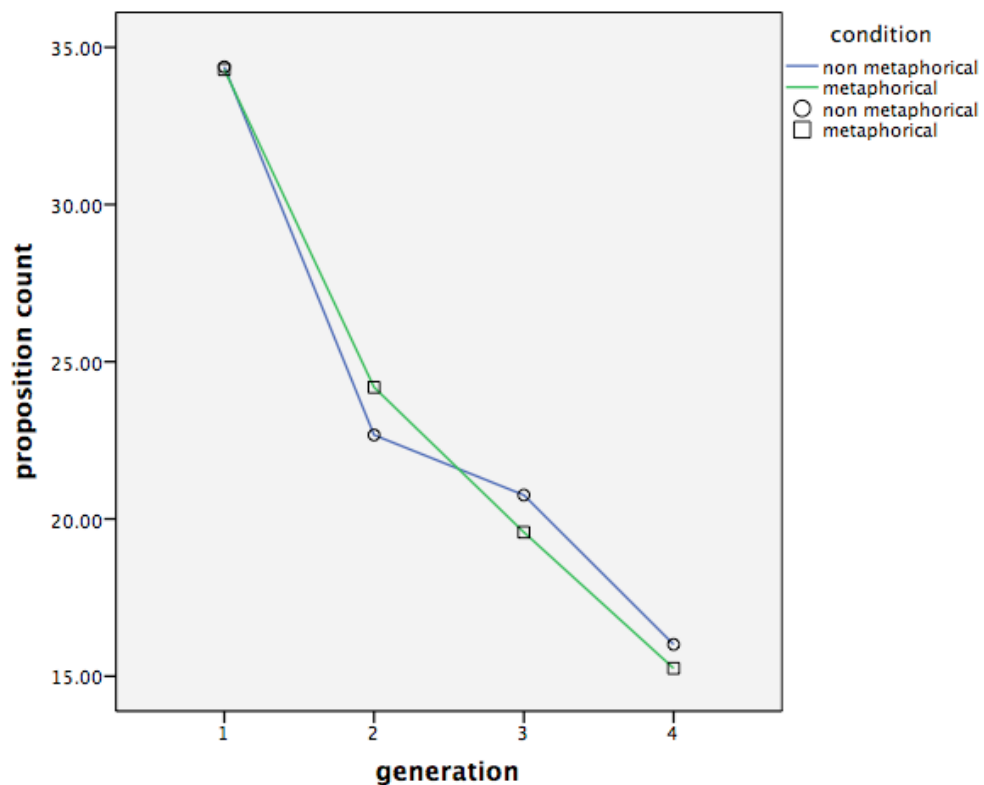
**Table 4.6: Mean propositional count by transmission generation, study 1**

word count	generation				
	0 (stimulus)	1	2	3	4
<i>M</i>	64.35	34.33*	23.50*	20.12*	15.60*
<i>SD</i>	-	10.29	10.33	12.18	7.36

\*Mean word count values are significantly smaller than mean word count at preceding generation (at  $p < .001$ ).

The effect of the use of metaphorical language in stories on transmission quality was non-significant,  $F(1, 20) = .001$ ,  $p = .974$ ,  $\eta_p^2 = .000$ . This indicates that regardless of the generation of reproduction, propositional values in the metaphorical language condition were not significantly different to those in the condition without metaphorical language. The generation x metaphor interaction was non-significant,  $F(3, 60) = .19$ ,  $p = .83$ ,  $\eta_p^2 = .01$ , indicating that metaphor had no significant effect on the transmission quantity of stories in the serial reproduction task. Figure 4.3 shows the estimated marginal means of propositional value across the four generations of the transmission chain.

**Figure 4.3: Mean value of propositions produced at each generation of serial transmission by condition, study 1**



#### **4.2.6 Discussion**

The aim of this first serial reproduction task was to examine the effect of metaphorical language in the transmission of a simple narrative. In terms of whether metaphor confers transmission advantages, results of the analysis of both transmission quantity (in terms of word count) and quality (in terms of proportional analysis) suggest that metaphorical language bore no effect on transmission of the story across four generations. It could be argued that the absence of an effect of metaphorical language on the fidelity of transmission in this task may be due in part to the nature of the story. That is, the stimulus for this task may not have been sufficiently vivid or attention getting for an effect to be detected. In addition, because the task was open to a population of online participants from a wide range of countries (English-language majority and non-English speaking countries alike), the sampling may have been a factor in the results. The next study addresses both of these issues.

### **4.3 Study two**

In the second study, modifications were made to two aspects of the serial reproduction task. First, a new stimulus was used. The text used in study 2 was a story about a recent scientific development and related risks of terrorism and pandemic. In the transmission of urban legends, it has been found that emotional salience—a story's potential to evoke anger, fear, or disgust—can be linked to a greater probability of transmission of the story (Heath, Bell, and Steinberg, 2001). More generally, representations that evoke more emotions, positive or negative, can be considered to be more "fitness relevant", which is thought to enhance recall and transmission (Gervais et al., 2011, p. 393). Thus, it is possible that a stimulus that does not sufficiently evoke emotion may not activate underlying mechanisms of recall or attention that fuel cultural transmission. The stimuli in study 2 introduce an enhanced emotional dimension (anger, suspicion, fear, etc.) in the content matter of the story. The second modification in the study relates to the participants. Rather than recruiting using Internet sites accessible to anyone in any country, an online, crowdsourcing labour market, Amazon Mechanical Turk, was used to introduce more control in the sampling. These aspects are detailed in the following sections.

#### **4.3.1 Experiment overview**

As in the previous study, study 2 uses a metaphor-manipulated story and the serial reproduction paradigm to examine metaphor in cultural transmission. Participants ( $n = 92$ ) formed 23 transmission chains; each chain had four generations. The independent variable in this between-groups design was the metaphoricality of the stimulus, with two levels: with metaphorical language and without metaphorical language. The dependent variable was transmission fidelity, defined in terms of transmission quantity and transmission quality. The aim of study 2 was to test whether metaphorical language used in an emotionally evocative story had an effect on transmission of the story.

### **4.3.2 Participants**

Native speakers of English were recruited online using Amazon Mechanical Turk to participate in this serial reproduction task. In total 123 people completed the task; 31 submissions were excluded for reasons of quality (e.g. direct address in the reproduced text, gross spelling errors, etc.). The remaining 92 participants (59 females, 33 males) ranged in age from 18-67 years ( $M = 32.73$ ,  $SD = 12.83$ ) and reported between 10 and 26 years of formal education ( $M = 15.62$ ,  $SD = 2.480$ ).

Participation on Amazon Mechanical Turk was limited to residents of the United States, Canada, and the United Kingdom; the proportion of participants from each country totalled 80%, 12% and 8%, respectively. In terms of nationality, 73% of the sample were American, 12% Canadian, 10% British, 3% Irish, and 2% Trinidadian. Participation was also limited to only those individuals who had an acceptance rate (of previous work by other requesters) of at least 95% (see chapter 3 for more details about Amazon Mechanical Turk). Each participant was paid \$US 0.35 for completing the task. On average, participants took about 10 minutes to complete the task, for an approximate hourly pay rate of \$US 2.10.

### **4.3.3 Materials**

The experimental stimulus was a short text about a recent scientific development. The text was in the style of a news article for a lay public and was based loosely on a report of research done at the China Agricultural University in Beijing, "High genetic compatibility and increased pathogenicity of reassortants derived from avian H9N2 and pandemic H1N1/2009 influenza viruses," published in the Proceedings of the National Academy of Sciences (Sun et al., 2011) and a popular science online magazine article about this research (Carpenter, 2011). These texts are appended in appendix 4.C. The final stimuli were checked by biologist and a journalist to help ensure that no factual errors were reported, and to check for appropriate content and style.

The stimulus was manipulated into two conditions: with metaphorical language and without metaphorical language. The text comprised 22 sentences in total. Of these

22 sentences, 14 were identical (without metaphorical language) in both versions of the story. The other eight sentences expressed the same meaning, using metaphorical language in one condition (308 words), without metaphorical language (299 words) in the other. The two versions of the story are shown in Table 4.7.



**Table 4.7: Experimental stimuli, study 2**

	<i><b>non-metaphorical condition (299 words)</b></i>	<i><b>metaphorical condition (308 words)</b></i>
1	Researchers begin to <b>understand</b> bird flu threat in humans; officials demand censorship	Researchers begin to <b>untangle</b> bird flu threat in humans; officials demand censorship
2	Over half of all people infected with bird flu die. The reason it is not a major global threat is that the virus can only be contracted from birds, not other people. Until now.	Over half of all people infected with bird flu die. The reason it is not a major global threat is that the virus can only be contracted from birds, not other people. Until now.
3	After years of <b>considering</b> questions about human-to-human transmission, a university research team has genetically altered the deadly bird flu virus to spread among mammals through coughing or sneezing.	After years of <b>digging into</b> questions about human-to-human transmission, a university research team has genetically altered the deadly bird flu virus to spread among mammals through coughing or sneezing.
4	In a new study, virologists combined a bird flu gene with genes from the swine flu virus. "It took only four mutations. Three mutations allow stability and transmission in mammals. We do not yet <b>understand</b> the role of the fourth mutation," said one researcher.	In a new study, virologists combined a bird flu gene with genes from the swine flu virus. "It took only four mutations. Three mutations allow stability and transmission in mammals. We do not yet <b>grasp</b> the role of the fourth mutation," said one researcher.
5	Some believe these findings could be used by bioterrorists to start pandemics. The National Biosecurity Board advised censoring the study. "Publishing instructions for creating a highly contagious flu is dangerous. Scientists <b>deliberating</b> these ideas in public would be a security threat," said one official.	Some believe these findings could be used by bioterrorists to start pandemics. The National Biosecurity Board advised censoring the study. "Publishing instructions for creating a highly contagious flu is dangerous. Scientists <b>bouncing</b> these ideas <b>around</b> in public would be a security threat," said one official.
6	According to virologists, flu viruses are already a threat because they mutate constantly and can cause epidemics at any time, like the 1918 Spanish flu pandemic that killed some 50 million people. "Viruses mutate in nature. They don't need a lab. We need to <b>understand</b> how killer flu viruses can become contagious in humans to develop vaccines and treatments," explained a flu specialist.	According to virologists, flu viruses are already a threat because they mutate constantly and can cause epidemics at any time, like the 1918 Spanish flu pandemic that killed some 50 million people. "Viruses mutate in nature. They don't need a lab. We need to <b>get a grip on</b> how killer flu viruses can become contagious in humans to develop vaccines and treatments," explained a flu specialist.
7	Public health experts argue that the results should be published. "We must <b>understand</b> the latest research to	Public health experts argue that the results should be published. "We must <b>be on top of</b> the latest research to

	<i>non-metaphorical condition (299 words)</i>	<i>metaphorical condition (308 words)</i>
	prepare for future epidemics. There may be risks, but the findings should be published to give us a chance to <b>learn</b> the implications of this research,” explained one expert.	prepare for future epidemics. There may be risks, but the findings should be published to give us a chance to <b>digest</b> the implications of this research,” explained one expert.
8	“There are health, economic, even military issues. We have to <b>consider</b> them <b>in different ways</b> , cooperate, and seek <b>help</b> from other authorities and other governments, too,” he said.	“There are health, economic, even military issues. We have to <b>look at</b> them <b>from different angles</b> , cooperate, and seek <b>direction</b> from other authorities and other governments, too,” he said.

The difference in word count between the two conditions was kept at a minimum to allow for comparison; there is a 3% difference (9 words) in the length of the stories. Equivalent meanings of metaphorical and non-metaphorical sentences were judged independently. In total, nine metaphorical variants were introduced. As in study 1, the choice of metaphorical language and sensorimotor modalities used in this study reflect the findings of the preliminary empirical work presented in chapter 3. The nine metaphorical variants and their sensorimotor modalities are presented in Table 4.8.

**Table 4.8: Language variants and sensorimotor modalities used in stimuli, study 2**

section of text	non-metaphorical language	metaphorical language	sensorimotor modality
1	understand	untangle	haptic/performatory
3	consider	dig into	haptic/performatory
4	understand	grasp	haptic/performatory
5	deliberate	bounce around	performatory
6	understand	get a grip	haptic/performatory
7	understand	be on top of	locomotor/postural, orientation
7	learn	digest	appetitive
8	consider in different ways	look from different angles	visual/investigating
8	(get) help	(get) direction	locomotor, orientation

#### **4.3.4 Procedure**

The experiment was housed at the LSE social psychology online laboratory. Participants recruited on Amazon Mechanical Turk were given the URL for the experiment, together with a unique identification number that was required to gain access to the study. Information and consent procedures were identical to those in the study 1.

The procedure for allocation of a position in a transmission chain was identical to that of the first study, as was the moderation of each participant's submission. Participants followed the same procedure as concerns the instructions, distractor task, and reproduction of the text; the same quality assurance measures were taken. Of the 123 participants who completed the experiment, 31 were excluded on the basis of these quality control measures. One participant reported using a memory aid (e.g. notes or "copy and paste"); 19 participants' responses contained spelling errors or all capital letters; and 11 participants were excluded because they used direct address in their responses (e.g. "I don't remember how many tests the scientists used", "I think it was America").

Upon completion of the task, participants were given a second identification number and asked to enter this number on the original Amazon Mechanical Turk page. In this way, the identification of the worker could be linked to the submission at the LSE social psychology online laboratory, to verify the task had been completed. Workers who completed the task were paid \$US 0.35 (an hourly rate of approximately \$US 2.00) for their participation. All participants who completed the task according to the instructions were paid, regardless of whether their data were included in the final analysis.

#### **4.3.5 Results**

Twenty-three transmission chains (11 non-metaphorical, 12 metaphorical) of four generations each, were completed. Data were analysed using a mixed-design analysis of variance (ANOVA) to assess the impact of metaphoricality on transmission quantity (number of words produced) and transmission quality

(number of propositions correctly produced) along the four generations of the transmission chain. In the two-way mixed ANOVA, the between-subject factor was metaphoricality (metaphorical, non-metaphorical) and the within-subjects factor was generation of the transmission chain (4 levels).

### Transmission quantity

Transmission quantity, measured in terms of number of words reproduced at each generation, was analysed with a 2 x 4 mixed model ANOVA with metaphoricality (two levels, with and without metaphorical language) as a between-participant factor and reproductive generation as a within-participants factor (four levels, generations 1-4). In addition, all first-generation reproductions were compared with the stimulus texts using planned *t*-tests. Mean word count values at each generation, by condition, are shown in Table 4.9.

**Table 4.9: Mean word count values at each generation, study 2**

	generation			
	1	2	3	4
<b>condition</b>				
NMET (n=11)	125.64	86.27	55.18	37.55
MET (n=12)	99.50	68.00	50.25	39.17

The mixed model ANOVA revealed significant main effects of transmission generation on word count ( $F(3, 63) = 65.22, p < .001, \eta_p^2 = .76.$ ). Mauchly's test indicated that the assumption of sphericity had been violated ( $\chi^2(5) = 15.76, p = .008$ ), therefore degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ( $\epsilon = .65$ ) and Greenhouse-Geisser significance levels are reported. The effect size (partial *eta* squared reported above) suggests that 76% of the variance in transmission quantity is attributable to generation, a relatively large effect. Specifically, contrasts revealed that second generation reproductions contained significantly fewer words than first generation reproductions,  $F(1, 21) = 30.271, p < .001, \eta_p^2 = .59$ . Contrasts also revealed that third generation

reproductions contained significantly fewer words than those in the second generation,  $F(1, 21) = 36.749, p < .001, \eta_p^2 = .64$ . Finally, contrasts revealed that the fourth generation word count was significantly lower than the third generation word count,  $F(1, 21) = 15.225, p = .001, \eta_p^2 = .42$ . These are, by convention, considered large effect sizes (Cohen, 1988). Also, the  $t$ -test result yielded a significant difference in word count between the stimulus test and the first generation,  $t(22) = 18.92, p < .001, r = .97$ . The effect size estimate indicates that the difference in word count found between the stimulus and the first generation reproduction represents a large, and therefore substantial effect. These results, detailed in Table 4.10, confirm the expected result of decreasing transmission quantity at each generation.

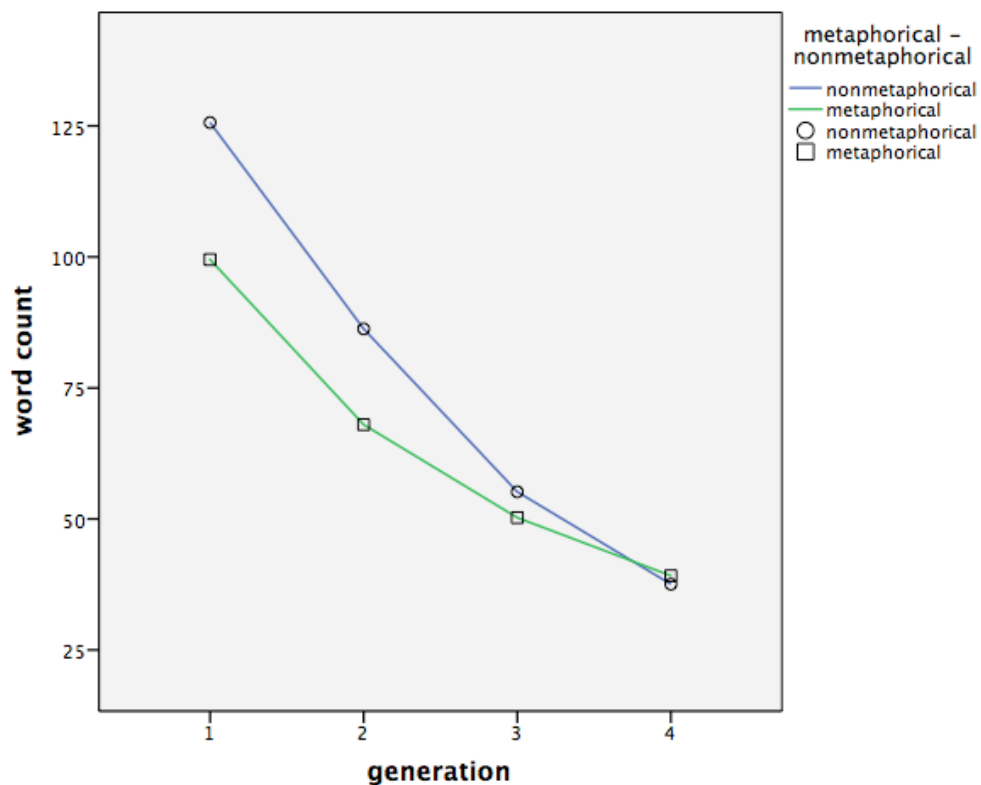
**Table 4.10: Mean word count by transmission generation, study 2**

word count	generation				
	0 (stimulus)	1	2	3	4
<i>M</i>	303.5	112*	76.74*	52.61*	38.39*
<i>SD</i>	-	47.10	34.65	30.68	20.46

\*Mean word count values are significantly smaller than mean word count at preceding generation (at  $p < .001$ ).

Results of the ANOVA revealed that the effect of the use of metaphorical language in stories on transmission quantity was non-significant,  $F(1, 21) = .91, p = .352, \eta_p^2 = .04$ , indicating that regardless of the generation of reproduction, word counts in the metaphorical language condition were not significantly different to word counts in the condition without metaphorical language. The generation x metaphor interaction was non-significant,  $F(3, 63) = 2.45, p = .101, \eta_p^2 = .10$ , indicating that metaphor had no significant effect on the transmission quantity of stories in the serial reproduction task. This result is illustrated in Fig 4.4.

**Figure 4.4: Mean number of words produced at each generation of serial transmission by condition, study 2**



### **Transmission quality**

Transmission quality was measured in terms of the number of propositions correctly retained across the transmission chain. A propositional analysis was conducted using a simplified propositional analysis coding frame to facilitate coding and verification of inter-coder agreement. Instead of assigning values for each proposition (as in study 1) a binary present/absent code was given for each of 17 main propositions in the text. Propositions were coded 0 or 1 corresponding to their absence or presence at each generation. The coding frame is appended in appendix 4.D.

Analyses of transmission quality were conducted using a 2 x 4 mixed model ANOVA with metaphoricality (two levels, with and without metaphorical language) as a between-participant factor and reproductive generation as a within-participants

factor (four levels, generations 1-4). In addition, all first-generation reproductions were compared with the stimulus texts using a planned *t*-test. Mean proposition count values at each generation, by condition, are shown in Table 4.11.

**Table 4.11: Mean proposition value, by condition, study 2**

	generation			
	1	2	3	4
condition				
NMET (n=11)	9.66	7.00	4.27	2.91
MET (n=12)	9.08	6.75	4.08	3.33

A two-way mixed model ANOVA was conducted to test the effect of metaphorical language on transmission quality. Mauchly's test indicated that the assumption of sphericity had been violated ( $X^2(5) = 11.68, p = .04$ ), therefore degrees of freedom were corrected using Huynh-Feldt estimates of sphericity ( $\epsilon = .90$ ) and Huynh-Feldt significance levels are reported. Again, ANOVA results indicated a main effect of generation on proposition count,  $F(3, 63) = 96.11, p < .001, \eta_p^2 = .82$ . The effect size suggests that 82% of the variance in transmission quality count is attributable to generation, a relatively large effect. Contrasts revealed that second generation reproductions contained significantly fewer propositions than first generation reproductions,  $F(1, 21) = 39.58, p < .001, \eta_p^2 = .65$ . Contrasts also revealed that third generation reproductions contained significantly fewer propositions than those in the second generation,  $F(1, 21) = 41.33, p < .001, \eta_p^2 = .66$ . Finally, contrasts revealed that the fourth generation propositional count was significantly lower than the third generation propositional count,  $F(1, 21) = 17.48, p < .001, \eta_p^2 = .45$ . Again, these are, by convention, considered large effect sizes (Cohen, 1988). Also, *t*-test results revealed a significant difference in word count between the stimulus text and the first generation, ( $t(22) = 14.284, p < .001, r = .95$ ). The effect size estimate,  $r = .95$ , indicates that the difference in propositional count found between the stimulus and the first generation reproduction represents a large, and therefore substantial effect. Similarly to transmission quantity, these

results, detailed in Table 4.12, suggest decreasing quality of transmission across generations, which is typical of experimental serial reproduction tasks.

**Table 4.12: Mean propositional count by transmission generation, study 2**

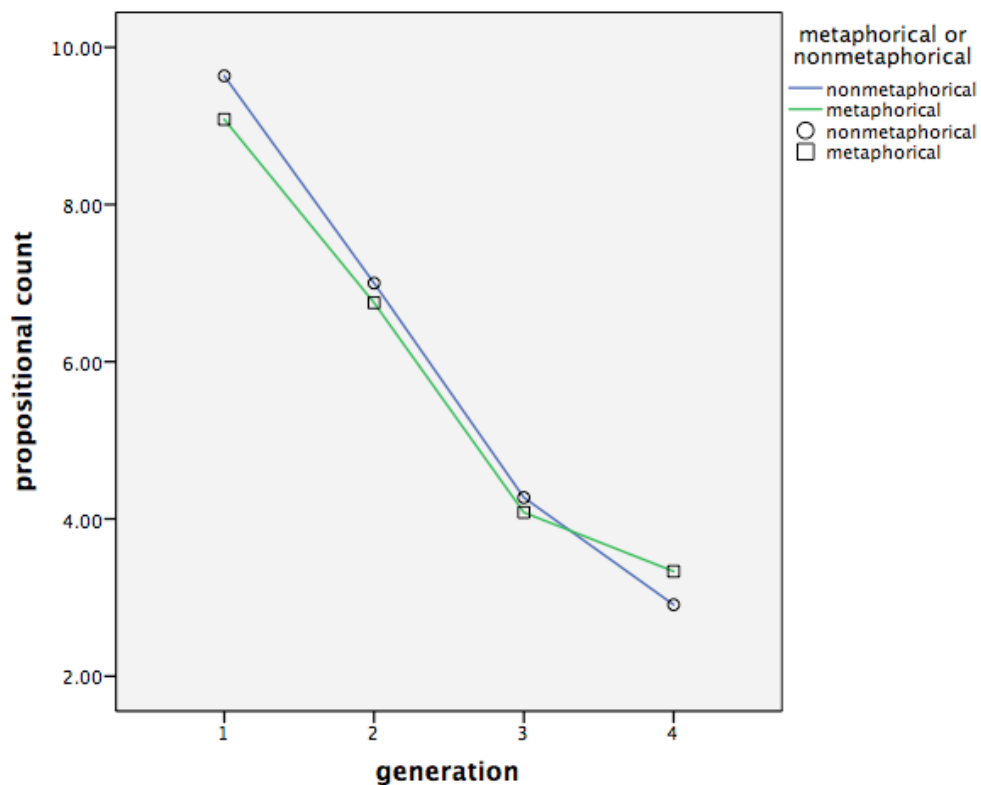
word count	generation				
	0 (stimulus)	1	2	3	4
<i>M</i>	17	9.35*	6.87*	4.17*	3.13*
SD	-	2.57	2.94	2.96	2.24

\*Mean word count values are significantly smaller than mean word count at preceding generation (at  $p < .001$ ).

The effect of the use of metaphorical language in stories on transmission quality was non-significant,  $F(1, 21) = .02, p = .892, \eta_p^2 = .001$ . This indicates that regardless of the generation of reproduction, propositional values in the metaphorical language condition were not significantly different to those in the condition without metaphorical language. The generation x metaphor interaction was non-significant,  $F(3, 63) = .51, p = .656, \eta_p^2 = .02$ , indicating that metaphor had no significant effect on the transmission quantity of stories in the serial reproduction task. Figure 4.5 shows the estimated marginal means of propositional value across the four generations of the transmission chain.



**Figure 4.5: Mean value of propositions produced at each generation of serial transmission by condition, study 2**



#### **4.3.6 Discussion**

The aim of study 2 was to examine the effect of metaphorical language in the transmission of an emotionally evocative narrative. In terms of whether metaphor confers transmission advantages, results of the analysis of both transmission quantity (in terms of word count) and quality (in terms of proportional analysis) suggest that metaphorical language bore no effect on transmission of the story across four generations.

The findings concord with the findings of study 1, despite the two adjustments to the method: the use of a more emotionally salient stimulus, and sampling over a more geographically homogenous population. Further modifications, the introduction of hierarchical structural levels in the stimuli and pre-screening of participants, are proposed in the next study.

#### **4.4 Study three**

Given the results of the first two serial reproduction studies, the third serial reproduction study introduced two further modifications. As with study 2, the first modification aimed to explore further aspects related to the experimental stimuli and the second sought to introduce more stringent selection criteria for participants in the study.

With respect to the experimental stimuli, study 3 aimed to investigate whether there was an effect on transmission fidelity of metaphor used at different hierarchical levels of narrative. It has been suggested that some types of information, including the understanding of common events, is organised hierarchically (Chomsky, 1957; Mandler and Johnson, 1977; Rumelhart, 1977). Further, these hierarchies, or "action scripts" (Schank and Abelson, 1977) can act as a transmission bias. Consistent with script theory, details of a story at the "low" level of the narrative are lost in the transmission earlier and more consistently than information about main events in the story or overarching goals, said to be at a "higher" hierarchical level (Atran and Norenzayan, 2005; Mesoudi and Whiten, 2004). Thus, an explicit structural hierarchy was incorporated into the story in study 3.

The stimuli were presented in six conditions, varying in the use of metaphorical language in the content of the story at a low hierarchical level, and in the overarching, "high" level of the structure of the narrative. The possibility to be investigated, then, is that the absence of an effect of metaphor in studies 1 and 2 arose from metaphors used only at a "low" content level. Study 3 therefore sought to examine the effect of metaphor at low and high levels of narrative structure. The higher level of the story involves the use of an extended metaphor, a metaphor that uses one base to inform a number of sub-metaphors with the same target (e.g. the path of learning AND every step along the way). Empirical evidence suggests that extended metaphors are more persuasive than simple, non-extended metaphors, in some conditions (Sopory and Dillard, 2002); their effect on transmission was tested in this study.

As for the modification in the sampling and selection criteria, all participants in study 3 were required to qualify for the task by successfully passing a pre-screening reading and writing task. This pre-screening was introduced to verify in advance the participants' ability and willingness to follow directions, read with attention, and write clearly.

#### **4.4.1 Experiment overview**

As in studies 1 and 2, study 3 used a short narrative text, expressed with different levels of metaphoricality, in an independent design serial reproduction task. Participants ( $n = 120$ ) formed 30 transmission chains of four generations each. The independent variable was the use of metaphor in story content (-metaphor, +metaphor) and in story structure (no structure, - metaphorical structure, +metaphorical structure). The dependent variable was transmission quantity, measured by word count and proportion decay of the narrative across four transmission generations. The aim of study 3 was to test whether metaphorical language in the content or the overarching structure of a story had an effect on transmission of the story.

#### **4.4.2 Participants**

Participants were recruited on Amazon Mechanical Turk. A preliminary screening task was designed to help ensure that participants who would ultimately be invited to complete the serial reproduction task were both able and willing to read with attention and write clearly. Given that some participants' submissions required exclusion in the two previous studies due to quality-related issues, this pre-screening required participant to provided a sample of the their writing, as a basis for inclusion in the task.

Participants for the screening task were recruited on Amazon Mechanical Turk. One hundred seventy-one participants, residing in the United States, Canada, and the United Kingdom completed the screening procedure. Participants were informed that successful completion of the task would qualify them for a future task. Each participant was paid \$US 0.10 for their participation, regardless of whether they

qualified for the serial reproduction experiment. This is a relatively low payment compared to other types of tasks available on Amazon Mechanical Turk. However, because this task was a short, pre-screening task, and there was the prospect of a further task associated with it, participation was high. This is a common and accepted practice on Amazon Mechanical Turk.

Information and consent procedures were identical to those in the first two studies. For the task itself, each participant was presented with a short story about a man who was buying holiday gifts. The story ended abruptly, and the participant was asked to write an ending for the story. Participants' submissions were reviewed and those who followed the directions carefully and wrote clearly, using complete sentences were sent an invitation to participate in the serial reproduction task. The screening task is appended in appendix 4.E.

Of the 158 participants who qualified, 152 participants went on to complete the serial reproduction task; 32 submissions were excluded for reasons of quality (e.g. direct address in the reproduced text, unclear language, etc.). The remaining 120 participants (89 females, 31 males) ranged in age from 18-68 years ( $M = 31.07$ ,  $SD = 13.032$ ) and reported between 11 and 24 years of formal education ( $M = 15.73$ ,  $SD = 2.456$ ). Of the sample, 67% of the participants lived in the United States, 26% the United Kingdom, and 7% in Canada. In terms of nationality, 63% of the sample were American, 7% Canadian, 28% British, and <1% other. In addition to the screening procedure to verify the quality of participants' reading and writing, participation was also limited to only those individuals who had a previous acceptance rate of at least 95% (See chapter 3 for more details about Amazon Mechanical Turk).

#### **4.4.3 Materials**

The experimental stimulus was a short text about learning. As in the two previous studies, identical propositions that formed the content of the narrative were expressed in two conditions, non-metaphorical and metaphorical. Elements of the content of the stimuli are presented below in Table 4.13.

**Table 4.13: Language variants and sensorimotor modalities used in story content, study 3**

<b>non-metaphorical</b>	<b>metaphorical</b>	<b>sensorimotor modality</b>
understand	grasp	haptic/performatory
complex	heavy	performatory
concentrates	follows	locomotor
analyse	untangle	haptic/performatory
help	direction	locomotor, orientation
consider the material in more detail	dig into the material	haptic/performatory
deliberate with his classmates about the ideas presented in the course	bounce around the ideas presented in the course with his classmates	performatory
consider ... in different ways	look at ... from different angles	visual/investigating
understand	get a grip on	haptic/performatory
understand	get on top of	locomotor/postural, orientation
learn	digest	appetitive

A new variable was introduced in study 3, an overarching hierarchical structure. Elements at this structural level included subheadings and transitional sentences related to the process of learning. In the metaphorical condition, the structural elements formed an extended metaphor around a "path of learning". The 17 structural elements of the stimuli are presented below in Table 4.14.

**Table 4.14: Language variants used in story structure, study 3**

	<b>non-metaphorical</b>	<b>metaphorical</b>
1	...every stage of learning...	...every step of the path of learning...
2	..every stage of learning...	...every step of the path of learning...
3	At the initial stage of the learning process...	First steps on the trail...
4	...to learn even more...	...to move even further...
5	...begin the process right...	...get the journey off to a good start...
6	At the intermediate stage of the learning process...	Mid-way through the journey
7	...in the initial stages of learning...	...in the first part of the journey...

	<b>non-metaphorical</b>	<b>metaphorical</b>
8	...he may understand less and less...	...he may slow down...
9	...discover more on his own...	...go even further on his own...
10	...experiencing learning as part of a group, no longer a lone student...	...marching along the path as part of a group, no longer a lone traveller...
11	At the late stages of the learning process...	Towards the end of the path...
12	When students are in the late stages of learning...	As students travel even further along the trail...
13	Some students will make achievements rapidly from stage to stage, whereas for others it may be slower.	Some students will travel quickly along the path, whereas others may travel at a much slower pace.
14	Learners may very well need to repeat lessons or readings, or even have other types of learning experiences...	Learners may very well need to back up to cover the same ground more than once, or even explore other paths...
15	...in learning and understanding...	...and moving along a path...
16	... have the impression that they are not learning or that they simply cannot understand.	...have the impression of being at a dead end, or being lost.
17	...students find their learning experience challenging, but also satisfying, as they discover new ideas and create ways of thinking of their own.	...students find their journeys challenging, but also satisfying, as they discover new territories and create paths of their own.

There were three levels of the structural variable: no structure (i.e. no structural elements were added to the content), non-metaphorical structure (i.e. the "process" of learning), and metaphorical structure (i.e. the "path" of learning). These three variations of structure, together with the content at two levels of metaphoricality, generated six experimental conditions. The various combinations of content and structural elements yielded a range of text lengths, as shown in Table 4.15. All six stimuli are appended in appendix 4.F.

**Table 4.15: Six conditions of metaphoricality and stimuli word counts, study 3**

		STRUCTURE		
		none	NMET	MET
Content	Nmet	368 words	512 words	526 words
	Met	373 words	518 words	530 words
<i>difference in length</i>		<i>1.3% difference in word count</i>	<i>1.1% difference in word count</i>	<i>1.1 % difference in word count</i>

#### **4.4.4 Procedure**

The experiment was housed at the LSE social psychology online laboratory. Participants who had successfully completed a pre-screening task on Amazon Mechanical Turk were given the URL for the experiment, together with a unique identification number that was required to gain access to the study. Once they accessed the study using this number, they were presented with information about the study, asked to complete a form indicating their understanding and consent, and asked to provide basic demographic information, following the same procedure as the first two studies.

The procedure for allocation of a position in a transmission chain in was identical to the first two studies, as was the moderation of each participant's submission. Participants followed the same procedure as concerns the instructions, distractor task, and reproduction of the text as in the first two studies. Likewise, the same measures were taken to help ensure quality - disabling the "back" function, allowing only one visit per IP address, and asking explicitly whether any memory aids had been used. Of the 152 participants who completed the experiment, 32 were excluded due to unclear language, making no attempt at reproducing the story, or the use of direct address in the story.

Upon completion of the task, participants were given a second identification number and asked to enter this number on the original Amazon Mechanical Turk HIT page. In this way, the identification of the worker could be linked to the submission at the LSE social psychology online laboratory, to verify the task had

been completed. Each participant was paid \$US 0.35 for completing the task. On average, participants took about nine minutes to complete the task, for an approximate hourly pay rate of \$US 2.34. All participants who completed the task according to the instructions were paid, regardless of whether their data were included in the final analysis.

#### 4.4.5 Results

Transmission quantity was measured in terms of numbers of words reproduced at each generation. Thirty transmission chains of four generations were completed. Analysis of variance (ANOVA) results show that, independently of metaphoricality, there was a significant effect of generation on transmission quantity,  $F(3, 69) = 53.62, p < .001, \eta_p^2 = .70$ . The effect size suggests that 70% of the variance in transmission quantity is attributable to generation, a relatively large effect. (Mauchly's test indicated that the assumption of sphericity had been violated ( $\chi^2(5) = 31.90, p < .001$ ), therefore degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ( $\epsilon = .53$ ); and Greenhouse-Geisser corrected significance levels are reported.) Specifically, contrasts revealed that on average, second generation reproductions contained significantly fewer words than first generation reproductions,  $F(1, 23) = 50.34, p < .001, \eta_p^2 = .67$ . Contrasts also revealed that third generation reproductions contained significantly fewer words than those in the second generation,  $F(1, 23) = 25.39, p < .001, \eta_p^2 = .53$ . These effect sizes estimates suggest a large effect (Cohen, 1988). Results of a *t*-test also revealed a significant difference in mean word count between the stimulus text and the first generation, ( $t(28) = 18.22, p < .001, r = .96$ ). The effect size estimate indicates that the difference in word count found between the stimulus and the first generation reproduction represents a large, and therefore substantial effect. However, there was no significant difference in transmission quantity in the final generation of reproduction (i.e. between the third and fourth generation),  $F(1, 23) = 1.51, p = .23, \eta_p^2 = .06$ . This non-significant finding and small effect size estimate for the final generation of reproduction suggest that the decrease in transmission quantity was completed over only three generations. In effect, the third generation was sufficiently short to be reproduced in the fourth generation



without significant decrease in transmission quantity. Nonetheless, these results confirmed an overall, significant decrease in transmission quantity across generations of linear serial reproduction, as to be expected for this serial transmission chain design.

Given the small sample sizes in this study (see Table 4.16.), non-parametric tests were conducted to detect whether metaphor had an effect on transmission across these chains.

**Table 4.16: Six conditions of metaphoricality and sample sizes, study 3**

		STRUCTURE		
		none	NMET	MET
Content	Nmet	n = 5	n = 6	n = 5
	Met	n = 3	n = 8	n = 3

Mann-Whitney tests were used make various comparisons. Table 4.17 below gives details on analyses that were conducted, listing the conditions compared, and the purpose of the comparison. Details of each of these analyses, identified by letter used in the Table 4.17, are presented in the next section.

**Table 4.17: Various pairwise comparisons of conditions analysed, study 3**

	paired conditions	purpose
<b>CONTENT</b>		
A	none/Nmet x none/Met	Comparison of $\pm$ metaphorical content, with no additional structural element.
B	NMET/Nmet x NMET/Met	Comparison of $\pm$ metaphorical content within a non-metaphorical structure
C	MET/Nmet x MET/Met	Comparison of $\pm$ metaphorical content within a metaphorical structure
D	all NMet content (n = 16 ) x all MET content (n = 14)	Comparison of $\pm$ metaphorical content, across all types of structure
<b>STRUCTURE</b>		
E	NMET/NMet (n = 5) x MET/NMet (n = 5)	Comparison of $\pm$ metaphorical structure with only non-metaphorical content.
F	NMET/Met (n=8) x MET/Met (n = 3)	Comparison of $\pm$ metaphorical structure with only metaphorical content
G	NMET structure (n=14) x MET structure (n = 8)	Comparison of $\pm$ metaphorical structure, for both types of content combined

### Story content

The first set of tests (A-D) concern principally the use of metaphorical language in the content of the story. Mann-Whitney tests were used to test for effects of metaphor in the content of the story. The results of each test are presented here.

A. The first pairwise test paired none/Nmet and none/Met, shown as conditions 1 and 2 in Table 4.18 below.

**Table 4.18: Experimental conditions analysed in A, study 3**

		STRUCTURE		
		none	NMET	MET
Content	Nmet	1	3	5
	Met	2	4	6

Median word count values for all four generations in conditions 1 and 2 are reported in Table 4.19. Descriptive statistics indicated no pattern of differences in median word count that was consistent across all four generations of the chain.

**Table 4.19: Median word counts for all generations, A. conditions 1 and 2, study 3**

condition	generation			
	1	2	3	4
1 none/NMet (n=5)	155	38	33	28
2 none /Met (n=3)	132	76	36	39

A Mann-Whitney test was used to test whether the use of metaphor in the story content, with no added structural element, had an effect on transmission. Test results indicate that the distributions of the word count between conditions did not differ significantly, as seen in Table 4.20

**Table 4.20: Mann-Whitney test results, A. conditions 1 and 2, study 3**

	generation			
	1	2	3	4
<b>U =</b>	1.5	6	7	6
<b>p =</b>	.072	.655	.881	.655

B. The second pairwise test paired NMET/Nmet and NMET/Met, shown as conditions 3 and 4 in Table 4.21.

**Table 4.21: Experimental conditions analysed in B, study 3**

		STRUCTURE		
		none	NMET	MET
Content	Nmet	1	3	5
	Met	2	4	6

Median word count values for conditions 3 and 4 are reported in Table 4.22. Descriptive statistics indicated no pattern of differences in median word count that was consistent across all four generations of the chain.

**Table 4.22: Median word count for all generations, B. conditions 3 and 4, study 3**

Condition	generation			
	1	2	3	4
3 NMET/NMet (n=6)	103.50	84.50	69.50	58.50
4 NMET/Met (n=8)	184	60	39.50	23

A Mann-Whitney test was used to test whether the use of metaphor in the story content within a non-metaphorical structure had an effect on transmission. Test results indicate that the distributions of the word count between conditions did not differ significantly, as seen in Table 4.23.

**Table 4.23: Mann-Whitney test results, B. conditions 3 and 4, study 3**

	generation			
	1	2	3	4
<b>U =</b>	15	19.5	17	18
<b>p =</b>	.245	.561	.366	.438

C. This test paired MET/Nmet and MET/Met, shown as conditions 5 and 6 in Table 4.24. below.

**Table 4.24: Experimental conditions analysed in C, study 3**

Content	Nmet	STRUCTURE		
		none	NMET	MET
		1	3	5
Met	2	4	6	

Median word count values for conditions 5 and 6 are reported in Table 4.25. Across all four generations of the transmission chain, median word count values for non-metaphorical content were higher than for metaphorical content.

**Table 4.25: Median word count for all generations, C. conditions 5 and 6, study 3**

condition	generation			
	1	2	3	4
5 MET/Nmet (n=5)	135	63	40	37
6 MET/Met (n=2)	78	54.50	32	21.50

Results of Mann-Whitney indicate no significant difference in the distributions of the word count between conditions however, as detailed in Table 4.26.

**Table 4.26: Mann-Whitney test results, C. conditions 5 and 6, study 3**

	generation			
	1	2	3	4
<b>U =</b>	1	4	3	2
<b>p =</b>	.121	.699	.439	.245

D. This test paired all three conditions with non-metaphorical content (1, 3, and 5) and all three conditions with metaphorical content (2, 4, and 6), as shown in Table 4.27.

**Table 4.27: Experimental conditions analysed in D, study 3**

Content	Nmet	STRUCTURE		
		none	NMET	MET
		1	3	5
	Met	2	4	6

Median word count values for combined conditions (1,3, and 5) and combined conditions (2,4, and 6) are reported in Table 4.28. There is no pattern of differences consistent across the four generations of the chain.

**Table 4.28: Median word count for all generations, D. combined conditions (1,3,5) and (2,4,6), study 3**

condition	generation			
	1	2	3	4
NMET content (1,3,5) (n=16)	143.50	58	41.50	36.50
MET content (2,4,6) (n=13)	132	65	36	23

Mann-Whitney tests were used to test whether, use of metaphor in the story content, independently of structure, had an effect on transmission. Results indicate that the distributions of the word count between conditions did not differ significantly, as seen in Table 4.29.

**Table 4.29: Mann-Whitney test results, D. combined conditions (1,3,5) and (2,4,6), study 3**

	generation			
	1	2	3	4
<b>U =</b>	103	98.50	91.50	80.50
<b>p =</b>	0.983	0.809	0.583	0.302

### Hierarchical structure

The second set of tests (E-G) concern principally the hierarchical structural elements. Mann-Whitney tests were used to investigate whether use of metaphor in the overarching structure of the story had an effect on transmission.

E. This test pairs conditions 3 and 5, NMET/NMet and MET/NMet as shown in Table 4.30.

**Table 4.30: Experimental conditions analysed in E, study 3**

		STRUCTURE		
		none	NMET	MET
Content	Nmet	1	3	5
	Met	2	4	6

Median word count values for conditions 3 and 5 are reported in Table 4.31. Descriptive statistics indicated no pattern of differences in median word count that was consistent across all four generations of the chain.

**Table 4.31: Median word count for all generations, E. conditions 3 and 5, study 3**

condition	generation			
	1	2	3	4
3 NMET/NMet (n=6)	103.50	84.50	69.50	58.50
5 MET/NMet (n=5)	135	63	40	37

A Mann-Whitney test was used to test whether metaphor in the structure had an effect on transmission, given non-metaphorical content. Results indicate that the distributions of the word count between conditions did not differ significantly, as seen in Table 4.32.

**Table 4.32: Mann-Whitney test results, E. conditions 3 and 5, study 3**

	generation			
	1	2	3	4
<b>U =</b>	11	12	11	11
<b>p =</b>	.465	.647	.465	.465

F. Conditions 4 and 6, NMET/Met and MET/Met were paired for E. as shown below in Table 4.33.

**Table 4.33: Experimental conditions analysed in F, study 3**

		STRUCTURE		
		none	NMET	MET
Content	Nmet	1	3	5
	Met	2	4	6

Median word count values for conditions 4 and 6 are reported in Table 4.34, which shows a pattern of differences in median word count consistent across all four generations of the chain. Median values are higher in the non-metaphorical structure condition in for all four generations.

**Table 4.34: Median word count for all generations, F. conditions 4 and 6, study 3**

condition	generation			
	1	2	3	4
4 NMET/Met (n=8)	184	60	39.50	23
6 MET/Met (n=2)	78	54.50	32	21.50

To understand whether use of metaphor in the structure had an effect on transmission, given metaphorical content, a Mann-Whitney test was used. Results indicate that this difference in distribution is not significant, as reported in Table 4.35.

**Table 4.35: Mann-Whitney test results, F. conditions 4 and 6, study 3**

	generation			
	1	2	3	4
<b>U =</b>	3	6	5	5
<b>p =</b>	.192	.602	.432	.600

G. This test compares combined conditions 3 and 4 with combined conditions 5 and 6 to investigate whether use of metaphor in the structure alone, independently of the story content, has an effect on transmission. The conditions compared are shown below in Table 4.36.



**Table 4.36: Experimental conditions analysed in G, study 3**

		STRUCTURE		
		none	NMET	MET
Content	Nmet	1	2	5
	Met	2	4	6

Median word count values, combined for NMET/Nmet and NMET/Met (non-metaphorical structure) and for conditions MET/NMet and MET/Met (metaphorical structure), are reported in Table 4.37.

**Table 4.37: Median word count for all generations, G. combined conditions (3,4) and combined conditions (5,6), study 3**

condition	generation			
	1	2	3	4
NMET structure (3 & 4) (n=14)	145	68	44	28
MET structure (5 & 6) (n=8)	106	63	36	34

There is no consistent pattern of differences across the four generations of the chain.

Mann-Whitney test results indicate that the distributions of the word count between conditions did not differ significantly, as seen in Table 4.38.

**Table 4.38: Mann-Whitney test results, G. combined conditions (3,4) and combined conditions (5,6), study 3**

	generation			
	1	2	3	4
<b>U =</b>	41	41.50	39	45
<b>p =</b>	.551	.576	.455	.765

#### 4.4.6 Discussion

Given the results of the first two serial reproduction studies, which provided no evidence of an effect of metaphor in the content of stories on their transmission,

study 3 sought to test whether metaphorical language used in the overarching structure of a story, in addition to in its content, would have an effect on transmission of the story.

Potential issues of the quality of participants' submissions were addressed by introducing a further element of control in the sampling, the successful completion of a reading and writing task to qualify for inclusion in the study.

The results of a series of Mann-Whitney tests and are summarised in Table 4.39.

**Table 4.39: Results of pairwise comparisons, study 3**

	paired conditions	question addressed in the analysis	outcome
CONTENT			
A	none/Nmet x none/Met	<i>Does use of metaphor in the story content have an effect on transmission?</i>	NS
B	NMET/Nmet x NMET/Met	<i>Within a non-metaphorical structure, does use of metaphor in the story content have an effect on transmission?</i>	NS
C	MET/Nmet x MET/Met	<i>Within a metaphorical structure, does use of metaphor in the story content have an effect on transmission?</i>	NS
D	all NMet content (n = 16 )x all MET content (n = 14)	<i>Independently of structure, does use of metaphor in the story content have an effect on transmission?</i>	NS
STRUCTURE			
E	NMET/NMet (n = 5) x MET/NMet (n = 5)	<i>Given non-metaphorical content, does use of metaphor in the structure have an effect on transmission?</i>	NS
F	NMET/Met (n=8) x MET/Met (n = 3)	<i>Given metaphorical content, does use of metaphor in the structure have an effect on transmission?</i>	NS

	<b>paired conditions</b>	<b>question addressed in the analysis</b>	<b>outcome</b>
G	NMET structure (n=14) x MET structure (n = 8)	<i>Independently of content, does use of metaphor in the structure have an effect on transmission?</i>	NS

While there is evidence for the existence of a hierarchical transmission bias (Mesoudi and Whiten, 2004), study 3 does not lend support to an effect on transmission of metaphor used at a hierarchical, structural level of a narrative. Further implications of these findings, together with those of the first two studies are discussed in the next section.

#### **4.5 Discussion**

Using the experimental serial reproduction paradigm, studies 1, 2, and 3 explored the effect of metaphorical language on cultural transmission. Specifically, the studies aimed to identify what effects, if any, metaphorical language would have in terms of the quantity and quality of transmission of narratives across reproduction chains. Results of three different serial reproduction experiments lend no support to the hypothesis that metaphor has an effect on cultural transmission. The hypothesis that metaphorical language used to talk about knowledge, learning, and understanding in a narrative would have an effect on its transmission was not borne out in these findings.

Results of the first study indicated no effect of metaphorical language on transmission of a simple story across a four-generation chain, neither on the quantity nor the quality of transmission. Study 2 yielded no evidence of a difference in the transmission of a more emotionally salient story, as a function of whether it contained metaphor or not. The results of study 3 also lend no support for the existence of an effect of metaphor on transmission, neither in the content of a story, nor at hierarchical structural level.

These findings are somewhat surprising. Metaphor, in epidemiological terms described in chapter 2, enjoys widespread cultural success. In addition, past research indicates that metaphor has marked persuasive effects and pedagogical functions (Mayer, 1993; Moran, 1996; Petrie and Oshlag, 1993; Sopory and Dillard, 2002). These factors are not, in and of themselves, a sound basis for a formal hypothesis that metaphor would confer transmission advantages. They could, nonetheless, inform a notion that metaphor might have some detectable effect in serial reproduction. Of course, cultural transmission of metaphor specifically has not been researched to date. Thus building support for any such hypothesis cannot rely on replicable empirical work.

In an epidemiological view, the principal determinants of an artefact's cultural success are thought to be the qualities of its content, and how these contribute to its memorability, thus its likelihood to be retained and reproduced (Gregory and Barrett, 2009; Norenzayan et al., 2006; Sperber, 1985). If memorability, as a fundamental constraint on the transmission and stability of cultural artefacts, is not demonstrated empirically, what other explanations could account for widespread cultural success? If not straightforward mnemonic qualities and content-related transmission biases, what other explanatory factors merit attention in accounting for the cultural success of metaphor?

Serial reproduction tasks (SRTs) have been successfully applied to investigations of a wide range of phenomena that contributed to important areas of social psychology (Bangerter, 2000; Barrett and Nyfhof, 2001; Kashima, 2000; Marfaing and Tafani, 2011; Mesoudi et al., 2006). Indeed, many consider the serial reproduction experimental paradigm (both through traditional linear chains and other variants including group methods, replacement methods, etc.) to be central to the study of cultural dynamics and cultural evolution (Kashima and Yeung, 2010; McIntyre et al., 2004; Mesoudi and Whiten, 2008). It is perhaps timely then to consider what kinds of cultural artefacts lend themselves to being studied using SRT, and whether there may be types of cultural artefacts that are less apt to be investigated using this method. How can we account for the absence of transmission advantages in

experimental serial reproduction of what is known to be a culturally successful artefact?

In reflecting on whether the application of SRTs to the study of metaphor about learning, knowledge, and understanding is appropriate, one aspect to consider is the content of the representation. Perhaps SRTs are better suited for artefacts with content that is related to the "questions of anthropology" raised in chapter 1, "what happens after death?", "what is going to happen next?" (i.e. religious ideas, supernatural beliefs) (Astuti, 2007). Perhaps ideas informed by dominant social stereotypes and other objects studied using SRTs enjoy powerful content biases that can "activate" extra-contextual transmission in ways that other cultural artefacts cannot.

If metaphor somehow goes "under the radar" of experimental serial reproduction, might there be factors that 1. are inherent to language use "locally" as a form of social interaction and 2. help account for the success of metaphor in everyday language? Metaphor may support communicative functions that have more to do with social interaction than message content. Its cultural success may be linked more to its perlocutionary effects—the consequences of using metaphorical language—than to its content. These perlocutionary effects may not be observable or detectable in SRT.

The studies presented in the following chapters explore these possibilities. The guiding question thus becomes,

*Given the role of communication in cultural transmission, what are social and pragmatic aspects of communicative interaction that can help account for the cultural success of metaphor?*

Studies 4 and 6 consider in closer detail three phases of cultural transmission discussed in chapter 1, and the effects of metaphor throughout these phases (Eriksson and Coultas, 2014; Stubbersfield et al., 2014). Studies 5 and 6 explore the inferential potential of metaphor discussed in chapter 2 and how it may contribute

to explanations of cultural success (Boyer, 2001; Gervais et al., 2011). Studies 5 and 7 shed light on how metaphor supports social interaction and the building of common ground raised in chapter 2 (Clark, 1996; Wilkes-Gibbs and Clark, 1992).

#### **4.6 Conclusion**

The psychological sciences, and indeed other sciences, must contend with an oft unspoken, but real aversion to null results (Ferguson and Heene, 2012). Formally, this aversion manifests itself as a preference to publish studies that result in significant findings over those with non-significant findings (Rosenthal, 1979). At best, null results are considered "difficult to interpret". More often, they are thought to be an indication of a Type II error, or that the researcher is "not trying hard enough to find significant results" (Ferguson and Heene, 2012, p. 554). The null results of studies 1, 2, and 3 indicate that metaphor has no effect in experimental serial reproduction. Despite refining the research method and introducing greater sampling stringency, the tendency of the results persisted throughout the three studies. I would suggest that these results, though null, are interesting findings nonetheless, and propose that they form the basis of further work to explore the nature of the particular cultural artefact and its role in social communication and social interaction.

## **Chapter 5      Effects of metaphor on production and transmission choices**

This chapter presents study 4, which focused on the effect of metaphor in the “choose-to-transmit” phase of cultural transmission under more naturalistic conditions of speaker agency. The experiment investigated the effect of metaphor on the stories that participants themselves generated and their decisions to pass along these stories. In this experiment, participants were asked to call to mind a situation about learning or trying to understand something, then to create a story following guidance about some aspects of the story. This guidance on developing the story was given in one of two conditions: with metaphorical language and without metaphorical language. The question at hand was whether metaphor had an effect on 1. participants’ intention to transmit the story (measured by their rating of the likelihood that they would tell the story to someone else), and 2. the story itself (indicated by the story endings they wrote). Results indicated that metaphorical language had no significant effect on likelihood to transmit. In terms of the story itself, however, metaphorical prompts were found to yield more metaphorical language in the endings of the stories written by participants.

Overall, results suggested that when participants exercise agency in calling to mind situations themselves and in creating their own stories, metaphorical language used in the prompt has an effect on the metaphoricality of the stories. Thus, in contexts that more closely replicate naturalistic cultural production and cultural transmission, metaphor use seems to beget metaphor use.

## 5.1 Introduction

Metaphor is ubiquitous in verbal communication, written and spoken, formal and informal. Embodied metaphor about learning, understanding, and knowledge is a specific example that shows ample cultural success in both formal and everyday language. This cultural success was not borne out, however, by serial reproduction tasks in studies 1, 2, and 3. The problem, then, is to explore further why a cultural artefact that exhibits no transmission advantage in experimental serial reproduction would otherwise be culturally successful.

Critics of serial reproduction experiments argue that they focus on only one phase of cultural transmission, the "encode-and-retrieve" phase, the phase where one receives a story, or other cultural item, and then reproduces it. In a serial reproduction task, because the participant has no choice as regards what item she receives, or whether she wishes to transmit the item, it is argued that the experimental paradigm fails to investigate the "choose-to-receive" phase prior to the "encode-and-retrieve" phase, and the "choose-to-transmit" phase afterwards (Eriksson and Coultas, 2014).

Clearly, in the real world, individuals exercise choice about the kinds of stories they wish to pass on. While there has been research on the kinds of stories people choose to transmit (e.g. Heath et al., 2001 on bias for emotional selection), the recognition of the "choose-to-transmit" phase has not been broadly incorporated into the larger body of work on cultural transmission. In this light, it should be considered whether the exclusion of participants' input on the form of the item to be transmitted and the choice to transmit the item, which is inherent in serial reproduction task experimental design, might obscure some aspects of cultural transmission. Serial reproduction tasks, then, might be more suited for the investigation of a specific phase of cultural transmission of particular kinds of cultural items. Depending on the type of cultural artefact being investigated, there may be a possibility that experimental paradigms that are not sufficiently sensitive to individuals' autonomy in creating and passing on cultural items—their communicative "agency"—do not detect effects in transmission fidelity.



## **5.2 Study 4**

Study 4, presented in this chapter, sought to address this issue of speakers' agency and its role in cultural transmission by focussing on the effect of metaphor in the "choose-to-transmit" phase of cultural transmission, under conditions of increased speaker agency. The experiment investigated the connection between metaphor and agency in two ways—with respect to the stories that participants themselves generated and to their decisions to pass along these stories. The specific questions that guided this study were

*Given more naturalistic speaker agency, does metaphor have an effect on likelihood to transmit a story? Given more naturalistic conditions of speaker agency, does metaphor have an effect on the content of a story?*

### **5.2.1 Experiment overview**

For this online experiment, participants (n=100) were asked to call to mind a situation about learning or trying to understand something and were given general guidance to create their own story. In this between-groups design, the independent variable was the metaphoricality of the prompt to develop the story, which was given in one of two conditions: with metaphorical language and without metaphorical language. There were two dependent variables, the reported likelihood to transmit the story, and the use of metaphorical language in the outcome of the story, written by participants. The aim of the experiment was to investigate whether metaphorical language in the prompt had an effect on the likelihood to transmit and on the content of the story itself, under conditions where participants themselves generated the story.

### **5.2.2 Participants**

As in study 3, participants were recruited on Amazon Mechanical Turk. The same preliminary screening task was administered to help ensure that participants were both able and willing to complete the task. The screening task was posted on Amazon Mechanical Turk and was open to participants in the United States with a prior acceptance rate of at least a 95%; 137 participants completed the screening

procedure and were paid \$US 0.10 for their participation, regardless of whether they qualified for the experiment. Of these 137, 120 participants qualified for the experiment and were notified that they were eligible to participate in this task, in exchange for a payment of \$US 0.30.

There were 103 participants in the study. Responses from three participants were eliminated due to unclear language in the story ending or failure to respond to ratings of likelihood. All participants (41 males and 59 females) were native speakers of English aged between 18-65 years ( $M = 33.6$ ,  $SD = 11.28$ ). Participants reported having between 10 and 26 years of formal education, ( $M = 15.64$ ,  $SD = 2.44$ ).

### 5.2.3 Materials

The study appeared online as a “Story imagination task”. Instructions were given to call to mind a situation, then a story about a learning experience; all participants received the same instructions. A prompt to develop the story was then given in one of two conditions, with metaphorical language and without metaphorical language. The instructions and two stimuli are shown in Table 5.1.

**Table 5.1: Instructions and experimental stimuli, study 4**

INSTRUCTIONS
<p>In this task you will be asked to call to mind a situation, either an actual situation you have experienced or one that you simply invent. You will then be asked to think of a story about this situation, and finally to answer a few questions. Now, please imagine a situation, real or invented, where you are trying to learn or understand something complicated.</p> <p>This could be an idea or a theory you were taught by a teacher; something you discovered on your own about the world; or an issue or problem you encountered in your life.</p> <p>Please take a few moments to really try to put yourself in the situation that you recall or imagine. Try to call to mind as many details as you can – how the situation came about and developed; other people involved, what they said, what you said; your reactions and your feelings, etc.</p> <p>There is no right or wrong way to do this. Just bring to mind whatever fits best with how you remember or imagine your situation. Take as much time as you like.</p> <p>Once you've got this situation in mind, please continue.</p>

PROMPT	
Non-metaphorical condition	Metaphorical condition
<p>Now, please imagine a story that involves you and your experience with the complex idea or issue you were trying to understand.</p> <p>The story, very generally, goes as follows:</p> <p>-At first, you had difficulty understanding it.</p> <p>-Then, you really considered it carefully and tried hard to figure it out... to analyse it.</p> <p>-You even deliberated it with friends to understand it better.</p> <p>-Finally, in the end...</p>	<p>Now, please imagine a story that involves you and your experience with the heavy idea or issue you were trying to understand.</p> <p>The story, very generally, goes as follows:</p> <p>-At first, you had difficulty grasping it.</p> <p>-Then, you really dug into it and tried hard to figure it out... to untangle it.</p> <p>-You even bounced it around with friends to get a better grip of it.</p> <p>-Finally, in the end...</p>
<p>In imagining your story, please try to call to mind as many details as you can about learning or understanding the idea or issue you thought of a moment ago. Think of the situation, the other people involved, your feelings, etc. The story you create is up to you, just use your imagination to make up a story that has these four general phases. Once you have your story in mind, please continue.</p>	

The experimental stimuli used in this study were considerably shorter in length than those used in previous studies. However, the selected prompts are consistent with earlier versions, as are the choices of non-metaphorical language.

Similarly to the protocol used by Heath and colleagues (2001) to measure willingness to transmit emotionally evocative stories, participants were asked three questions to indicate their likelihood to transmit their story. Using a 7-point scale with values ranging from extremely, likely, quite likely, likely, neither likely nor unlikely, unlikely, quite unlikely, extremely unlikely, participants responded to the following questions:

*1. How likely would you be to tell this story to someone else?*

*2. More specifically, how likely would you be to tell this story to someone who told you a very similar story?*

*3. How likely would you be to tell this story to someone who had had a very similar experience?*

In addition, participants were prompted to reveal the subject of the story and write the ending with the following questions:

*1. How does your story end?*

*2. In the situation that you called to mind, what was it that you were trying to learn or understand?*

#### **5.2.4 Procedure**

The experiment was housed at the LSE social psychology online laboratory. Participants who had successfully completed a pre-screening task on Amazon Mechanical Turk were given the URL for the experiment, together with a unique identification number that was required to gain access to the study. Once they accessed the study using this number, they were presented with information about the study, the nature of what they would be asked to do and their right to withdraw from the study, potential risks and benefits of taking part in the study and contact information of the researcher. They were asked to complete a consent form indicating their understanding of the material and their consent to participate and asked to provide basic demographic information (appendix 5.A).

Participants were allocated randomly into one of the two experimental conditions, non-metaphorical language prompt and metaphorical language prompt. As described in the Materials sections, participants were asked to call to mind a situation, real or invented, where they were trying to learn or understand something. They were then prompted to develop a story, following guidance in one of the two conditions. Participants completed the task in their own time; no time restrictions were applied.

As with the other studies conducted with participants recruited via Amazon Mechanical Turk, upon completion of the task, participants were given a second

identification number and asked to enter this number on the original Amazon Mechanical Turk page. In this way, the identification of the worker could be linked to the submission at the LSE social psychology online laboratory, to verify the task had been completed. On average, participants took about 9 minutes 28 seconds to complete the task, for an approximate hourly pay rate of \$US 1.90 (at \$US 0.30 for completing the task). All participants who completed the task according to the instructions were paid, regardless of whether their data were included in the final analysis.

## 5.2.5 Results

### Quantitative results

Mean values for ratings of likelihood to transmit the story to various audiences are reported in Table 5.2.

**Table 5.2: Mean values for likelihood to transmit the story, by condition, study 4**

condition	likelihood to tell the story to ...		
	someone else	someone who told you a similar story	someone who had had a similar experience
NMET (n=42)	$M = 3.55, SD = 1.71$	$M = 2.53, SD = 1.15$	$M = 2.38, SD = 1.30$
Met (n=58)	$M = 3.81, SD = 1.73$	$M = 2.71, SD = 1.68$	$M = 2.52, SD = 1.70$

(n.b. "Extremely likely" was coded with a value of 1, "quite likely" 2, etc. Thus, a lower value indicates higher likelihood.)

An independent-samples *t*-test was conducted to compare likelihood to transmit in the metaphorical and non-metaphorical conditions. There was no significant difference for likelihood to tell the story to someone else,  $t(98) = -.752, p = .454$ ; for likelihood to tell the story to someone who told you a similar story,  $t(97.785) = -.647, p = .665$ ; nor for likelihood to tell the story to someone who had had a similar experience,  $t(98) = -.435, p = .665$ . These results suggest that the use of metaphorical language in the prompt has no effect on one's likelihood to transmit a story.

As there was no significant difference between conditions, both conditions were combined to test for differences in likelihood to transmit to various audiences. Results of paired samples t-tests indicate that participants reported being significantly more likely to tell their story to someone who told them a similar story ( $M = 2.63, SD = 1.47$ ), compared to "someone else" (generic) ( $M = 3.70, SD = 1.72$ ),  $t(99) = 8.352, p < .001, r = 0.643$ . They also reported a significantly higher likelihood to tell their story to someone with a similar experience, compared to "someone else" ( $M = 2.46, SD = 1.54$ ),  $t(99) = 6.673, p < .001, r = 0.557$ . No significant difference was found between the likelihood to tell the story to someone who had told a similar story compared to someone with a similar experience,  $t(99) = 1.914, p = .059$ .

To discover whether the experimental manipulation bore an effect on the reported likelihood to transmit the story, it was decided to opt for the use of non-parametric tests in the first instance. While it is common practice to report Likert-scale and similar scale findings in terms of means, using parametric tests, a more conservative stance would advocate the use of non-parametric tests (Jamieson, 2004; Cohen, Manion, and Morrison,, 2000). Independent sample Mann-Whitney tests indicate that the distributions of likelihood ratings did not differ significantly across metaphorical conditions. Results indicate no significant difference in the distribution of likelihood ratings between the two conditions. Likelihood ratings to transmit the story to someone else in the non-metaphorical condition ( $Mdn = 3.50$ ) did not differ significantly from ratings in the metaphorical condition ( $Mdn = 4.00$ ) ( $U = 1110.50, z = -.761, p = .447$ ). For the likelihood to tell the story to someone who had told a similar story, the median value was equal for both conditions ( $Mdn = 2.00$ ) and there was no significant difference in the distribution ( $U = 1214.00, z = -.029, p = .977$ ). Finally, for likelihood to tell the story to someone who had had a similar experience, again the median value was equal ( $Mdn = 2.00$ ) and there was no significant difference in the distribution of the values ( $U = 1212.50, z = -.040, p = .968$ ).

## Story endings

The second question guiding this study concerned the effect of metaphor in prompts on the content of the story endings written by participants. To consider such an effect, the story endings were analysed for metaphorical content. This analysis consisted of first identifying metaphorical language used in the textual data, using the metaphor identification procedure (Pragglejaz, 2007) and then comparing the occurrences across experimental conditions. The Pragglejaz procedure involves first comparing the meaning of words and word groups in the context in which they are used to their "basic meanings" (in this case with reference to the Oxford English Dictionary). Where there is a discrepancy between the contextual meaning and the basic meaning, the word or group is isolated. Where the discrepancy can be resolved and word or group of words can be understood by making comparisons, it is considered to be used metaphorically. Throughout the procedure, rules for exclusion are developed and applied in a stepwise manner (e.g. idiomatic expressions, "dead" metaphors, etc.)(See chapter 3 more details on the procedure).

Metaphorical language was identified and coded in all 100 text segments collected during the experiment. The textual material was short. On average the story endings written by participants contained 26.97 words. There was no significant difference between the mean word count in the metaphorical condition ( $M = 25.44$ ,  $SE = 2.63$ ) and word count in the non-metaphorical condition ( $M = 29.09$ ,  $SE = 2.13$ ),  $t(103) = 1.085$ ,  $p = .280$ .

Metaphorical language was used relatively scarcely in the story endings. From the 100 segments, 19 occurrences of metaphorical language (produced by 13 participants) were identified. In the non-metaphorical condition, two participants used a total of three metaphorical language segments; in the metaphorical condition, 11 participants used 16 metaphorical languages segments, as shown in Table 5.3.

**Table 5.3: Use of metaphorical language in story endings, by condition study 4**

	number of participants who used metaphorical language	number of metaphorical segments used
NMET (n = 42)	2	3
MET (n = 58)	11	16

Results of an independent-samples t-test indicate that significantly more participants in the metaphorical condition used metaphor ( $M = .190$ ,  $SE = .052$ ) than in the non-metaphorical condition ( $M = .048$ ,  $SE = .033$ )  $t(98) = -2.11$ ,  $p = .024$ . In addition, participants who were prompted with metaphorical language used significantly more metaphorical language segments ( $M = .28$ ,  $SE = .084$ ) than those who were prompted with non-metaphorical language ( $M = .07$ ,  $SE = .053$ )  $t(98) = -2.053$ ,  $p = .043$ , in the story endings they wrote.

The metaphorical language segments were coded for sensorimotor modality. (See chapter 3 for detailed description of sensorimotor modality coding frame.) As per the metaphor identification procedure, a list of exclusions was established, which in this case contained various idiomatic and figurative expressions and "dead" metaphors (e.g. "get the hang of", "finally, it clicked", "tweak", "I see", etc.). The findings are summarised in Table 5.4 and examples follow. From the non-metaphorical condition (N=42), two participants used three metaphorical language segments. All three were in the haptic/performatory modality; all three were "grasp".

*It took me a while to **grasp** the concept and explanation I received for my questions. In the end I was able to **grasp** what my husband was trying to explain, I just needed another perspective to fully understand as he couldn't explain it differently. [P377570]*

*I gave up religion and became an atheist. At first I couldn't **grasp** the concept, but eventually it became clear. [P998595]*

From the metaphorical condition (N=58), eleven participants generated sixteen segments of metaphorical language. Ten segments were coded in the haptic/performatory modality (seven occurrences of "grasp" and four segments



involving "breaking/cutting/dissecting into pieces"). It should be noted that the prompt in the metaphorical condition contained metaphorical language in this sensorimotor modality (shown above in Table 5.1) (...you had difficulty grasping it... you really dug into it... etc.). The seven occurrences of "grasp" are thus identical to the language used in the prompt.

*I was able to **grasp** how the municipal RFP process worked. I really knew nothing about it, but was able to find out on my own by reading another RFP and **dissecting** it. In the end, I could proceed to write my own RFP for the department. [P127522]*

*In the end I was able to understand the situation, at that point I was able to **dissect** and resolve the situation. [P613859]*

*It's about solving a problem that I **couldn't grasp**. I was having trouble in my advanced economics classes and the theories were hard to **grasp** until they **were broken down into smaller chunks** that were easier to digest. I knew I should have looked at the smaller pieces to get the whole eventually. [P220229]*

Four segments were coded in the locomotor/postural (orientation) modality (three examples of "being on top " or "on a plateau", one example of travelling as though on a path).

*After exhausting many efforts to understand the idea, it was explained very simply to me by my friend. After my friend explained the idea in laymen terms I was able to **backtrack** and apply the scientific and scholastic learnings to the principal and I finally fully grasped the idea. [P573328]*

*I didn't have much success the first time I tried to understand it. I gave up with hopes that on the next time, I'll figure it out. **I didn't come out on top.** [P126941]*

*In the end, **I came out on top** with a passing grade and truly understanding the concepts of Organic Chemistry. [P114150]*

*I had an epiphany and everything fell into place. I felt I'd reached a **plateau**, and I could barely conceive of how I had struggled with the concept previously. I felt a complete sense of enlightenment. [P536707]*

Finally two segments were coded in the appetitive modality (both examples use "digest").

*It's about solving a problem that I couldn't grasp. I was having trouble in my advanced economics classes and the theories were hard to grasp until they were broken down into smaller chunks that were easier to **digest**. I knew I should have looked at the smaller pieces to see the whole eventually. [P220229]*

*Finally, in the end, practice paid off. It didn't come when I was looking for it, but rather unexpectedly as though my subconscious mind had finally **digested** everything I had been trying to teach it. [P285183]*

**Table 5.4: Metaphorical language segments and modalities in story endings, by condition, study 4**

	sensorimotor modality			total metaphorical segments	total participants
	HAP/PER	LOC/POS (ori)	APP		
NMET (n=42)	3			3	2
MET (n=58)	10	4	2	16	11

### 5.2.6 Discussion

Study 4 investigated the effect of metaphor on stories that participants themselves generated under more naturalistic conditions of speaker agency and, their decisions to pass along these stories, in the "choose-to-transmit" phase of cultural transmission. Results suggest that the metaphoricality of the prompt to create the story bore no effect on the likelihood to transmit the story. No differences were found in ratings of likelihood between the conditions for any of the three potential "audiences" of the story: another person, another person who had told a similar story, or another person who had had a similar experience. One limitation of this experimental design with respect to investigating the "choose-to-transmit" phase is that it measures only reported likelihood to transmit. No actual decision to transmit the story or subsequent transmission was involved. This design was

thought to provide a reasonably accurate indication of intentions; however a relation between reported likelihood and actual transmission must be assumed.

With respect to whether metaphor has an effect on stories generated by speakers themselves, a significant result was found. Participants were more likely to use metaphorical language in their story when they were prompted with metaphorical language. Further, participants who received metaphorical prompts used significantly more metaphorical language in the story endings they wrote, compared to those who received non-metaphorical instructions. Finally, the majority of metaphorical language segments used were either identical to the language used in the prompt or in the same sensorimotor modality.

Thus, under more naturalistic conditions of agency, where participants created their own stories, metaphor was not found to have an effect on the likelihood to transmit the story. However, metaphor did have an effect on the story itself. Stories prompted with metaphorical language contained more metaphorical language, and to a large extent language in the same sensorimotor modality. Further, people who were given instructions using metaphorical language were more likely to use metaphorical language themselves.

In light of the results of studies 1, 2, and 3, the overarching question remains of how to account for the fact that a culturally successful artefact, exhibited no transmission advantage in experimental serial reproduction. It has been suggested that experimental serial reproduction allows for investigation of one of the three phases of cultural transmission, the "encode-and-retrieve" phase, to the exclusion of the phase prior, the "choose-to-receive" phase and the "choose-to-transmit" phase (Eriksson and Coultas, 2014; Stubbersfield et al., 2014). The results of this study do not indicate an effect of metaphor in the "choose-to-transmit" phase. Considering the results of the first four studies, thus, it would seem that metaphor does not have an effect on either the "encode-and-retrieve" phase, nor the "choose-to-transmit" phase. The significant finding did indicate, however, a type of "mimicry" or language matching in the story endings written by participants.

These findings thus raise two questions. First, it remains to be seen whether metaphor has an effect on the "choose-to-receive" phase in cultural transmission. This will be explored further in chapter 6. One factor that is relevant to a person's choosing to receive a cultural item from a source, concerns the their assessment of the qualities of that source. The question then is whether metaphor is perceived as indicating qualities about the source of the item, which may then influence the choice to receive the item. Such an influence may be a factor in choosing to receive, thus may contribute to explanations of the cultural ubiquity of metaphor. Second, the finding of mimicry or matching of metaphor may suggest a different possible explanation for the cultural success of metaphor, where the use of metaphorical language is related less to the content of the message or with perceptions of the speaker, and more with the co-ordination of the interaction between the speaker and the hearer. Behaviour matching in this way may contribute to the establishment and accrual of common ground (Clark, 1996). Such an explanation, though, would leave unaddressed the question of how metaphorical language is introduced in the first instance. In addition, it is not clear why the use of metaphorical language in a talk exchange might cause an interlocutor to use, in turn, metaphorical language—either identical language or other metaphorical language. Given the nature of these questions, a qualitative approach is required to explore metaphor use in more naturalistic context. Metaphorical language matching and the communicative function of metaphor in naturalistic talk are explored in study 7. Inquiry into the function of metaphorical language, why it might be used in the first place, is the focus of studies 5 and 6. This cultural success was not borne out, however, by serial reproduction tasks in studies 1, 2, and 3. The problem, then, is to explore further why a cultural artefact that exhibits no transmission advantage in experimental serial reproduction would otherwise be culturally successful.

### **5.3 Conclusion**

Metaphor is a widespread, thus culturally successful artefact. However, results of studies 1, 2, and 3 show that metaphorical language has no effect in experimental

serial reproduction. This study was the first of four to address question of what might account for the cultural success of metaphor? While the "encode-and-retrieve" phase is investigated in serial reproduction tasks, the "choose-to-transmit" phase is not. Study 4 investigated whether metaphor had an effect on transmission in the "choose-to-transmit" phase. Results suggest that it does not. However, it was found that under more naturalistic conditions of agency where participants created their own stories, those to whom instructions were given using a metaphorical language prompt were more likely to use metaphorical language. Overall, they also used more metaphorical language. This metaphorical language mimicry effect will be explored further in study 7.

## Chapter 6 Inferential potential of metaphor

This chapter describes studies 5 and 6, which sought to investigate the inferential potential of metaphor. Inferential potential is the extent to which the generation of ideas, images, thoughts, or memories (Boyer, 2001; Gregory and Barrett, 2009) is catalysed or supported by a cultural item. It is an important element in explanations of cultural transmission of supernatural ideas, as described in chapter 1. Past metaphor research, presented in chapter 2, has explored some perlocutionary effects of metaphor—how metaphor effects a change in understanding, opinion, or actions of those who produce or receive metaphorical language and the range of these possible changes and consequences. Perlocutionary effects and inferential consequences of metaphor have not been considered in the context of cultural transmission, however.

In studies 5 and 6, participants were asked to read texts about students' learning experiences and respond to questions about the text and a hypothetical producer of the text. Study 5 was an online experimental study and study 6 was a face-to-face conversation-based study. The results of the experimental study showed that the hypothetical speaker who used non-metaphorical language was judged to care more about students' learning experience than the metaphorical speaker. The findings of the qualitative study show how metaphorical language supports ample judgements of the texts presented and the various contexts where they would be more or less appropriate. The texts also sparked numerous judgements about the hypothetical speaker and his intentions.

Overall, it was found that differences in metaphoricality can generate different judgements under experimental conditions. In a more naturalistic context, interviewees made elaborate and varied judgements and inferences about both the text and the speaker, based solely on the metaphoricality of the text.

## 6.1 Introduction

Inferential potential is the extent to which a representation allows or facilitates the generation of ideas, images, thoughts, or memories (Boyer, 2001; Gregory and Barrett, 2009). The degree to which a cultural item generates an inference that influences or informs a subsequent action (e.g. a decision or another inference)—or how “potentially actionable” it is— is an important element in explanations of the cultural transmission and success cultural items (Gervais et al., 2011). In this sense, an “actionable” cultural item is a useable one. Ideas about adverse events (e.g. bad luck, illness, natural disasters) that have no causal link to potential victims of the event preclude any action by potential victims to prevent or attenuate the bad effects. Such “non-actionable” ideas would not then contribute to helpful inferences or actions. As such they would be expected to be difficult to retain individually and maintain culturally (Gervais et al., 2011). In comparison, consider how ideas that establish causal links between, for example, black cats and bad luck facilitate further inferences or actions to avoid bad luck. In this sense, the more actionable cultural artefact is expected to enjoy greater cultural success. More generally speaking, the more a cultural artefact is useful to inform inferences or actions, the more likely it is to be retained in a cultural set of representations. In particular, findings of study 4 raise the question of whether metaphor might signal qualities about the speaker that have an effect on a hearer's willingness to attend to the speaker. Such differences would pertain to the "choose-to-receive" phase of cultural transmission (Eriksson and Coultas, 2014; Stubbersfield et al., 2014).

The studies presented in this chapter aim to explore this actionable quality of metaphor, the potential of metaphor to inform inferences. The specific application of inference investigated in these studies is the formulation of judgements, both about known entities (texts) and about unknown entities (a hypothetical producer of the text). The specific questions considered in these studies are

*Does metaphorical language have an effect on judgements in an experimental setting? How does metaphorical language inform judgements generated in naturalistic talk?*

## **6.2 Study 5: Text and speaker judgement task**

Study 5 is an experimental study where participants were asked to read a text, in one of two conditions, and then to respond to questions about both the text they read and the hypothetical producer of the text. Study 6 explores the judgements and views of interviewees that arise in a face-to-face conversation, based on their reading of two texts, a metaphorical one and a non-metaphorical one.

### **6.2.1 Experiment overview**

In this online experiment, participants (n = 105) were asked to read a short text about learning and were then asked to judge the text (on its clarity and vividness) and the producer of the text (on the speaker's being knowledgeable, engaging, caring, and able to help) on a 7-point scale. The study used an independent design where participants were assigned randomly to one of four conditions of the text ( $\pm$  metaphorical content,  $\pm$  metaphorical structure). The aim of the experiment in study 5 was to discover whether metaphorical language had an effect on judgements about both the stimulus text and a hypothetical producer of the text, the speaker.

### **6.2.2 Participants**

As in studies 3 and 4, participants were recruited via Amazon Mechanical Turk, using the same pre-screening qualification task to help ensure that participants were both able and willing to complete a reading and writing task. The screening task was posted on Amazon Mechanical Turk and was open to participants in the United States with a prior acceptance rate of at least a 95%. The pre-screening task was completed by 140 people, who were paid \$US 0.10 for their participation, regardless of whether they qualified for the experiment. Of the 140 people, 121 qualified for



the experiment and were notified that they were eligible to participate in the present experiment, in exchange for a payment of \$US 0.30.

There were 111 participants in study 5. Six participants submitted no verbal comments in the task; their responses were omitted from the final analysis. The remaining participants (42 males and 63 females) were native speakers of English, aged between 17-68 years ( $M = 32.57$ ,  $SD = 11.87$ ), who reported having between 11 and 23 years of formal education ( $M = 15.92$ ,  $SD = 2.28$ ).

### 6.2.3 Materials

#### Stimuli

Participants were presented with a short text about learning. The stimulus was developed in four conditions, with/without metaphorical language in the main content of the text and with/without metaphorical language in the overarching structure of the text. The four resulting conditions, A-D, are shown in Table 6.1.

**Table 6.1: Four conditions of metaphoricality used in judgement task, study 5**

		STRUCTURE	
		NMET	MET
content	Nmet	A	C
	Met	B	D

The four stimuli used in this study are identical to four of the six texts used in study 3. Consistent with the four previous studies, the stimuli were developed systematically on the basis of the findings of the preliminary work reported in chapter 3. For the content variable, identical elements of propositional content were expressed in two conditions, non-metaphorical and metaphorical. Elements of the content of the stimuli are presented below in Table 6.2.

**Table 6.2: Language and sensorimotor modalities used in the stimuli (content variable), study 5.**

<b>non-metaphorical language</b>	<b>metaphorical language</b>	<b>sensorimotor modality</b>
understand	grasp	haptic/performatory
complex	heavy	performatory
concentrate	follow	locomotor
consider	dig into	haptic/performatory
understand	untangle	haptic/performatory
deliberate	bounce around	performatory
consider in different ways	look from different angles	visual/investigating
(get) help	(get) direction	locomotor, orientation
understand	get a grip	haptic/performatory
learn	digest	appetitive
understand	be on top of	locomotor/postural, orientation

In addition, 17 structural elements related to the process of learning, including subheadings and transitional sentences, were used in the text, expressed with and without metaphorical language, as shown in Table 6.3. In the metaphorical condition, the structural elements formed an extended metaphor, using one metaphorical “base” for more than one expressions with the same “target,” (Sopory and Dillard, 2002), in this case, several instances of metaphorical language based in a journey.

**Table 6.3: Structural elements, study 5**

	<b>non-metaphorical language</b>	<b>metaphorical language</b>
1	...every stage of learning...	...every step of the path of learning...
2	..every stage of learning...	...every step of the path of learning...
3	At the initial stage of the learning process...	At the beginning of the trail...
4	...to learn even more...	...to move even further...
5	...begin the process right...	...get the journey off to a good start...
6	At the intermediate stage of the learning process...	Mid-way through the journey
7	...in the initial stages of learning...	...in the first part of the journey...
8	...he may understand less and less...	...he may slow down...
9	...discover more on his own...	...go even further on his own...
10	...experiencing learning as part of a group, no longer a lone student...	...marching along the path as part of a group, no longer a lone traveller...
11	At the late stages of the learning process...	Towards the end of the path...
12	When students are in the late stages of learning...	As students travel even further along the trail...
13	Some students will make achievements rapidly from stage to stage, whereas for others it may be slower.	Some students will travel quickly along the path, whereas others may travel at a much slower pace.
14	Learners may very well need to repeat lessons or readings, or even have other types of learning experiences...	Learners may very well need to back up to cover the same ground more than once, or even explore other paths...
15	...in learning and understanding...	...and moving along a path...
16	... have the impression that they are not learning or that they simply cannot understand.	...have the impression of being at a dead end, or being lost.
17	...students find their learning experience challenging, but also satisfying, as they discover new ideas and create ways of thinking of their own.	...students find their journeys challenging, but also satisfying, as they discover new territories and create paths of their own.

All four stimuli are appended in appendix 6.A.

## Questionnaire

Participants made judgements on the text and producer of the text (the speaker) using a set of six statements and a 7-point scale of agreement (very strongly agree, mostly agree, agree, neither agree nor disagree, disagree, mostly disagree, very strongly disagree). Participants were given the following instruction, "For each of the following statements, please rate your agreement with the statement by indicating one of the seven responses. In the box below each question, please comment on why you selected your response." Thus both quantitative and qualitative data were collected.

The statements were as follows:

- 1. The material presented by the speaker was clear and easily understandable.*
- 2. The material was presented in a way that was vivid and attention-getting.*
- 3. The speaker was knowledgeable about the material.*
- 4. The speaker was engaging.*
- 5. The speaker cares about students' learning experiences.*
- 6. The speaker would be able to help a student who is experiencing difficulty with his or her studies.*

These questions were formulated with specific aims with respect to the research question, as described below in Table 6.4.

**Table 6.4: Rationale of the questionnaire items, study 5**

<p><b>1. The material presented by the speaker was clear and easily understandable.,</b></p>	<p>Item 1 was concerned with the effect of metaphor on perceptions of the text itself. It explored effects of metaphorical language, in content and/or in structure, in terms of making a story perceivably clear and easy to understand.</p>
<p><b>2. The material was presented in a way that was vivid and attention getting.</b></p>	<p>Item 2 was also concerned with the effect of metaphor on perceptions of the text itself. It queried effects of metaphorical language, in content and/or in structure, in terms of making a story seem vivid or easy to imagine.</p>
<p><b>3. The speaker was knowledgeable about the material.</b></p>	<p>Item 3 concerned whether metaphorical language had an effect on impressions of the speaker. Specifically, would metaphorical language convey an impression of expertise or knowledge about the given subject?</p>
<p><b>4. The speaker was engaging.</b></p>	<p>Item 4 queried whether a speaker who used metaphorical language was perceived as more engaging, interesting to listen to. Would metaphorical language make a speaker seem more interesting to listen to?</p>
<p><b>5. The speaker cares about students' learning experiences.</b></p>	<p>Item 5 aimed to gauge whether the use of metaphorical language could be interpreted as a sign of involvement or affective proximity of a speaker. Would metaphorical language make a speaker seem as though he cared more about what he is talking about?</p>
<p><b>6. The speaker would be able to help a student who is experiencing difficulty with his or her studies.</b></p>	<p>Item 6 aimed to gauge whether the use of metaphorical language could be interpreted as a sign of competence of a speaker, with respect to the spoken material. Would metaphorical language make a speaker seem a skilled and competent at resolving the challenges he describes?</p>

#### **6.2.4 Procedure**

The experiment was housed at the LSE social psychology online laboratory. Participants who had successfully completed a pre-screening task on Amazon Mechanical Turk were given the URL for the experiment, together with a unique identification number that was required to gain access to the study. Once they accessed the study using this number, they were presented with information about the study, asked to complete a form indicating their understanding and consent,

and asked to provide basic demographic information, following the same procedure as the first previous studies.

Each participant was randomly assigned into one of the four metaphorical conditions. They were presented with a text, an "excerpt from a presentation of an educational specialist" and instructed to read the text twice, taking as much time as they wished. After the participant finished reading, each of the questionnaire items was presented, with the 7-point scale and a space to explain why the response was selected. These were presented in the bottom half of the computer screen; the text remained in the top half of the screen throughout the procedure for ease of reference. Participants were informed that they were free to re-read any part of the text while they reported their judgements.

To ensure that the task was completed in the intended order, the "back" function was disabled. As with the previous experiments, the Amazon Mechanical Turk unique worker ID and the restriction of only one visit to the online experiment per IP address helped exclude repeat participation. Like the previous tasks completed by Amazon Mechanical Turk workers, upon completion of the task, participants were given a second identification number and asked to enter this number on the original Amazon Mechanical Turk HIT page. This enabled the researcher to verify the task had been completed and link the submission at the LSE social psychology online laboratory to the appropriate participant. Participants were paid \$0.30 USD for their time, which on average was 11 minutes, 37 seconds (for an hourly rate of \$1.55 USD). All participants who completed the task according to the instructions were paid, regardless of whether their data were included in the final analysis.

## **6.2.5 Results**

### **Quantitative data**

Mean values for text and speaker judgements are reported in Table 6.5.

**Table 6.5: Mean values for text and speaker judgements, by condition, study 5**

	text clear, easy to understand	text vivid, attention-getting	speaker knowledgeable	speaker engaging	speaker cares
NMET/Nmet (n = 24)	<i>M</i> = 2.25 <i>SD</i> = 1.03	<i>M</i> = 3.67 <i>SD</i> = 1.90	<i>M</i> = 2.54 <i>SD</i> = 1.22	<i>M</i> = 3.58 <i>SD</i> = 1.69	<i>M</i> = 1.63 <i>SD</i> = 0.50
NMET/Met (n = 31)	<i>M</i> = 2.61 <i>SD</i> = 1.45	<i>M</i> = 4.00 <i>SD</i> = 1.63	<i>M</i> = 2.74 <i>SD</i> = 1.18	<i>M</i> = 3.58 <i>SD</i> = 1.54	<i>M</i> = 2.29 <i>SD</i> = 1.03
MET/NMet (n = 23)	<i>M</i> = 2.26 <i>SD</i> = 1.21	<i>M</i> = 4.00 <i>SD</i> = 1.68	<i>M</i> = 2.43 <i>SD</i> = 0.84	<i>M</i> = 3.74 <i>SD</i> = 1.48	<i>M</i> = 2.57 <i>SD</i> = 1.38
MET/Met (n = 27)	<i>M</i> = 3.04 <i>SD</i> = 1.77	<i>M</i> = 4.22 <i>SD</i> = 1.91	<i>M</i> = 2.74 <i>SD</i> = 1.29	<i>M</i> = 3.96 <i>SD</i> = 1.83	<i>M</i> = 2.44 <i>SD</i> = 1.53

(n.b. "Strongly agree" was coded with a value of 1, "agree" 2, etc. Thus, a lower value indicates higher agreement.)

Non-parametric tests are recommended over parametric tests in the analysis of Likert- and similar scale data (Jamieson, 2004; Cohen et al., 2000). In addition, the distribution of responses for all six variables were found to be significantly non-normal (Kolmogorov-Smirnov test results are shown in Table 6.6.). On this basis, non-parametric tests were conducted to analyse the data.

**Table 6.6: Kolmogorov-Smirnov test for normality, for all six variables, study 5**

D(105) =	material clear	0.29	, <i>p</i> < .001
	material vivid	0.20	
	speaker knowledgeable	0.26	
	speaker engaging	0.20	
	speaker cares	0.30	
	speaker can help	0.26	

First, Mann-Whitney tests were conducted to test for effects of metaphor in either the content (shown in Table 6.7) or the structural elements (shown in Table 6.8) of the texts. Results indicated no effect of metaphor, in either the content or the structure, on the distribution of judgements.

**Table 6.7: Mann-Whitney test results for effect of metaphor in content, study 5**

	non-metaphorical	metaphorical		
	<i>Mdn</i>			
material clear	2.00	2.00	$U = 1152.50, z = - 1.429$	p > .05
material vivid	3.00	4.00	$U = 1234.50, z = - 0.844$	
speaker knowledgeable	2.00	3.00	$U = 1199.50, z = - 1.108$	
speaker engaging	3.00	3.00	$U = 1305.50, z = - 0.381$	
speaker cares	2.00	2.00	$U = 1148.00, z = - 1.226$	
speaker can help	2.00	2.00	$U = 1322.00, z = - 0.275$	

**Table 6.8: Mann-Whitney test results for effect of metaphor in structure, study 5**

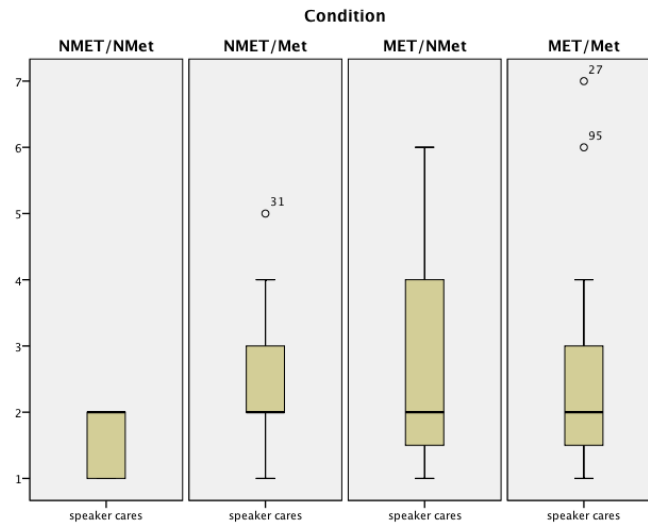
	non-metaphorical	metaphorical		
	<i>Mdn</i>			
material clear	2.00	2.00	$U = 1303.50, z = - 0.483$	p > .05
material vivid	3.00	4.00	$U = 1252.00, z = - 0.804$	
Speaker knowledgeable	2.00	2.00	$U = 1359.50, z = - 0.105$	
speaker engaging	3.00	3.50	$U = 1241.50, z = - 0.874$	
speaker cares	2.00	2.00	$U = 1148.50, z = - 1.544$	
speaker can help	2.00	2.00	$U = 1274.00, z = - 0.675$	

Second, Kruskal-Wallis tests were applied to the data to test for a difference in rankings of judgements across the four conditions. Judgements of the degree to which the speaker cares were significantly affected by the use of metaphorical



language in the speaker's text,  $H(3) = 8.042$ ,  $p < 0.05$ . Distributions of the responses in all four conditions are shown in Figure 6.1.

**Figure 6.1: Distribution of responses, "The speaker cares about students' learning experiences", study 5**



Mann-Whitney *post hoc* tests were used to follow up this finding. Three tests were conducted, and a Bonferroni correction was applied whereby the significance level is divided by the number of follow-up tests(3); thus all effects are reported at a .0167 level of significance. When both content and structure of the text contained no metaphor (NMET/NMet), participants judged the speaker to care about students' learning experiences significantly more than for texts with non-metaphorical structure and metaphorical content (NMET/Met)( $U = 234$ ,  $p < 0.11$ ,  $r = -0.34$ ) and for texts with metaphorical structure and non-metaphorical content (MET/NMet)( $U = 169.50$ ,  $p = .015$ ,  $r = -0.37$ ). In comparing judgement of speaker's care for the two extreme conditions, entirely non-metaphorical (NMET/Nmet) and entirely metaphorical (MET/Met), while the mean rank was lower (i.e. less agreement) for the metaphorical condition, 29.61 for NMET/NMet and 21.94 for MET/Met, this difference was not statistically significant ( $U = 226.50$ ,  $p > .0167$ ),

The quantitative data indicate that metaphor had a significant effect on judgements about the speaker. There was significantly more agreement that the non-

metaphorical speaker cared compared to speakers in the "mixed conditions" (NMET/Met and MET/Nmet).

### **Qualitative data**

To probe this result further, participants' verbal data were analysed. A thematic analysis of the open-ended comments that participants submitted to justify their quantitative responses was conducted to further inform the significant result. The focus of the initial review and coding of the material was limited to responses for the questionnaire item ("care") from participants in the extreme non-metaphorical category (NMET/Nmet), as this was the sole significant result in the quantitative analysis. All participants in the extreme non-metaphorical condition responded either "strongly agree" or "agree" to item 5, "The speaker cares about students' learning experiences." First, all the comments in the extreme non-metaphorical condition only (n = 24) were isolated and reviewed. Two initial themes relating to why participants thought the speaker cared about students' learning experiences were identified, "authenticity" and "endeavour". These themes are defined and expanded presently.

### **Authenticity**

"Authenticity" here refers to the quality of the speaker's attachment to the student and his experience as it pertains to "care". Comments reflected inferences of "genuine" concern for the student and interest in his success. Indications of perception of honest and strong commitment (even "passion") on the part of the hypothetical speaker were identified in the verbal data.

*"The speaker seemed to display genuine concern for student's ability to learn."*

*"It seems as though the speaker truly cares, because they wrote this piece meaningfully. They want students to have all the support that they need in order to fully understand and learn."*

*"The speaker seems to be interested in the success of the student, and having teachers realize that an attentive eye is key in all these phases, to ensure that the student captures the knowledge properly."*

*"The speaker seems to be passionate about the topic and to want people to really be able to learn."*

## **Endeavour**

The theme of "endeavour" encapsulates participants' inferences about how much work the speaker must have done, given what he said, and how this work is related to "care". In the verbal data is either implied or made explicit that if work was done, if effort was expended, then the speaker must care. This is especially the case where a high level of detail was achieved.

*"The author put some amount of effort into the material; I can only assume the author cared about the subject matter somewhat."  
(NMET/NMet)*

*"It is clear that the author is trying hard to analyze students' learning experiences."  
(NMET/NMet)*

*"I can tell by how detailed and thorough his ideas are that education is something that he/she really cares about."  
(NMET/NMet)*

*"The speaker explains in detail about learning, so I think he or she cares a great deal about learning experiences."  
(NMET/NMet)*

Other comments suggest a different basis for inference about the speaker's degree of care. Some participants, rather than identifying a reason, simply (and vaguely) located a basis for their positive judgement in the text itself.

*"I do believe the compassion for learning resides in his words."  
(NMET/NMet)*

*"Yes, the way he speaks, it shows the concern his giving to any individual student."  
(NMET/NMet)*

*"It seems clear from the article that the author cares about students learning, especially in a collaborative environment."  
(NMET/NMet)*

On the whole, positive views were maintained even in the face of negative impressions - bias or lack of objectivity on the part of the speaker, for example. As see below, some participants inferred care, in spite of problems or reservations about the text.

*"The overall writing does exhibit the feeling that the speaker does indeed care about student's learning experiences. But a bit of it seems like the speaker is using his own opinions in the matter and not as many facts as maybe the article should require."(NMET/NMet)*

*"Although, there are errors and slight biased opinions based on the information stated, I do believe the speaker does truly care about students and their success in their futures." (NMET/NMet)*

Indeed, one participant maintained both themes of endeavour and authenticity in her view, despite only a mediocre opinion of the text.

*"The analysis is thorough if unenlightening. It is an earnest attempt." (NMET/NMet)*

Finally, others had seemingly no particular reason for their judgement.

*"Why else would they write about it." (NMET/NMet)*

*"Definitely seemed to care about the learning process." (NMET/NMet)*

*"I felt the speaker did care about the student's learning experience, that they were really involved in the success of the student." (NMET/NMet)*

*"They were doing research to help the students. Why else would they write this article?" (NMET/NMet)*

Analysis limited to only those data given by participants in the condition (NMET/Nmet), those who judged the speaker to care more than in the other three conditions, suggests that "care" was interpreted on the simple basis of the language used. However, explanations given about why the language indicates care are generally imprecise, *"the compassion for learning resides in his words"*. Otherwise, themes of the speaker's endeavour in the formulation of the text seem to inform

ideas of authenticity of both his verbal expression and his approach to students and learning.

Second, the scope of the analysis was broadened to include verbal data from the other conditions (NMET/Met, n = 31)(MET/Nmet, n = 23) and (MET/Met, n = 27). Examination of the commentary to support responses for "care" item from the other three conditions reveals a broader variety of positions. Some found there was simply not enough information on which to base judgement, responding "neither agree nor disagree".

*"Not enough context to know." (MET/Met)*

*"Probably, but we can't know for sure." (MET/Met)*

*"I think he does but doesn't convey it right." (MET/Met)*

*"Perhaps he or she does, but again, there's no evidence of it in the text. In order to truly care about something, one must have undergone a significant process of gathering and reflecting on data about that thing." (MET/Met)*

*"The speaker did not side one way or another to show that he had anything personally invested in students' learning experiences. He merely presented a perspective." (MET/Met)*

Among the commentaries in the same condition, though, we find again themes of authenticity, endeavour, as well as seemingly less informed, default judgements.

*"Because his text is very passionate about helping students." (MET/Met)*

*"I would assume someone who would take the time and effort to write such an article would care about the subject matter." (MET/Met)*

*"I can only assume one would write about the benefits of collaboration in learning if the writer cared in the first place. I could be wrong, but why else would they write about this topic?" (MET/Met)*

Other participants still were more matter-of-fact, and made direct reference to the difficulty of the judgement they were being asked to make, and even to the metaphorical language in the text

*"The speaker is so impersonal that it's hard to say." (MET/Nmet)*

*" The speaker seemed to be stating facts, I am unable to draw any conclusions on the speakers emotions or intentions." (MET/Nmet)*

*"On the whole, the speaker seems to care a great deal about students' learning experiences. However, I chose only "slightly agree" as my rating due to the overpoweringly stale rhetoric of the speaker in statements such as this. "But with opportunities for supportive and constructive interactions, at every stage of the learning process, students report that they really feel they can digest even the most challenging work. These students find their learning experience challenging, but also satisfying, as they discover new ideas and learning processes of their own."*  
(NMET/Met)

Interestingly, a different participant in the same condition also inferred that the speaker cared about students, but had quite a different appreciation of exactly the same text.

*"I DO believe that this speaker cares about students and wants to help them succeed in their learning endeavours. The reason I think this is that the presentation is full of positive language, such as encouraging 'supportive and constructive interactions'." (NMET/Met)*

### **6.2.6 Discussion**

The text and speaker judgement task in study 5 sought to investigate whether metaphorical language had an effect on judgements in an experimental setting, as an indicator of the inferential potential of metaphor or how actionable it may be. In question were participants' judgements about the stimulus text and their inferences about the hypothetical producer of the text, the speaker. No significant differences were found in judgements about the text across metaphorical conditions. This result is somewhat surprising in light of past metaphorical research. It is also surprising that whereas there were no differences in assessments of the texts, a

significant difference was found in judgements about the hypothetical speaker. In terms of the degree to which the speaker cares about students' learning experiences, there was significantly more agreement that the non-metaphorical speaker (NMET/NMet) cared compared to speakers in the mixed conditions (NMET/Met and MET/Nmet), based on the metaphoricality of the text.

Verbal data collected during the experiment shed light on how participants justified their judgements. Thematic analysis of the data in the extreme non-metaphorical condition (NMET/NMet) suggests that on the basis of the text, participants inferred the effort the speaker put into thinking about and producing the text. They also gauged the speaker's authenticity with respect to students. Views of participants in other conditions reveal a broader set of inferences and interpretations about the speaker.

From these results, we can conclude that the metaphoricality of a message can serve as a basis for inference about the speaker. This is an interesting result, albeit limited to only one of the variables tested. Face-to-face interviews in the next study allow for a more detailed exploration of judgements and fuller explanations of participants' reasoning behind their judgements, complementing these experimental findings. The objective of study 6 is to understand further how judgements and inferences are formed and informed on the basis of metaphoricality of the text in a more naturalistic context.

### **6.3 Study 6: Text comparison interviews**

In this study, interviewees were asked to read two texts and to discuss their views on the text and the hypothetical producer of the text.

#### **6.3.1 Overview**

This qualitative study follows on from the findings of study 5 to understand more about how metaphor and the inferential potential of metaphor inform judgements in a naturalistic context. Interviewees were asked to read two texts, one with metaphorical language and one without, and to judge the two texts comparatively

(for clarity and vividness). They were also asked to judge the hypothetical producers of the texts (the speaker's knowledge, care, etc.), using a topic guide adapted from the experimental questionnaire used in study 5. The aim of study 6 was to investigate how metaphorical language supports judgements and inferences generated in naturalistic talk.

### **6.3.2 Participants**

Interviewees were selected from students at LSE who had sought study advice from the university's Teaching and Learning Centre<sup>5</sup>.

#### **Sampling criteria**

The main criterion applied to this convenience sample was native English language mastery. Interviewees who had already met with the researcher were sought to reach a level of familiarity quickly in the interview. Current students or recent graduates, for whom the topic of learning was particularly relevant, were selected. No exclusion criteria were applied with respect to subject studied, university level, age, sex, or country of origin.

The resulting sample comprised one undergraduate, five master's degree students and two doctoral students (5 female, 3 male) aged between 21-50 years old ( $M = 32.29$ ,  $SD = 11.10$ ) volunteered to take part in the interviews. All interviewees were from the United States or the United Kingdom. All volunteers had met with the researcher for at least one one-hour meeting prior to being invited to participate in these interviews. Six of the volunteers had met with the researcher numerous times (3-11 times) over the course of the academic year.

The participants were informed that the interviews were part of a study about how people describe and understand their learning experiences, and that they were solely for the purpose of the author's research (and unrelated to the work of the Teaching and Learning Centre). All interviewees were given written information

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<sup>5</sup> The author has worked as a study adviser at the Teaching and Learning Centre since 2011. I work with students on developing skills for study, research, and critical thinking.



about their right to end the interview at any time and the measures taken to ensure their anonymity. They were also informed that the interviews would be audio-recorded and transcribed, and asked to grant their consent to participate [Consent form appended in appendix 6.B.]

This sample of interviewees is the same group who took part in study 7.

### **Ethical considerations**

Due consideration was given to the circumstances of the interviewees and their relation to the interviewer, in a professional capacity, to help ensure that principles of ethical conduct in research were upheld (British Psychological Society, 2014). Interviews were held outside of term time, when one-to-one study support appointments with the researcher were not available. This guaranteed that the time that the participants spent in the interview did not detract from time they could have spent receiving study support. Participants were also informed that their choice to participate or not would have no impact on whether they would be able to have further study support meetings.

### **6.3.3 Method**

The aim of the interviews was to discover how metaphor informed interviewees' judgements about two specific texts, and a hypothetical producer of those texts. A semi-structured interview was conducted to allow for judgements and other reflections and questions to arise in a naturalistic, conversational context, to the greatest extent possible. Two specific instruments were used during the interview, a set of two texts, and a set of questions. The two texts were identical to two of the experimental stimuli used in study 5, the extreme non-metaphorical text, with no metaphorical language in the structure or content (NMET/Nmet), and the extreme metaphorical text, with metaphorical language in both the structure and the content (MET/Met). The set of questions was adapted from the questionnaire used in study 5, as shown in Table 6.9.

**Table 6.9: Interview topic guide, study 6**

In your opinion, what is the main difference in these two presentations?	
In terms of the <b>material</b> presented here...	
<input type="checkbox"/>	How clear and easily understandable is the material?
<input type="checkbox"/>	Is there is any difference in that respect between the two?
<input type="checkbox"/>	How vivid and attention-getting do you find the material?
<input type="checkbox"/>	Is there is any difference in that respect between the two?
Now, please think of the <b>producer</b> of these two presentations, the speaker...	
<input type="checkbox"/>	How knowledgeable is the speaker about the material?
<input type="checkbox"/>	Is there is any difference in that respect between the two?
<input type="checkbox"/>	How engaging is the speaker?
<input type="checkbox"/>	Is there is any difference in that respect between the two?
<input type="checkbox"/>	In your opinion, does the speaker care about students' learning experiences?
<input type="checkbox"/>	Is there is any difference in that respect between the two?
<input type="checkbox"/>	In your opinion, would the speaker be able to help a student in difficulty?
<input type="checkbox"/>	Is there is any difference in that respect between the two?
Do you have any other observations or comments about the material or the speaker?	
Do you have any other observations or comments about the difference between the two presentations?	

### 6.3.4 Procedure

#### Data collection

The interviews took place on the premises of the LSE. Each participant read and signed the consent form prior to the start of the interview. The interviews lasted between 15 – 35 minutes.

Interviewees were informed that they would be asked to read two short texts and that the aim was to have a very informal conversation about their views on the texts. They were assured that the texts were fictional excerpts of a presentation about learning and that there were no right or wrong answers. They were invited to take as much time as they liked reading and reviewing the texts, and told that they would be able to keep the texts and refer back to them during the interview, as they pleased. As the interviewees were all familiar with the venue and with

discussing study-related issues and questions with the researcher, the atmosphere during the interviews was quite relaxed and pleasant.

### **Data analysis**

All eight interviews were audio-recorded and transcribed (see appendix 6.C for a sample interview transcript) and prepared for thematic analysis. First, responses in each transcript were segmented according to the interview topic guide. This was helpful in the initial organisation and perusal of the data. It soon became apparent, though, that in considering their judgements, participants often referred back to previous questions, referred to the same part of the texts to answer various questions, or raised issues that proved to be interesting but not directly related to the specific item they were being asked to judge. In this sense, the discussion was more like a conversation rather than an orderly question - answer session. Another dimension of analysis was to consider the data in terms of condition of the texts the participants were referring to. Again, this step allowed for insight on some general opinions about the two texts, although there was no consensus. However, here again the complexity of the responses could not be adequately captured in a simple, side-by-side comparison of texts. Finally, like the experimental participants, interviewees sometime referred to language used in the texts directly. Some noted explicitly the use of metaphor. Most, however, did not mention the word "metaphor". Instead they referred to language that seemed more "visual", more "real", or more "alive".

In further readings, two major themes emerged from the data themselves: proximity and formality. "Formality" refers here to notions of formal use or applications of language - users, applications, formats of delivery, etc. Interviewees talked about the types of institutions where the language in the texts could be found, what kind people would use the language, for what purposes, and in which modes. "Proximity" here refers to an affective distance of the speaker, whether he was personable and approachable, or distant and detached. For both themes, many associated inferences arose.

The coding and analysis were also informed by the themes that arose in the analysis of verbal data in study 5. The comments to support and justify responses in study 5 were concise, but they useful to understand more about participants' judgements. Recall that the themes identified in textual experimental data were the speaker's "endeavour" and "authenticity", as well as to language-related factors. These themes, established in earlier work, help ground the analysis and are retained in the coding frame for the present interview data (Boyatzis, 1998).

Finally, as described in earlier, the topic guide for the interviews was based six variables established in the research instrument in study 5. These variables—clarity and vividness of the texts, the speaker's knowledge and the degree to which he was engaging, caring, and helpful—also informed the development of the coding frame. All these factors together contributed to the development of the coding frame, shown in Table 6.10.

**Table 6.10: Coding frame for interviews, study 6**

<b>code</b>	<b>definition</b>	<b>examples</b>	<b>observations</b>
proximity	Refers to an affective distance. This distance may be between the speaker and the hearer, or the interlocutors and the text or subjects of the text.	Indications of the speaker being distant, detached, or approachable, accessible.	This code was derived directly from themes identified in the interview data.
formality	Refers to notions of formal use or applications of language. This includes the kinds of people who use it, the motivations or applications of the use, and formats of delivery.	Indications of specific contexts where the language would be used (e.g. educational establishments, community centres, businesses); the types of people who would use it (e.g. teacher), their motivations or intentions (e.g. to get attention, to encourage), and modes of delivery (e.g. written, spoken, formal or informal presentations).	This code was derived directly from themes identified in the interview data.
language / concept	Indicates references to language itself, or to uses of metaphor related to conceptualisation of abstract ideas using concrete ideas.	Recognition of metaphors, as metaphors explicitly, or as language that uses imagery. Characterisations of "alive" or "dull" language use.	This code was used in the analysis of verbal data in study 5. It was adapted (to include "conceptualisation") and further developed as a function of relevant interview data in the present study.
authenticity	Refers to the extent to which the actions or disposition of the speaker are genuine or true.	Indications of the quality of the speaker's emotion or intentions (e.g. honest commitment, real concern, passion, etc. ) .	This code was used in the analysis of verbal data in study 5, and was also applicable to interview data in the present study.
endeavour	Refers to work or effort in developing the text or in speaking, thinking, cooperating, understanding etc.	Indications of how much effort was involved as evidenced by the language in the text. (e.g. "effort went in to the text")	This code was used in the analysis of verbal data in study 5, and was also applicable to interview data in the present study.

The coding process—dissecting the text, open coding, establishing code families, adjusting the coding frame—was undertaken by hand, without the use of a computer-assisted qualitative data analysis software.

### **6.3.5 Findings**

The findings will be presented in two parts. First, a brief overview of interviewees' judgements of the texts and speakers, organised by each of the six aspects queried during the interview. Second, the data will be described in detail in terms of the codes identified in the coding frame.

#### **Text and speaker judgements**

In terms of the six comparative judgements that were elicited explicitly during the interview, no clear consensus emerged. In some cases, interviewees found that a distinction between the two texts was not possible, or that there was no difference. Of course, this lack of consensus is not problematic; to the contrary, the range of views enriches the understanding of the processes of making judgements. More favourable judgements (text was clearer, speaker was more engaging or helpful, etc.) were made about the metaphorical text than the non-metaphorical text. The data are presented in more detail below.

In terms of clarity, most interviewees considered the two texts equally clear. Where a distinction was made, the metaphorical text was considered slightly clearer.

*"I guess I can appreciate the use of a path to and a journey to make things more understandable... The issue of travel and paths, and journeys has the potential to be more engaging." [P4]*

There was less consensus on how vivid the text was, however. While most found that the metaphorical text seemed more vivid, one interviewee [P2] had a strong view to the contrary. The interviewee ultimately considered his view of the texts in relation to his own learning experience.

*P2: I thought this one [NMET] got my attention more.*

*Int: OK, why?*

*P2: I guess, specifically like the words 'complex theory' as opposed to 'heavy theory'.... I don't know, I guess that just means, it just has a different connotation to it I guess.*

*Int: So for you, complex, for example, seems more attention-grabbing, more vivid.*

*P2: Yeah, yeah...differences like "understand less and less" grabs my attention more than "he may slow down"*

*Int: OK. Any idea why?*

*P2: Mmm, I don't know. Because I feel the need to understand a lot! (laughter)*

During the initial questions about the four specific qualities of the speaker (knowledge, engaging, care, and helpfulness) various views were given. One interviewee found the non-metaphorical speaker to be more knowledgeable because his language "[was] a little bit more formal I guess. And it also makes you realise there's a, you know... he emphasises the fact that there's a process. It's not just a pour it in the glass and you're done, kind of thing" [P2]. Based on the formality of the language, others drew the opposite conclusion. They considered the metaphorical text to be simpler language, and inferred that speakers who are able to use simple language would have more knowledge.

*"...this one [REFERRING TO METAPHORICAL SPEAKER], is like translating the same information into... you know, there's a flow to it, you kind of almost see that this person understands it. Because he understands it and he's able to translate it into a way that you can now visualise and conceptualise it. [P6] "*

*"It's when you use simple terms, simple explanations...that you really know something. I think they [REFERRING TO METAPHORICAL SPEAKER] know the material better because it's only ... you can only do an elevator speech that is simple and understandable, you can only do it if you understand it really well." [P1]*

In terms of how engaging the speaker would be, interviewees inferred from the texts that they would feel more engaged by metaphorical speaker; that he would be more interesting, effective, and convincing.

*"...He didn't put it really technical terms...to be able to talk in this sense seems much more effective, to teach philosophical concepts, for example. So in my personal experience, that shows the person is more convincing... he would be a more interesting person". [P1]*

*"I would be so bored if someone was saying this [REFERRING TO NON-METAPHORICAL TEXT] ... Versus this one [REFERRING TO METAPHORICAL TEXT], I would be more engaged. [P8]*

When asked directly about how much they thought the speakers cared about students' learning experience, interviewees thought, on the whole, that there was little difference. Two interviewees, however, held views that the metaphorical text signalled more care on the part of the speaker.

*"I think [THE METAPHORICAL TEXT] has more emotion in it just because of the again the imagery of like, there's more feeling language... the whole idea of students find their journey challenging but also satisfying as they discover new territories and create paths of their own...it's more touchy-feely language, I guess. Emotional language makes them sound like they care more." [P7]*

Similarly, interviewees did not interpret a clear difference in how helpful the speaker would be, with the exception of one who found the metaphorical speaker to be more helpful. Participant 8 found the metaphorical speaker more "approachable" and associated this with helpfulness. (This theme will be discussed further in the next part under "proximity").

*"If that person you're trying to help is this person whose has this desire to learn... it's so much more important that they feel like they can go to someone who is more easy to approach, and imagine if someone's finding certain difficulties with their learning experience, you want to be able to feel like you're going to someone who's ...who understands you more as a person and this one to me again is more conversational and more informal, it would make the student more comfortable to approach them." [P8]*



## **Coded themes**

### **Endeavour**

Similarly to the participants in study 5, work or effort on the part is inferred from the texts. For example, participant 2 was the only interviewee to find the non-metaphorical speaker more caring, on the basis of the work that was thought to go in to writing the text.

*"I think if the language is a bit more formal then I think there was more effort and caring that went into it." [P2]*

### **Authenticity**

"Authenticity" refers to how the actions or dispositions of the speaker are felt to be genuine or honest. This quality of authenticity was indicated in talk about the speaker's feelings and concern about the subject matter and his commitment and intentions toward the audience. This theme emerged in the data from study 5, and to some extent persists in the reflections of the interviewees. In considering how the speakers cared about students, participant 7 in the excerpt above notes the metaphorical speaker's emotion expressed in the text. Another participant goes as far as to interpret "passion" in the text (as did participants in study 5).

*"[REFERRING TO THE METAPHORICAL TEXT] The active verbs and all that does give a sense of emotions. It's very had to put an active verb and then not sound emotional... so to that extent, some of the sentences, I do get a sense of urgency, passion kind of." [P1]*

*"[REFERRING TO THE METAPHORICAL TEXT] This is more human, so to speak." [P1]*

### **Language / Concept**

Direct references to language itself, or to uses of metaphor related to conceptualisation of abstract ideas using concrete ideas were coded "language / concept." The first question asked after the interviewees had finished reading the texts was about the main difference they saw between the texts. All the

interviewees identified a difference easily. They described it differently, though. While some focused on the words themselves (see P6 below), others emphasised how the language informed the concepts in the texts (see P4 below).

*"The biggest difference that I notice is just the different words. Like, this one is a path, there's a trail, it's a journey; whereas this one is stages. It almost breaks it up more... here's the first stage, then the intermediate, then the late, so it feels a little more choppy. Just very surface level." [P6]*

*"They are conceptualising sort of the process, so in [THE METAPHORICAL TEXT] it is the idea of a journey or travel, so giving a concrete example of what the process might be, where [THE NON-METAPHORICAL TEXT] is talking about the more abstract idea of a stage. [THE METAPHORICAL TEXT] gives a physical manifestation and [THE NON-METAPHORICAL TEXT] is more of an intellectual, less concrete, more abstract, less tangible." [P4]*

While data from study 5 is limited to relatively vague references to the language used in the text, interviewees elaborated on the qualities of the language and the comparative differences between the two versions that they considered to be important.

*"One of the things I didn't like about the use of the word 'stage', even though they both talk about a beginning, middle and end, I felt the idea of the end that we were talking about... the use of the word 'stage' makes the idea of the end more concrete, which I find problematic (...because learning doesn't end). [P4]*

*"I don't know why for me, but saying "grasp some particularly heavy theory" kind of makes it feel more real, almost, like your grasping for something (hand gesture) I can visualise that. Whereas you're saying 'oh, a student's trying to understand something.' Well, everyone's always trying to understand something. ...calling it a journey as opposed to just stages of learning, it resonates better, I think." [P6]*

*"...once you really understand something and you can help someone else visualise it and see it in their minds." [P6]*

This distinction of how metaphorical language provides a "concrete" basis to "abstract" ideas and how it can help the interlocutor "visualise", thus understand

better speaks directly to prominent theoretical accounts of metaphor! (See chapter 2: conceptual metaphor theory (Lakoff and Johnson, 1980), perceptual simulation (Barsalou, 1999; Gibbs, 2006; Ritchie, 2008).

### **Formality**

"Formality" was used code ideas and inferences about the formal use or applications of language. Based on the metaphoricality of the texts interviewees differentiated the kinds of people who produce the texts and their intentions or motivations. Various contexts, applications, and formats of delivery of the texts were inferred as well. For example, interviewees found that the non-metaphorical text "felt institutional" [P3] whereas the metaphorical text would better suited to an teaching context.

*"[THE NON-METAPHORICAL TEXT] sounds more institutional and [THE METAPHORICAL TEXT] sounds more like active metaphors, sort of like one that you would give a facilitation training for community people who want to work with kids." [P7]*

*"...to be able to talk in this sense [REFERRING TO METAPHORICAL TEXT] seems much more effective, to teach philosophical concepts, for example." [P1]*

Interestingly, one interviewee perceived the difference in the two texts to be more closely linked to the audience, rather than the speaker. Participant 8 also found the metaphorical text more suited to pedagogical purposes.

*P8: I can imagine this [THE METAPHORICAL TEXT] being used to give a speech on a training to try to train people how to teach and how to understand... like how to train a teacher to understand... the students' perspective and how they should try and understand the students' learning experience.*

*Int: Why would that be useful to train somebody?*

*P8: Because we're talking about a student which is a person, which is ... this one [THE NON- METAPHORICAL TEXT] is kind of dissecting it formally. This one [THE METAPHORICAL TEXT] is more personable and, I think, trying to make the teacher understand and trying to build a rapport because this is more personal, it would be more effective. I think probably everyone would use this... I think it's quite similar, it just seems this is more conversational.[P8]*

The preceding excerpt also underscores that not only is an appropriate context understood from the use of metaphor, but an intention is inferred. The metaphorical speaker is trying to "make the teacher understand" and "build a rapport" and the metaphoricality of the text can help reach this goal. Other interviewees identified the speaker's intentions or motivations *vis à vis* the audience. Below, the interviewee perceives that the speaker has a specific wish for the audience, reflected in his use of language.

*"Just this style of the text I guess makes me think that ... I don't know, like this paragraph has a little bit ... it seems like "enrich his knowledge and discover more on his own" where "enrich his knowledge and go even further on his own" ... like there's a promotion, that they want you to discover." [P2]*

Other aspects of formality involve participants' inferences of how the language is used or delivered. For example, some found that the non-metaphorical text would be a written form, whereas the metaphorical text would be a spoken version of the same message [P3]. Another found the non-metaphorical text to be "institutional and specific" and went as far as to imagine how the non-metaphorical speaker would speak.

*"I can just imagine this person standing behind a podium, bla bla bla bla, going on intentionally monotone." [P7]*

In response to the initial question about the main difference between the texts, one interviewee framed his view in terms of how the text could be used.

*"The subtitles are obviously different, this journey... so story helps... this one [THE NON-METAPHORICAL TEXT] is sort of a process, so detached. This [THE METAPHORICAL TEXT] could almost be a pamphlet, marketing material. This one [THE NON-METAPHORICAL TEXT] has no place in a marketing pamphlet. The story... I mean people like to hear stories; people like to hear stories that are journey-like." [P1]*

## **Proximity**

Perhaps the richest among the themes that emerged from the interview text was that of "affective distance" or affiliation between the speaker and his audience, and in relation to the text or subjects of the text. Degrees of proximity were raised in relations between the speaker and the "immediate" audience, that is the interviewee, in this case and between the speaker and a hypothetical audience, a student, for example.

When they considered themselves as the audience, via the text, interviewee noted a greater proximity in reaction to the metaphorical text. For instance, participant 1 remarked that he could identify more easily with the metaphorical text. Another interview elaborated further, referring to their proximity with respect to both the text and the speaker

*"I feel like I can relate to this so... I feel like I'm in their same camp from a personal perspective, so, they can't be all that crazy, because I have a similar stance." [P4]*

Other interviewees interpreted from the metaphorical text that the speaker was making an effort to be closer, more understandable to them, by empathising, considering how they felt, thinking in their shoes.

*This one [THE METAPHORICAL TEXT], (reads aloud:) '...may begin digging...bouncing around ideas...' as a human trying to empathise or trying to consider how I would feel towards this, I find it more easier, emotionally and mentally, to understand it that this ...might also take the initiative to deliberate. So this one B I find more personal. Both I can relate to, but this one [THE METAPHORICAL TEXT] is easier. [P8]*

*[REFERRING TO THE METAPHORICAL TEXT]"there is sort of an indirect effect that I feel that he is thinking in my shoes..." [P1]*

Conversely, the non-metaphorical speaker was perceived to be distant. One interviewee related this distance in terms of herself.

*"I think [THE METAPHORICAL SPEAKER] sounds like they'd be more personable, which doesn't work for every student. It works for me. [THE METAPHORICAL SPEAKER] sounds like someone who would actually sit down and walk you through something where [THE NON-METAPHORICAL SPEAKER] sounds like someone who has these really brilliant Powerpoint slides but who won't sit down to talk to you about them." [P7]*

While some interviewees gauged proximity in terms of themselves, others considered this idea, in terms of the relationship between the speaker and a student, or another third party. Thus, the metaphoricality of the texts allow for a judgement of relations that do not involve them directly.

*"If that person you're trying to help is this person whose has this desire to learn... it's so much more important that they feel like they can go to someone who is more easy to approach, and imagine if someone's finding certain difficulties with their learning experience, you want to be able to feel like you're going to someone who's ...who understands you more as a person and this one to me again is more conversational and more informal, it would make the student more comfortable to approach them." [P8]*

*"this language seems more, a bit...like I said, not as formal so -- like "marching down the path" or whatever...maybe this one [THE METAPHORICAL SPEAKER] would be closer to the students in some way? maybe because the language is a little less formal. I'm not sure 'formal' is the right word, but it's different. (reads aloud: "same ground". Yeah, like words like this, like 'same ground' that's more, you know, 'need to repeat lessons' ... so this one [THE METAPHORICAL TEXT] makes me think this is someone you can talk to easier, perhaps? More accessible and this person [THE NON-METAPHORICAL SPEAKER] is may be more formal, so maybe not as accessible. [P2]*

Interestingly, later when comparative expertise of the speakers is raised, participant 2 suggested that the non-metaphorical speaker would be more knowledgeable. In

reviewing the responses, participant 2 refers back to the conversation about "accessibility" and associates more expertise with more distance.

*Int: So you thought that [THE NON-METAPHORICAL SPEAKER] could be more knowledgeable?*

*P2: Yes, yes. More knowledgeable but maybe not as accessible.*

*Int: OK, that's interesting.*

*P2: It's surprising me too!*

One final observation on proximity and the relations among the hypothetical speakers; the "immediate" audience, the interviewee; a more remote audience, a student; and the texts themselves concerns an interesting notion that came up in two interviews: translating. Recall participant 6's remark on how a person who understands something well is able to translate it into metaphorical language (See *Text and speaker judgements* above). The idea of translating from non-metaphorical language into metaphorical language is raised again, but with the introduction of a new entity into the relationship, a "middleman". Participant 8 remarked that the non-metaphorical text was very "cold", "detached", and "scientific". She then suggested that using the non-metaphorical text to explain something to a teacher would require more work for the teacher, an extra process of interpretation.

*"if this is for... a teacher ... say if you've got the person who's trying to explain this to the teacher ... this is like making the teacher do this work [REFERRING TO THE NON-METAPHORICAL TEXT], whereas this just means they have to like get it to this to understand the student, whereas this [THE METAPHORICAL TEXT] just cuts out the middleman. And just go straight through." [P8]*

When asked to explain further, the interviewee described a how using metaphor was a type of conceptual "shortcut" and a way to reduce distance with the audience. The alternative, a non-metaphorical description, obliged the hearer to translate into familiar metaphor.

*"I have to turn this [THE NON-METAPHORICAL TEXT] into this [THE METAPHORICAL TEXT] and then to start to think about it [from NMET into MET]"... "whereas with this[MET] it's like straightaway it's made you feel more empathetic, made you feel more familiar with this setting. It makes you almost go back to any sort of personal memory that you could talk... because at one point you've probably been a teacher or a student. So it makes it, because it's more personable you can react to this straightaway whereas with this you have to think, "this early stage" what is this early stage? The beginning of the journey! Oh, OK, the beginning of the journey. Then you start to think, what kind of point is that, oh, it's when the student just begins to learn something... when you start off... Whereas with this, it's like you're skipping that part." [P8]*

In this sense, metaphor creates a potential for both conceptual and affective "rapprochement", failing which a "middleman" or some other reconciling effort is required.

### **6.3.6 Discussion**

The aim of the interviews to elicit judgements in study 6 was to investigate how metaphorical language supports judgements and inferences generated in naturalistic talk.

This conversation-based method complemented the experimental judgement tasks in study 5. While the judgements themselves were of interest, it was interviewees' reasoning and how they used the differences they perceived between the two texts to develop and inform their judgements that were of primary interest.

Interviewees drew on the metaphorical and non-metaphorical variants in the two texts they read to arrive at a rich set of intricate, personal, varied, and founded judgements. Themes identified in study 5, endeavour and authenticity, as well as observations of the language itself informed the judgements generated during interviews. The texts were also the basis of a range of judgements and views on the formality of the speaker, the text and its uses, and the contexts where the speaker and text could be expected. Most dominant among the judgements formed by the participants based on the metaphoricality of the texts were those related to the affective proximity of speakers, to both the interviewees themselves and to others.



They perceived the metaphorical speaker as more "approachable" and "accessible" and that they could relate to the metaphorical version of the story more easily.

#### **6.4 Discussion**

Studies 5 and 6 sought to respond to two specific questions: whether metaphorical language had an effect on judgements in an experimental setting, and the how did metaphorical language inform judgements generated in a more naturalistic context. Results of experimental judgement tasks in study 5 indicate that the metaphoricality of stimulus had significant effect on participants' judgement of the speaker. Specifically, the hypothetical non-metaphorical speaker was considered to care more than the hypothetical speaker who used metaphorical language. Interview findings from study 6 illustrate how interviewees discovered, debated, and formulated a rich set of judgements informed by the metaphorical variants in the two texts they read. Metaphor informed their inferences about the proximity of the speaker and the formality of both speaker and the ways he would use the text.

Interestingly, there was not a consensus across all the participants' judgements. This is neither surprising nor problematic. The understanding of metaphor in terms of how it may cause or inform inference can be usefully considered in terms of perlocution. As reviewed in chapter 2, perlocutionary acts are the least tractable of Austinian speech acts. The set of effects of an utterance on a hearer—on her beliefs, emotions, actions, or inferences—is potentially limitless (Sadock, 1974; Bach and Harnish, 1979; Levinson, 1983). In this sense, there was no expectation that interviewees arrive at the same judgements. Instead the importance of the findings is that metaphor helped participants arrive at these judgements.

The empirical findings offer an example of the inferential potential of metaphor; how metaphor affords the generation of ideas, images, or thoughts (Boyer, 2001; Gregory and Barrett, 2009). In this sense, the metaphorical language in the texts used in studies 5 and 6 can be considered "actionable", or generally useful to help generate further inferences. Inferences generated in both studies related to known

items—the texts presented to participants—and more interestingly, perhaps, to unknown entities as well. A range of unknowns featured among the interview findings: the speaker, his intentions and motivations; the context and format of how the texts might be used; how other students would find the speaker, how they would react to him. For example, interview findings indicate that the hypothetical speaker who uses metaphor is judged to be affectively closer to the hearer and perceived to be generally easier to relate to and more accessible to students as well. This finding builds on the earlier question of potential factors that influence a person's choosing to receive a message. Where the speaker is judged to be affectively closer, there may be a greater likelihood that his message, whatever its content, will be attended to. In this way, metaphor may have an effect in the "choose-to-receive" phase of transmission.

Inferential potential has been identified as a contributing factor to cultural success (Boyer and Ramble, 2001). Empirical work suggests that the capacity of some representations to trigger inferences can "boost" its retrieval (Boyer and Ramble, 2001, p. 558). The extent to which such "high-inferential-potential" representations can then contribute to causal explanations (of unexplainable events, for example, [See Whitehouse, 1992; Bloch, 1998]) and inform subsequent actions should then also be a factor in their distribution across a population.

If metaphor effectively supports inferences about formality, the hearer of metaphor could conceivably make further inferences and take action in response to the kind of person she thinks the metaphor user is or the context in which they interact. Where metaphor informs inferences about a speaker's authenticity, the genuineness of his motivations, a hearer could use these inferences to act accordingly (believe the speaker, reject the speaker, ask a particular question, etc.). Metaphor-informed judgements of proximity would be actionable social information that could potentially guide hearers' actions usefully. Cultural artefacts with such inferential potential, while they might not be memorable in an asocial context, could be expected to be retained in social contexts, thanks to their actionability, their simple "usefulness". This usefulness or function could also

explain why metaphorical language is not only matched, as seen in study 4, but why it is introduced into naturalistic talk exchanges in the first instance. Consider finally, one interviewee's remark about the metaphorical text:

*"This one's more personable and, I think, trying to make the teacher understand and trying to build a rapport because this is more personal, it would be more effective. [P8]*

In light of inferential potential in communication, the metaphorical language here might contribute to both establishing a bond with the hearer and *signalling* to the hearer that the speaker intends or wishes to establish a bond. The inferential potential and actionability of metaphor and the specific kinds of inferences and communicative actions or functions metaphorical language supports are explored further in study 7.

## **6.5 Conclusion**

Inferential potential, the extent to which a representation allows or facilitates the generation of ideas, images, thoughts, or memories (Boyer, 2001; Gregory and Barrett, 2009), has been identified as a contributing factor to cultural success (Boyer and Ramble, 2001). The degree to which such an inference can then influence or inform another action is the "actionability" of the original representation (Gervais et al., 2011). In sum, an actionable representation is a "useable" one. Studies 5 and 6 investigated this actionable quality of metaphor. Results indicate that differences in metaphoricality can generate different judgements under experimental conditions. In a more naturalistic context, interviewees made elaborate and varied judgements and inferences about both texts and hypothetical speakers, based on the metaphoricality of the text. These empirical findings offer an example of the inferential potential of metaphor.

## **Chapter 7 Metaphor and coordination in naturalistic talk**

The results of studies 4, 5, and 6 revealed two empirical phenomena related to metaphor that may contribute to an explanation of its cultural success. First, metaphorical prompts yielded more metaphorical language in story descriptions and endings. Second, metaphorical language was linked to inferences about both known factors (texts) and unknowns (hypothetical speakers). Thus, the simple use of metaphorical language by one interlocutor encourages metaphorical language use by another; and metaphorical language supports inferences, particularly about otherwise unknown entities.

An exploratory, interview-based study is presented in this chapter. Study 7 sought to understand further these phenomena by describing specific patterns of "prompted" metaphor use and investigating inference-making in a face-to-face verbal exchange. The findings describe ways that metaphorical language may be used to coordinate joint action in conversation, involving "echoing" metaphorical language and matching metaphorical sensorimotor modalities. In this final study, it was found that metaphorical language was used in several ways that can facilitate the establishment and maintenance of common ground (e.g. displaying agreement, softening disagreement, clarification, negotiating conceptual pacts, etc.) Coordination towards common goals in face-to-face verbal exchange, it is suggested, may be supported by the use of metaphorical language.

## 7.1 Introduction

An interactionist view of language holds that social factors are crucial to understanding language use and that these factors "should be systematic and describable" (Clark, 1985, p. 179). A rich literature, both theoretical and empirical, informed by this view details many mechanisms that help establish, probe, and maintain interlocutors' shared knowledge—their common ground. These include ways that mutual knowledge is accrued in a conversation and how matching language use can help converge on shared meanings. For instance, as described in chapter 2, conversations are highly coordinated joint activities and processes of social interaction. One aspect of this joint activity is the building of common ground through orderly discursive contributions (Clark and Schaefer, 1989). In alternating phases of presenting and acceptance of information, interlocutors work together in a "participatory act" to arrive at a shared belief that mutual understanding has been reached; these phases are organised in 'contributions' (Clark and Schaefer, 1989, p. 263). Lexical entrainment, a tendency for interlocutors to use the same words in referring and describing over the course of a conversation, is another such mechanism (Brennan and Clark, 1996; Garrod and Anderson, 1987). Because lexical entrainment (and other types of behavioural entrainment, e.g. posture, gesture, facial expression, speech rhythm, syntax, accent, etc.) is easily detectable, it has been suggested that it can impact perceptions of affiliation between interlocutors (Manson, Bryant, Gervais, and Kline, 2013). By converging on the same lexicon, participants in a conversation can coordinate what a word or description refers to in a conceptual pact, "a temporary agreement about how the referent is to be conceptualized" (Brennan and Clark, 1996, p. 1484). The interview-based study presented here explores the ways that metaphorical language may be used coordinate joint action in conversation, informed by this interactionist perspective.

In studies 4, 5 and 6, two phenomena in the use of metaphorical language were discovered. First, story endings collected under experimental conditions in study 4 showed that metaphorical prompts yielded more metaphorical language than non-metaphorical prompts. Second, results of both experimental and qualitative studies

(5 and 6) suggest that metaphorical language supports judgements about both observed verbal narrative, and rich inferences about unknown persons—in this case, a hypothetical speaker. Thus, the simple use of metaphorical language by one interlocutor may encourage metaphorical language use by another, either by echoing the exact language or producing new metaphorical language in the same sensorimotor modality. In addition, metaphorical language may support inference and understanding, particularly about otherwise unknown entities. To the extent that both of these phenomena can be means to establish and maintain common ground, and because common ground is a fundamental process of social interaction they are potentially important in understanding the cultural success of metaphor (Clark, 1996). Study 7, an exploratory, interview-based study, sought to understand further these phenomena by identifying specific patterns of "prompted" metaphor use and investigating inference-making in a face-to-face verbal exchange, and consider how use of metaphorical language might contribute to coordinating social interaction in a conversation.

## **7.2 Study 7**

This qualitative study follows on from the findings of studies 4, 5, and 6. Interviews were conducted using a topic guide based on the preliminary work described in chapter 3. The aim of study 7 was to identify patterns that emerge in the use of metaphorical language in naturalistic talk, to observe how metaphors are used and matched by interviewees, and to reflect on coordinating functions that metaphorical language may support in a naturalistic context.

### **7.2.1 Participants**

Interviewees were selected from students at LSE who had sought study advice from the university's Teaching and Learning Centre.<sup>6</sup>

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<sup>6</sup> The author has worked as a study adviser at the LSE Teaching and Learning Centre since 2011.

### **Sampling criteria**

The main criterion applied to this convenience sample was native English language mastery. In addition, interviewees who had already met with the researcher were sought to allow for a level of familiarity quickly in the interview. Current students or recent graduates were selected, for whom the topic of learning was particularly relevant. No exclusion criteria were applied with respect to subject studied, university level, age, sex, or country of origin.

The resulting sample comprised one undergraduate, five master's degree students and two doctoral students (5 female, 3 male) aged between 21-50 years old ( $M = 32.29$ ,  $SD = 11.10$ ) volunteered to take part in the interviews. All interviewees were from the United States or the United Kingdom. All volunteers had met with the researcher for at least one one-hour meeting prior to being invited to participate in these interviews. Six of the volunteers had met with the researcher numerous times (3-10 times) over the course of the academic year.

The participants were informed that the interviews were part of a study about how people describe and understand their learning experiences, and that they were solely for the purpose of the author's research (and unrelated to the work of the Teaching and Learning Centre). All interviewees were given written information about their right to end the interview at any time and the measures taken to ensure their anonymity. They were also informed that the interviews would be audio-recorded and transcribed, and asked to grant their consent to participate (Participant information and consent form appended in appendix 7.A).

### **Ethical considerations**

Due consideration was given to the circumstances of the interviewees and their relation to the interviewer, in a professional capacity, to help ensure that principles of ethical conduct in research were upheld (British Psychological Society, 2014). Interviews were held outside of term time, when one-to-one study support appointments with the researcher were not available. This guaranteed that the

time that the participants spent in the interview did not detract from the time they could have spent receiving study support. Participants were also informed that their choice to participate or not would have no impact on whether they would be able to have further study support meetings.

### **7.2.2 Method**

The aim of the study was to allow for a naturalistic conversation to the greatest extent possible. Data were collected using semi-structured interviews. To facilitate the interviews, an indicative topic guide was used. The topic guide (see appendix 7.B) provided a flexible framework for the conversation without imposing a rigid structure (Gaskell, 2000). It was organised into four parts, allowing for discussion of

1. a general characterisation of the overall learning experience,
2. specific experiences with learning and understanding texts, theories, studies, ideas, etc.,
3. working with others during the learning process, and
4. general conclusions about their experience.

The first question in the topic guide asked for an overall impression of the student's learning experience, and contained no metaphorical language. Each of the three subsequent parts contained a set of prompts that included the metaphorical language used in the research tools applied throughout the project. Specifically, the set of metaphorical elements in the various sensorimotor modalities that were developed in the preliminary work and used in the experimental stimuli in studies 1-5 were also used in the topic guide. In this sense, the development of the research instrument followed an experimental logic, to help ensure consistency across the various studies. There was, however, no experimental manipulation of the stimulus, nor treatment of the participants.



### **7.2.3 Procedures**

#### **Data collection**

The interviews took place on the premises of the LSE. Upon arrival, each participant was welcomed by the researcher. No others were present at any point during the interview. Each participant read and signed the consent form prior to the start of the interview. The interviews lasted between 35 – 135 minutes.

At the beginning of each interview, participants were informed that the aim was to have a very informal conversation about their learning experience. It was emphasised that there was no specific list of topics or obligatory questions, and that they should feel free to describe those issues, aspects, difficulties, and discoveries that were most important and interesting to them. Overall, the ambience of the interviews was quite relaxed and familiar. All of the interviewees were familiar with the venue and with discussing study-related issues and questions with the researcher.

#### **Data analysis**

All eight interviews were audio-recorded and transcribed (see appendix 7.C for sample interview transcriptions). The first step of the analysis required identifying the metaphorical language used during the interview. As with the first set of interviews, described in chapter 3, this was done following the metaphor identification procedure (Deignan, 2008; Pragglejaz, 2007; Steen, 2008). Consistent with the application of the procedure in the preliminary work described in chapter 3, most common idiomatic expressions and dead metaphors (e.g. "being in the groove," "I kept an open mind," "I couldn't see the forest for the trees") were excluded from the metaphorical language to be analysed. Unlike the first set of interviews, however, for this analysis it was important to observe the conversational context in which the metaphors were used. The metaphorical language segments were identified first by the researcher alone. One page of each transcript, coded by the researcher was given to two native English speakers for consultation on variances according to the Pragglejaz procedure. The coders

worked together, and exclusions were made, and agreement was reached on the sample pages. The agreed upon framework was used to identify metaphor in the remainder of the data. Finally the metaphorical language segments were coded for sensorimotor modality, using the coding frame in Table 3.1.

Metaphorical language about knowledge, learning, and understanding was coded in terms of metaphor matching (metaphor begets metaphor) and the communicative functions. A variant of content analysis was conducted to describe the talk in a way that was both objective and systematic (Berelson, 1954). Three specific dimensions were analysed: the position of the metaphorical language, the extent of matching, and the function of the metaphorical language.

### **Coding frame**

The code "position" refers to whether matched metaphors occurred in the turn immediately following the original use of the metaphor (adjacent), or afterwards (not adjacent). The code "language" indicates whether the re-occurrence is the same metaphorical language, different metaphorical language using the same sensorimotor modality, or different metaphorical language in a different modality. Finally, the code "function" indicates the function of utterances that contained matched metaphors. Four functions were coded: maintenance or further development of the meaning proposed in the initial occurrence of the metaphorical language, a slight modification to the use of the original metaphorical language or possibly to disagree slightly, explicit disagreement with the original metaphorical language, and interrogation about the original metaphorical language. The framework is shown in Table 7.1.

**Table 7.1: Coding frame, study 7**

<b>category</b>	<b>code</b>	<b>definition</b>
POSITION	adjacent <b>[+ adj]</b>	occurrence of metaphor immediately after initial occurrence, in the following utterance/turn
	not adjacent <b>[- adj]</b>	not adjacent: occurrence of metaphor after the following utterance/turn
LANGUAGE	metaphor matching <b>[=met]</b> (∴ = modality)	use of exactly the same metaphorical language
	Modality matching <b>[=mod]</b> (but ≠ met)	use of different metaphorical language in the same sensorimotor modality
	no matching <b>[ ≠MET, ≠mod ]</b>	use of different metaphorical language that is in a different sensorimotor modality
FUNCTION	<b>[maintain]</b>	to maintain the meaning in the first use of the metaphorical language
	<b>[modify]</b>	to consider or offer a slight modification or rectification of the meaning, to disagree slightly with the meaning in the first use of metaphorical language
	<b>[disagree]</b>	to disagree explicitly
	<b>[question]</b>	to ask a question or to ask for a clarification

The coding frame was developed to suit the aim of the study, to identify patterns of metaphor use. "Position" was chosen because the relative order and positions of interviewer's and interviewee's metaphorical segments were important to the analysis. The metaphorical language segments had already been coded for sensorimotor modality previously during the metaphor identification procedure, allowing for three degrees of matching. For the category "function", the definitions of the codes were informed by the observation of the patterns found in the data (agree, modify, etc.).

It should be noted that the scope of analysis enabled by this coding frame is limited only to metaphorical language identified in the data and to a selection of possible communicative functions. Only those segments identified as metaphorical language about knowledge, learning, and understanding were included in the analysis. The entire range of potential conversational events and functions is not considered, nor are specific themes or opinions expressed during the interviews. Rather, the analysis aims to describe occurrences of metaphorical language and how they are used in a conversational context. Given the exploratory nature of this study and the small sample size, this work aims to capitalise on the strengths of a qualitative approach that affords not an "inventory", but a discovery and a description of a range of possibilities to inform reflection (see Gaskell, 2000, p. 41).

#### 7.2.4 Findings

Several interesting patterns of metaphorical language use emerged in the data. An overview and illustrations are offered in this section. [Note the coding convention {**position, language, function**}. For example, "[+adj] [=met] **maintain**" indicates an occurrence of metaphorical language that was adjacent to the prior occurrence, identical, and maintained the gist of the initial occurrence, as detailed in the coding frame in Table 7.1.

In many cases, participants repeated and re-used metaphorical language immediately in the talk sequence. In some cases, it was a simple matter of agreement.

*I: This way of thinking, this way of approaching the material, do you think that has **spilled over** into how you think of other things? Non-academic things? News items...*

*P2: Yeah, I think so... I think it **spilled over**. [P2](p. 5, 6-7)  
[+adj] [=met] **maintain***

Here P2 agrees, using the identical metaphorical language. Here the matched metaphor is uttered in an adjacently after a moment of reflection. P2 marks ends the acceptance phase of the contribution with the identical metaphor repeated.

In other cases, this immediately adjacent matched repetition was used to disagree with the proposal that was expressed in the metaphorical language.

*I: You said it was unfamiliar territory. By the time a couple of terms had gone by, and you were into the dissertation - a year ago now - did it feel like familiar territory? or **were you feeling lost?***

*P5: **I think I wasn't feeling lost**, I was feeling it was more familiar. The dissertation was completely unfamiliar, I didn't do a dissertation for my undergraduate... [P5] (p. 2 10-11) [+adj] [=met] disagree*

While P5 disagrees, the identical language is used. Lexical entrainment is often used to display agreement; or failure to lexically entrain to display disagreement (Brennan and Clark, 1996). Interestingly, here P5 disagrees with the proposition but still matches the metaphorical language. This may be a way to soften displayed disagreement as a means of face maintenance (Rees-Miller, 2000).

Other times, though, repeating exactly the same metaphorical language was used when the speaker did not disagree explicitly, but where in the context of the conversation there was not full agreement with the statement. In this sense the metaphorical language was used as a point of reference against which to contrast the speaker's view.

*I: And thinking back a little further to exam time, come exam time, **did you feel sort of on top of all the material**, that you had gotten a good grip on it at that stage?*

*P5: Oh no, I found the exams terrible, terribly hard to go back to that way again. **Being on top of the material?** ... You know what with the exams, I could have done better if I had done more rote learning and I had done more sitting down practice, practice, practice, practice, practice, [P5](p. 2, 35-38) [+adj] [=met] modify*

For instance, at the question of whether P5 felt "on top of the material", she repeated the metaphorical language, paused for reflection, and then described how she did feel.

*I: And now a year later, do you find that having gone down that path and dealt with that, does that bring you something today?*

*P5: Yeah, it does, I'll give you an example, so because I want to keep **on top of all this stuff**, I can now, back in the world of work, I can now subscribe to academic journals. [P5] (p. 5, 6) [-adj][=met] **maintain***

In this case, though, P5 uses this same metaphorical language much later, near the end of the interview, affirmatively, to describe the interviewee's relation with the material she studied, one year later.

In the contribution below, P5 uses identical metaphorical language in a question to clarify and agree upon a meaning of the metaphorical language.

*I: OK, and so if you had to name just one thing, what would be the most challenging part of that **whole journey** for you?*

*P5: Um, so **the journey from starting to finishing in terms of learning are you thinking?***

*I: Yes, yeah, that's it. [P5] (p. 4 34-37) [+adj] [=met] **question***

This explicit clarification seems to indicate the potential for ambiguity in interpreting metaphor, and a means to manage and clarify the ambiguity by matching language.

In considering the repeating of exactly the same metaphorical language, it was rare to find this other than in the very next turn. There was one case.

*I: And after this process, given the discomfort and trying to access this information, were there times that you really felt satisfied **that you really grasped the material?** that you really got to it and got your hands on it?*

*P2: Yes, yeah, there were some satisfying times. Whether that would be, and I can think of a few times, sitting alone in the library and you're like, Oh! OK, I get it or in seminars, a lot of times, and lectures, I guess, when things would sort of come together. You'd pull... I guess those times where you'd pull from another course and would come in, and you'd say, Oh that's just like this but maybe in a different context or a different way, and so then you'd say, you'd make connections. And so that was always like, wow, that's powerful learning I think, there, because you can kind of see the forest from the trees or something.*

*I: Did you ever feel like you had to go over the same ground twice - or more than once?*

*P2: Yeah, definitely*

*I: Taking the same path more than once...*

*P2: **To really grasp the material?** Yeah. Yeah, it's true... [P2] (p2, 2-15) [-adj][=met] **maintain***

Among the data, typical occurrences of "echoed" metaphor were non-adjacent and non-identical. That is, metaphorical language in the same sensorimotor modality was used to refer back to the same subject. For example, once some metaphorical language in the haptic/performatory modality had been introduced ("What did you do to really grasp the ideas?", "...untangle the articles...", "...gotten a good grip on it..."), interviewees used metaphorical language in this same modality.

*P5: Your way of helping me to think differently about things and **break things up**, was really, really useful. [P5](p. 3, 20-21)[-adj] [=mod] **maintain***

*I: What do you think they were doing? {students in meetings with supervisors}*

*P5: Talking, **bouncing ideas**, lots of them showing stuff. And I don't think the door would ever have been closed with my supervisor. [P5](p. 4, 1) [-adj] [=mod] **maintain***

*P5: I'm in corporate life as an independent person and psychologically that makes me feel so much freer and so much, so liberated and I think if I hadn't been on the journey of leaving work going to university again, doing something different, again, **just to shake up my thinking**, like disrupting my thinking, disrupting my pattern of living... then I probably wouldn't have done it. [P5](p. 6, 20) [-adj] [=mod] **maintain***

Of course, because the re-occurrence is distal, it is not possible to assess the degree to which the modality was maintained or whether it was re-used, unrelated to previous utterances. It is the case that HAP/PER is the most used modality in this sample.

In the interesting exchange below the interviewee changes the metaphorical language, from "untangle" to "tangle".

*I: OK, so what you think you did? You know, what do you think you did to **untangle** it? (p. 1, 43)*

*P6: ... You have to **tangle** yourself and it's going to be frustrating. And it's tough because how do you prepare for that? You can't. [P6](p. 2, 21) [-adj] [=mod] **modify***

As with the previous example, we see again how the modality (again HAP/PER) re-appears in later uses of metaphorical language in the following turns.

*P6: Like even right now, I was studying, I was reading for my lit review there are plenty of **pieces** that... I'm like I'm not really **picking out** what she's saying, but let me keep going and you know, and maybe I'll read this article again after I do more. It's like, I'm only up to my second or third book so it's like I know that I need to do more before I'm really going to **pick up**. [P6](p2, 28-32) [-adj] [=mod] **maintain***

Below, the same pattern of distal modality matching emerges, but in the appetitive modality.

*I: at this stage, going back to that theory and all the material you've studied... **Do you feel like it's absorbed... digested?** (p. 8, 37)*

*P6: Yeah...with sounding pretentious, I feel the smartest I've ever felt...*



*So it's almost frustrating because I want more... My friends and I joke about it, but it's like you want more. **You know you can't stop you wanna just keep consuming once you really get it.** [P6](p. 8, 39 and 47)  
[-adj] [=mod] maintain*

In one example, shown below, metaphorical language was used adjacently, but both the language and the modality changed (LOC/ORI to APP). Also interesting is that this change in modality did not seem to signal disagreement. Perhaps thus, to a degree, the simple use of metaphorical language, unmatched for language and modality could also be form of mimicry.

*I: Did they help **give you direction**? What did...*

*P2: Yeah, I think you kind of **fed off each other**, you know. Different ideas and different experiences, and stuff. I mean sometimes it would be something that came up in [P2](p. 2, 38)[+adj] [≠MET, ≠mod] maintain*

Of course, there is no claim that these functions cannot be carried out without metaphorical language. In fact, the example below, P2 agrees with matched language (+ADJ, =language (NMET) agreement). This is an identical function as in the contribution with P2 (the first example in this section).

*P2: and they were giving me crap about the stuff United States had done...(laughter) no but it was good, it was all healthy...*

*I: **and in a good spirit***

*P2: **In a good spirit, yeah.** [P2](p. 7, 1)*

**[+adj] [ identical language, non-metaphorical (sui generis)] maintain**

In addition to using the metaphors initiated in the topic guide, all interviewees also introduced their own metaphorical language. Typically, these metaphors were used consistently throughout the interview.

### 7.2.5 Discussion

It was found in study 4 that story endings written after receiving metaphorical language instructions contained more metaphorical language than those written after non-metaphorical prompts. This can be considered in light of past research on behaviour matching. Bargh, Chen, and Burrows (1996) propose a perception-behaviour link, whereby upon perceiving a behaviour in another increases the likelihood of adopting the same behaviour oneself. The unconscious, automatic link is theorised to drive the "chameleon effect"—mimicry of postures, facial expressions and other motor behaviour. It is claimed that increased mimicry is correlated with increased social cohesion in a group (Chartrand and Bargh, 1999) and that the chameleon effect increases affiliation, which promotes social cooperation, an evolutionarily-informed "social glue" (Lakin, Jefferis, Cheng and Chartrand, 2003).

A communicative analogue to the chameleon effect by which language used by one speaker can influence an interlocutor's language use has been proposed in language style matching (Neiderhoffer and Pennebaker, 2002). Style matching, in this sense, is based on similarity of number of turns, word count, word length, negation style, and types of words used (e.g. nouns, pronouns, modifiers, etc.) and is calculated using computer assisted analysis (Linguistic Inquiry and Word Count, LIWC). It is thought that using more "function words" (e.g. pronouns, definite articles) requires a higher level of mutual understanding in a conversation since they are heavily context-dependent (Meyer and Bock, 1999; Chung and Pennebaker, 2007; Gonzales, Hancock, and Pennebaker, 2010). Increased style matching in conversations dyads has been found to be linked with greater levels personal engagement in both positive and negative circumstances (Neiderhoffer and Pennebaker, 2002). For example, greater style matching in conversations was found to predict outcomes of romantic relationships. Pairs who matched language style more were more likely to become romantic partners and stay in the relationship longer (Ireland et al., 2011).

The empirical findings from study 7 provide indications of a metaphorical language style matching. As demonstrated above, interviewees matched metaphorical

language to indicate agreement. They also, however, used matched metaphorical language when they disagreed with the interviewer, perhaps to soften the disagreement (Rees-Miller, 2000). In other cases metaphorical language was matched as a means to reduce ambiguity, in a clarification sub-dialogue (Litman and Allen, 1987) to arrive at an explicitly agreed interpretation of the metaphorical language presented. In one case, in response to the interviewer's metaphorical utterance another metaphorical segment of different language and different modality was produced (in agreement). Thus, if a type of metaphorical entrainment were occurring, it might be sufficient simply to use metaphorical language, even of a different modality.

*I: Did they help **give you direction**? What did...*

*P2: Yeah, I think you kind of **fed off each other**, you know. Different ideas and different experiences, and stuff. I mean sometimes it would be something that came up in [P2](p. 2, 38)[+adj] [ **≠MET, ≠mod** ] **maintain***

These observations are of an exploratory nature only. Metaphorical language was purposefully introduced into the interview to explore further the matching effect of study 4. For the purposes of a conversational analysis, of course, a truly naturalistic exchange is required. It is interesting, nonetheless, to observe conversational coordination using metaphorical language. Of course, there is no suggestion that metaphorical language is required for such coordination. There may be ways the coordination is achieved differently with metaphorical language compared to non-metaphorical language. It may also be the case that it is used more in conversations about abstract concepts.

Turn-taking, incremental building of common ground is a feature of all conversation (Clark, 1996) and language matching is part of the many means used to build common ground. Interestingly, matching is most likely not a matter of imitation without intention, but a part of coordinating processes that fulfil informational and affiliational imperatives for social interaction (Enfield, 2006).

### **7.3 Conclusion**

In this final study, it was found that metaphorical language was used in several ways that can facilitate the establishment and maintenance of common ground (e.g. displaying agreement, softening disagreement, clarification, negotiating conceptual pacts, etc.). Seeking, displaying, building, and maintaining common ground in face-to-face verbal exchange fulfils both informational and affiliational imperatives for social interaction. Metaphorical language, it is suggested, may support such coordination.

## **Chapter 8 A social-inferential account of the cultural success of metaphor**

This chapter presents a discussion of the ensemble of the findings as they relate to the research questions and aims of the study. It begins with a short description of the research process, then briefly recapitulates the main findings. An account of the cultural success of metaphor based on a potential role in inferential processes that support social interaction is detailed in terms of the informational imperative and the affiliational imperative. Theoretical and methodological implications are discussed, as are limitations of this work and directions for the future.

## **8.1 Introduction**

The aim of the study was to apply an account of cultural transmission to a cultural artefact not previously considered within an epidemiological approach, everyday metaphorical language; first, to understand more about cultural transmission, and second, to understand more about metaphor. The cognition and culture framework and its view of cultural transmission, an epidemiological one, have great appeal in terms of a healthy debate around well-formulated determinants of cultural success. An established empirical method, and a rather interesting set of past applications (folk legends, various gods, ghosts, etc.) exist within this framework. Metaphorical language is a ubiquitous, even universal, cultural variant. Metaphor and cultural transmission had a common foundation in communication. Communication is thought to be a "motor" of cultural transmission; and metaphor in communication is a long-standing area of reflection. The first phase of research used the serial reproduction experimental paradigm, and results called for further reflection about the research. (Early iterations of the research plan included questions about what types of transmission biases metaphors might exploit in cultural transmission, and whether there were different types of metaphoricality or degrees of embodiment that would show different degrees of fidelity in transmission.) But metaphor was found to have no effect in experimental serial reproduction. Thus another set of research questions developed. While the first three studies aimed to understand whether metaphorical language in a story had an effect on its transmission, the last four studies aimed to understand the social and pragmatic aspects of communicative interaction that can help account for the cultural success of metaphor. This chapter presents a discussion of the ensemble of the research findings as they relate to these questions and aims. The main findings of the research are briefly reviewed; then theoretical and methodological implications are discussed, as are future directions.

## **8.2 Summary of findings**

Studies 1, 2, and 3 sought to investigate whether metaphor had an effect on cultural transmission. Results of this first phase of research showed that

metaphorical language about knowledge, learning, and understanding had no effect on the transmission of stories in three experimental, online serial reproduction tasks. The question arose then as to how to account for the cultural success of metaphor, in light of these results. Study 4 revealed a metaphor-matching effect, where metaphorical prompts to invent a story led to more metaphor use in the story. Results of a further experiment (study 5) and interviews findings (study 6) indicated an inferential potential of metaphor that allows for inferences of a unknown person's motivations, intentions, and affective proximity based on their metaphor use in a text. Findings from interviews in study 7 showed that metaphorical language may facilitate the coordination of conversational joint action and building common ground.

### **8.3 A proposal to account for the success of metaphor**

*What accounts for the cultural success of metaphor, in light of the results of the findings that metaphor has no effect in experimental serial reproduction?*

I suggest that the cultural success of metaphor may be linked to its role in inferential processes that support social interaction. This role can be considered in terms of the informational imperative and the affiliational imperative.

During social interaction, in the midst of "grounding for inferring" cycles (Enfield, 2006; see discussion in section 2.5), metaphor can help respond to an informational imperative by catalysing and informing inferences. In this sense, they are inferentially "rich", one aspect of the transmission bias conferred by minimal counterintuitiveness (Boyer, 1994, Barrett and Nyhof, 2001). Where qualities, motivations, and intentions of a person can be made more detectable by the use of a language form, that form could be preferred over others in some contexts. In addition, inferences that inform assessments of the authenticity of a speaker, as those found in study 5, could usefully inform future actions (e.g. continuing to interact, attending to messages, leaving, sharing a resource, etc.). The more a cultural item generates actionable inferences, the more likely it is to be retained

(Gervais et al., 2011). Qualitative findings from study 6 showed that participants inferred the demeanour of a hypothetical speaker, whether he seemed cold and detached, or personable and approachable, depending on the use of metaphorical language. Such inferences would likely have an impact on whether utterances would be attended to in the "choose-to-receive" phase of transmission (Eriksson and Coultas, 2014; Stubbersfield et al., 2014). Interviewees also made judgements about the context where such language would be used (e.g. a school, a business). Metaphor-informed inferences of this type would constitute actionable social information that could potentially guide hearers' actions to some benefit. Thus with respect to cultural success, potential "informational" advantages conferred by the inferential potential of metaphor would be two-fold, both in terms of an impact on choice to receive and actionability. Metaphor may also have a role in fulfilling the "affiliational imperative" where its use in conversation could establish useful referential frameworks in a conceptual pact (Brennan and Clark, 1996) or vividly signal verbal mimicry or lexical entrainment (Garrod and Anderson, 1987; Brennan and Clark, 1996).

#### **8.4 Implications of a social-inferential account of the success of metaphor**

This proposal to explain a cultural success of metaphor based in its potential to support social interaction at an interpersonal level has numerous implications for an epidemiological view of culture. Importantly, these findings show that this cultural transmission research paradigm that can be successfully applied to some types of cultural artefacts may not have the same sensitivity to factors that affect transmission of small-scale, everyday cultural artefacts.

##### **8.4.1 Biases**

Epidemiological explanations of the distribution of cultural artefacts rely primarily the content biases that determine memorability, as described in chapter 1 (Sperber, 1985, Norenzayan et al., 2006). Indeed, their application has given rise to important insight into minimal counterintuitiveness in religious and supernatural beliefs, which in turn shed light on the cognitive mechanisms that allow for their



propagation (Boyer, 1994, Barrett and Nyhof, 2001). There may be a distinction to be made, however, between these "anthropological" types of cultural artefacts, and other cultural artefacts that are more context-dependent, perhaps because they are everyday items or because of degrees of granularity in their instantiations. However, currently no parameters to make such a distinction have been articulated.

Of course, there are other theoretical biases developed in the cultural transmission literature. Context biases (e.g. conformity or rarity biases, prestige or success biases) fall primarily in the broader domain of those who approach cultural dynamics using statistical modelling to capture large scale cultural evolution (Cavalli-Sforza and Feldman, 1981; Boyd and Richerson, 1985; Henrich and McElreath, 2003). Indeed, the argument has been made for a set of factors beyond content biases to be considered in the study of cultural transmission. Henrich and Boyd (2002) "accept that social learning, like all other forms of learning, requires innate expectations about objects in the environment and the nature of relationships among them. How these innate structures shape the human mind is obviously of great importance for understanding human culture. The mistake is to see these ideas as incompatible with making population dynamic models of cultural change. It will never be enough to focus on the mind and ignore the interactions between different minds" (p. 110). The interactions to which they refer are not interpersonal social interactions, however, but mathematical models of interactions. Prestige biases, or somewhat tangentially, attributes that might favour diffusion of innovations (e.g. social connectedness) are necessarily more social in nature than content bias. Here again, though, these concern one-way assessments (e.g. who is best to copy?) and not factors related to potential for social interaction.

Clearly, content biases can account for differential distribution of some types of cultural artefacts. This may be related to the degree to which the artefact is regularly maintained in institutions, with guides, teachers, norms, etc. The cultural success of metaphor, it would seem, is less linked to its representational content and more related to its context and its function in that context. Thus, these

findings contribute to the cultural transmission literature by calling for reflection on broadening the scope of potential transmission biases to include those factors that promote or dissuade social interaction, cooperation, and coordination.

#### **8.4.2 Phases**

Recent studies have drawn attention to a potential oversight in the current epidemiological approach in that important events that determine cultural transmission prior to and after the reception of cultural artefact are not systematically accounted for. Eriksson and Coultas (2014) propose at least three stages of cultural transmission, choose-to-receive, encode-and-retrieve, and choose-to-transmit, and argue that focusing solely on encode-and-retrieve (i.e. in a serial reproduction task) places too much emphasis on processes of memory alone. Another recent development in the literature is a proposal for a "four-stroke engine" model of transmission where biases might take effect upon "exposure" to the cultural item, mental "representation" of the item, "reproduction" of the item from a private representation to a public one, and during a "material" phase where the item is perceived in an external, physical context (Enfield, 2014, p. 201). As discussed earlier, in the choose-to-receive or material/exposure phase, inferences about the characteristics of a speaker based on metaphorical language use could likely have an impact on transmission. While there has been no debate against incorporating these recently proposed phases, by default traditional serial reproduction methods favour only a limited temporal scope of the process. In any case, for both the choose-to-receive phase and the choose-to-transmit phase, content would remain one important factor, but so too would assessments of the speaker, among other contextual factors. Taking into account other phases of transmission would make for a more complete explanation of cultural transmission.

#### **8.4.3 Cultural artefacts? or cultural processes?**

The epidemiological approach considers culture as a set of representations shared by a group and is concerned with the distribution of these representations (Sperber, 1996; Boyer, 1994). There may be scope to consider artefacts like metaphor as processes or practices (e.g. means by which to perform acts, build common ground).

Indeed, perhaps the terms used here, cultural "artefacts", "objects", or "items" is not apt. Enfield notes "while we speak of variants as 'things' that are distributed, in fact the more complicated reality is that we are in fact talking about the distribution of a communicative, collaborative practice of employing, and responding to, a word or linguistic form...a linguistic variant is a type of process, not a type of thing"(Enfield, 2008, p. 298). Rather than "what kind?" and "how many?", a greater latitude for "how?", "why?" and "among whom?" would be welcomed. Of course, these questions are certainly asked about religious beliefs and supernatural beliefs. But if it were the case that metaphorical language was widespread due to its social-interactive function rather than its content, a quasi-phatic language artefact (Jakobson, 1960), in effect, it would not be surprising that it had no effect in a study using a method oriented towards representational content.

Another process-oriented interpretation of metaphor could be made in terms of perlocution, where one possible act is "common ground building" (Austin, 1962). The basis of common ground is to be found in large-scale cultural practices (e.g. unison singing or praying) and in small-scale, everyday activities of people who regularly interact. For instance, Pomerantz and Mandelbaum (2005) take a conversation analysis approach to analyse types of everyday conversations and how they maintain relationships, to understand how specific conversational acts indicate belonging in relationships, focussing on interlocutors' "shared sense-making practices" in conversations(p. 151). The analysis of these practices is not focused on the content of the utterances in the conversations, rather the actions performed in making the utterances, for example, talking about personal problems, giving updates on ongoing situations that both interlocutors know about, referring to past shared experiences, being appropriately impolite with close people. At an even finer grain, in some contexts the use of metaphorical language can be considered a type of relationship building or maintaining action.

## **8.5 Limitations and future directions**

Many potential areas of inquiry were left unexplored in this study. The research design included both experimental and qualitative methods that allowed for testing

in the traditional serial reproduction paradigm, complemented by other experiments, textual data, and interviews. But, as the findings indicate, depending on the type of artefact to be transmitted, the biases in question, the transmission phases or other factors to be investigated (e.g. related to receiving, transmitting, interaction during transmission) there is certainly scope for the use methods that include more face-to-face interaction, or explicit collaborative or goal-oriented tasks, etc. Innovative variations on serial reproduction experiments that involve more explicit cooperation and interaction include a recent study where pairs of participants jointly discussed and recalled a story to explore sociocultural mediators of recall (Wagoner and Gillespie, 2014). The theoretical questions enumerated here contribute to informing methodological questions as well. If a broader range of biases, phases, and factors related to social interaction in cultural transmission were to be explored, or if other studies found no effect in serial transmission of otherwise widespread cultural artefacts, there would be an argument for variations in the design of cultural transmission experiments to make them more "social", or multi-method approaches that pair qualitative and experimental approaches.

Future studies in the area of social-inferential factors that influence cultural transmission of "everyday" culture could usefully broaden the delimitations of this study. For example, a longitudinal approach could be taken. If the use of cultural artefacts are found to influence affiliation or interpersonal interactions, observing such interactions over time could be informative. Likewise, investigation of the same factor in different contexts (e.g. family, professional, public places, private interactions, etc.) might be of interest. Finally, while this study had a narrow focus on metaphorical language about knowledge, learning, and understanding, future studies could examine metaphorical language (or any other cultural artefact) used in many aspects of everyday life (e.g. to talk about health, family, work, etc.).

## **8.6 Applications**

The aim of this research was primarily a theoretical exploration. In carrying out the research, though, I have become aware of views of metaphor as a teaching tool. Perhaps more useful than a means to make more "vivid" teaching materials or

learning experiences is an understanding of students' experiences and a potential for metaphor in fostering interaction among learners and teachers. Higher education aspires to foster critical interaction—with thinkers in the room, and thinkers long time gone. If the goal of teaching is to encourage this critical thinking and engagement with texts and with people; and not to "deliver" or "receive" knowledge, then surely an account of cultural transmission that includes cooperation, interaction, and common ground alongside memorability and recall would be appropriate.

## **8.7 Conclusion**

This study has tested assumptions about the correlation of cultural success and high fidelity transmission in serial reproduction. In this respect, the apparent difference between what have been referred to as "questions of anthropology" and so-called "everyday" culture raises further questions. Some of the dimensions that might inform a useful differentiation between the two have been raised here, content *versus* context, content *versus* function, artefact *versus* process.

Beyond matters of definition, though, are matters of explanation. If transmission were found to differ systematically along the lines of "anthropological" questions of life and death and "everyday" matters of common knowledge, or commonsense, is one account of transmission of both types to be sought? If so, what would be the basis of such an account?

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## Appendices

### APPENDIX 3.A. PRELIMINARY STUDY, PARTICIPANT INFORMATION AND CONSENT FORM

Thank you for your interest in this research project. You will find information below about the research and participation in the study.

#### PURPOSE OF RESEARCH

You are invited to participate in a study about how people describe and understand their learning experiences.

#### PROCEDURES

You are being asked to participate in a one-on-one interview, which will last for about 30 minutes. The interview will be audio-recorded for facilitation of transcription and analysis of your responses.

#### POTENTIAL RISKS AND BENEFITS

There are no known risks associated with this research. While there are no specific benefits to you expected from your participation, it is hoped that you will enjoy the interview.

#### PARTICIPANTS' RIGHTS

You should not feel obliged to agree to participate. If you agree to participate and then later change your mind, you are free to withdraw your consent and discontinue your participation at any time during the interview. You do not need to give a reason for your decision to end your participation. This research has been approved by the departmental ethics procedure of the Institute of Social Psychology, London School of Economics and Political Science.

If you have any questions or concerns about this research, you may contact either the principal researcher or the research supervisor, at the London School of Economics and Political Science.

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### APPENDIX 3.B. PRELIMINARY STUDY: INTERVIEW TOPIC GUIDE

I understand that you are an MSc student in \_\_\_\_\_.

During this term, have you felt busy with your MSc work?

Could you describe that?

Have certain periods felt busier than others?

How has this felt?

(...for example, have you experienced stress?)

Before you came to LSE, is this what you expected?

Compared to your studies before, is it similar?

...how

---

planning, procrastinating

In terms of time and your academic work, could you describe your typical week?

(...and your lectures? classes? )

(...you have study groups or other group work?)

(...and your individual work?)

Do you make plans for yourself for these different tasks / activities?

C: YES

How are your plans useful?

Do you usually work according to your plan?

C: YES

How do you manage to complete everything you plan to do?

Do you think your classmates work using plans, too?

C: NO

What might prevent you from working according to plan?

Do you think your classmates typically plan or schedule their work this way?

*\*It should be noted that one of the original intentions in the design of the study guide was to elicit talk about time. Time is (a classic focus of metaphor study.) (Boroditsky, 2000, 2001; Casasanto and Boroditsky, 2008). However, in the analysis of the data, the metaphorical language that students used to talk about learning and knowledge proved to be very interesting. Thus, while the focus of the research remained metaphor, the topic of the metaphorical language itself shifted.]*

C: NO

So, planning isn't very useful ...?

Do you think it can be useful at all?

... scheduling or setting dates to finish work?

Do you notice whether your classmates work using plans? How could it be useful... Why do you think people do it at all?

For you, what does it mean to procrastinate?

You indicated online that you ( always – sometimes -- never ) procrastinate...

Could you explain this?

...why do you procrastinate? when do you procrastinate? in what kind of situation do you procrastinate? how do you avoid procrastination?

But everyone has this problem, right?

What you recommend for students to avoid procrastinating?

---

lectures, seminars, individual or group work

You mentioned earlier/ I wanted to ask about your lectures and seminars...

You have 60 minute lectures? (correction)

In terms of presenting the material, do you think that 90 minutes is appropriate for a lecture?

Why? / why not?

Is there an opportunity for discussion also (...during the lecture)?

And you have seminars or other sessions for other discussions?

And those are... (also 90 minutes / an hour?)

What are those sessions like?

For the purposes of that session, is xx minutes appropriate?

If you could have designed the schedule for lectures and seminars for this last term, how would you have done it?

Why?

(You mentioned group work, studying alone ...) do you feel that your work other than in the classroom setting is sufficient?

For you personally, of (provide sheet with 3 items listed while asking)

one-on-one meetings with professors and instructors,

working in groups with other students,

individual reading and study.

During the last term, which of these three would you've liked more of?

why?

Would you say this is the general opinion of students you know here?

assignments, deadlines

When are you due to submit your next assignment?

How are you feeling about that assignment?

Does it cause you to feel any stress? (refer to online questionnaire answer, Q2, Q3)

C: YES Could you describe that?

Do you think the stress is related to the due date? or to being able to write?

C: NO Do you think any of your classmates feel stress about assignments?

How is that? How do you know? What is that like for them?

Do you think the stress is related to the due date? or to being able to write?

Do you ever work on your assignments until the last minute?

C: YES What is that like?

Why (do you think it happens)?

C: NO Do you think others work on assignments until the last minute?

Why?

During this term, have you ever felt particularly rushed?

C: YES Could you tell me more about that (...particular occasion) ?

C: NO Among the people around you – other students or professors -- do you think they feel rushed?

Like when?

What is that like?

---

exams

Right now, are students thinking much about the exams in May or June?

What is the general feeling?

What do you and your classmates talk about when you talk about exams?

What have you heard about exams here at LSE?

(Is it like this in your country / in the other places you've studied?)

Do you think responding to a question in writing, on a certain day, from 2 o'clock to 3 o'clock, for example, is a good way to demonstrate knowledge?

Personally, how do you feel when you think about exams?

...

How will you prepare for your exams?



---

general feelings

Since you've been here, have you ever felt frustrated about your studies?

... or had any negative feeling about your studies?

Could you describe that?

Is this comparable to other places where / times when you have studied before?

And could you describe a time when you felt particularly positive about your studies?

Could you tell me more about that...

Did you experience this during your studies at other schools?

Overall, how do you feel about your MSc programme so far?

Generally, do you think your classmates share this view?

---

Is there anything else about your MSc student experience you'd like to tell me about?

### APPENDIX 3.C. PRELIMINARY STUDY, INTERVIEW TRANSCRIPT SAMPLES

Group 1  
Tuesday

I: During this term, have you felt busy with your MSc work?

R: Yeah, I felt busy.

I: Could you describe that?

R: Um, I mean, I guess there's like a fair amount of reading, and there's quite a bit of course time, at least, I felt. I was on campus everyday for various different reasons. So I was basically at LSE from like 9 to 5, 9 to 6 and then tried to do work even around all those things so, I felt busy.

I: Have any periods felt busier than others?

R: Um, I guess around when the formative assignments were due and then at the end of the term it felt a bit busier, but in general, kind of once I got into the classes it was a steady rate of how I need to be doing things.

I: Did you experience any stress?

R: Uh, yeah, for sure. I was actually probably more stressed at the beginning than I was um now, maybe just because of adjustment and getting used to how much I can actually get done and then... you also just get tired as the semester goes on and don't care as much, which is maybe a bad thing to say, but...

I: Before you came to LSE, is this what you expected in terms of the work?

R: Um, yeah. No, it's pretty much what I expected. In some ways, it actually hasn't been as bad as I thought it might be, I'm a little bit more worried about next semester than this one.

I: And how is it compared to your previous studies?

R: Um, it's relatively similar. Um. Maybe a little bit more reading, but not a massive difference. There was more course time than I thought there would be for a graduate programme. But it's probably about the same as what I did in undergraduate. So, it's pretty much the same.

I: Now I've got some questions about planning and procrastination. In terms of time and academic work, could you describe your typical working week?

R: Um. Well I guess most days I had to be on campus at 10 o'clock and so I would have courses or whatever for an hour or two, then I'd have a 2 or 3 hour break, so I would maybe get an hour of productive work done and then the rest would be eating and meeting up with people, bla bla bla. Um, then have some more courses or meetings or study groups in the afternoon. Um, and head home around 5 or 6.

And then try to get the bulk done of the readings of whatever I have to definitely have done for the next day whether it's an assignment or what not. So, that's kind of my typical day everyday.

I: OK. Do you make plans for these different tasks?

R: Um. Not too much. I always have a good idea of what needs to be done first, if that makes sense. Like, if I know that I have a study group the next day and I have to read some for that, I'll make sure that I'm doing those first before I do some other thing, so depending on where I am in the week I have different priorities but yeah, that's about it.

I: Do you think it can be useful at times to have a written out plan or schedule?

R: Yeah, I think so. I used to do it a lot in undergrad but I never really stuck to it and so I haven't been doing it so much now 'cause it just seems like an added thing to be spending time on when I could be spending that time to be doing work.

I: Have you noticed whether your other classmates work using plans?

R: Um, I know one or two of them who do, and I think it works very well for them, but the majority don't.

I: Why do you think the people who do use plans use them?

R: Um, I think they like the structure and the clear goal setting. I think they're a bit better at reaching those goals than I was, so...

I: You indicated online that you often procrastinate. For you, what does it mean to procrastinate?

R: Um, I mean, I think it's kind of, I think where it takes me a while to get started doing something, and even when I'm doing it, I'll take like frequent breaks sometimes to do different things, or this idea that as soon as you sit down at your computer to take notes or something, you probably check your e-mail first, it's all those little things that, like, eat up time here and there.

I: In what kind of situation do you procrastinate? All the time, or do you find particular...

R: Um. I mean I do it quite frequently (laughter). But I think I can do it more sometimes when I'm quite stressed. Um, like if I'm working on my essay and I know I have to get it done I can catch myself doing it a lot more. Um. Yeah.

I: Has it always been this way?

R: Yeah, I think so. I mean, there's been more and more access to things to procrastinate with (laugh) in recent years. But pretty much, yeah.

I: Do you know if a lot of the other students are similar? Do they also procrastinate?

R: Um I think so. From my conversations with people, it seems relatively like common.

I: Now I have some questions about the lectures and the seminars. Do you have 60 minute lectures? Is that right?

R: No, they're two hours.

I: In terms of presenting the material, do you think that's enough time for the lectures?

R: Um. Yes and no. I would not want to be in longer lectures, if that makes sense. I think they try to present a lot of information within that time. Well, different lecturers have different styles, but, in general, I feel like that's the most I can absorb at one time. So, yeah.

I: Is there an opportunity for discussion during the lectures? or is it...

R: It really depends on the day, for the most part. Not so much. I mean there is always space, like to put up your hand and ask a question. But there's not prolonged discussion periods which is actually something that is quite different than my undergrad experience.

I: And you have seminars?

R: Yep.

I: And they're how long?

R: They're an hour long. 60 minutes.

I: And what are those seminars like?

R: They're a bit more discussion oriented but it's often, well the way ours were structured for the core course was people would do a 10 to 15 minute presentation, and there would be some kind of activity or task and we'd split up into small groups and like discuss that and then come back together as a group. Yeah, that's pretty much how they always were.

I: And do you think they're long enough?

R: Yeah, they're definitely long enough?

I: If you could've designed the schedule for the lectures and seminars for the past term, how would you have done it?

R: I actually really didn't like our schedule this term because we had our core course, is all in this term. And we had it Mondays and Tuesdays so it just made for a very condensed start to the week. Um, I also had research methods and stats closer to the end of the week, but the core course is the main reason, like why I'm here, it's the core of the programme. So it was a little bit intense having it, like Monday morning, Tuesday afternoon and then we had tutorial Wednesday and

then seminars on Thursday or whatever. So it would've been nicer if it had been a bit more spread out in the week. Um, yeah.

I: Do you feel that you do enough work other than in the classroom and the lectures and seminars?

R: In like getting enough work done?

I: Yeah.

R: Um, I feel like there's a lot more I could be doing, so maybe not (laughter).

I: Do you have study groups with the other students?

R: I do, yeah.

I: And are they useful?

R: Yeah, I've actually found them quite good. It's been one of the better experiences I've had with study groups where um... Yeah, we do (?have group/crew?) two hours once a week and that's effective and we're talking about a lot of things. It's good.

I: I have just have some questions about these 3 points, there. For you personally, which of these is the most useful?

R: In terms of, like, how much I learn from it?

I: Yeah.

R: Um... that's hard. I want to say probably individual reading and study.

I: Any particular reason?

R: I think I can get through the most material that way. And I often need to look at something myself before I can really understand it. I don't learn that well from people just telling me things, I need to read it. But, I mean, it's tricky because I find if I'm not understanding something I read though, it's not that useful for me to read it 4 or 5 times, like it does help to talk to people and get other people's opinions about things. Um, yeah.

I: For you, during the last term, which of these 3 would you have liked more of?

R: Oh, the one-on-one meetings with professors and instructors.

I: Any particular reason?

R: Probably because I didn't really have that at all. Like I have lots of working groups with other students and lots of individual reading, um, but I missed out on those opportunities to have one-on-one time with the instructors. Yeah, I'd always felt, 'cause you can go to office hours, but you only get 10 minutes so it's kind of, there's a lot of pressure to like figure out what you want to say, what you

specifically want to ask, and try to absorb what they're saying really quickly. And so, I didn't find it that, kinda, helpful when I did go.

I: Are there other types of working styles or situations that you would've liked other than the lectures and seminars?

R: Um. I mean, I wish there was more discussion in our seminars and lectures. More of like a, 'cause our course isn't that big, there's only about 18 of us, so just to have the whole class talking about issues, I feel like, could've happened but it never really did. We were always either in small groups, or it was like a dialogical lecture. Um, so I would've liked more of that but in terms of having more meetings or sessions during the week, not so much 'cause it was already feeling a bit stretched.

I: Would you say that this is an opinion shared by the other students in the course?

R: Um, I think in general, yeah.

I: Now I have some questions about assignments and deadlines. When are you due to submit your next assignment?

R: I think it's January 11<sup>th</sup>, it's the first day of term, yeah.

I: How are you feeling about that assignment?

R: Um, I'm now starting to feel quite stressed about it. As I think a lot of my classmates were quite a bit more stressed about it before the end of the term, and I was feeling OK. But now, that I'm like, OK I have 4 weeks and I have to get this done, it's starting to really hit me.

I: Can you tell me a bit more about the stress?

R: Um. I think it's just, I don't know, I tend to get quite stressed about papers in general and I've tried to figure out what your arguments and ideas are and like having that original idea, whatever that may be. I didn't realise the library was going to closing on the 22<sup>nd</sup> so that's kind of upped my level (laughter).

I: Do you think the stress is caused by the due date? just being able to write it? or understanding the material?

R: I think it's, I think the stress is caused by the due date, but I also feel like I need deadlines to get things done. So it's not so much that I'm worried I don't understand the material or I have no idea what to do, but it's this pressure that now is the time to start pulling everything together and you only have so much time before the deadline comes.

I: Do you ever work on your assignments until the last minute?

R: Uh, yeah. Always.

I: OK, and what's that like?

R: Um. I mean, I guess it's not the healthiest thing to do. I feel like it's the only thing I can do. I can't, even if I finish an assignment ahead of time, I'll still keep working on it up to the deadline. I might leave it for a few days, but I have to look at it again, like the day before, I can't really just let things go. So, yeah, it's just how I've always worked.

I: During this term have you felt particularly rushed with your work?

R: Um, felt rushed? Not really. I mean the term felt (?bot?) like it went by really quickly. For sure. So there wasn't a lot of catch-up time. Well there was no catch-up time. So I kinda just let that go, and once I did that, then it was fine. So I didn't feel particularly rushed, but it did go by fast.

I: And do you think any people around you, the students, the professors feel rushed?

R: Um. I think the students feel rushed. I don't know if the professors feel rushed. I assumed that the terms are short 'cause they liked it that way. (laughter). So I'm not sure. I think everyone has this idea that we do have to learn a lot of material in a relatively short period of time so it's important to get through it.

I: So I have some questions about the exams. Are students thinking much about the exams, even though they're in May or June?

R: Um. I think so. We're thinking about it. I don't know how many people are being productive towards it. But it's definitely been kind of a topic of conversation throughout the semester. And like in terms of at least my study group, we've organised to keep meeting next semester to talk through the exam topics for the core course so that we kind stay on top of the material, so it's definitely on my mind.

I: What's the general feeling amongst the students about exams?

R: Um. I think there's quite a bit of concern about what's going to be expected from us. Um, just in terms of writing quite a few essays in a very short period of time. Um. So yeah, I don't think anyone's really excited about it or feels super-prepared for it at this point (Laugh).

I: Have you heard anything about exams here at the LSE?

R: Very little, I've just heard that they're pretty much like our undergraduate exams except there's kind of an expectation of a higher level of writing and dealing with the information.

I: Do you think it's going to be similar to exams you've done at your previous university.

R: Um. A bit. Like I think the set up's gonna be the same, like I'm gonna be in a huge room with a bunch of people, say at a desk and you have, whatever it is, 3 hours. Um. I do feel like the expectations for our written work is quite a bit higher than what was expected in undergrad, even in terms of um, referencing and essays

and things like that. Um, but on the other hand, they're giving us a pretty good idea of what the questions will be so.

I: Do you think that responding to a question in writing, on a certain day, say from 2 to 3, is a good way to demonstrate your knowledge of the course?

R: No. Not at all. Really. And I partially am biased. I don't tend to do super well on exams so that could be why I feel like that, but um, I just don't think it's that practical in terms of real life situations. I mean you would never try to learn information and then test yourself on it like that. Like learning information is much more of a group process and it takes time and I think that these core essays, that you have time to work on and really like focus an idea, but pull in core material is a much better reflection of your understanding of a course.

I: And personally, how do you feel when you think about exams?

R: Um. I mean I find them quite stressful. And I just don't like them, I'm just not a fan of them as a method of assessment in general (laugh), so. Yeah.

I: Have you thought of how you're going to prepare for your exams? I think you mentioned a study group...

R: Um. A little bit, yeah. I'm gonna have study groups, and I do find it useful that we have a general idea of what the questions will be so, it'll be just going over the material and trying to write practice essays and figuring out arguments for them.

I: And just some final questions about your general feelings. Since you've been here have you ever felt frustrated about your studies, or any negative feelings?

R: Um. I have been frustrated. I guess in terms of what you were saying before, in terms of whether it was rushed sometimes, it felt like things were going by too quickly to really be getting the most out of them. Um, like we're just trying to absorb so much information so quickly that you don't have that much time to reflect on it. I found that frustrating at times.

I: Is that comparable to your experience at other universities?

R: Um. Not really, I found in my undergraduate degree as I went up in the levels, like the third and fourth year, I was taking quite a few kind of upper level undergraduate, graduate seminars, and it was very different than here. They were small group discussion classes where you had quite a bit of reading but there was a lot of time to really reflect on the material and to pull it in together, and very little kind of lectures and note-taking, so yeah, it was quite different.

I: Could you describe a time when you felt particularly positive about your studies?

R: ... (laugh) I'm trying to think! I mean. I really enjoyed working on my undergraduate thesis which was my major research project, and again there were a couple graduate seminars that I took in undergrad that I really enjoyed, either because of the topic because it was a new thing that I got to do, or just because I wasn't feeling lost in these massive classes anymore. Um... so yeah.



I: Any positive experiences in your studies here so far?

R: Um. I mean overall I've enjoyed my experience so far, like I really like the course and I like the people in my programme and I feel like I'm really, like I'm learning really interesting theories about people that I wouldn't have necessarily been exposed to if I'd done a different programme, um. So all of that I've found quite positive.

I: Overall how do you feel about your MSc programme so far?

R: I mean, overall, I'm happy with it. Um, I had a general idea of what it was going to be like so I was totally shocked when I arrived at LSE, and be like, oh my god, what's going on? Um. So, yeah, like I have been frustrated at times at how quickly it goes and the fact that there's not more discussion and one-on-one time with professors, et cetera. But in general, I'm quite happy with like what it is that I'm about and the access to resources we have here and things like that.

I: And generally, do you think you classmates share your positive view?

R: Mmm, I don't know. I think it really depends on the individual. I know some people who are quite unhappy with the programme. But it's not like everyone has one reason why they're happy or one reason why they're not. I think it really does depend.

I: Is there anything else about your MSc student experience that you'd like to tell me about?

R: No.

I: Do you have any questions or queries about the interview?

R: No.

### APPENDIX 3.D. PRELIMINARY STUDY, EARLY CODING OF METAPHORICAL LANGUAGE SEGMENTS

Conceptual Metaphor coding of metaphorical language data, based on (Lakoff, Espenson, and Schwartz, 1991)

"Primary metaphor" perceptual information evoked in descriptions of knowledge/learning are listed below

General perceptual information described with reference to knowledge/learning

solid	tangible solidified manipulated (e.g. stacked, cut, stored) having mass/volume having a structure
liquid	absorption flow saturation
processes of internalising/externalising	capacity (e.g. filled) retention input output ingesting / digesting
space	navigation direction destinations fixed locations
objects in a space	object arrays
(?) vision	light acuity

For the language items in the global category of knowledge/learning, coded as metaphorical, general characteristics associated with sensory and motor systems were identified. The most frequently occurring characteristics attributed to knowledge/learning involved knowledge as a solid, a liquid, something internalised/externalised. Knowledge was also described in terms of a space or an array of objects in a space.

Knowledge as a solid, tangible substance was described extensively in utterances including

“in terms of the material, I feel like we all will have a good grasp of it by the time the exams come around”

(re: theories) “I really grab on to something”

“these handful of concepts”;

or knowledge can become solid through study, as in

“I guess the working groups is a way that helps you know, crystallise things”

“part of my learning process... as you prepare your paper, and as you prepare for exams, it’s often when you kind of, things really gel in your head”.

In addition to simply holding or touching, other actions can be performed with knowledge as something solid, such as in the following utterances:

(re: theories presented in different classes) “So it was a challenge juggling them”

(re: studying theories) “bouncing everything off each other”

“the dissection we’ve had of the material in that course”

“you get everything, all at once, really rushed, all on top of each other, and then you put it away for 3 months”

“some weeks you have many ideas but you just keep them somewhere and then whenever you have more time”.

Like solid objects, knowledge is attributed with a mass

“because you’re so overloaded with information”

“the same amount of knowledge, but mine is packed into one (year, compared to a sibling’s two year course)”,

and a structure

“you’re building, and then you take the exam when you’re at, you know, the peak of the information that you have”

“to build up your knowledge throughout the course”.

In other utterances, knowledge and theory are described in terms of a liquid substance, as in

(re: during an exam) “that can be funneled down to an hour’s worth of writing”

“But if you don’t always... you know, if you’re trying to get all the information absorbed during a lecture”

“how grounded in theory, saturated with theory”

“I feel like that’s the most I can absorb at one time”

“there’s a lot of pressure to like figure out what you want to say, what you specifically want to ask, and try to absorb what they’re saying really quickly”

“everyone has kind of absorbed it differently”.

References to knowledge also describe internalisation, particularly in learning, either in general terms

“right now I’m full of knowledge on the topic so if I sat the exam now or at the beginning of January, I would be confident to do very well in it”

"I don't know if it's the best for the retention of the material"

"I could say that we are crammed every day"

"I could actually sit back and go and read the additional information and internalise"

"I've taken in all this information, but actually, I haven't been terribly inspired by it

"and that she takes in and can synthesise and say something articulate about information far faster than I can.

"So often I'm just, essentially you're just, what you, go, do, is you go into a mode where you are all input",

or specifically in terms of food, feeding, and eating

"but there was no time to digest the information"

"I'd probably like to be spoon fed a little more"

"the teaching and instruction is also challenging in the sense of not spoon-feeding".

There are also levels to which knowledge is internalised, as in

"it certainly hasn't sunk in to any deep level".

Conversely, once knowledge is internalised, it can be externalised, as described in the following:

"everything just comes out on the paper"

"all they want to know is that you can regurgitate the readings that we've talked about"

"so the idea of preparing all by myself and then expecting it all to just regurgitate itself in an hour"

"you know, break the water, and everything just comes out".

Another prominent expression of sensorimotor information in metaphorical language about knowledge relates to space. Knowledge or theories exist in a space in which one can move towards or around them

"then you're able to ask questions but you have, you know, people coming at it from different angles"

"giving you the space to manoeuvre and actually develop your own understandings and opinions about it"

"I was able to clearly state where I was going with the topic"

"you can get on tangents when you're with groups and you might start just, you know, discussing everything"

As such, theories and ideas can be described in terms of an array of objects in a space, as in

"there's so many ideas and so many people to keep track of"

"(re: several theories) It was just all scattered".

Knowledge itself can also be described as a space, as with these utterances

"I mean there's a vast world of knowledge out there"

"this may not necessarily be like their, their main area, but they have opted, like they opt to do that particular course"

“you don’t really get to explore the debates you know”,

and one may have a position inside this space,

“I know I am not anywhere near where I’m supposed to be, but I think I’m in a good place ” (re: understanding theories)

“I definitely clearly indicated what my position was”.

In some cases, there are issues or difficulties with orientation in this metaphorical space,

“you end up just, really sort of unclear about the trajectory of the seminar”

“you know when you’re writing an essay or do research something, like you’re just stuck nowhere”

“whereas I feel like I’m just kind of, I’ll just be drifting until June”.

In these cases, there can be assistance in orientation in space,

“she went through, she mapped it out,

“the facilitator is there to correct you, and bring you back on the right track”

or not

“sometimes in terms of direction of study and research, I don’t know if we have enough of that”

“I didn’t feel like I had a lot of direction and I wanted to know where I missed that direction, where should I have been seeing that direction”.

Interestingly, knowledge is very often described with characteristic associated with vision. For instance, participants spoke in terms of clarity, reflection, viewpoints, views, perspectives, fuzzy concepts, seeing, keeping focus, shifting focus, etc. In the coding process, all these expressions were excluded as either “etymological” metaphors or otherwise conventionally fixed. Only two vision-related expressions were considered metaphorical

“it gives me a completely new idea of the world, a new sense, new glasses, pair of glasses to look at things,”

“(?) I feel particularly happy on those days when I go to bed seeing the world differently, in a different light than I saw it when I woke up that morning”.

### APPENDIX 3.E. METAPHORICAL LANGUAGE "BEST MATCH" TASK

Please read the sentence in the left column.

Of the choices given in the right column, please circle the phrase that **means the same thing**, or is the **closest match in meaning**, among the choices given. If you find none of the alternatives satisfactory, please write another sentence that you think means the same thing.

<p>Fred didn't understand his lectures and classes.</p>	<p>Fred was lost in his lectures and classes.</p> <p>Fred couldn't get a grip of his lectures and classes.</p> <p>other:</p>
<p>The reading assignments were very long and complex.</p>	<p>The reading assignments were very long and heavy.</p> <p>The reading assignments were very long and dense.</p> <p>other:</p>
<p>He listened very carefully in his classes and lectures.</p>	<p>He took in his classes and lectures very carefully.</p> <p>He followed very carefully in his classes and lectures.</p> <p>other:</p>
<p>He read the various theories and concepts over and over...</p>	<p>He ploughed through the various theories and concepts over and over ...</p> <p>He dug into the various theories and concepts over and over ...</p> <p>He swallowed the various theories over and over...</p>

	<p>other:</p>
<p>...to understand them better.</p>	<p>...to digest them better</p> <p>...to untangle them better</p> <p>...to see them better</p> <p>other:</p>
<p>He regularly talked about ideas and questions with classmates</p>	<p>He regularly approached the ideas and questions from different angles with classmates ...</p> <p>He regularly bounced around ideas and questions with classmates ...</p> <p>other:</p>
<p>...to understand the various theories better.</p>	<p>... to build up a better knowledge of the various theories</p> <p>...to get more out of the various theories</p> <p>other:</p>
<p>He asked his teachers for help.</p>	<p>He asked his teachers for support.</p> <p>He asked his teachers for guidance.</p> <p>He asked his teachers for direction.</p>

	other:
<p>Gradually, he began to understand the theories and ideas that were discussed in his courses.</p>	<p>Gradually, he began to grasp the theories and ideas that were discussed in his courses</p> <p>Gradually, he began to harmonise with the theories and ideas that were discussed in his courses</p> <p>Gradually, he began to wrap his mind around the theories and ideas that were discussed in his courses</p> <p>other:</p>
<p>By the end of the course, he thought that he had really learned the various theories.</p>	<p>By the end of the course, he thought that he really brought the various theories together.</p> <p>By the end of the course, he thought that he had really digested the various theories.</p> <p>other:</p>
<p>He believed that he had really understood the work.</p>	<p>He believed that he was really on top of the work.</p> <p>He believed that he really had a good handle the work.</p> <p>He believed that he was really at the peak of the work.</p> <p>other:</p>



## APPENDIX 4.A. STUDY 1, PARTICIPANT INFORMATION AND CONSENT FORM

Thank you for your interest in this research project. You will find information below about the research and participation in the study.

### Purpose of the research

This study investigates ways of telling stories or recounting events; it is part of doctoral research at the London School of Economics and Political Science.

### Procedures

If you choose to participate, you will be asked to read a short text and write a short text. You will also be asked to provide some basic information about yourself. In total, your participation should take about ten minutes.

### Participants' rights

Your participation in this study is completely voluntary. At any stage, for any reason, you have the right to withdraw from this study and end your participation. Your answers will be used in the research only if you click "complete the study" at the end of the tasks.

This study is anonymous. You will not be asked to identify yourself, and the information you provide cannot be linked to you personally. It will be used only for the purposes of the study.

### Potential risks and benefits

We do not anticipate any risks associated with participation in this study. Those who have participated in pilot phases of this study reported no adverse effects. There are no identified benefits linked to participating in this research, although you may find it interesting to complete the tasks involved in the study.

This research has been approved by the departmental ethics procedure of the Institute of Social Psychology, London School of Economics and Political Science.

If you have any questions or concerns about this research, you may contact either the principal researcher or the research supervisor, at the London School of Economics and Political Science.

### Principal researcher

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I have read and understood the information above; I give my consent to participate in this study.

**APPENDIX 4.B. STUDY 1, PROPOSITIONAL ANALYSIS CODING FRAME**

chain number:  
 participant number:  
 condition:  
 recall:

	Predicate	arguments	qualifiers	comments
	IS <sub>1</sub> <input type="checkbox"/> 1	male or Bob <sub>2</sub> <input type="checkbox"/> 1 student <sub>3</sub> <input type="checkbox"/> 1	good <sub>4</sub> <input type="checkbox"/> 0.5 always <sub>5</sub> <input type="checkbox"/> 0.25	
	GO, or ATTEND, or LEAVE FOR <sub>6</sub> <input type="checkbox"/> 1	male or Bob <sub>7</sub> <input type="checkbox"/> 1 university <sub>8</sub> <input type="checkbox"/> 1	18 y.o. <sub>9</sub> <input type="checkbox"/> 0.5	
	HAD <sub>10</sub> <input type="checkbox"/> 1	male or Bob <sub>11</sub> <input type="checkbox"/> 1 difficulty <sub>12</sub> <input type="checkbox"/> 1		
	UNDERSTAN D <sub>13</sub> <input type="checkbox"/> 1	male or Bob <sub>14</sub> <input type="checkbox"/> 1 lectures <sub>15</sub> <input type="checkbox"/> 0.5 classes <sub>16</sub> <input type="checkbox"/> 0.5	early or initially <sub>17</sub> <input type="checkbox"/> 0.25	
	BE <sub>18</sub> <input type="checkbox"/> 1	reading or assignments <sub>19</sub> <input type="checkbox"/> 1 long <sub>20</sub> <input type="checkbox"/> 0.5 complex <sub>21</sub> <input type="checkbox"/> 0.5	very <sub>22</sub> <input type="checkbox"/> 0.25	
	FEEL <sub>23</sub> <input type="checkbox"/> 1	male or Bob <sub>24</sub> <input type="checkbox"/> 1 discouraged <sub>25</sub> <input type="checkbox"/> 1	quite <sub>26</sub> <input type="checkbox"/> 0.25	
	STUDY or WORK <sub>27</sub> <input type="checkbox"/> 1	he <sub>28</sub> <input type="checkbox"/> 1	continue or persist <sub>29</sub> <input type="checkbox"/> 0.5 hard <sub>30</sub> <input type="checkbox"/> 0.5  but, or nonetheless <sub>31</sub> <input type="checkbox"/> 0.25	

	CONCENTRATE or LISTEN or FOLLOW <sub>32</sub> <input type="checkbox"/> 1	he <sub>33</sub> classes <sub>34</sub> lectures <sub>35</sub> <input type="checkbox"/> 1 <input type="checkbox"/> 0.5 <input type="checkbox"/> 0.5	carefully <sub>36</sub> <input type="checkbox"/> 0.5	
	CONSIDER or THINK ABOUT or REFLECT <sub>37</sub> <input type="checkbox"/> 1	he <sub>38</sub> theories <sub>39</sub> concepts or ideas <sub>40</sub> <input type="checkbox"/> 1 <input type="checkbox"/> 0.5 <input type="checkbox"/> 0.5	repeatedly <sub>41</sub> <input type="checkbox"/> 0.25	
	UNDERSTAND <sub>42</sub> <input type="checkbox"/> 1	-- theories or concepts or ideas or them <sub>43</sub> <input type="checkbox"/> 0.25	better <sub>44</sub> <input type="checkbox"/> 0.5	
	WORK <sub>45</sub> <input type="checkbox"/> 1	he <sub>46</sub> <input type="checkbox"/> 1	with others <sub>47</sub> began or started <sub>48</sub> <input type="checkbox"/> 0.5 <input type="checkbox"/> 0.25  *cooperate 1.5	
	DELIBERATE or DISCUSS <sub>49</sub> <input type="checkbox"/> 1	he <sub>50</sub> ideas <sub>51</sub> questions <sub>52</sub> or concepts or other <sub>53</sub> <input type="checkbox"/> 1 <input type="checkbox"/> 0.5 <input type="checkbox"/> 0.5	with classmates <sub>54</sub> <input type="checkbox"/> 0.5	
	HELP <sub>55</sub> <input type="checkbox"/> 1	deliberating or discussing or working with others <sub>56</sub> <input type="checkbox"/> 1		
	CONSIDER <sub>57</sub> <input type="checkbox"/> 1	he <sub>58</sub> theories <sub>59</sub> <input type="checkbox"/> 1 <input type="checkbox"/> 1	differently <sub>60</sub> <input type="checkbox"/> 0.5  for to <sub>61</sub> <input type="checkbox"/> 0.0	
	ASK <sub>62</sub> <input type="checkbox"/> 1	he <sub>63</sub> teachers <sub>64</sub> <input type="checkbox"/> 1 <input type="checkbox"/> 1	help <sub>65</sub> <input type="checkbox"/> 0.5	
	UNDERSTAND <sub>66</sub> <input type="checkbox"/> 1	he <sub>67</sub> theories <sub>68</sub> ideas <sub>69</sub> <input type="checkbox"/> 1 <input type="checkbox"/> 0.5 <input type="checkbox"/> 0.5	began / gradually / started to <sub>70</sub> <input type="checkbox"/> 0.25  discussed in class (which theories)	

				71 <input type="checkbox"/> 0.25	
	LEARN <sup>72</sup> <input type="checkbox"/> 1	he <sup>73</sup> <input type="checkbox"/> 1 theories <sup>74</sup> <input type="checkbox"/> 1  (THINK/BELIEVE meta) <sup>75</sup> <input type="checkbox"/> 0.5		finally/at the end <sup>76</sup> <input type="checkbox"/> 0.25  various <sup>77</sup> <input type="checkbox"/> 0.10	
	UNDERSTAN D <sup>78</sup> <input type="checkbox"/> 1	he <sup>79</sup> <input type="checkbox"/> 1 work <sup>80</sup> <input type="checkbox"/> 1  (THINK/BELIEVE meta) <sup>81</sup> <input type="checkbox"/> 0.5			
	IS <sup>82</sup> <input type="checkbox"/> 1	he <sup>83</sup> <input type="checkbox"/> 1		nervous <sup>84</sup> <input type="checkbox"/> 0.5  about exams <sup>85a</sup> <input type="checkbox"/> 0.5 *either here or with nervous – not both	
	IS <sup>86</sup> <input type="checkbox"/> 1	he <sup>87</sup> <input type="checkbox"/> 1		confident <sup>88</sup> <input type="checkbox"/> 0.5 about exams <sup>85b</sup> <input type="checkbox"/> 0.5 *either here or with nervous – not both	
	Total PRED	Total ARG		Total QUAL	

Total propositions

Other notes on coding, propositions, etc.

VERBAL CONSTRUCTIONS			
could ABLE should (and verb)		0.50 + verb	see 4:1 prop23, 3.2; 3.1
CAUSAL verb	make (to feel)	0.50 + verb	see 6.1:23
META + that	think / find / believe THAT	0.50 + verb	+ pred (but only one he if sub and META sub are same)
other verbal constructions	try to start to keep VERBing	0.25 + verb	hmmm... see 1.1 try 6.1 keep
to GO (and verb)		0.10	see chain 2, part 3, prop62
	do well	1	one verb, see 6
ADVERBIAL			
time	gradually eventually after that...	0.25	
degree	very pretty rather quite a little more	0.25	

CONJUNCTIVE			
comparison	xx than yy  more complex than he expected	0.50	+ pred, qual  --see chain 7
opposition	NOT (check 3:1, 0.5??) but though although (8) nonetheless	0.25	
condition	if	0.25	
consequences	since because as	0.25	
conjunction	so and then also	0.10	
INCIDENTALS			
narrative devices	once there was, of our story	0.10	
for him?		0.25	
with?		0.25	
in general		0.10	4.1, 4.2
	on his own / alone	0.25	see 2.1
	with practice	0.50	
	with a lot of practice	0.75	

## APPENDIX 4.C. STUDY 2, ARTICLES FOR DEVELOPMENT OF EXPERIMENTAL STIMULI

### Does Bird Flu + Swine Flu = Superflu?

by Jennifer Carpenter on 28 February 2011

What do you get if you cross bird flu with the 2009 pandemic human virus, widely known as swine flu? Unfortunately, the answer isn't funny. A new study predicts that swapping genes between the avian and human influenza viruses may result in an even more dangerous flu.

The human influenza virus H1N1 that caused the 2009 flu pandemic, and H9N2, an avian influenza virus that is endemic in bird populations in Asia, are close cousins—close enough that they can swap genes if they find themselves in the same cell, resulting in new viruses that are a patchwork of the parent strains. Scientists suspect that some gene combinations may result in a particularly potent form of flu and ignite a pandemic in humans. But because these viruses are more likely to meet in the lungs of an Asian chicken farmer than under the nose of a virologist, researchers find it difficult to predict which gene combinations might be the most virulent and contagious.

So instead of waiting and seeing, researchers have played matchmaker and thrust the two viruses together in a test tube. A team in China generated 127 hybrid viruses and injected each one into lab mice. More than half of the hybrids were as good as their parent strains at infecting the mice, and eight of them proved to be more pathogenic, the team led by Jinhua Liu of the China Agricultural University in Beijing reports online today in the *Proceedings of the National Academy of Sciences*.

"These are important experiments", says virologist Peter Palese of Mount Sinai Medical Center in New York City, who was not involved in the work. The viral hybrids that the Chinese team has identified are the ones that scientists might want to watch out for worldwide, he says. If these strains were recognized early, governments could launch a speedier response.

Creating highly virulent viruses in the lab is controversial, says virologist Ab Osterhaus of the Erasmus University Medical Center in Rotterdam, the Netherlands. "[But] I don't think we should shy away from these experiments. ... The more information we have, the better," he says.

He explains, however, that the hybrids that are the most virulent in mice will not necessarily be the most dangerous in humans, nor the most contagious. "Mice mirror, to a certain extent, what happens in humans," he says, but they are not perfect model animals. Liu agrees. He plans to investigate how contagious his new viral blends are in guinea pigs and ferrets—animals whose respiratory system better reflects our own feverish battle with flu.

## High genetic compatibility and increased pathogenicity of reassortants derived from avian H9N2 and pandemic H1N1/2009 influenza viruses

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Edited by Peter Palese, Mount Sinai School of Medicine, New York, NY, and approved January 28, 2011 (received for review December 21, 2010)

H9N2 influenza viruses have been circulating worldwide in multiple avian species and repeatedly infecting mammals, including pigs and humans, posing a significant threat to public health. The coexistence of H9N2 and pandemic influenza H1N1/2009 viruses in pigs and humans provides an opportunity for these viruses to reassort. To evaluate the potential public risk of the reassortant viruses derived from these viruses, we used reverse genetics to generate 127 H9 reassortants derived from an avian H9N2 and a pandemic H1N1 virus, and evaluated their compatibility, replication ability, and virulence in mice. These hybrid viruses showed high genetic compatibility and more than half replicated to a high titer in vitro. In vivo studies of 73 of 127 reassortants revealed that all viruses were able to infect mice without prior adaptation and 8 reassortants exhibited higher pathogenicity than both parental viruses. All reassortants with higher virulence than parental viruses contained the PA gene from the 2009 pandemic virus, revealing the important role of the PA gene from the H1N1/2009 virus in generating a reassortant virus with high public health risk. Analyses of the polymerase activity of the 16 ribonucleoprotein combinations in vitro suggested that the PA of H1N1/2009 origin also enhanced polymerase activity. Our results indicate that some avian H9-pandemic reassortants could emerge with a potentially higher threat for humans and also highlight the importance of monitoring the H9-pandemic reassortant viruses that may arise, especially those that possess the PA gene of H1N1/2009 origin.

**H**9N2 influenza viruses circulate worldwide and are endemic in multiple terrestrial avian species in Asia (1–4). It is noteworthy that H9N2 influenza viruses in poultry have occasionally been transmitted to mammalian species, including humans and pigs (5–9). Human H9N2 infections produce a typical human flu-like illness that can easily be overlooked (6, 10), so they may have a greater opportunity to adapt to humans and acquire the ability of human-to-human transmission. In fact, several serological surveys revealed that a large number of people in China, ranging from 13.7% to 37.2%, might have evidence of prior infections of the H9N2 virus (11, 12). In addition, previous studies demonstrated that a significant proportion of H9N2 field isolates have acquired preference for a human virus-like receptor (10, 13). Thus, H9N2 influenza virus, along with H5N1 virus, is high on the list of candidates that could potentially cause another human influenza pandemic.

Pandemic H1N1/2009 influenza virus has spread by human-to-human transmission across the globe at an unprecedented rate since it was first isolated from humans in Mexico in 2009 (14, 15, 16). Recently, it has been announced by the World Health Organization (WHO) that the pandemic H1N1 influenza virus is now in the postpandemic period but is expected to become a recurrent seasonal influenza virus and circulate for some years (WHO; <http://www.who.int/csr/disease/swineflu/en/>). Additionally, pandemic H1N1/2009 influenza viruses were also frequently

isolated from pigs (17–19) that were proposed to be “mixing vessels” for the reassortment of influenza viruses.

Coinfection with H9N2 and pandemic H1N1/2009 influenza viruses in the same host (e.g., pigs and humans) provides the opportunity for reassortment between these viruses. Reassortment is an important mechanism for the generation of a pandemic influenza strain (20, 21). For example, the pandemic influenza viruses of 1957 and 1968 emerged through genetic reassortment of avian viruses with the prevailing human viruses to possess novel antigenicity and efficient human-to-human transmissibility (22, 23). These facts remind us that avian H9N2 influenza viruses could acquire some functions critical for pandemic strains by reassortment with pandemic H1N1 influenza viruses when infecting the same host. Furthermore, previous studies revealed that frequent reassortment is an important evolution mechanism of H9N2 influenza viruses (4, 5) and that the pandemic H1N1/2009 influenza virus had already reassorted with the H1N1 swine influenza virus (24). Therefore, the concern is that if H9N2 influenza virus reassorts with a pandemic (H1N1) virus, another pandemic strain will emerge.

Reverse genetics provides a tool to predict the potential public health risk of novel influenza viruses. Using such an approach, previous studies generated various avian H5N1–human H3N2 reassortant viruses to evaluate their biological properties (25, 26). In the current study, we generated a panel of reassortants derived from contemporary avian H9N2 and pandemic H1N1/2009 viruses by reverse genetics to study their genetic compatibility and biological characteristics. Theoretically, 254 (256 minus 2 parental viruses) genotypes of reassortants can be generated from two distinct influenza A viruses. In the present study, we attempted to generate all of the 127 (128 minus 1 H9N2 parental virus) reassortants derived from an avian H9N2 influenza virus (A/chicken/Hebei/LC/2008, HB08) and a pandemic H1N1 influenza virus (A/Beijing/16/2009, BJ09). These

Author contributions: Y. Sun, J.P., and J.L. designed research; Y. Sun, K.Q., J.W., Q.T., Y.H., Y.B., and X.Z. performed research; K.Q. and J.L. contributed new reagents/analytic tools; Y. Sun, K.Q., J.P., Q.T., Y.H., H.Y., Y. Shu, and J.L. analyzed data; and Y. Sun, K.Q., J.W., and J.L. wrote the paper.

The authors declare no conflict of interest.

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The sequences reported in this paper have been deposited in the GenBank database [accession nos. GQ373026 (H9N2, PB2 gene), GQ373043 (H9N2, PB1 gene), GQ373060 (H9N2, PA gene), GQ373077 (H9N2, HA gene), GQ373094 (H9N2, NP gene), GQ373111 (H9N2, NA gene), GQ373128 (H9N2, M gene), GQ373144 (H9N2, NS gene), HQ098624 (BJ09, PB2 gene), HQ098625 (BJ09, PB1 gene), HQ098626 (BJ09, PA gene), HQ098627 (BJ09, HA gene), HQ098628 (BJ09, NP gene), HQ098629 (BJ09, NA gene), HQ098630 (BJ09, M gene), and BJ09, NS gene)].

<sup>1</sup>Y. Sun and K.Q. contributed equally to this work.

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#### APPENDIX 4.D. STUDY 2, PROPOSITIONAL ANALYSIS CODING FRAME

chain number

condition

no.	proposition	1	2	3	4	total	remarks
1	RESEARCH Scientists / researchers are researching / working on / studying bird flu.						
2	DEATH RATE Half / 50% of people infected with bird flu die. Bird flu kills half of all people infected.						
3	TRANSMISSION (BEFORE) People can only catch bird flu from birds (until now).						
4	EXPERIMENT Scientists altered / modified bird flu (genes/genetically)						
5	<i>combining it with swine flu genes</i>						
6	EXPERIMENT There were 3 or 4 mutations						
7	<i>4<sup>th</sup> mutation is not understood</i>						
8	TRANSMISSION (AFTER) Genetically altered flu can be transmitted between mammals / people						
9	<i>by sneezing and coughing</i>						
10	CENSOR (Gov't / some) want study not to be published.						
11	BIOTERROR Terrorists/people could cause epi-/pandemics. Bioweapon risk.						
12	VIRAL MUTATIONS Viruses mutate naturally, don't need a lab.						
13	PUBLICATION (Scientists/some) want study to be published.						
14	PREPAREDNESS Study can help prepare vaccines, etc. for epidemics						
15	CASE: Spanish flu Killed 50 million people						
16	<i>in 1918</i>						
17	INTERDISCIPLINARY INVOLVEMENT Different experts/fields should work together. Mil, etc						

#### **APPENDIX 4.E. STUDY 3, PRE-SCREENING TASK**

##### 3-minute reading and writing screening task

Thank you for accepting to do this screening task. The purpose of this task is to select participants for a research study, based on demographic information, reading skills, and a short writing sample.

At the end of this task, you will be given a six-digit pass-number. Your input will be assessed and you will be contacted with 72 hours, via MTurk, if you are selected. If you are selected as a participant, you will need your six-digit pass-number to access the study.

The study will appear on MTurk in approximately one week from today. It will be entitled "9-minute reading and writing task"

Only selected participants who correctly input their six-digit pass-number will be able to participate in the second HIT.

CONTINUE

First, you will be asked a few questions about yourself. Then you will be asked to complete a short reading task, and to answer a few questions.

Follow all the instructions carefully, please. While you are completing the activity, please do not do any other activities (e.g. phone calls, writing or reading messages, taking notes, etc.)

Once you have completed the activity, you will be given a six-digit pass-number. In order to be paid for your work, you will need to enter this number correctly at the MTurk page for this HIT.

Please note that you will be paid for completing this task only one time.

By clicking continue, you understand that your participation in this task is entirely voluntary and that you may withdraw at any point. In exchange for your time, you will be paid \$.05. In order to be paid, you must enter your six-digit pass-number in the HIT at MTurk.

CONTINUE

As you work on this task, please refrain from other distractions (such as talking with others, sending or reading messages, taking notes, etc.).

Please read the following text, at least two times. Take as much time as you would like to read the text.

The following text is an excerpt of a story where a person is talking about his friend's experience.

So with the holidays approaching, my friend, Richard, decided that he couldn't put off shopping for presents any longer. He's married; so he needed a gift for his wife, and one for his father as well. What's more, he had to get a gift for a work colleague, as part of a "secret santa" scheme that he actually wanted no part of. At the best of times, Richard never liked shopping and he was particularly reserved about it around the holidays - too many people, too many choices, too much "cheer", he'd say. But last Saturday, he decided that there was no way around it - he had put it off long enough, so off he went.

First he went to one of those big department stores, with at least a half dozen floors and a counter for everything. He made a dash through all the perfumer sprayers; fought his way through the hordes in ladies' scarves, gloves, and handbags; and wandered aimlessly through the housewares. These seemed like good places to look for a gift for his wife, but nothing really seemed special. He left after an hour and a half of strangers' elbows in his ribs and at least 4 versions of "Jingle Bells".

I had tried to warn him...

Then, Richard thought he'd try something different, something more "his style" and headed for his neighbourhood independent bookshop. While it was nearly as crowded as the department store, it was a much smaller shop - so it seemed less overwhelming to Richard. He had a look in the fiction section, and saw plenty of titles that he knew his father had already read - but nothing very inspiring. He saw a few nice leather-bound, gold-lettered antique editions; but then didn't really know if his dad would like that.

After a while, my friend was exhausted, exasperated, and still empty-handed. He wanted desperately to sit and rest in a quiet spot somewhere. So, he spotted the closest coffee shop, ordered, and had a seat. His head was spinning and he still didn't have any good ideas about what to get for anyone. Then, finally, it came to him! He knew just what he should do! Richard jumped up from his seat - nearly knocking over his coffee - grabbed his coat and made a bee-line to the door...

{CONTINUE [text disappears]}

1. In the text you just read, what was Richard's main task?
2. In your opinion, how does the speaker feel about the holidays?
3. In your opinion, how will the story end? What will happen next...

4. If you could change one thing to make this story more interesting, what would it be?

{CONTINUE [no more access to the stimulus]}

Thank you for completing this task. You will now receive a six-digit pass-number. Please keep this number carefully. You must enter the number correctly at this HIT on MTurk to be paid for your work. Also, if you are selected for the next part of this study, you **MUST** have this number to access the HIT. If you do not retain the number, it will not be possible to re-send it to you.

## APPENDIX 4.F. STUDY 3, EXPERIMENTAL STIMULI

stimulus 1: nul/NMet

### **The importance of collaborative episodes at every stage of learning**

I'd like to present the importance of collaboration at every stage of learning, and to do this, I'd like to use an example. Let's consider a situation where a student is trying to understand some particularly complex theory.

Let's imagine a student in a classroom setting. At first the student works hard and concentrates carefully in class. Then, outside of class, he takes time to try to analyse the material on his own. It is very important the student feels free to seek help from tutors or teachers at this early stage.

If the student has difficulty and does not manage to find help early on – from his teacher or others in the learning institution – his desire to learn might very well diminish. However, if he does manage these early difficulties in collaboration with others, he is more likely to seek to enrich his knowledge. At this stage, he may begin to consider the material in more detail, to discover its complexities. He might also take initiative to deliberate with his classmates about the ideas presented in the course. Again, here in the intermediate stage, the potential for collaboration with other learners is crucial to the learning process. It allows students to consider challenging concepts in different ways.

In the late stages of learning, again, we expect that students who had collaborative learning experiences - and this can be with teachers, tutors, family members, classmates, among others - will be more motivated to work hard to understand challenging material. Of course, there is no fixed time frame for the length of the initial stage and the intermediate stage. In fact, there may be cycles between the initial and intermediate stage prior to the late stage.

The most important factor in learning through these stages is the opportunity and the quality of the collaborative episodes. Where students do not have resources or do not feel comfortable asking for help, they may never feel that they truly understand challenging theoretical work. But with opportunities for supportive and constructive interactions, at every stage of the learning process, students report that they really feel they can learn even the most challenging work.

stimulus 2: nul/Met

### **The importance of collaborative episodes at every stage of learning**

I'd like to present the importance of collaboration at every stage of learning, and to do this, I'd like to use an example. Let's consider a situation where a student is trying to grasp some particularly heavy theory.

Let's imagine a student in a classroom setting. At first the student works hard and follows carefully in class. Then, outside of class, he takes time to try to untangle the material on his own. It is very important the student feels free to seek direction from tutors or teachers at this early stage.

If the student has difficulty and does not manage to find help early on – from his teacher or others in the learning institution – his desire to learn might very well diminish. However, if he does manage these early difficulties in collaboration with others, he is more likely to seek to enrich his knowledge. At this stage, he may begin to dig into the material, to discover its complexities. He might also take initiative to bounce around the ideas presented in the course with his classmates. Again, here in the intermediate stage, the potential for collaboration with other learners is crucial to the learning process. It allows students to look at challenging concepts from different angles.

In the late stages of learning, again, we expect that students who had collaborative learning experiences - and this can be with teachers, tutors, family members, classmates, among others - will be more motivated to work hard to get a grip on challenging material. Of course, there is no fixed time frame for the length of the initial stage and the intermediate stage. In fact, there may be cycles between the initial and intermediate stage prior to the late stage.

The most important factor in learning through these stages is the opportunity and the quality of the collaborative episodes. Where students do not have resources or do not feel comfortable asking for help, they may never feel that they truly get on top of challenging theoretical work. But with opportunities for supportive and constructive interactions, at every stage of the learning process, students report that they really feel they can digest even the most challenging work.

stimulus 3: NNET/NMet

### **The importance of collaborative episodes at every stage of learning**

I'd like to present the importance of collaboration at every stage of learning of learning, and to do this, I'd like to use an example. Let's consider a situation where a student is trying to understand some particularly complex theory.

#### **At the initial stage of the learning process**

Let's imagine a student in a classroom setting. At first the student works hard and concentrates carefully in class. Then, outside of class, he takes time to try to analyse the material on his own to learn even more.

It is very important that the student feel free to seek help from tutors or teachers begin the process right at this early stage.

#### **At the intermediate stage of the learning process**

If the student has difficulty and does not manage to find help early on in the initial stages of learning – from his teacher or others in the learning institution – his desire to learn might very well diminish and he may understand less and less. However, if he does manage these early difficulties in collaboration with others, he is more likely to seek to enrich his knowledge and discover more on his own.

At this stage, he may begin to consider the material in more detail, to discover its complexities. He might also take initiative to deliberate with his classmates about the ideas presented in the course, experiencing learning as part of a group, no longer a lone student.

Again, here in the intermediate stage, the potential for collaboration with other learners is crucial to the learning process. It allows students to consider challenging concepts in different ways.

#### **At the late stages of the learning process**

When students are in the late stages of learning, we expect that those who had collaborative learning experiences - and this can be with teachers, tutors, family members, classmates, among others - will be more motivated to work hard to understand challenging material. Of course, there is no fixed time frame for the length of the initial stage and the intermediate stage. Some students will make achievements rapidly from stage to stage, whereas for others it may be slower. In fact, there may be cycles between the initial and intermediate stage prior to beginning the late stage. Learners may very well need to repeat lessons or readings or need to have other types of learning experiences.

The most important factor in learning and understanding through these stages is the opportunity and the quality of the collaborative episodes. Where students do not have resources or do not feel comfortable asking for help, they may never feel that they truly understand challenging theoretical work. They might have the impression that they are simply not understanding, that learning is not happening. But with opportunities for supportive and constructive interactions, at every stage of the learning process, students report that they really feel they can learn even the most challenging work. These students

find their learning experience challenging, but also satisfying, as they discover new ideas and learning processes of their own.



stimulus 4: NMET/Met

### **The importance of collaborative episodes at every stage of learning**

I'd like to present the importance of collaboration at every stage of learning of learning, and to do this, I'd like to use an example. Let's consider a situation where a student is trying to grasp some particularly heavy theory.

#### **At the initial stage of the learning process**

Let's imagine a student in a classroom setting. At first the student works hard and follows carefully in class. Then, outside of class, he takes time to try to untangle the material on his own to learn even more.

It is very important that the student feel free to seek direction from tutors or teachers to begin the process right at this early stage.

#### **At the intermediate stage of the learning process**

If the student has difficulty and does not manage to find help early on in the initial stages of learning – from his teacher or others in the learning institution – his desire to learn might very well diminish and he may understand less and less. However, if he does manage these early difficulties in collaboration with others, he is more likely to seek to enrich his knowledge and discover more on his own.

At this stage, he may begin to dig into the material, to discover its complexities. He might also take initiative to bounce around the ideas presented in the course with his classmates, experiencing learning as part of a group, no longer a lone student.

Again, here in the intermediate stage, the potential for collaboration with other learners is crucial to the learning process. It allows students to look at challenging concepts from different angles.

#### **At the late stages of the learning process**

When students are in the late stages of learning, we expect that those who had collaborative learning experiences - and this can be with teachers, tutors, family members, classmates, among others - will be more motivated to work hard to get a grip on challenging material. Of course, there is no fixed time frame for the length of the initial stage and the intermediate stage. Some students will make achievements rapidly from stage to stage, whereas for others it may be slower. In fact, there may be cycles between the initial and intermediate stage prior to beginning the late stage. Learners may very well need to repeat lessons or readings, or need to have other types of learning experiences.

The most important factor in learning and understanding through these stages is the opportunity and the quality of the collaborative episodes. Where students do not have resources or do not feel comfortable asking for help, they may never feel that they truly get on top of challenging theoretical work. They might have the impression that they are simply not understanding, that learning is not happening. But with opportunities for supportive and constructive interactions, at every stage of the learning process, students report that they really feel they can digest even the most challenging work. These students find their

learning experience challenging, but also satisfying, as they discover new ideas and learning processes of their own.

stimulus 5: MET/NMet

### **The importance of collaborative episodes at every step in the path of learning**

I'd like to present the importance of collaboration at every step of the path of learning, and to do this, I'd like to use an example. Let's consider a situation where a student is trying to understand some particularly complex theory.

#### **First steps on the trail**

Let's imagine a student in a classroom setting. At first the student works hard and concentrates carefully in class. Then, outside of class, he takes time to try to analyse the material on his own to move even further. It is very important that the student feel free to seek help from tutors or teachers get the journey off to a good start.

#### **Mid-way through the journey**

If the student has difficulty and does not manage to find help early on in the first part of the journey – from his teacher or others in the learning institution – his desire to learn might very well diminish and he may slow down. However, if he does manage these early difficulties in collaboration with others, he is more likely to seek to enrich his knowledge and go even further on his own.

At this stage, he may begin to consider the material in more detail, to discover its complexities. He might also take initiative to deliberate with his classmates about the ideas presented in the course, marching along the path as part of a group, no longer a lone traveller.

Again, here in the intermediate stage, the potential for collaboration with other learners is crucial to the learning process. It allows students to consider challenging concepts in different ways.

#### **Towards the end of the path**

As students travel even further along this trail of learning, we expect that those who had collaborative learning experiences - and this can be with teachers, tutors, family members, classmates, among others - will be more motivated to work hard to understand challenging material. Of course, there is no fixed time frame for the length of the initial stage and the intermediate stage. Some students will travel quickly along the path from stage to stage, whereas other may move along at a much slower pace. In fact, there may be cycles between the initial and intermediate stage prior to moving to the late stage. Learners may very well need to back up to cover the same ground more than once, or need to explore other paths to get from one stage to another.

The most important factor in learning and moving along a path through these stages is the opportunity and the quality of the collaborative episodes. Where students do not have resources or do not feel comfortable asking for help, they may never feel that they truly understand challenging theoretical work. They might have the impression of being at a dead end, or being lost. But with opportunities for supportive and constructive interactions, at every stage of the learning process, students report that they really feel

they can learn even the most challenging work. These students find their journeys challenging, but also satisfying, as they discover new territories and create paths of their own.

stimulus 6: MET/Met

### **The importance of collaborative episodes at every step in the path of learning**

I'd like to present the importance of collaboration at every step of the path of learning of learning, and to do this, I'd like to use an example. Let's consider a situation where a student is trying to grasp some particularly heavy theory.

#### **First steps on the trail**

Let's imagine a student in a classroom setting. At first the student works hard and follows carefully in class. Then, outside of class, he takes time to try to untangle the material on his own move even further. It is very important the student feels free to seek direction from tutors or teachers get the journey off to a good start.

#### **Mid-way through the journey**

If the student has difficulty and does not manage to find help early on in the first part of the journey – from his teacher or others in the learning institution – his desire to learn might very well diminish and he may slow down. However, if he does manage these early difficulties in collaboration with others, he is more likely to seek to enrich his knowledge go even further on his own.

At this stage, he may begin to dig into the material, to discover its complexities. He might also take initiative to bounce around the ideas presented in the course with his classmates marching along the path as part of a group, no longer a lone traveller.

Again, here in the intermediate stage, the potential for collaboration with other learners is crucial to the learning process. It allows students to look at challenging concepts from different angles.

#### **Towards the end of the path**

As students travel even further along this trail of learning, we expect that students who had collaborative learning experiences - and this can be with teachers, tutors, family members, classmates, among others - will be more motivated to work hard to get a grip on challenging material. Of course, there is no fixed time frame for the length of the initial stage and the intermediate stage. Some students will travel quickly along the path from stage to stage, whereas other may move along at a much slower pace. In fact, there may be cycles between the initial and intermediate stage prior to moving to the late stage. Learners may very well need to back up to cover the same ground more than once, or need to explore other paths to get from one stage to another.

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even the most challenging work. These students find their journeys challenging, but also satisfying, as they discover new territories and create paths of their own.

## **APPENDIX 5.A. STUDY 4, PARTICIPANT INFORMATION AND CONSENT FORM (FOR MTURK)**

Thank you for accepting to do this task. In this task you will be asked to call to mind a situation, an actual situation you have experienced or one that you simply invent. You will then be asked to think of a story about this situation, and finally to answer a few questions. There are no right or wrong answers in this task. It is important, though, that you respond to all the questions.

At the end of this task, you will be given an ID number. You will need to enter this ID number at the HIT on MTurk in order to be paid for your work.

Please click below to continue.

[CONTINUE button]

Here you will find information below about the research and your participation in this study.

### **Purpose of the research**

This study investigates ways of telling stories or recounting events; it is part of doctoral research at the London School of Economics and Political Science.

### **Procedures**

If you choose to participate, you will be asked to imagine a situation and a story and to answer a few questions. You will also be asked to provide some basic information about yourself.

### **Participants' rights**

Your participation in this study is completely voluntary. At any stage, for any reason, you have the right to withdraw from this study and end your participation. Your answers will be used in the research only if you click "complete the study" at the end of the tasks. You will be paid according to the MTurk HIT, if you complete the task by responding to all the questions, note the ID number that you are given at the end of the task, and enter this number at the HIT on MTurk.

This study is anonymous. You will not be asked to identify yourself, and the information you provide cannot be linked to you personally. Your responses will be used only for the purposes of the study.

### **Potential risks and benefits**

We do not anticipate any risks associated with participation in this study. Those who have participated in pilot phases of this study reported no

adverse effects. Apart from the monetary payment, there are no identified benefits linked to participating in this research, although you may find it interesting to complete the tasks involved in the study.

This research has been approved by the departmental ethics committee of the Department of Social Psychology, London School of Economics and Political Science.

If you have any questions or concerns about this research, you may contact either the principal researcher or the research supervisor, at the London School of Economics and Political Science.

Principal researcher

Helen Amelia Green  
London School of Economics  
and Political Science  
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London WC2A 2AE  
United Kingdom  
[h.a.green@lse.ac.uk](mailto:h.a.green@lse.ac.uk)

PhD research supervisor

Bradley Franks  
London School of Economics  
and Political Science  
Department of Social Psychology  
St. Clements Building  
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London WC2A 2AE  
United Kingdom  
[b.franks@lse.ac.uk](mailto:b.franks@lse.ac.uk)

I have read and understood the information above; I give my consent to participate in this study.



## **APPENDIX 6.A. STUDY 5, EXPERIMENTAL STIMULI**

stimulus A NMET/NMet

### **The importance of collaborative episodes at every stage of learning**

I'd like to present the importance of collaboration at every stage of learning of learning, and to do this, I'd like to use an example. Let's consider a situation where a student is trying to understand some particularly complex theory.

#### **At the initial stage of the learning process**

Let's imagine a student in a classroom setting. At first the student works hard and concentrates carefully in class. Then, outside of class, he takes time to try to analyse the material on his own to learn even more.

It is very important that the student feel free to seek help from tutors or teachers begin the process right at this early stage.

#### **At the intermediate stage of the learning process**

If the student has difficulty and does not manage to find help early on in the initial stages of learning – from his teacher or others in the learning institution – his desire to learn might very well diminish and he may understand less and less. However, if he does manage these early difficulties in collaboration with others, he is more likely to seek to enrich his knowledge and discover more on his own.

At this stage, he may begin to consider the material in more detail, to discover its complexities. He might also take initiative to deliberate with his classmates about the ideas presented in the course, experiencing learning as part of a group, no longer a lone student.

Again, here in the intermediate stage, the potential for collaboration with other learners is crucial to the learning process. It allows students to consider challenging concepts in different ways.

### **At the late stages of the learning process**

When students are in the late stages of learning, we expect that those who had collaborative learning experiences - and this can be with teachers, tutors, family members, classmates, among others - will be more motivated to work hard to understand challenging material. Of course, there is no fixed time frame for the length of the initial stage and the intermediate stage. Some students will make achievements rapidly from stage to stage, whereas for others it may be slower. In fact, there may be cycles between the initial and intermediate stage prior to beginning the late stage. Learners may very well need to repeat lessons or readings or need to have other types of learning experiences.

The most important factor in learning and understanding through these stages is the opportunity and the quality of the collaborative episodes. Where students do not have resources or do not feel comfortable asking for help, they may never feel that they truly understand challenging theoretical work. They might have the impression that they are simply not understanding, that learning is not happening. But with opportunities for supportive and constructive interactions, at every stage of the learning process, students report that they really feel they can learn even the most challenging work. These students find their learning experience challenging, but also satisfying, as they discover new ideas and learning processes of their own.

stimulus B NMET/Met

### **The importance of collaborative episodes at every stage of learning**

I'd like to present the importance of collaboration at every stage of learning of learning, and to do this, I'd like to use an example. Let's consider a situation where a student is trying to grasp some particularly heavy theory.

#### **At the initial stage of the learning process**

Let's imagine a student in a classroom setting. At first the student works hard and follows carefully in class. Then, outside of class, he takes time to try to untangle the material on his own to learn even more.

It is very important that the student feel free to seek direction from tutors or teachers to begin the process right at this early stage.

#### **At the intermediate stage of the learning process**

If the student has difficulty and does not manage to find help early on in the initial stages of learning – from his teacher or others in the learning institution – his desire to learn might very well diminish and he may understand less and less. However, if he does manage these early difficulties in collaboration with others, he is more likely to seek to enrich his knowledge and discover more on his own.

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Again, here in the intermediate stage, the potential for collaboration with other learners is crucial to the learning process. It allows students to look at challenging concepts from different angles.

### **At the late stages of the learning process**

When students are in the late stages of learning, we expect that those who had collaborative learning experiences - and this can be with teachers, tutors, family members, classmates, among others - will be more motivated to work hard to get a grip on challenging material. Of course, there is no fixed time frame for the length of the initial stage and the intermediate stage. Some students will make achievements rapidly from stage to stage, whereas for others it may be slower. In fact, there may be cycles between the initial and intermediate stage prior to beginning the late stage. Learners may very well need to repeat lessons or readings, or need to have other types of learning experiences.

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stimulus C MET/NMet

### **The importance of collaborative episodes at every step in the path of learning**

I'd like to present the importance of collaboration at every step of the path of learning, and to do this, I'd like to use an example. Let's consider a situation where a student is trying to understand some particularly complex theory.

#### **First steps on the trail**

Let's imagine a student in a classroom setting. At first the student works hard and concentrates carefully in class. Then, outside of class, he takes time to try to analyse the material on his own to move even further. It is very important that the student feel free to seek help from tutors or teachers get the journey off to a good start.

#### **Mid-way through the journey**

If the student has difficulty and does not manage to find help early on in the first part of the journey – from his teacher or others in the learning institution – his desire to learn might very well diminish and he may slow down. However, if he does manage these early difficulties in collaboration with others, he is more likely to seek to enrich his knowledge and go even further on his own.

At this stage, he may begin to consider the material in more detail, to discover its complexities. He might also take initiative to deliberate with his classmates about the ideas presented in the course, marching along the path as part of a group, no longer a lone traveller.

Again, here in the intermediate stage, the potential for collaboration with other learners is crucial to the learning process. It allows students to consider challenging concepts in different ways.

#### **Towards the end of the path**

As students travel even further along this trail of learning, we expect that those who had collaborative learning experiences - and this can be with teachers, tutors, family members, classmates, among others - will be more motivated to work hard to understand challenging material. Of course, there is no fixed time frame for the length of the initial stage and the intermediate stage. Some students will travel quickly along the path from stage to stage, whereas other may move along at a much slower pace. In fact, there may be cycles between the initial and intermediate stage prior to moving to the late stage. Learners may very well need to back up to cover the same ground more than once, or need to explore other paths to get from one stage to another.

The most important factor in learning and moving along a path through these stages is the opportunity and the quality of the collaborative episodes. Where students do not have resources or do not feel comfortable asking for help, they may never feel that they truly understand challenging theoretical work. They might have the impression of being at a dead end, or being lost. But with opportunities for supportive and constructive interactions, at every stage of the learning process, students report that they really feel they can learn even the most challenging work. These students find their journeys challenging, but also satisfying, as they discover new territories and create paths of their own.

stimulus D MET/Met

### **The importance of collaborative episodes at every step in the path of learning**

I'd like to present the importance of collaboration at every step of the path of learning of learning, and to do this, I'd like to use an example. Let's consider a situation where a student is trying to grasp some particularly heavy theory.

#### **First steps on the trail**

Let's imagine a student in a classroom setting. At first the student works hard and follows carefully in class. Then, outside of class, he takes time to try to untangle the material on his own move even further. It is very important the student feels free to seek direction from tutors or teachers get the journey off to a good start.

#### **Mid-way through the journey**

If the student has difficulty and does not manage to find help early on in the first part of the journey – from his teacher or others in the learning institution – his desire to learn might very well diminish and he may slow down. However, if he does manage these early difficulties in collaboration with others, he is more likely to seek to enrich his knowledge go even further on his own.

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Again, here in the intermediate stage, the potential for collaboration with other learners is crucial to the learning process. It allows students to look at challenging concepts from different angles.

## **Towards the end of the path**

As students travel even further along this trail of learning, we expect that students who had collaborative learning experiences - and this can be with teachers, tutors, family members, classmates, among others - will be more motivated to work hard to get a grip on challenging material. Of course, there is no fixed time frame for the length of the initial stage and the intermediate stage. Some students will travel quickly along the path from stage to stage, whereas other may move along at a much slower pace. In fact, there may be cycles between the initial and intermediate stage prior to moving to the late stage. Learners may very well need to back up to cover the same ground more than once, or need to explore other paths to get from one stage to another.

The most important factor in learning and moving along a path through these stages is the opportunity and the quality of the collaborative episodes. Where students do not have resources or do not feel comfortable asking for help, they may never feel that they truly get on top of challenging theoretical work. They might have the impression of being at a dead end, or being lost. But with opportunities for supportive and constructive interactions, at every stage of the learning process, students report that they really feel they can digest even the most challenging work. These students find their journeys challenging, but also satisfying, as they discover new territories and create paths of their own.



## **APPENDIX 6.B. STUDY 6, PARTICIPANT INFORMATION AND CONSENT FORM**

**The London School of Economics and Political Science**

Houghton Street  
London WC2A 2AE  
UK

### **PURPOSE OF RESEARCH**

You are invited to participate in a study about how people describe and understand their learning experiences.

### **PROCEDURES**

You are being asked to participate in a one-on-one interview, which will last for about 40-60 minutes. The interview will be audio-recorded for facilitation of transcription and analysis of your responses.

### **POTENTIAL RISKS AND BENEFITS**

There are no known risks associated with this research. While there are no specific benefits to you expected from your participation, it is hoped that you will enjoy the interview.

### **PARTICIPANTS' RIGHTS**

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### **CONTACT INFORMATION**

If you would like more information about this research, you can contact

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### **CONFIDENTIALITY AND ANONYMITY**

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### **CONSENT STATEMENT**

I consent to participate in the research as described above. I consent to the audio-recording of my responses in this interview, and the subsequent use of this data for research purposes.

I understand that all my responses will remain confidential. I understand that I will not be identified in the reports of this research; and that no identifiable personal data will be published or shared with anyone outside the research team.

I acknowledge that my participation is voluntary, and understand that I can choose not to participate and that I can withdraw from the interview at any point without being further penalised or disadvantaged in any way.

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please print your name

signature and date

## APPENDIX 6.C. STUDY 6, INTERVIEW TRANSCRIPT

Participant 2

I: Have a look at these two texts... Feel free to mark on them or do what ever you want. Please have a look at both of them and I'm going to ask you a few questions. You get to keep them, so don't feel like you have to commit anything to memory or anything like that.

P2: OK

I: And this is an excerpt of someone, an educational specialist's take on the learning process.

P2: OK. There are two different ones?

I: Yeah, there are two different ones. Have a look at both please.

[Reading from 38:14 to 42:10] P2: OK.

I: OK? So in your opinion, what's the main difference between the two texts?

P2: Let's see, this one seemed... as more a process, perhaps, more collaborative

I: A does.

P2: A does, yeah.

I: In terms of the material itself, is there any difference in how clear it is? How easily understandable it is to you?

P2: No, not a big difference.

I: OK.

P2: I guess... how you interpret some of the differences...

I: Like um?

P2: Like "discovering new ideas and learning processes of their own" as opposed to "new territories and create paths of their own"

I: OK

P2: Yeah, so this one is more, in that sense, tends to more creative, like you're dealing with your own schema and you're trying to figure it out, whereas this one is like all of a sudden, perhaps, your collaboration you have, it's opened up to you, like "oh, there it it!"

I: OK

P2: I don't know if that makes any sense.

I: Like you just happen upon it?

P2: Yeah. yeah.

I: Right... so, again in terms of the material, to your eye, is there any difference in how vivid it is?

P2: Um... Let's see, like which one you might think is more vivid...

I: If there's any difference at all...

P2: I thought this one got my attention more. A.

I: OK, why?

P2: I guess, specifically like the words 'complex theory' as opposed to 'heavy theory'.

I: What -

P2: I don't know, I guess that just means, it just has a different connotation to it I guess.

I: So for you, complex, for example, seems more attention-grabbing, more vivid.

P2: Yeah, yeah.

I: OK

P2: And, so like differences like "understand less and less" grabs my attention more than "he may slow down"

I: OK. Any idea why?

P2: Mmm, I don't know. Because I feel the need to understand a lot! (laughter)

I: OK!

P2: But over... I guess this (A) gives me the hope that it's understandable... where this (B) gives me the hope that... well, ok, he can't go as fast, because he can't grasp the material. This one (A) gives you the hope that he's going to grasp it, it's just gonna be slower.

I: If you had to think about the speaker, the person who produced this material, do you have any sense of ... in terms of does this person know what she's talking about - is there any difference in the two versions.

P2: (no pause) I think this one maybe because of the language.

I: A?

P2: Yeah

I: So, how for example?

P2: Like the process right at this early stage, as opposed to get off to a good start

I: OK.

P2: This is a little bit more formal I guess. And it also makes you realise there a, you know...emphasises the fact that there's a process. It's not just a pour it in the glass and you're done, kind of thing, you know.

I: OK... and in terms of the person who produced this, do you have any sense that there might be a difference in how engaging that person is?

P2: Hmm, engaging?

I: Mmhmm.

P2: Yeah, I would think this one would be, (tapping) A.

I: OK. How come?

P2: Hmm, I don't know. Just this style of the text I guess makes me think that ... I don't know, like this paragraph has a little bit ... it seems like "enrich his knowledge and discover more on his own" where "enrich his knowledge and go even further on his own" ... like there's a promotion, that they want you to discover. I don't know.

I: OK... and again in terms of the person, the producer of this material, can you make a judgement as to how much that person cares about what he's talking about? Cares about students and their experience. In the two versions, do you have a sense that there's a difference?

P2: (no pause) Yeah, I gotta go with A again. I don't know...

I: OK, so this person cares more.

P2: Yeah. I guess probably just because I think if the language is a bit more formal then I think there was more effort and caring that went into it.

I: And finally the degree to which this person could help a student who is having this experience? Their ability to do something about it.

P2: Yeah. Right.

I: Do you get a sense of that between the two versions?

P2: Hmm, (hesitation). Not really.

I: OK. Is there anything else that you pick up on about this person?

P2: Yeah. Well I make a lot of assumption here but

I: Of course!

P2: Like um, I don't know, this language seems more, a bit...like I said, not as formal so -- like "marching down the path" or whatever...

I: And what inference does that... what does that lead you to think about this person?

P2: Maybe that... I don't know. Now you've got me thinking because that last question, that maybe this one would be closer to the students in some way? I don't know ...

I: This one (B)?

P2: Yeah, maybe because the language is a little less formal. I'm not sure 'formal' is the right word, but it's different. (reading aloud...same ground) Yeah, like words like this, like 'same ground' that's more, you know, 'need to repeat lessons' so

I: So what does that make you think about...

P2: Yeah, so this one (B) makes me think this is someone you can talk to easier, perhaps? More accessible and this person may be more formal, so maybe not as accessible.

I: So you thought that (A) person could be more knowledgeable.

P2: Yes, yes. More knowledgeable but maybe not as accessible.

I: OK, that's interesting.

P2: It's surprising me too!

I: And any other observations at all about either ... both of the texts?

P2: (reading aloud) No, no I don't think so.

I: In your opinion, based on your experience, has that person got it right?

P2: Yeah, you mean as far as the learning process?

I: Yeah, the way the description of the path or the process, or whatever, do you think that person...

P2: Well, I think there's something to... They talk about collaboration in the beginning, but I don't get the sense that there's a lot of it until later. So in the initial stages ... I guess I was expecting a lot of... in class, group work, you know, we were going to talk about how we we're gonna break into two or three and do this that and the other thing and that never came, really. Although later they talk about collaborative learning experiences with teachers, tutors, etc. but that was toward the end.

## **APPENDIX 7.1. STUDY 7, PARTICIPANT INFORMATION AND CONSENT FORM**

**The London School of Economics and Political Science**

Houghton Street  
London WC2A 2AE

### **PURPOSE OF RESEARCH**

You are invited to participate in a study about how people describe and understand their learning experiences.

### **PROCEDURES**

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please print your name

signature and date



## APPENDIX 7.2. STUDY 7, INTERVIEW TOPIC GUIDE

### A. INTRODUCTION

How would you characterise your experience over the past year?

### B. LEARNING, material, theories, ideas

Can you tell me about how you engaged with the material - the various theories?

-Were there some aspects of the work that seemed particularly heavy to you?

-What did you do to really grasp that?

-When did you first begin to untangle things?

-What was useful to help you untangle this material?

-Did you feel like you had enough time to digest the various theories?

-Did you get the opportunity to really dig into the material?

-And now do you feel like you have a good grip on these ideas?

-Did you ever feel like you were lost?

-Did you ever get lost?

-Did you have to cover the same ground more than once?

-Do you think you discovered any new paths of your own?

-Did you discover any new territory of your own?

-Did you feel on top of the work in time for you exams?

Could you tell me more about how you prepared for your exams...  
conducted your research... worked on your dissertation...

### C. COLLABORATING WITH OTHERS

Tell me about your experience working with other people? (professors, advisers, students, family or friends?)

-Did you get direction from other people?

-Did other people give you direction / guidance ? show you the way?

-Did your professors send you in the right direction? someone else?

-In lectures, were you able to follow the professor? Did this change over the course of the year?

Was it helpful to work with other students? Why (why not?)

-For example, did you ever get together to bounce around ideas?

-How did you manage to see the material from different angles ?

-Do you think other students took a different path?  
moved along the path slower / faster than you?

### D. CONCLUSION

What was the most challenging part of this journey?

What about this journey was valuable to you?

What was your favourite aspect about this journey?

If you had it to do over, would you take this same path? Would you take a different path?

### APPENDIX 7.3. STUDY 7, INTERVIEW TRANSCRIPTS

#### Participant 2

I: How would you characterise your learning experience here in the past year?

P2: Challenging, independent, analytical, trying - because, yeah, there were times where... but also like mind-opening. Where you see, where you listen, you'd be in a seminar or lecture or something, and perhaps something you hadn't considered or some angle you hadn't considered or something. Uh, so yeah I mean sometimes would open your mind and other times I think it would tax your mind, but that's a good thing. That's one reason I came here. ... Challenging in the fact that there was a lot of information and probably challenging maybe for me in a certain way because I'm an older student, I came back, you know I didn't come straight from undergrad or anything so I had to get back into the game, as my advisor said. ... Analytical, the analytical part was some of the critical thinking ... some good professors who would sort of force us I guess to keep analysing, to dig deeper, to go behind the question or the word or the essay or the article and to see what was going on, so yeah, I think that was a big part of what I got out of this. Yeah, so a lot of the learning was just fun too. Just because when, and one of my professors kept emphasising made a lot sense, he says, when are you gonna take a year off just to learn, in something that you obvious have some interest in, or you wouldn't have applied to the school in the first place. So, I think in a lot of ways, you know it's kind of fun to dig into things that perhaps you only had 10, 15 minutes to read in the paper or to consider, even if you looked it up on the internet, or something. But here you gotta say OK, let's look at that issue in more of a holistic way and more of a deeper way as well.

I: Let me pick you up on this challenging aspect.

P2: Sure

I: I'd like to hear more about that. If you think about a time...did you ever feel like you were dealing with some idea or some theory that was especially heavy...something you really had to untangle.

P2: Yeah, some of it was just the terms...I think, in my programme it seemed so broad in a lot of ways. You know people were coming in with several different backgrounds and so we'd get on like...I think I'm fairly weak in economics for example. So there'd be some economics theory where people would like oh yeah, nod their head like, oh yeah, I get that. You know, and I'd be like, what is he talking about? Even with his short little explanation, I wouldn't understand it. So then you'd have to, on your own, and I guess that's where the independence comes in, go and talk to somebody or read about it or do something.

I: and what was that experience like? there you are trying to figure out this thing, independently, to untangle it. How did that work for you?

P2: Yeah sometimes it was interesting because, you're like oh, OK now I understand and you open up some things, open up your mind a little bit. But other times, it's just frustrating because you feel like you didn't have enough to kind of access it, you know, to kind of access the information. So sometimes that was difficult, but you know, learning is uncomfortable. That's the thing. I got a great quote from a guy who was at Berkeley and actually my brother in law took a class

from him at Berkeley, and he had a quote something more eloquently said, but to the fact that learning was uncomfortable and if we're ever going to get anywhere as a society we're going to have to embrace that it's uncomfortable and keep going. So I try to live by that, but it's frustrating.

I: And after this process, given the discomfort and trying to access this information, were there times that you really felt satisfied that you really grasped the material? that you really got to it and got your hands on it?

P2: Yes, yeah, there were some satisfying times. Whether that would be, and I can think of a few times, sitting alone in the library and you're like, OH! OK, I get it or in seminars, a lot of times, and lectures, I guess, when things would sort of come together. You'd pull... I guess those times where you'd pull from another course and would come in, and you'd say, Oh that's just like this but maybe in a different context or a different way, and so then you'd say, you'd make connections. And so that was always like, wow, that's powerful learning I think, there, because you can kind of see the forest from the trees or something.

I: Did you ever feel like you had to go over the same ground twice - or more than once?

P2: Yeah, definitely

I: Taking the same path more than once...

P2: To really grasp the material? Yeah. Yeah, it's true. Some of that was just re-reading, some of that was looking at slides again or talking to a professor about the same thing, that they had said in class. But yeah, there was definitely some repeating that went on for me. I think it's probably different for different individuals. There's some people who seem to pick on stuff pretty fast. ...

I: And some not! (laughter)

P2: It was interesting in the first couple seminars, in one of them, I felt going in there like I am SO prepared! Like I have read everything, I went over, I made good notes. I'm like man! it's gonna be great. And I go in there and I'm like, what is everyone talking about?! Right? (laughter)

I: Is this the right week? the right room?

P2: Yeah! They were just taking it, you know and then that was - you know I had some good seminars in that particular one as well. But for that one, they just took it, you know I guess just to a different level so my experience was kind of frustrating there. But then

I went back .. I talked to... you know I walked out and I said, man, I read so much for this and I feel like I didn't get as much out of it. So then, you have conversations so I suppose that's part of the learning experience too. It was a conversation with the other classmates.

I: Actually... tell me about your experience ... in this learning experience, what happened with other people.

P2: OK, yeah, some conversations, before and after class, with classmates were pretty awesome, I would say.

I: Did they help give you direction? What did...

P2: Yeah, I think you kind of fed off each other, you know. Different ideas and different experiences, and stuff. I mean sometimes it would be something that

came up in seminar and then we'd take it out and have coffee and talk about it and they'd say... you know and it'd be something that they said, and I'd be like oh yeah! I was thinking that, what do you think of that? Or even someone, I don't know, I'm an older student so I think sometimes I seem to fall back on my experiences, and so, they'd ask about mine or I'd ask about theirs and say, oh, you know did that work in that situation or what happened. Uh, so that was part of it. And then sometimes you know, semi-random conversations about anything and I don't think I'm particularly social, but you know, somebody would say, oh I see you're reading that book and I'd say, oh yeah I'm doing it for a class. He'd say, have you ever heard about ... and we'd start talking about authors

or whatever else. I had a good conversation about my dissertation with someone I hadn't seen, a classmate I hadn't seen in a month or five weeks. You know we talked outside the library, he was giving me ideas and I was, hopefully, giving him ideas. And you know, bouncing things back and forth about how to approach things, and his idea for an argument. So that, I mean, I thought that was good and, in some ways he was one of those that sort of, at the beginning of the year who I thought, phew, I don't know if I can have a conversation with him because he's pretty sharp, he's an economist.

I: That's interesting.

P2: Yeah, so I almost felt like, wow, I've come a ways, because I had a conversation with him and it was useful for both parties.

I: So this bouncing around of ideas, I guess that helps you see things from different places, different angles...

P2: Yeah, exactly. Everybody's different point of view, too, it's interesting. You know you always come in with your sort of set of ...how you view the world, the contexts. And then you'll see, you know, well in this situation, this could happen, and... it gets more complex. I guess you realise that...the more you keep studying, the more you realise how you do know.

I: Yeah! They say...the awareness of what you don't know...so you're talking about having come a distance, having come a ways, as though on a path.

P2: Yeah, I think so.

I: In terms of other people, what about professors? So students on one hand, like your classmates, um... how do you think your different tutors, professors, advisers - how were they part of your experience? Giving you direction, sending you the right way...

P2: On very pragmatic things, like essays. And uh, the dissertation; studying for exams, stuff like that, I think it was you know, useful, because, like you said, they kind of point you in the right direction. Stuff like that. ... The better professor that I had I thought were the ones who would challenge but still make it accessible. I'm thinking of one in particular, who, he would always... You know, so I have a teaching background too and this is always one of the secrets to teach to your class, who are not all robots. So, I thought he always had a good sense of where the class was at, and the individuals.

I: OK

P2: So he would challenge individuals to point that they could be challenged.

I: OK (?)

P2: Like he knew, and he probably knew at some point that I was not going to be the economic expert in the room, right, so he would not challenge me with a question that was above my head. So to speak... But to a place where you could access it, right.

I: What do you mean?

P2: So you can get to it, yeah. It's a challenge, but you can grab it right.

I: Right.

P2: Where, you know, you can't grab if it's just (shwoo) too far. And that's what I mean....that's what I thought he was good at.

I: And he did that, you mean calling you by name? When you say challenging individuals, you mean asking individuals questions, "So, B. what do you think...?"

P2: Yeah, in seminars he would say, you know... some people would pull up people, "so, John what do you think of that?". But other ones, he wouldn't do that, he'd ask for volunteers and then, he usually had it though and he'd sort of refer, kind of in a nice way to people, "it's your turn to talk". But then you'd say something, and then he'd challenge you to the point that you can do it. He'd say, "well what do you mean by that?" "Be more specific." "What about this?" "If you said this, would that support your argument? or would it hurt your argument?" Right?

I: OK

P2: So, you could tell he'd challenge, once in a while he'd do this even in his lectures, where people raise their hand and come up with a point, he said, I understand that but what about this? you know and it'd be some expert on this certain...and everybody else would be going, "I don't even know what they're talking about!" (laughter). But then someone else, and then... so I thought he was very patient and very good at that. And he'd do that if you go to his office, he'd do that as well. So in every context I can think of him in, I thought he did that well. ... yeah, I thought that was good, and then sometimes, I mean, there were seminars where you kind of went off in tangents where from a very pragmatic... where you're worried, you know, we're not really answering the question of the week, but gosh this is cool! So I kind of walked out of there sometimes like, "Ah, that was awesome." and I'd have these conversations we'd continue in the hall, then I'd go home and look at the question, I'd go, I don't really know if we answered that question but

I: But you had some cool moments of thinking.

P2: Yeah! exactly! which I guess hopefully develops skills of thinking analytically, thinking out of the box, thinking in a different way, thinking critically.

I: So you were talking about this analytical notion, about digging deeper.

P2: Yeah

I: Could you tell me more about that? Digging deeper than what? than you used to do?

P2: Yeah, I guess so. Digging deeper behind the issues. Being... I mean I don't know, I thought the first term we were just so critical of everything, to the nth degree.

I: OK

P2: You know, which was, after a while it looked like... everything we talked, every transaction, every financial transaction was an exploitation or something, to the point where you thought, man if I breathe I'm doing something wrong! I have to be critical of it (laughter) but it was good. Because I think, I don't know, it's very easy to take things on face value and even if you think critically for some things, there's... even though I think I thought critically before there seemed to be like another layer that I could go under. You know. And think critically there and I think ... and you know... I feel like just once in a while I open my mind and go wow! there it is! and then it would close (laughter)

I: in a fleeting moment

P2: you know, I don't know if that was like... sometimes it was very philosophical sort of stuff like Foucault, and they try not to bring too much of that stuff up but I think, oh this is what - when I was reading that about Foucault - this is what it was talking about. And then, bam! and I lost it. It's like one of my professors says, always write stuff down, before you lose it.

I: Catch it before it gets away!

P2: Yeah. I do thing back to this layer thing, I do think there was just... I don't know if it was because we did it so many times, or because we dug a little deeper in some of the stuff, and maybe because of the perspective of my course, because it was social policy. I don't know, I feel like it was so broad... you know, that you can bring so many different elements in as you dig deep, instead of just taking in economics or psychology or whatever (shovel gesture?), you're bringing so many elements so then that, I don't know, that was different I guess. Maybe more complex, I don't know. At least, more messy.

I: This way of thinking, this way of approaching the material, do you think that has spilled over into how you think of other things? Non-academic things? News items...

P2: Yeah, I think so. I think it spilled over. Because like you said, you'll hear something on the news, like some phrase or some word, and... dug into where that came from or what that's about and now that means a lot different than it did before. Like even the stuff I've doing my dissertation on, repatriation. I see that word now, and it's a whole different ball game than I would've a year ago [sic].

I: If you had to identify one thing,

P2: OK,

I: what would be the most challenging aspect of this whole journey?

P2: Um, I suppose sort of the... diversity of the literature.

I: OK

P2: In some way that was great but in some ways that was a challenge because it seemed like we pulling in so many things. And sometimes it's hard to deal with that. Um, some of it was challenging especially early on, I think and then, I think you become a better reader, hopefully, and a better analyser. And saying OK I need... to understand what's going on here, I need a cursory knowledge of this. Where this, I need to really know what it's about. So I think at the beginning, that was it, that there were these articles and things that just thrown in a lot of stuff, which, I don't know I didn't have the background to deal with a lot of it. But yeah, I think, I mean that was the most challenging, a lot of the other stuff I enjoyed.

I: OK, well in the same spirit, if you had to identify one thing, for you what would be most positive aspect of this journey? or rewarding, if you like?

P2: Um...as far as, in terms of learning experiences?

I: Sure

P2: I think just the opportunity to engage the literature deeper and for a longer period of time, and to read things that I probably would not have read, if I hadn't come here. I think and the opportunity for the conversations with the professors and the... I mean I have ... my classes and stuff were just great. I have no problems. People would say, oh I didn't like that seminar, but I got something out of everybody. People have different styles...stronger... whatever, but I got something out of every class. I can honestly say that. And so yeah, I think the institution as a whole, just like sort of promoted this idea, yeah, go! be an independent learner and do this. I think that's ... But yeah the positive thing I think came out was the opportunity to really engage in things and to learn! I mean I learned about things, I learned to write better, hopefully, I learned to think in a different way - better. I don't know, I'm gonna miss it! (laughter) I gotta find something that's like this in some way. But the frustrating thing is, I don't know if this applies to anything, and I almost hate to say it, but the frustrating thing sometimes I had, I said some of those conversations with classmates and stuff were great. But then the other times, frustrating things were some of my classmates. That they weren't prepared, that they didn't come to things, that they had, you know, they slacked off on essays and stuff and I just thought, you're just - well part of it was selfish, was me right - because I wanted them to be as engaged as I was so we could have a great conversation, or we could do something cool in seminar, or whatever, but the other thing, I think for them! I think they're just missing out. I mean, I don't know, ... we talked about this a little before I think. I just don't know what some of them were thinking when they got here. Some people have come and they thought some other universities were hand-holding them and they're not used to this independent sort of idea. You know I'm older and I've got another master's so I understand sort of, you have to be responsible and whatever, but I just can't imagine taking this time and money and everything else and then say, oh boy! I mean I know some that basically read about nothing for some courses until exam time came away.

I: Yeah, it kind of a shame. You sort of feel...

P2: Yeah!

I: a waste

P2: Yeah! and then I'd say, oh, you know, we organised this study group on Fridays, which I told you about a little bit, and I understand, some people would, you can read, you can't read and bla bla bla, but in those, and one reason I did it 'cause I though well, you're gonna get some conversations with people, so that was good. But then other times, you'd wanna talk about the essay coming up or you'd want to do this, or talk about the reading before class or something. And "aww, I didn't read that." "No, I haven't that". Well you know it's due in two days! (laughter) I know one guy who wrote 4,000 words in two days, to hand in. He can probably do it, because he's pretty (sound), he can go.

I: There are people like that too.

P2: But, yeah, but ... I just... I know it can be overwhelming, still it's a chance, and then there's a lot, I know there's second language learners and stuff like that but,

they come and they, I don't know, you just don't see the effort. You're like, wow, you know a lot of people would love to be in your spot! And you're not giving much effort... maybe I'm too serious...

I: If you could rewind and you had the path to take all over again

P2: Oh I'd love to!

I: What would you do differently?

P2: What would I do differently... I would read more before I came! That's one thing I'd probably do. I don't know...I mean there's an idea of taking a different... I could take a different course, but that's the story of my life, which course to take.

I: A different MSc?

P2: Yeah, but I don't know which one. But that's neither here nor there... what else would I do differently? One regret I had was when I had to decide on my second term courses and I could get a guarantee that I was going to get the same ... professor in seminar, and I thought, even though I wasn't like in love with the content of the state class, it'd just be good because it was him, you know. And there were several courses I wanted to take, so I took a poverty class instead. But a small regret, he ended up doing the same seminar and the first Friday when they moved classes, because you know, you get a connection with professors and with other people, and they were giving me crap about the stuff United States had done...(laughter) no but it was good, it was all healthy...

I: and in a good spirit

P2: In a good spirit, yeah. Um, so then... I wasn't there but, they said he said, "Did someone tell B that we moved rooms?" They said, Dr. he's not in this class anymore. 'Cause he just thought I'd be in there, right, 'cause we had had so many good conversations the term before. So a small regret with that, but I went and saw him in his office. So, no big regrets, I guess.

I: Let me ask you, in a couple sentences, how would you describe this learning experience to somebody else - who was not involved?

P2: Ah, that's good. I would say, you have to deal with a lot of material. You should be pretty I guess, focused, disciplined, and independent to get the most out of it.

I: OK, now again, a few sentences and you're describing your experiences to someone say who's interviewing you for a job you'd really like.

P2: Ah! yeah.

I: Someone you'd like to make a good impression on... how would you describe the way you learned here?

P2: I guess almost in the same way, independent, um, focused, we had a chance to like delve into some issues; analytical, we had lots of opportunities to write and, you know, sort of defend arguments, whether it be in class or on paper.

I: Similarly, in just a few sentences how would you describe this experience to say a family member - someone who's making a sacrifice for you to be able to do this.

P2: right, right, right... well what I usually say it's just been great, great professors, a lot of support, um, which I might tell someone who wants to come here that too. A lot of support if you need it. But yeah, it 's a chance to sort of learn independently



but with a lot of ... I mean, there's just a lot of good academics here. I mean, you'll read stuff and then you'll say, oh, he or she's in the LSE department over there, you know.

### APPENDIX 7.3. STUDY 7, INTERVIEW TRANSCRIPTS

#### Participant 5

I: How would you characterise the learning experience that you had here?

P5: Well, I think it was great, you know I really valued the opportunity to take some time out of paid work and spend some time thinking for a change and writing and so on and reading. But I think it was, I guess for me it was kind of, you try to remember how to do academic work, I kind of had to go in to the back of my memories and think... it was very unfamiliar territory for me because I'd been working for like 20-odd years. So it was almost like once I'd finished the Master's I knew how to do a master's but when I started I didn't. I don't know I suppose that's part of the learning, but I suppose I thought I would've been more ready to write essays and do stuff straight away, and I sort of had to re-learn it, unlearn it. It was all learning, everything was, being with people younger than me, 20 years younger than me everyday was a learning. (laughter)

I: So you talk about at the beginning, the reading and all those things compared to the end, when you knew how to do a master's degree. If you think back to the beginning, can you think of a time when you were dealing with some particularly heavy material - a particularly complex theory - some heavy concept, what was that like?

P5: What was it like? It was like learning another language. It was like reading something in another language. The connections were just really hard to make. And I think I read something somewhere about learning that learning is painful, and when it's painful you're really learning, because it's something completely new. At times I found it really painful and really exhausting and like, I couldn't do it and then all of a sudden connections started to happen and it becomes something you can do. It was a very strange feeling because I had been in the same profession for a long time, and I know what I'm doing in my job. Back in academic life, I didn't know what I was doing and it was quite disconcerting at times.

I: So, tell me about when the connections were being made, what do you think you did to make them happen? What did you do to really grasp the ideas and make these connections?

P5: I think some of it's practice, you know. Practicing reading an academic paper and... I suppose when I first started reading I went back to how I did my, god, I'm old enough to have done my O levels in the UK. So when I did my O levels I read stuff, and I wrote copious notes and highlighted them and remembered them, you know on a rote basis. And I suppose I was still in that mind set and I was trying to go through these papers that were really hard to understand and making lots of notes and at the end of it I looked back at my notes and thought, oh god... awful...what's the point of that? Yeah, so that didn't work. And... I think it might have been when I was with you trying to pick out the key purpose of the paper and really kind of just have sth you know, words on a page, on one page to try to encapsulate what the paper was getting at. And, you know using that technique was really good. You know, not reading, remember you said about having a shopping list when you read something. That really helped. Techniques like that really helped.

I: OK, do you think you had enough time to really untangle all these articles and untangle the ideas and digest the material.

P5: I had... I could have done with more time. You know my family life never stopped. I suppose I wasn't as fortunate as some of the young free and singles at the LSE who just had studying to do. But I did dedicate a lot of time to my studying and I kept thinking that god if I had have done this much work at undergrad, I would've got a first class degree. But you know I worked really hard, I was just out of the groove of academic learning. And you know, when I went to see my professor on graduation, I said god that was really hard, that was one of the hardest things I've ever done, she said it was a master's degree! It was supposed to be hard! So, yeah, I think I had enough time, I could have done with more time maybe. I didn't know what I didn't know, I reckon had I stopped my master's degree, maybe gone straight into a PhD I think I might've found that transition a little easier than doing nothing for 20 years and then doing the master's degree.

I: You said it was unfamiliar territory, by the time a couple of terms had gone by, and you were into the dissertation - a year ago now - did it feel like familiar territory? or were you feeling lost?

P5: I think I wasn't feeling lost, I was feeling it was more familiar. The dissertation was completely unfamiliar, I didn't do a dissertation for my ug I had...essay, so. I did well on my dissertation; I got a first on my dissertation.

I: Excellent!

P5: So I did really well. Do you know what I thought... the dissertation, although it was unfamiliar, it felt more natural to me because I was writing and that's part of what I did for a living and I felt I was writing my own voice. And I think that's why I did pretty well, actually, because it was pretty original and really from the heart, really my creation, whereas I felt like some of the other stuff I was doing I was too much using too much, other people's work. Maybe for the dissertation I was really into the flow then. And I'd really got it, what I had to do, so, you know.

I: At that point you had absorbed the material and it was coming from you .

P5: Yeah, I think, I said to my professor when I graduated, I said you know I was writing my dissertation, I finished my dissertation at something like 3 in the morning I actually handed it in. And she was like, oh, why did you do that? You should've allowed more time. I was like, it wasn't the time. I hadn't like made all the connections it was like I had the eureka moment 2 weeks before it was to be handed in and I was just...typing and typing, I couldn't type fast enough to get all the stuff you know written, whereas it just seemed like some of the others they had... they had it proof read, you know. (laughter)

I: You needed time to digest it and you can't rush that

P5: But it was really the connections, the eureka moment didn't happen until really far into it...

I: And thinking back a little further to exam time, come exam time, did you feel sort of on top of all the material, that you had gotten a good grip on it at that stage?

P5: Oh no, I found the exams terrible, terribly hard to go back to that way again. Being on top of the material? ... You know what with the exams, I could have done better if I had done more rote learning and I had done more sitting down practice, practice, practice, practice, practice, write out a standard answer for this question, this question pops up time and time again.

I: Right

P5: That would've held me in better stead, but I just couldn't do it. There was like a mental barrier. It's a sort of learning I hate, I hate doing that kind of thing. I'm not a lover of exams, I don't think the test people's real learning, they test people's ability to memorise stuff and regurgitate it, so I had a kind of philosophical opposition to that type of learning and testing of learning. I did enough to get through those exams, I think I kind of scrape high passes. But yeah I could have done better. They were tough, they were really tough and going back into it after all that time out. I think the exams were the toughest thing for me.

I: Yeah, no I would tend to agree. Like you say, the dissertation is your project, you're doing it, and it comes from the heart, like you say... (laughter)... now I'd like to talk to you about other people, this whole learning process and how other people - your tutors and professors, advisers, but also your family - how would you describe the part other people played in this experience?

P5: In my learning experience? Well, my family gave me the space to do it. They gave me the space to do it, which was great. My husband did a great job of supporting me and the kids even, kind of leaving me alone, in the main. You know. I've got a 6 year old and 9 year old, and there were times that I just had to shut the door and say I just can't come out here. Dissertation time in particular, that was tough. So they gave me the permission to do it and the space to do it. My husband is in communications also so he was good; he read my dissertation at whatever in the morning and proofed it. How he helped me was sometimes he read stuff and he just looked at me and said I just don't understand what you're talking about. And it's not because it's academic, it's because you're not explaining yourself in a way that regular people could understand. That was good, so him having that kind of neutral, you know, can you sit across the table and explain it to your mom sort of thing. That was good. So, that's what he did for me. Um...

I: And in terms of people around here, professors, or tutors, or other students.

P5: Well you helped me a lot, I think I told you that. Your way of helping me to think differently about things and break things up, was really really useful. I don't think I would have done as well as I did without the coaching you gave me. That was really great.

I: Oh, thank you.

P5: I found my academic tutors... I don't think I called upon them as much as I could have done actually. I mean when I got together with two older students recently, they were like, what you didn't give you dissertation to your supervisor in draft. I was like, no! I didn't think you were supposed to. (laughter) I thought you were supposed to do it on your own, so, they sort of helped me.

I: Did they sort of send you in the right direction

P5: (hesitate) yeah... I think their marking did.

I: OK

P5: Their marking did, but I don't think. I probably could have done with showing them more drafts of things, and getting direction that way, whereas I kind of gave them final versions and it would be too late to feedback by then.

I: Right

P5: and obviously the lessons they gave, they helped. You know, greatly. And some better than others, some were better at it than others, and you're more inclined to learn more effectively when you're interested in stuff. Some topics were more interesting, so I was naturally more keen about it.

I: and these other students, you mentioned these classmates of yours, do you think other people got more guidance, more direction from professors?

P5: Yeah, they definitely did, but that's only because they asked. But I didn't ask. ...Yeah, there were some people who were in their dissertation supervisor's office every week, you know, every week. I was just too compliant on reflection, because you know we had guidance, meet your supervisor four times in the whole... you know... (laughter) and I did what I was told?

I: What do you think they were doing?

P5: Talking, bouncing ideas, lots of them showing stuff. And I don't think the door would ever have been closed with my supervisor. She did a few calls with me right at the beginning when I was trying to formulate my views. She was very, very helpful, but I probably didn't do enough on that front. But you know, when I saw her afterwards, she was like, you did that all on your own, you did really well. So..

I: Exactly!

P5: But I tell you what I did do...

I: Tell me.

P5: Is the topic I was interested in wasn't really covered at the LSE and it was... I did (inaudible) networking in helping employees cope with organisational justice and the kind of social networking piece, there wasn't really anyone at LSE who was into that enough in my school. And I found a writer, an academic who's at Heriot-Watt University and I just kind of seized on him cause he was, there's very few people doing it. You know I just phoned him up, and we had a great conversation and I used him actually.

I: Oh, so what do you think he did for you?

P5: He was just my sounding board, and he was just like, he had the knowledge I needed. He had really in-depth knowledge about the topic that I was covering and he just got what I was doing. I had a dissertation supervisor who didn't even use facebook.

I: Right.

P5: There's nothing wrong with that, but it was really hard for her to make the connection with what I was doing, until I finished it. And then she said, oh this is really good, this is great.... Yeah, he was just great, he was really, really, really useful as a ... just saying, I said I think they're doing it because of this -- people who were protesting on Facebook about their employer. I said I think they're doing it because of this, he's like, mm I don't know, think about this. So, that was great.

I: OK, and in terms of other students, did you ever get together with other students to bounce around ideas and try to see things from different angles?

P5: Yeah, we did, we had a little study group and we did study groups for the exams and um, I just felt they were more, they were just more into the groove of the exam thing and they were good because they were really great with note-taking and some of them shared their really good notes. And I just used those for

my revision. Yeah, I mean some... be more inclined to than others and have a few conversations with people. Yeah, definitely, I didn't work in isolation from the other students.

I: OK, and so if you had to name just one thing, what would be the most challenging part of that whole journey for you?

P5: Um, so the journey from starting to finishing in terms of learning are you thinking?

I: Yes, yeah, that's it.

P5: I think it was just ...getting into the groove of being a...thinking like an academic, being an academic. You know, it was like this whole operating in a different world in a different language...going into the unknown, you know.

I: And now a year later, do you find that having gone down that path and dealt with that, does that bring you something today?

P5: Yeah, it does, I'll give you an example, so because I want to keep on top of all this stuff, I can now, back in the world of work, I can now subscribe to academic journals. I've got a subscription to the journal of organisational behaviour that's sitting here in my office. And now when I get a chance to read the articles, I can read them. Right. I remember when I started and I...first kind of articles that I needed to pick up off the system and I downloaded them and I thought oh my god, what is this? I cannot ... I'll never understand this. Now, I make the connections, I can understand some of the theories, I don't actually look up the theories 'cause I know them. I know how to read by... I'm not one for reading the methodology or the empirical evidence, I just get straight to the discussion and conclusion...I just know what I need to get out of it in order to get the essence of the article. So yeah, that is something I actually noticed when I got them through and I started to read my first article, oh, this is quite (meaty? neat?)

I: So you're really right there at the cutting edge of research and what people are trying to do

P5: Yeah, and I can just read it and get it whereas before I couldn't get it. I didn't even understand how an academic article was set out and ...standard headings, standard ways of doing it.

I: That's excellent. Thank you for that example. Just a couple last questions.

Imagine you were talking to someone doing an MSc, someone in the position you were in... what would you tell them? In a few sentences how would you describe your experience and what kind of advice would you give to them?

P5: I would say it was definitely worth doing. You should always push yourself to go out of your comfort zone and when you go out of your comfort zone, that's when you learn the most in life. And absolutely exploit all the resources that you have available to you in the institution that you're going to. Absolutely, you know, use other people as sounding boards, their opinions, yk, because the way you look at things, there's always another way of looking at it, and makes your work richer. So yeah, and um, persevere. Because at some point you will have that moment of yes! I understand, I've learnt something (laughter).

I: Now if you were talking to someone - maybe you did talk to someone for this BT job or another job - this is someone you want to make a certain impression, how would you explain it to them?

P5: I would say that the fact that I took on a master's degree at the stage in my career that I was at demonstrates that I am someone who is looking to better myself professionally, and ...I've got an open mind to the fact that I can always learn more in life and work. Now I have in my kitbag some techniques, tools, applications that will make me as an employee as a consultant, a lot more valuable.

I: Finally, you're describing the same experience to a family member, somebody who gave you support, one of your children later on - but who didn't really know about your experience. How would you describe it to them.

P5: I would say that it was a challenging journey, something I just feel so privileged to have done. And, you know, never too late to learn! and always... whenever I have joined companies in the past, the first thing I do is to look on the intranet site to see what courses and what things I can do to learn new approaches. I really like learning. I think this was a challenging journey. I'm very proud of it.

I: And rightly so! I heard the word "Phd" is that something...

P5: I tell you , when I sent my dissertation to print and it was funny actually, 'cause we were, what was a really different experience from being a student now as to when I was...a lot younger, Facebook is prolific now and we have a little group with our MSc students, we had a little group. And those of us who were up until what ever in the morning were like yk posting stuff, saying oh my god when will it be over and I think I posted as I sent it to print, if anyone...If I ever say to anyone that I'm signing up for a PhD, you are entitled to personally come over to my house and shoot me. And everyone else was like, like and totally agree. Um, but now I think, never say never! I tell you what I'd like to do ... what I'd do differently is I would do it at a college or university where there are more mature students and I tell you why because I think my journey was very different from other people's for different reasons, I don't think I was terribly accommodated at the LSE, I think I would go, I have - let you into a secret - I've looked at a PhD at [Ashridge] and I would want to go somewhere like there so that I felt more included and that people knew what I was going through, my journey is different, you know because I'd be combining it with work, or I'd be taking time out of work after over 20 years of working. I'd love to have a PhD but you know, I don't underestimate how much work it is... it's like anything - you get out the other side and it's such a sense of achievement and you do, I did learn to write and I have absolutely applied what I've learnt in my work, and if it's not a practical application that benefits the employer, it's a personal application that benefits me because it makes it think differently about what is going on.

I: I suspect that the MSC brought you - like you say, you have so many tools in your bag - I quite suspect that you're really well-equipped for such a thing.

P5: Yeah, I'm also well-equipped for ... I'm in corporate life as an independent person and psychologically that makes me feel so much freer and so much, so liberated and I think if I hadn't been on the journey of leaving work going to university again, doing something different, again, just to shake up my thinking, like disrupting my thinking, disrupting my pattern of living... then I probably wouldn't have done it. I would've looked for another permanent job, you know. It's really good, really good. ... and good luck with your PhD journey! I know you'll get out the other side.

### APPENDIX 7.3. STUDY 7, INTERVIEW TRANSCRIPTS

#### Participant 6

I: Let me tell you, this is just a very informal interview. There are some questions I have to ask, but really I'm interested in hearing whatever is of interest to you about your learning experience.

P6: OK

I: Here in the past year obviously, but if there are other things about learning, ways of learning that you think of, anything goes.

P6: Mm-hm.

I: There's certainly no right or wrong...

P6: OK, cool.

I: So, in a nutshell, how would characterise overall your learning experience?

P6: Like, at LSE mostly?

I: Sure.

P6: It's been challenging. But in the best way, so it was a different style of learning. So, I mean you know coming in that it is going to be very independent, but it was still, um, you jumped right in, right away. And it's only a one year programme but it was, you know, kinda trying to get used to a totally different theoretical set, you know and I come in with no media and communication background. So it was new information, difficult information, and then you know, not a whole lot of like individual one on one time with you know any sort of academic staff

I: OK

P6: So it was very individual and very challenging to get used to you know. Especially after that first round of papers, I didn't know you know, the certain style of writing and stuff like that..

I: Sure. So you're talking about this "theoretical set"

mhmm

I: For example, could you think of a time when you came across some particularly heavy theory?

P6: Yeah.

I: So, what was that like? What happened then?

P6: I remember that was the first, second week of reading for our theories course.

I: OK.

P6: And, um, it was one of those where every other word wasn't a word. You know how they do in theories sometimes? And so I tried to go through it the way that I had in the past, which is to read and highlight and take notes. But it still wasn't working.

I: You weren't able to grasp it that way?

Exactly! So, it was so frustrating because it was doing what I had done in the past but it wasn't bringing about the same results.



I: OK

But I remember studying for my exam. I went back and re-read that article

I: Mmhmm

P6: And it almost all made sense. You know it was kind of just like a light bulb . Just like, 'I get it, I get what he's saying'. Like I can read this, I understand, you know.

I: OK, so what you think you did? You know, what do you think you did to untangle it? What do you think made that difference?

P6: Honestly I think it was a studying of all the other courses. So it was kind of like bringing everything together.

I: OK

P6: And then really understanding, um, I guess, like how to read theory where it's not like a hard set of knowledge, going through. Like someone's just trying to tell you something.

I: OK

P6: Telling you it in a strange way. Using words they like probably made up and you know, it was almost like I needed to remove myself one step. To read it further back than to be up close and trying to like get everything. As opposed to, you know, instead of like that was much more like I needed to look at it holistically.

I: OK

P6: I almost like remember this enlightenment of myself. And it was when I was studying for this theories course and I was just like reading and absorbing so much. It was like, 'oh my god, it all builds on each other and it's all making sense', and it's you know, it's this big holistic thing rather than doing a reading to understand this one article and then moving on to this one, and then understand this one. It's like they all piece together.

I: Right, but I guess that so hard because you can't see that when you only have one.

P6: Exactly.

I: Then you only have two. You know, you have to have sort of 15 or 16, I don't know, some set.

P6: You almost have go through the jungle to get to the beach, you know. You have to tangle yourself and it's going to be frustrating. And it's tough because how do you prepare for that? You can't.

I: And now you know in retrospect,

P6: Mmhm

I: you do it to untangle,

P6: Yeah

I: but if you don't know that

P6: Like even right now, I was studying, I was reading for my lit review there are plenty of pieces that... I'm like I'm not really picking out what she's saying, but let me keep going and you know, and maybe I'll read this article again after I do more. It's like, I'm only up to my second or third book so it's like I know that I need to do more before I'm really going to pick up.

I: Right, right, gosh, and that's a completely different confidence. "I don't get it now, but I will later."

P6: Yeah! Or like, OK! I get this one thing that she's saying, I'll write that down. I don't have to understand every little thing, almost.

I: Mhm. I guess you didn't know that as well ... you're weren't in on that secret.

P6: Essentially

I: in October.

P6: Yeah, like my background was political science, and we did theory in my undergrad. We did. But not like LSE does. And even with political science I learned a lot of like game theory and stuff like that but it was still like, what is parliamentary democracy, and you know, 'how does sub-Saharan Africa deal with, you know, what are their different styles of government?'

I: Questions with answers!

P6: Almost, yeah, exactly. So, it was, um coming in with a different background, I think that was the most challenging part. But getting through to the end was really, it was nice.

I: When you say end, what do you mean? Do you mean now? exams?

P6: The end, when I say that in the last sentence, I think I mean exams. But now as well, like I'm writing for my dissertation. It's been, it's helpful as well. but yeah... Studying for that exam time it was just like, you know. The two hours were frustrating. I wanted four hours. I had so much to say, because I finally, you know, understood it.

I: Yeah, and that was what I was going to ask you. So when you got to that point, did you feel like you had had time to digest the material? and you really had a grip of it at that stage?

P6: Yeah, yeah. I think actually for that theories class, I was over-prepared. I had too much to say. And so in the end I walked away feeling un-confident, but not because I didn't know the material, almost because I knew it too well. And to answer two questions in two hours, you can only scratch the surface. It was like there's so many more layers in here and I couldn't get it all out.

I: OK, well that not a bad ...

P6: No. I had more to say, I understand more!

I: So the flip side of that, was there any particular time when you really felt lost along the way?

P6: Yeah, I mean the first semester... really actually the first time I came to see you that was the most down that I was. Because I really was trying my hardest and clearly wasn't getting the results that I, you know, wanted, and it was really, it was just frustrating. You know, it was like I'm not doing something right. I need some one, I need some sort of guiding light. Even just like sitting down and talking it through with you... you know...it was a step in the right direction. It was like I was... it was the first marks that we had gotten back. I had some friends that had done really well on them. You know, it wasn't that I wasn't putting in the effort. I'm devoting two hours to each of these articles and I feel like I have no time, but yet I'm still not getting where I should be getting. That was probably, that first term, it was difficult stuff. After I kind of got through it and got into the second

term, I kind of, it all started to make more sense and I felt much more confident which was nice.

I: Good, now I'd like to talk about that experience in terms of working with other people.

any other people...any person who crossed your path. What experience did you have working with anyone else in all of this?

P6: Um, so working with my friends actually ended up being really helpful, especially come exam time. But it's like you almost have to be selective about it which is tough, because you have lots of friends. And people are like oh you want to study together? I really like you as a friend and I really don't want to hurt your feelings but you're like not who I need to study with.

I: Because of what?

P6: Because they just have styles of learning. Like some people you know work well for 30 minutes and then they want to chit chat for 10 and then they'll work hard for 30 more minutes. I'm very much where I need to sit and be in the zone and work for 2 hours and then maybe take a 20 minute coffee break and not talk about anything and then go back. I'm much more individual so I kind of need to like figure it out myself. So I have a couple different friends where we worked very similarly but um you know if there were issues, talking it through with them, I knew which of my friends were almost, not that anyone does it on purpose, but almost the most...least patronising about it. You know where someone gets something they can explain it to you and in a way that your like oh I get it. It's almost like you're not embarrassed. Sometimes at LSE it's ver like people want to show off their intelligence. Sometimes talking to peers can be challenging, but once you kinda like found my group of like you know 4 girls and we could work through it together and if they didn't understand something and I did, I would talk it through with them. Just talking it through helped me learn it. You know like talking it out loud and explaining to someone else it's like almost reinforcing it in yourself.

I: OK so did you ever find in this group, you guys are bouncing these ideas around together, that you didn't agree?

P6: Yeah, definitely that happens. But that's almost nice because, especially with theory, you aren't supposed to agree. You know so it's kind of nice for someone to not agree with you so it's challenging you in the right way. So why is this what I think? You know let me defend it, and here's a good counterargument that she's bringing up that I hadn't thought of. Oh you're right, well let's work that out. And then you come back to my point. ... yeah and by find the friends who aren't patronising you can have that discussion without feeling like someone is challenging your intelligence. You're finding people that you can just work well together but there's no hierarchy of smarts.

I: Do you have the impression that you took the path together? or do you think they went somewhere else, they had a different journey from you?

P6: I think that most of the people that I studied with, and they're all from my programme as well, did something, did kind of a similar thing. We're all quite similar. I know that there's one girl she's probably, she's one of my closest friends, she's super independent. More so than any of the rest of us so we didn't see her quite as much but it was nice just every once in a while all of us would just grab a coffee and talk about how's it going for you and how's it going for you? You talk about it in a lighter sense, you're not necessarily studying. I think that how she

worked she really just like needed to burrow herself into her room and not talk to anyone as opposed to I found a couple of other people where we were on the straight and narrow together. We did the same thing and just needed to work all day without a whole lot of distractions. By being with someone else it almost forces you to do the work and do the readings and stuff. You know that's such a niche thing. That was only like 4 or 5 of us. I don't know... As far as, even in the ways in which they understood it, we definitely still all understood it differently. You know even though we all studied together, if you were to put our 4 essays together you would never imagine that we did any sort of studying together because I think everyone definitely takes in their own way.

I: Sort of see things through your own

P6: Yeah from your own perspective. Exactly. Much more gender theory, like more feminist and that kind of thing a girl who I studied with, she's much more technical, and so she writes lot about like open source so she relates a lot of things, you know. She can look at Foucault's power and take it to Huber and Huber uses computers to talk to each other, whereas I can take Foucault's power and talk about it in gender theory, so it's understanding of the theory and then you take it into what you know best.

I: Kind of looking at it from two different places.

P6: Mmhm. That's interesting too.

I: So apart from students, and your group, were there other people?

P6: So the staff, we had an academic adviser first term and then a dissertation supervisor second term but, as far as being helpful...

I: Those were 2 different people?

P6: yeah, 2 different people.

P6: it was not so much, you know. For me at least. They were very, very nice people and you could sit down and talk with them. Also I met with a couple professors regarding the summative essays, so. Make appointments to see and talk to them. Appointments are only 15 minutes long and you know there are so many students and so few staff that they're you know always pressed for time, which I totally understand, but like I still think, and I'm not just saying this because I'm in front of you, I think my meetings with you were by far the most helpful. So a whole hour, and you know you can really like break it down and talk about stuff, whereas like 15 minutes just becomes like, what are you thinking about writing? OK, here's what I'm thinking. OK, well did you think about this person? and here's maybe two people to go read, and OK, 15 minutes is up and my next appt. is here so.

I: So that wasn't the direction you were really looking for?

P6: No. no it wasn't nearly as helpful as I'd hoped.

I: What did you think you might have gotten? what could you have hoped?

P6: I think what I was used to and you know this was again because of the school I came from was very small, you had the same academic advisor for four years.

I: Oh, wow.

P6: Yeah, so you really build a relationship with them. You know our meetings were so much longer, more like an hour almost every time, and it was much more like OK, what are you doing? Like, almost like what it is with you, what are you

doing? and let us talk about that and let's look at it from a different way as opposed to like, here's a couple general thoughts that I have, what do you think? You know, OK, right or wrong, or maybe, here's another theorist you should look at or something like that. It was almost like it was unsatisfying in not at all in the academic staff's fault, like they're all very intelligent very helpful people. But it's unsatisfying in that there's no building of a relationship. You know, it was just always very short and very specific to like, what's this one paper, as opposed to like, let's help you do better.

I: If I were going to be the devil's advocate about this, and what you were saying that it was useful to come and talk to me, for example

P6: yeah

I: If I were to say the study adviser doesn't know anything about media and communications, how could that be helpful?

P6: Yeah, that's true. (laughter)

I: What then was helpful? What guidance could you have?

P6: Yeah, I think it was the time. So having an hour is really helpful, just because you don't feel rushed.

I: OK

P6: You know you do just feel like we can really just hash it out. Also, I guess bringing in the draft and talking about what you have, is really helpful as well because, um, and this again is not the academic staff's fault - they're not allowed to look at your stuff, and I totally get that. But having it in front of you, and this is just for me for how I learn. I have to print everything off and I just have to mark it, I can't do it on the computer. And sitting and doing it with someone else - like my poor mother. I made her read every single thing! like from age 4 until now.

I: That's great!

P6: Yeah, like, you know, even my personal statement to get in to LSE. We went over that thing a million times. But that's just like, I know that's how I work best. You know, print it out, you know, I go line by line, read it through, you know mark it up. And having your feedback on things I don't think of. That's... and like as you should. It wouldn't make sense any other way. Like me, I'm much more of a stickler for my grammar and what I'm saying and trying to be articulate, and then I lose the bigger picture of what's my style, what's my flow, what's my argument, weaving through the paper. You know that red thread, I still remember that comment, that first one. And that is my biggest challenges and that was something that you personally helped me look at you know. For myself, if I were just doing it in my room and printing it off, that's not something I would've thought of.

I: OK, so, just curious, with academic staff in media and communications, they don't want to look at drafts?

P6: No, they're not allowed to because they mark the papers, but they mark the papers blind, so they can know what you're writing about. You know, you can talk to them, you know, I'm thinking about reading about Pentacostalism in Brazil and let's talk about that... in a smaller class, maybe she'll remember that but the idea is that's supposed to be blind. You don't put your name on it, so...

I: And same for the dissertation? Did you show an abstract? or a draft chunk of anything?

P6: You're allowed to turn in a lit review as a formative, either an outline or up to a 3000 word lit review.

I: OK

P6: Which just because of myself and my time, I didn't have time to do it. So, that's you know not at all on them, that's totally my fault. So that you're allowed to do. But I think also because the dissertation gets marked by so many different people...total outside examination, so I don't think it's as much a problem for them to actually see the work. But I still don't... I still question even that with them, though. Just because I think it would become much more of a 'what are you writing about' 'what is your research question?'. And not so much, and again for myself, where my weaknesses are, not so much like...uh well there's no flow to this, let's rework some paragraphs to make sure it flows, it'd be much more of a surface level, like 'what's your research questions?' 'are you doing the correct reading?' You know, which is helpful in and of itself but, yeah.

I: ...so if you had to identify one thing, what would you say would the most challenging aspect of this whole journey?

P6: For me? In general, just getting used to a different style of learning. Holistically, a different style of reading, writing. Even the big lectures, in my school, my background, the class sizes were 15-20 people. I never sat on a lecture hall before. So I show up in Peacock Theatre and I'm like what? I thought this only happened in big undergrads, you know? 200 people...

I: So getting used to this different style?

P6: Yeah, different styles. So being able, learning how to read theory was something that really... and theory of a different kind. And then learning how to write in a different style. You know, I knew that my intelligence was there, but almost re-working my systematic procedure, I guess.

I: OK, and then, similarly, along the whole path, along the journey, what do you think is the most rewarding aspect for you?

P6: By far and away, how much I learned, and knowing how much I learned. So, like looking back on that period of discomfort and challenge almost not in a negative way, but just like again like the lightbulb just went off. And I just know that I've learned more in this past year than I'll ever have again in my life, honestly. I don't think I'll have another year that is so academically challenging but in such a rewarding way that in the end, you really feel like there's a lightbulb, where I get it now. Even studying for my stats, you know, like I went to those lectures and I didn't understand any of it and it was so frustrating and then, you know, even though I had to do it all myself and again, had some stats study groups, and we went through it lecture by lecture and took, you know, an hour and a half to break down each lecture. In the end, there was, you know, I sat the exam and it was like, I can do this. I can do a chi-square test! (laughter) don't ask me to do it now! So I think in the end, looking back on it and knowing how much I learned and feeling that and, that's really rewarding.

I: If you were, strangely, at the beginning of the path all over again

P6: I would love to be!

I: To take the journey again, is there something you'd do differently knowing what you know now?

P6: Yeah! Definitely. If I were to start it all over, I would definitely be you know, again, just less concerned about maybe I don't understand this one reading, but try to look at it in a holistic way. So getting to the end of an article, and saying ok, what did he say? In all of that jargon, what was being said? Pause Yeah, I think and just not worrying so much about not understanding all of it. If I were to go into economic theory, which I think would be the absolute worst thing I could do to myself, but... it would be really challenging, it would be a totally different mind set with a totally different set of theories I've never read. But I'd almost be calmer about it, not that I was ever like really stressed or out of whack or ever had any sort of panic attack, nothing like that but just kind of go into it more holistically again. Just knowing that there's gonna come a time when I can bring this all together.

I: Like you say you have to step back to untangle...

P6: Yeah, exactly. Even like going into the writing of the essays, I understand how to form my argument, you know, and build that, which is something coming in that I didn't know how to do, so. Even writing a paper, I would feel so much more confident doing now even if it was on theory that I hadn't studied so much. If I were to go back through and have formatives due in October and only having read 5 articles I would at least understand OK, what's my argument going in to this. You know, that's what's gonna get me through.

I: So now, thinking about this year, imagine telling somebody else, in a few sentences... how would you describe your experience to somebody else?

P6: Um... almost what I said, academically rigorous but so satisfying in the end, so rewarding. So... it was the most I've ever been challenging intellectually by far, with such an independent style of learning. Which they tell you coming in, there's no secrets about it. You know that. But until you really do it, you don't get it. But in the end that it's all gonna be worth it and it feels good to get through. And so... Yeah! I just wanna do it again. Am I crazy?

I: That's how PhDs happen! Like, I just figured out what I'm supposed to be doing, and it's over!

P6: Exactly! It's over! I just want to write formatives again! I have so much more to say!

I: You never know... If you had to explain this to a prospective employer in an interview, or someone you wanted to make a good impression on, how would you explain it?

P6: Well I would definitely play up... and this is great practice because I'm going to have to do it, so... "what did you get out of your master's...." Beyond just the intellectual knowledge on media and communications, I learned how to work independently. I learned how to take something that I might not understand and figure out a way to get an end result. Which is applicable to any job across the field, so getting a project, getting you know something, here's something you need to go, now go do it, and I'm not going to hold your hand through it. So a very independent style of getting things done, so the self motivation the adaptability, so all of that kind of plays in. At the same time, being challenged is not scary. You know I can be challenged I can be pushed and I know that in the end I can come out and feel satisfied.

I: Good. And finally if you were explaining this to someone in your family?

P6: I would definitely, you know even with my parents, they knew the first term how tough it was for me, and being able to tell them when the results were coming in, they were just so happy, they get almost more than anyone how hard I had to work for it. For some people, maybe it came easy, but I know that I worked hard to get to where I am. So, yeah just rigorous. It really felt like a masters! I didn't come in with any expectations, but now I get what a master's is about, you know. Undergrad is much more about getting your degree, and maybe it's independent, but maybe in a different way. You can kind of sneak by if you try... but a master's is just being challenged and having to get it done independently. [30 minutes] And if you're not getting it done, then going to find the resources like you or talking to more academic staff. Like, being able to know that you don't understand something and being able to reach out and find ... and deal with it. You can't just, like, you know hide under a rock, you only have 10 months so you have to get it done. You can't just kind of ride it out and hope to sneak by, but. Yeah, that's not a master's.

I: OK, so you've talked a lot about what you've learned to do, to manage, to persevere, and the process

P6: Yeah...

I: at this stage, going back to that theory and all the material you've studied...at this stage do you feel like you're on top of the actual knowledge? Do you feel like it's absorbed... digested? for you.

P6: Yeah...with sounding pretentious, I feel the smartest I've ever felt. Which is a nice feeling! But at the same time, if the knowledge mountain is you know, yea high (hands) I'm still down here!

I: OK

P6: So it's almost frustrating because I want more. I just like, wanna be paid to a student. I joke that I would love to do another master's. I really would, but I don't have the money. You know that's how PhDs happen. My friends and I joke about it, but it's like you want more. You know you can't stop you wanna just keep consuming once you really get it. Learning... you know I feel like I know a lot about media and communication theory - much more than I knew coming in. But you know, so much about cyber law, probably my favourite course, but, at the same time, I could take the same exact course again and still learn more. Without even changing programmes, I could go right back in and get another master's in media and communications and I would come out with a totally different set of knowledge than I have. It's a strange feeling because I'm happy and I know I'm the smartest that I've been but, now I've gotten the ball rolling. My friends and I talk and it's like, how, you know, I'm at such a split in my life because I need a job and I need money, but I cannot go into mind-numbing work. This year was so intellectually stimulating, that I need to continue to be challenged, I need that now. So now it's gonna be tough. You're not prepared to re-enter the real world after leaving this. You can kinda see how people get, form this academic bubble. Not that I would ever look down on people, nothing like that, just being able to converse on a different level when you want to... so my friends and I joke about that: how am I going to go back to the workplace? I have to but how? A think tank would be great... [43:40]